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CRISIS PREPAREDNESS GUIDE

JASON GASPER

2023 EDITION

YOUR ULTIMATE SURVIVAL GUIDE

THE PREPPER'S SURVIVAL BIBLE

14-IN-1

Life-Saving Strategies To Live After The Collapse Of The World. Including Stockpiling, Self Defense, Medical Emergencies, And More.

JASON GASPER

THE PREPPER'S SURVIVAL BIBLE: 14 IN 1

*Life-Saving Strategies To Live After The
Collapse Of The World.
Including Stockpiling, Self Defense, Medical
Emergencies, And More.*

Your Ultimate Survival Guide.

JASON GASPER

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BOOK 14

MEAT CANNING COOKBOOK

Pork Stock

Pork Goulash

Black-eyed Peas with Pork

Pork Chops with Apple

Pork Carnitas with Bay Leaf

Canned Meatballs

Pork and Potato Stew

Chopped Pork Sausage

Pork Meatballs with Parsley

Mexican Beef Garden Soup

Pressure Canned Beef Round

Corned Beef and Potatoes

Roast Beef and Potatoes

BOOK 1
CRISIS PREPAREDNESS
GUIDE

**THE DEFINITIVE GUIDE TO
BEING PREPARED AND
SURVIVING WHEN CRISIS
STRIKES**

Introduction

A disaster occurs when a situation worsens quickly because of events that are outside of our control. When you live everyday life, it is best to have an emergency plan with the necessities of what to do in these situations.

What Are the Essentials?

They are things that need to be done after a significant disaster or before it occurs. For example, a powerful earthquake will create destruction and death, and many other disasters. Basically, an emergency plan is made before these disasters occur. Still, when it comes time for them, you will need to know what to do.

A prepper is someone who has prepared for disasters that aren't entirely predictable, though. Some disasters can occur in your home or when you are traveling. Preppers need to know what they can do before a disaster occurs and what to do when it does.

At a fundamental level, prepping is a shortened version of the words “preparation” or “preparing,” but its modern use has taken it much further. Now, the word is associated with planning and prepping for disaster scenarios and major catastrophes. It involves basic things, such as stockpiling food, water, medicines, and so on—yet it goes much deeper than that.

Ultimately, we want to be prepared for the disasters that can occur and give us the ability to survive.

When Disaster Strikes

You'll also want to secure shelter for your family if you're already outside. You can also make sure you have a plan for the unexpected.

Take Care of Nature

You need to take care of nature and leave it alone. This means that you can't paint over rainwater tanks, dig up your well, or fill in your pond. If you do that, you may not have water in the future.

The Power Grid Is Down, and You Need to Protect It

Your power might be out for weeks or months. When the lights go out, looting usually follows. Your neighborhood may not always be as safe as it was before an emergency or disaster caused a power outage.

Protect Your Home from Looters

One of the biggest dangers during a crisis is looters. They are looking for easy targets and will attempt to take whatever they can from homes, businesses, cars, and trucks that aren't protected by security measures.

Staying Healthy in a Disaster

When the power goes out, getting water and food can become an issue. Make sure that you have a supply of bottled water and canned foods. A camping stove is a good option, or you could get an electric campfire stove if you want the ambiance of campfires. Clean water is also a vital issue as many people don't realize that it's easy to contract diseases from dirty water. You can boil your water or get an inexpensive solar shower.

Protecting Your Family

When disaster strikes, you need to be prepared for the possibility that some members of your family might not be with you. If this happens, it's essential to have plans in place for reuniting the family. Your first step is to get a method of communication. You can do that by getting a HAM radio license or getting a charged cell phone for each person in the household so you can call them if they aren't home when you are.

Research Evacuation Plans

Your evacuation plan will vary depending on your location, but most people think they can quickly get out of an area if disaster strikes by driving out of the site. But what are you going to do if you can't drive? You should have information on where highways are closed, bridges or tunnels are damaged, and other issues that could impact escape routes.

Financial Preparedness

Financial preparedness can help you to survive unexpected disasters. Having an emergency fund set aside for disaster situations can help you handle any financial hardships during a crisis. Finances are something that people often delay dealing with until they have the time.

Go Green

Being green means taking care of Mother Earth in general, but it also means being prepared for natural disasters. For example, you might think that using gasoline in a generator is the best option because it runs on gas. Still, generators aren't always reliable for running 20 hours straight without interruption. An alternative would be to get 3-kilo propane or butane fueled generator and use that instead.

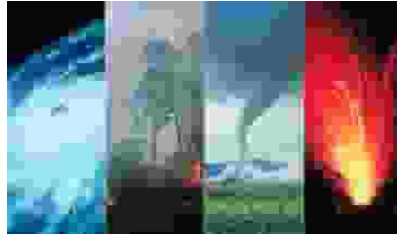
Think Outside of the Box

We all think every day about what we would do if disaster struck, but how prepared are you? Think outside the box and try some things out. You can make some incredible discoveries during an emergency and enjoy something that you usually wouldn't even know about.

Your town may not be affected by any of these disasters, but some of them could likely happen to you and your family. Make sure that you're prepared to handle any disaster situation with the help of these tips. Prepare and survive!

Chapter 1

Uncertainty Times



Preppers prepare for different kinds of scenarios. In fact, they can adapt to any kind of emergency because they have futuristic mindsets. This section will discuss the different types of scenarios that preppers prepare for.

Wildlife Survival Scenarios

Preppers prepare themselves for wildlife survival scenarios. Examples of such scenarios include those being trapped in the woods after getting lost on a hiking expedition or being shipwrecked on a deserted island.

Scenarios Involving Self-Defense

People who embrace the prepper's movement are also ready to face encounters of any type of violent activity. They know how to defend themselves and know about the legal ramifications of their actions. Such scenarios include being robbed or getting involved in a brawl.

Prolonged and Brief Natural Disasters

Preppers prepare for inevitable natural calamities that might happen in their areas, such as tornadoes, floods, earthquakes, or wildfires. To prepare for such scenarios, they build customized shelters and store a lot of supplies like food, water, and medicine.

Bio-Chemical Warfare

Bio-chemical warfare is another scenario that preppers prepare for. They are concerned about not acquiring fatal diseases thus they prepare disposable coveralls, boots, gloves, and face respirators.

Effects of Population Crash

There is an increase in the human population all over the world and this can affect the availability of food, freshwater, oil, and other human necessities. This can also lead to the spread of disease and the eventual fall of civilization. Thus, preppers aim to be sustainable despite the fall of society.

Economic Crash

Monetary disasters have happened in the past including the Great Depression and Lehman Shock. Having said this, preppers are always ready in case of an economic crash. They believe that the Federal Reserve System is flawed and they expect that paper

money will become worthless during hyperinflation, thus they keep reserves of precious metals and invest in mining shares to prepare for such a crash.

Biblical Rapture

Although not all preppers are religious, they still prepare in case biblical rapture will happen. On the other hand, religious fanatics also prepare for such a scenario thus they prepare food stockpiles and other supplies.

Medical Crisis

Some preppers prepare for medical crises that can happen to their family members. This is especially true if they have family members who suffer from grave medical conditions. Having said this, they keep medical packs in their cars and houses. They also take CPR, EMT, CERT, and other medical courses to help family members, friends, and other people in case of medical emergencies.

Chapter 2

How to Be Prepared for a Crisis

Planning, Preparation, and Prevention

Prepare for the worst with these disaster prevention tips!

It's not always easy to predict natural disasters, but thankfully there are ways to minimize your risk of them happening. From preparing an emergency kit to making sure you know how your home is insured, these disaster prevention tips will ensure you're ready in the event of a disaster.

It's essential to be prepared for a disaster in your area. Disasters are unpredictable and can strike at any time. But being prepared can help you avoid or minimize the effects of a disaster.

- Find out if there is an evacuation route from where you live, work, or study that doesn't pass under trees or over hills during heavy storms.
- Don't forget to plan for safety and comfort in the absence of electricity.
- Make a family emergency evacuation plan.
- Know where your neighbors live, work, or study so you can help them if they are in need.
- Fill up your gas tank before a significant storm so you won't be left with a severe shortage of fuel afterward.
- If you work in or near a school, learn what to do if there is a threat of an active shooter.
- Check for gas leaks before a storm is about to hit or during the shower, at your home, business or place of worship if that's where you're providing emergency services. This will prevent fires from destroying homes and businesses.
- Avoid overloading extension cords and appliances with heavy loads like clothes and furniture; they can cause fires if they get caught in a nearby wall heater, portable heater, or another device.

- •Put away anything that can burn at least six feet above the floor: fireplaces and logs, flower pots, stoves, grills, outdoor heaters, and other appliances.
- •Increase the distance from tall buildings. If you live in a high-rise building, stay in your building if it is safe to do so. Take the stairs unless an alternate object will prevent you from falling, such as a railing.
- •Make sure your home has fire extinguishers, especially ones that can be used indoors.
- •Have an emergency kit packed and ready for use at all times. Your equipment should have a battery-powered or hand-crank radio, extra flashlights and batteries, a first-aid kit, food, water, and additional medication.

How to Prepare Yourself Financially

Here are some things recommend you do to help you through the hard times ahead:

Acquire Cash

After you've stocked up on food, water, survival equipment, and medical supplies, the next thing you need to do is to accumulate cash.

In the starting stages of a financial meltdown, cash is king. You're going to need it if you lose your job and need time to start looking for another one, if your bank starts to limit your withdrawals, or if your bank goes broke. Yes, the money you have in the bank is insured by the FDIC, but it may take a while to get it.

Ensure your money is enough for you to live on, keep at least one month's worth of living expenses in cash in a small portable fireproof safe hidden in your home if you can afford it.

It is recommended to have three to six months' worth of cash on hand. Don't keep it in a safety deposit box because if your bank closes, you'd be out of luck.

To get some cash, you can start by selling things you don't need in a garage sale. Consider getting a part-time job until you have a cash reserve to see you through the hard times.

Purchase Precious Metals

Once you have at least a month's worth of cash, economists who know

what they're talking about and have foreseen this coming economic crash recommend acquiring silver and/or gold coins.

The economists recommend buying American Silver Eagle coins and Gold Eagles if you can afford them. Coins are easier to liquidate than bullion because they are recognizable and because they come in smaller sizes. They are also easy to store, and easy to transport.

Cut Your Expenses

Create a budget by entering all your monthly expenses on a spreadsheet, or on a free online budgeting app if you're not familiar with spreadsheets. When you've entered every last thing you spend your money on in a month, start looking for ways to cut your budget to the bone.

Do you need those 550 cable channels you never watch or can you live with basic cable? Can you reduce your insurance premiums by getting a higher deductible? Do you really need those \$4 lattes every day or could you make your own for 35 cents? Do you need to eat out when you have cheaper and more nutritious food at home? How much less would your mortgage be if you refinanced your home?

Pay Off Your Credit Cards

Pay off your credit cards if it is not a large amount. If it is large, don't pay it off with your savings because you may need those savings in the hard times to come.

The interest you have to pay on your credit card is based on a compounded rate, meaning you're not only paying interest on the amount you spend but also on the interest accrued. So, for instance, if you have a \$1,000 credit card debt and you make payments of \$25 a month, you'll end up paying \$2,055 to pay it off. That's more than twice what you originally charged!

Do It Yourself

During the Great Depression, people made do with what they had, and if they didn't have the money to buy something they needed, they bartered for it or made it themselves.

Instead of paying someone to fix their plumbing, fix their car, or repair household items, they did it themselves. There are thousands of tutorials on the Internet that can show you how to fix and do anything under the sun.

Generate a Second Income

During the Great Depression, many people did odd jobs or had part-time

jobs to make ends meet. Think of things you're handy with like carpentry, sewing, plumbing, baking, writing, house cleaning, painting, auto repair, etc.

Call businesses like the one you want to start and ask how much they charge or go online and Google "how much do (business type, ex: plumbers, house cleaners) make." Once you know how much similar businesses charge, set your price at a little less than theirs, and run an ad in your local newspaper, if you're not handy with anything, you can go online to view tutorials on how to do virtually anything.

Think about Moving

During the Great Depression, a series of droughts and dust storms caused thousands of farms to go under in the Southern Plains region of the U.S. The area, known as the Dust Bowl, saw the largest migration in U.S. history, with millions of people abandoning their homes and farms, and moving to places like California where they could find work.

With unemployment rising to levels that we haven't seen since the Great Depression, many Americans are going online to find jobs outside of their communities.

Sites like Google for Jobs, a search engine that compiles job listings from various sources, and indeed, a job website that lists jobs from thousands of websites and newspapers, are a great way to search for out-of-area jobs and even in-area jobs. Get connected.

During the Great Depression, people banded together to help each other through the hard times, whether it was feeding a starving family, giving them some clothes, or providing a place to sleep. Those who had more gave whatever they could spare to those who had less.

Get to know your neighbors, for they may be able to help you through the coming crisis, or you may be able to help them. Get familiar with your local charities, church groups, and food banks for the same reasons, and support them if you can.

Chapter 3

Total Preparedness

The Survival Mindset

Before learning any specific survival skills, it is crucial to get into the right type of mindset. Your mind will either make or break your opportunity for survival. There is just no way of getting around it, and if you are prone to panic, or remain in a stressed-out state of being, the most important thing you can do is to start to develop a calmer demeanor.

Even if you are calm by nature, strengthening your mental mastery is the number one way to keep yourself and your family safe from harm. Your powers of creativity and critical thinking can operate at their optimal levels when you are calm and relaxed. This is not a state of being you should wait around to develop in the heat of the moment, as that would simply be impossible. Instead, it is something you need to pursue now.

Just as you need to eat right, get enough sleep, and exercise, to develop a body that is capable of surviving, you also need to do things to condition your mind to be calm. This calmness needs to take precedence, despite the most chaotic situations that might be going on around you.

The survival mindset is so crucial to develop because you will need to be able to do your best thinking in life-or-death situations. That type of thinking comes from the part of the brain called the neocortex. The neocortex portion of the brain is the domain of your higher thinking skills, it determines your ability to take full command of your motor skills, spatial reason, language, and conscious thought.

When you are stressed, afraid, or panicky, the reptilian part of your brain starts to take over all of your energy. In other words, it immediately cuts off your ability to access your best thinking skills. As you can imagine, without these enhanced thinking skills, you are not going to be able to create the best survival opportunities.

It will help if you take a minute to consider the horror movies when someone gets stuck in fear mode. The audience knows that the actor, or

actress, needs to take certain actions to survive, but the character is stuck in fear mode. He or she is incapable of making rational decisions, and oftentimes does things that look completely counterproductive to survival. That is exactly what happens to you when panic, fear, or stress takes over your body.

When you are stuck in fear mode, you may freeze when you should be running. Or, you may start screaming when you should be silent or become unable to scream if you need to. You may choose to drink saltwater or do any number of irrational activities because your higher mind is unable to override the panicky “fight or flight” mind.

Developing a Survival Mindset

Begin today to stop approaching life as an emergency, and start to approach it from the higher part of your mind. The higher part of your mind is the part that witnesses your thoughts and feelings. If you are unsure how to get into that mind, stop what you are doing and listen intently to what is going on around you.

Did you notice when you stopped to listen that your mind immediately cleared of thoughts? As you answer this question, what part of you noticed that you either answered the question out loud or silently? That is the part of your mind that is witnessing what the other parts of your mind are doing, and that is the part you want to strengthen.

The best way to become more proficient in having higher mental strength is to meditate and practice mindfulness. Mindfulness is the art of paying attention to the present moment, with all of your senses, and without labeling or judging. Meditation helps build the discipline of staying mindful, and you can practice mindfulness to strengthen the essential skill of operating from your higher mind.

Remember, the higher mind accesses the neocortex, which will help you remain calm amid all hell breaking loose. This alone can save your life.

To begin practicing mindfulness, set an alarm to go off every hour. When the alarm goes off:

- Inhale and exhale slowly and purposefully three times, put all of your awareness on what each breath feels like, filling up your belly and leaving your body.
- Listen intently to all the sounds going on around you, do not think about what you hear, just notice and continue to listen.

- •Look around you intently, while making sure to avoid labeling or judging what you see. Just fully and completely notice what you can see.
- •Feel what the air around you feels like, how your body feels in its space, how the clothes you wear feel against your body, and anything else you can feel.
- •Notice what the air smells like.
- •Notice the tastes in your mouth.
- •If you notice thoughts in your head, just let them go without following them and return your focus to what is going on around you.

While you are practicing mindfulness, notice if you get any feelings or messages from your gut or intuition. These gut feelings are very important and should not be ignored. While you are practicing mindfulness, just notice them without acting upon them. You can try to figure them out better when you are not practicing.

Strengthen Your Mind

Gaining strength, and discipline, by staying aware of the present moment will help you stay focused when you need to be in survival mode. You may be tempted to look into the past and find out who, or what is to blame for the present circumstances. Or, you might become overwhelmed with fearful feelings or worried thoughts about how you will survive in the future.

When you are in survival mode, the past and future do not count. What counts is the immediate moment and getting through the immediate future, such as the next hour up to the next 24 hours. This makes it imperative that you get out of dwelling on all the problems and start looking for the solutions you need to stay alive.

Finding the solutions requires a positive and clear mind, and that happens when you are calm.

Try out the following ideas to strengthen your mind:

- •Practice being calm today, even if everyone else around you is upset, angry, or otherwise stressed out.
- •Build your level of patience, especially when it is the most frustrating, like having to wait in a very long line.

- •Stop dwelling on all the problems you believe you have, and start looking for the solutions that will provide you with what you want.
- •Try not to eat for a whole day and learn to use your energy efficiently throughout the day so that you can reach bedtime without breaking halfway through the day.
- •Expose yourself to really cold or hot conditions for a day or two and practice staying calm and efficient during that time. You could, for example, turn up the heat in your home as high as you can bear it for practicing under hot conditions or turn the heat all the way down during the winter season to practice in cold conditions.

The more you practice, the stronger you will get, so practice in every facet of your life. When it comes to survival, you will need this strength of mind, even more than you will need physical strength, even though that is also important.

Chapter 4

The Action Plan

Bugging in rather than bugging out will usually be the best option for most survival scenarios because you get to keep your entire stockpile, you know the area and the people, and you won't become vulnerable and exposed out on the open road.

Nonetheless, there will still be situations where you are forced to bug out your home, and you must be adequately prepared to do so. Any good bug-out plan always begins by writing an evacuation plan with your family.

Evacuations are actually more common in the United States than most people realize. Each year, floods, fires, and other natural disasters force hundreds of thousands of people across the United States to flee from their homes. Industrial or power plant accidents can also happen that force people to flee their homes.

In certain situations, the authorities will determine that the hazards within an area are serious enough and either strongly advise or even mandate an evacuation of all households. When a community evacuation does become necessary, the authorities will let the public know through sirens, text alerts, phone calls, or e-mail addresses.

The amount of time that you have to flee from your home will be entirely dependent on the type of disaster. If the disaster is a natural disaster such as a hurricane, if you are warned early, then you could have a day or more to evacuate. Other kinds of disasters, however, could give you only a few hours or mere minutes to evacuate.

This is why forming an organized and efficient master action plan with your family is so important. Your plan needs to lay out the following things:

- How will your family be able to contact one another if you are separated?
- How will you assemble your family together?
- Which destination(s) will your family evacuate to?
- What are your routes for getting to that destination?

- •Which supplies will you take with you?
- •What will your mode of transportation be?

One reason why an orderly master action plan is so important is that your family may be split up when a disaster strikes. Your children could be at school, on a field trip, or at a friend's house, you could be in your office working, and your spouse could also be away working or at an appointment or wherever.

Ideally, you will want to devise a number of different evacuation plans that will serve as your family's response to different scenarios.

Chapter 5

Basic Rules for Facing a Crisis

Don't Panic

The purpose of prepping is to avoid panicking when bad things happen. For many people, even just thinking about emergencies and planning can generate a lot of anxiety. When fear is running the show, it becomes much harder to stay organized and prep well. It can also paralyze you and you stop prepping altogether to avoid the feelings of anxiety. The key is to first acknowledge that you're anxious. Denying it will not make it go away; it usually makes it worse. Depending on the level of your anxiety and if it affects other areas of your life, you might want to learn more about anxiety, talk to a therapist, or research ways to lower anxiety on your own. By learning to reduce your anxiety now, you'll be better equipped to deal with it once an emergency scenario becomes a reality. Staying cool and collected in those situations will keep you safe.

Take It Step-By-Step

Prepping can be overwhelming. When you look at the list of possible disaster scenarios, do you wonder how you'll keep track of everything you need. The key to managing prepping anxiety is to take it step-by-step. If you're just beginning to prep, remember that most of the prepping supplies you need will cover all possible emergency scenarios. Next, plan on stockpiling

enough for just two weeks. Factoring in health concerns, loss of income, and lack of access to a store, make a list of everything you'll need for 14 days. Once you have that stockpile, think about what you would need for four weeks. Eventually, you'll have months, and if you keep going, years.

Chapter 6

Emergency Water Storage



All water should be stored in a cool, dark place. You want to keep it out of direct sunlight as this degrades the material. It should also be kept away from any chemicals or gasoline since those fumes can leach into your supply.

There are a few ways to store water. Just stockpiling bottled water you get at the store is the simplest method. You can rest assured that these bottles are food-grade, sealed, and safe to drink. They aren't ideal for long-term storage, though, as the plastic degrades over time.

Long-Term Storage

If you want to store a supply for a long time, you'll need a water storage container. These come in a bunch of sizes as small as 5 gallons. There are large 55-gallon ones, as well. The best size for your needs depends on how much space you're working with.

Step 1: The first step is to clean the container. Squirt in some dish soap and fill about a quarter of the way with warm water. Shake the container or roll it around. Rinse well. If you don't want to use soap, just hot water will work, too. If you're working with a big container, a drinking water hose is a way to go. A

regular garden hose may contain contaminants that flush into your containers.

Step 2: Once you've filled your containers with water, you can add a water treatment solution. Water doesn't expire or "go bad," but bacteria can grow inside. If you're using a drinking water hose or water from the tap, it's already been treated, so you're most likely fine. If you do choose to use a preserver, you can find a handful of brands on websites like Amazon. Always follow the instructions carefully for volume per gallon of water.

Step 3: The last step is to seal the containers. This is very important because you don't want anything nasty getting in your freshwater. When it's time to drink your water and you're worried it wasn't sealed properly, you can boil it or add a water treatment pill. Know that water that's been stored for a while will have a flat taste, but that doesn't mean it's been contaminated.

Supplies for Water Storage and Treatment

Besides regular water containers, here's a list of what you'll need for storing water or making water safe to drink:

A WaterBob: This container is best for short-term water emergencies. It's a big plastic bladder you put in the bathtub and fill with water. You would use this in situations when you anticipate a storm or other events that will cut off the running water. Put it in the tub and fill it with water before that happens. The WaterBob is made with food-grade plastic and can hold up to 100 gallons.

Water filters: In situations where you do have access to water but it's contaminated, you'll want filters in addition to your water stockpile. There are all kinds of choices, including pitcher-

style filters and ones that attach to your sink. When making your selection, think about how much work the filter requires, how much water it's designed to filter, its durability, and so on. For on-the-go water filtering, get some pocket filters like the LifeStraw. These are ideal for camping and bugging out.

Water treatment pills: You'll want these to add to your water when you suspect it's contaminated. Aquatabs is a very well-known brand, but there are lots of options out there. Pill size and number of pills vary depending on how much water you want to treat, so always follow the directions.

Bleach: I like water treatment pills more than bleach, but unscented chlorine bleach can purify water. You want to make sure the bleach is meant for sanitization and disinfection. For every quart of water, you'll need two drops of bleach. Add four if the water looks cloudy. Mix and let the water rest for half an hour. The water should have a slight bleach smell after that time, but if not, add another 2–4 drops and wait 15 minutes.

Rain harvesting gear: If you want to be a prepper who thinks of everything, you'll want rain harvesting gear. Because water is essential to life and it shouldn't be rationed, even the biggest stockpile will eventually run out. Rain harvesting gear lets you collect rainwater in larger amounts, which you can then treat, drink, and store! Setting up the gear takes a bit of work at first, but it's worth it.

When in Doubt, Boil the Water

Safe drinking water is your #1 priority as a prepper. If you're ever in doubt, I recommend boiling the water if possible. This lets you keep your other water treatment supplies for emergencies. Boiling for safety is simple. In a pot, bring the water to a rolling boil. That heat kills disease-causing bacteria and viruses. The CDC recommends boiling for a minute to be

sure everything is dead. The one downside to boiling is that it doesn't remove chemical toxins.

Chapter 7

Food Storage for a Crisis



Planning Your Food Supply

Take a deep breath. There is no need to panic. Prepping is something you want to take in bite-size bits and pieces. There is no point in taking on the monumental task of building up long-term food storage that will last your family a year all on the first day. Easing into it and setting reasonable goals is the way to go. This way you are still moving forward without getting overly stressed or trying to buy too much of any one thing and completely forgetting about another.

Planning your food supply should be approached with the mindset of starting with a short-term supply, about 3 months' worth of food, and building up to a medium-term supply of 6 months. Once you have crossed that threshold, you will aim for the long-term, which is a year or more of food sitting in your prepper pantry.

It takes planning to build up adequate food storage. You can't just run to the grocery store and toss a bunch of stuff in the cart and then put it on your shelves and call it a day. Not only will that cost you a small fortune, but it probably won't be a well-rounded pantry and you are going to be a bit hit and miss. You won't be able to prepare actual meals. It will be a can of chili, a can of tuna, and some crackers for dinner.

The following is a list of the foods you will want to add to your food storage. However, like it was mentioned earlier, skip an item if there is no way your family will eat it. Please note this list includes a lot of items for baking from scratch. You won't be able to run to the store for bread—you have to make it.

Grains

- •Rice
- •Flour
- •Wheat
- •Oats
- •Granola
- •Cornmeal

Beans

- •Pinto
- •Red
- •Navy
- •Kidney
- •Lentils

Baking

- •Baking powder
- •Baking soda
- •Cooking oil
- •Shortening
- •Sugar
- •Salt
- •Bouillon

Canned Meats

- •Tuna
- •Salmon
- •Oysters
- •Sardines
- •Spam
- •Corned beef
- •Chicken

Canned Fruit and Veggies

- •Corn, beans, peas

- •Oranges, pears, peaches

Dried Foods

- •Jerky
- •Dried vegetables
- •Dried fruit
- •Dry soup

Miscellaneous

- •Crackers
- •Canned soup
- •Coffee
- •Tea
- •Energy bars
- •Chocolate
- •Honey
- •Canned chili
- •Freeze-dried dairy products; milk, cheese, butter
- •Mac and Cheese
- •Canned beans

If your children have a specific snack they really enjoy, do your best to stock up on it. You want to create as much of a normal atmosphere as possible. By giving your family some typical foods and meals, you will be adding a sense of normalcy to a time that is anything but.

Take advantage of sales and stock up when you see items on clearance. Instead of buying one box of mac and cheese when you go shopping, buy two. Put one in your everyday pantry and the other in your long-term food storage pantry. This is one way to build up a little here and there without writing out one big check.

How to Safely and Efficiently Store Food

Safeguarding Your Food Supply

As you consider what foods to store, you also need to find a place perfect to store your foods, especially stock food, which is a part of your everyday routine and diet.

Make a list of all the foodstuffs, foods for your pet, supplies for your pet, medical needs, and nutritional items. In short, prepare everything that you think you will need when forced to stay at home for several weeks or months. Decide how you'll store food, whether by kind or period. Rotating your stock is a crucial aspect of the plan, your storage areas will help you to find the best way to organize your goods.

How to Choose the Right Container for Storing Your Emergency Foods?

Sometimes, choosing the right type and size of containers for your emergency foods can be a little confusing. In this portion, we will help you with some beneficial information that you need to know when storing your emergency foods.

- Always make sure to use a food-grade container when storing your emergency food—this is to make sure that non-food chemicals that are harmful to human health will not transfer. Food-grade containers do not contain any chemical that is hazardous to human health. If you are uncertain, find time to reach the manufacturer, you can send an email or call them and inquire if it is safe for storing foods.
- For foods like pasta, noodles, cereals, and other dried foods, you can use different sizes of plastic storage containers. These containers are out of polycarbonate and polyethylene, which are special for dehydrated and dried foods.
- For storing bulk, dry emergency foods like wheat, rice, beans, oatmeal, flour, and sugar, food storage buckets work great.

Chapter 8

Steps for Making a Long-Term Food Storage Plan

How Big Should My Stockpile Be?

You know the kind of food you need to get for your stockpile, but how much do you need to get? You should not plan on rationing water. Experts say most people need at least $\frac{1}{2}$ gallon per day. If you are ill or physically active (and losing water through sweat), you'll need more. To be safe, we recommend stockpiling at least 1 gallon per person per day. For a two-week supply, that means 14 gallons for one person. For a family of four, that's 56 gallons for two weeks. If that sounds like too much, it isn't. A huge portion of your emergency pantry will be water.

Pets also need water. Dogs need 1-ounce per pound of body weight. Cats need around $3\frac{1}{2}$ – $4\frac{1}{2}$ ounces per every five pounds. You'll also need water for cooking and cleaning. That means about another $\frac{1}{4}$ gallon for cooking and another $\frac{1}{4}$ for cleaning.

Calculating Food

To figure out how much food you need, we recommend using a

meal plan strategy. Choose a week's worth of meals you plan on making during a crisis and write down all the ingredients you'll need. That's breakfasts, lunches, and dinners. For the sake of variety, we recommend not repeating the same meal more than 2–3 times a week. Breakfast is maybe the one exception.

Write down the amounts of the ingredients you will need for each meal. As an example, if you plan on making an oatmeal breakfast for four people three times a week, that's 12 portions of oatmeal, which is about 6 cups of oats. Will your oats have add-ins like raisins, nuts, brown sugar, etc.? Factor those amounts in, as well. Repeat this process for the rest of your week's meals. You now know how much food you'll need to last one week.

To build up your supply, keep multiplying the amounts for the number of weeks you want to be prepared. Add different recipes and ingredients as you stockpile because it's never a bad idea to have more variety. Once you have the essentials, you can start adding ingredients for desserts (like homemade cookies and baked goods) and snacks. We like to make sure we have at least the basics for three square meals a day before thinking too much about treats and snacks.

Label this master list as your “goal inventory.” It represents what you want your complete emergency stockpile to look like. When you reach that inventory, however, don't throw out the list. An emergency stockpile isn't stagnant. Once you get all the oatmeal needed for two weeks, it's not like you can just forget about it forever. Good preppers rotate and maintain their pantry and forgetting about your master list makes it seem like your work is done when it's not.

The absolute minimum amount of recommended food to be preserved per person per year is:

- 365 pounds of vegetables
- 321 pounds of fruit

- •300 pounds of grain
- •182 pounds of meat
- •75 pounds of dairy
- •75 pounds of legumes
- •65 pounds of sweetener
- •5 pounds of salt
- •4 pounds of shortening
- •2 gallons of oil
- •2.5 pounds of leavening agents (yeast, baking soda, baking powder, etc.)

This may sound like a lot, but keep in mind that you do not *have* to store enough food for up to a year. You can store enough food for 3 to 6 months to start and go from there. You can always add more to your inventory every few months to keep you going this way for the long haul. Not everything needs to be added at once, either, nor should it be. Starting with shorter periods may be ideal because it will allow you to get used to storing and using your food preservation stores.

Chapter 9

Growing and Preserving Food for a Crisis



Gardening for Your Food Stockpile

If the land is no issue for you, you might establish a garden. Using a garden to add to your food stockpile is a great way for you to be certain that you've got fresh food. The food that you grow can then be canned and preserved, or frozen, to make sure that you've got additional food available to you. If you've got plenty of space available, certain foods that will last longer in your pantry can be gardened readily.

You may live in a place where growing food year-round is entirely possible. You may even grow indoors, using hydroponics and grow lights, or in a greenhouse that will help you grow food even when the temperatures are too cold outdoors. However, these aren't always workable options for all people, especially when you're in an urban or suburban area. If you've got a plot of land and you're not doing much with it at the moment, creating a garden that can sustain you is a great way to ensure that you're stockpiling food at very little cost to you.

As you stock your pantry and freezer with produce, the best thing you can do is select foods that are easier to store because they keep for months when kept cool and dry, or because you can pickle, can, or freeze them.

Vegetables that can simply be stored in cool, dry places include:

- Dried beans

- •Garlic
- •Onions
- •Potatoes
- •Pumpkin
- •Shallots
- •Sweet potatoes
- •Winter squash

Vegetables that may be canned easily in sealable glass jars include:

- •Asparagus
- •Beans
- •Beets
- •Carrots
- •Cabbage
- •Corn
- •Peas
- •Peppers
- •Pickled onions
- •Pickled cucumbers
- •Potatoes
- •Tomatoes
- •Winter squash

If you want to stock a deep freezer with the vegetables you've grown, you can grow crops such as:

- •Asparagus
- •Broccoli
- •Brussels sprouts
- •Cabbage
- •Carrots
- •Cauliflower
- •Corn
- •Eggplant
- •Mushrooms
- •Onions

- Peas
- Spinach
- Squash
- Tomatoes (when processed)

Having a garden of your own could be a valuable way to create your stockpile at home.

Gardening in Small Spaces

Even if you've got less space available to you than you'd like, there are ways you can garden in smaller spaces with little trouble. By focusing on using the space that you have, you will enjoy the benefits of gardening, even if it's on a smaller scale.

Vertical Gardens

Vertical gardens are those that primarily grow upwards. This is done by growing on a vertical plane instead of a horizontal one. Typically, several planters are placed slightly on an angle so you can grow several tiers of something in a row. These usually work well for plants that grow somewhat smaller, such as greens, herbs, carrots, and other small vegetables.

Raised Beds

Raised beds allow you to create a small area dedicated solely to gardening. Usually, they are in sizes like 2'x4' or 4'x4', and you can fill them up with soil, allowing you to grow even if you live somewhere that doesn't have very good ground for growing, such as if you have a small patio with little soil.

Container Planting

If you don't even have the space for a raised bed, there are plenty of containers you can plant in. Many plants can be grown in containers, including fruit trees. You can grow, for example, a pot of tomatoes and pick them up throughout the season. You could grow a container of peas or carrots, or just about anything else. Most plants can be grown in a container, as long as you're willing to care for them properly. Often, because container planting involves so much less space than other forms of gardening, you'll need to be mindful of how you choose to care for them. They will need to be watered and fertilized more often, but you can still get plenty of produce from them.

Potted Fruit Trees

Potted fruit trees often do well, especially if you select dwarf varieties

and you keep them trimmed. You'll be able to get plenty of fruits from them, however, so don't discount them for their small size. Just keep in mind that many fruits require at least two trees of the same species to properly fertilize and fruit.

Preserving Your Own Food

Even with a long shelf life, survival food cannot last fresh for long unless stored properly. Food storage is central to this process. Otherwise, the whole effort of stocking up the food will prove pointless. Several variables and factors come into play; food storage is not as simple as stocking up items in a sealed container or bags. Food storage has a science of its own, and it requires a complete understanding of the items that are used and stockpiled. In this section, we shall look into all the variables responsible for food spoilage and how they can be prevented using effective techniques.

Determining the period of food storage is the basic step of this whole process. When you decide on the duration of storage, set the right trajectory, making storage convenient, effective, and easy. It is said that stocking food in great bulk without analyzing the situation will end in complete failure and massive food spoilage. The smart move is always to start from small achievable targets and then move towards something big; in other words, start with short-term food storage and then gradually shift towards long-term storage. And if you haven't stockpiled food before, this basic technique will save you from unwanted errors and mistakes.

Methods of Food Preservation

Learning preservation techniques is the most important part of food management, especially when you are planning to stock for weeks, months, or even a year. The food preservation methods that we can use at home are all conventional and tested by many. The bottom line is to prevent the growth of microbes or other living organisms inside the food we are about to store. Items that are commonly stored as survival food include raw lentils, legumes, spices, and grains, along with frozen meat and dairy products. Such items' shelf life varies considerably, but we can ensure longer shelf life by using different traditional and old-school methods of preservation.

Vacuum Sealing

Air is the major carrier of oxygen, moisture, and contaminants that spoil food. The basic concept of this method is that if we successfully prevent the air from reaching the food, we can reduce early spoilage risks. For this reason, vacuum sealing is used for all types of food items, whether perishable or non-perishable; in both cases, the shelf life of the food is extended. This method can be applied to the food items that are stored in Mylar or aluminum bags. The vacuum is artificially created inside the bag by removing all the air inside. To do so, first, take a clean and food-grade aluminum pouch or Mylar bag, then place the food inside the bag. Now hold the sealable edges of the bag in your hands and submerge the rest of the bag in a bucket full of water; the air leaves the bag as it is lighter, and the water outside the bag exerts pressure. Once the air is removed, seal the bag immediately and store it in the refrigerator, freezer, or any other suitable place.

Dry Ice Process

The dry ice technique also works on a similar concept, and in this method, the effort is made to remove oxygen from the food. Whether you are storing food in a bag, PETE bottle, or food bucket, you can easily use this method and ensure the minimum growth of microbes and insects inside the food. Dry ice is basically carbon dioxide, which is heavier than oxygen. So, remove the oxygen from the food. The storage bucket is placed in another larger bucket filled with dry ice, and the oxygen leaves the bucket due to its lighter weight. Then you can seal the lid to store the food for long durations.

Oxygen Absorbers

There is yet another technique that can remove oxygen from food and prevent insects' growth inside the containers, and it is the use of oxygen absorbers. They are considered even more effective than the vacuum sealing method. Oxygen absorbers are small packets that contain iron powder, and the packets are made out of such materials that they absorb oxygen and moisture but do not allow the iron or other chemicals to leak out of the bags. Therefore, they are considered safe for human health. These bags are most appropriate for places where there is more humidity and a greater chance of oxidation.

Freezing Method

Freezing can keep even the perishable food items like meat, dairy, vegetables, and fruits stored fresh for as long as three months. And it is one of the most effective methods to extend the shelf life of all the

survival food items. It is mainly because freezing drops the food's temperature below zero degrees, which ceases microbial growth and prevents spoilage. The texture, taste, and nutrients of the food are also preserved.

Pickling

Pickling is one of the most traditional methods of preserving a variety of food, especially fruits and vegetables. As they rot quickly, it was a major issue in ancient times to keep them stored for a longer duration. And pickling was discovered as an appropriate method that prevented the fruits and vegetables from spoilage and ensured good taste and nutrients. The process works because it does not allow microbes to grow within the food. The items are submerged in the liquid, which has a high concentration of salts, spices, sugar, or citric acid. The environment thus created around the food is best to prevent microbial growth. Once pickled, the food takes on a rich and concentrated flavor but tends to remain edible, which is the end goal here. That is why pickling can be employed to store food if desired.

Dehydrating

The process is used to remove all the moisture from the food. Dehydration is not new, and it has been in use for centuries. It enables you to preserve a variety of food items from dehydrated vegetables, meats, spices, and fruits. Dehydration simply extends the shelf life of the food and prevents microbial growth. The question is, how exactly can we dehydrate the food, and will it remain the same after dehydration? The taste and texture of the food definitely change after the dehydration process, but its nutritional value is preserved. Food with higher water content like vegetables and fruits is usually reduced in volume and enriched in nutrients. Even a small amount of such dehydrated food items is sufficient to meet your caloric needs. The reduction in volume also allows you to store a large amount of food in a smaller space.

Dehydration is carried out at extremely low heat so that the food is not cooked but only loses its moisture. Such low heat is difficult to maintain manually. Therefore, there are dehydrators available to carry out this task for you. Using these dehydrators makes it easier to control the low heat and manage the dehydration in the required time. It can also be carried out in ovens if you keep the temperature low and food away from the direct heat.

But before getting to the actual dehydration, the first step is to prepare it for the process. The science of dehydration is simple: the greater the

surface area of the food and the lesser the thickness, the more moisture will be evaporated out of it. For this reason, the food must be sliced thinly. For instance, if you are dehydrating fruits and vegetables, you need to cut them into thin slices. The same is the case with meat, and it has to be cut into thin strips or slices like the beef jerky we eat. However, when extremely thin slices are dehydrated, they get super crispy and crunchy, whereas thick slices turn a bit chewy in texture. So, prepare and cut the food items according to the texture you want.

Once the food is prepared and ready for dehydration, the next step is to decide on the method of dehydration. Direct sunlight dehydration only works for certain vegetables (like peppers), but not all food items. You can remove the moisture from grains and legumes from the sunlight. However, meat and fruits must be dehydrated using dehydrators.

Slices are then placed in a single layer over the dehydrator plate. And if you want your fruits and vegetables to retain their original color even after dehydration, then drizzle some citric acid or lemon juice over the slices. The food inside is covered and left for several hours at a temperature between 105 and 130 degrees Fahrenheit. Once the food is completely dehydrated, it can be packed in a sealable clean container or plastic bag. After dehydration, the food must be kept in a dry and cool place like other non-perishable food items.

Smoking

Smoking is just another method of dehydration. Instead of drying food in an electric dehydrator or other heating appliance, the dehydration is carried out through smoking. It is most suitable to dehydrate meat as it removes moisture from the meat grains and dries out all the microbes residing on it. Direct fire smoking was the method of the past, and today it can be carried out at home using electric smokers.

Wood chips are burned to produce smoke, which infuses a strong flavor into the meat and gradually dehydrates. Meat jerky is often prepared using the smoking method. Once smoked, the jerky can then be stored without refrigeration in a clean, dry, and cool place like other non-perishable food items. As dehydration takes many hours, 24–46 at a minimum, you must prepare yourself to invest an adequate amount of time. This preservation technique cannot work for instant storage.

Chapter 10

How to Prepare a Shelter for a Crisis

The shelter is one of our most fundamental needs. We'd expire soon if we didn't have shelter or clothes to protect us from the elements. OK, maybe not within minutes, depending on the weather conditions, but we're going to be suffering and unpleasant if we don't have a method to keep the rain, wind, and snow off our heads. The likelihood is that you'll be allowed to remain in your own house, or at the very least at the home of a family member or close friend, in the aftermath of a big tragedy. Having a roof over your head can alleviate a slew of troubles in the future. The alternative, bugging out to uncharted territory, is fraught with the possibility of disaster.

Clothing

Clothing that is appropriate for the weather is your first line of protection against the elements. Most of us have whole closets stuffed with shirts, jeans, shoes, and other clothing essentials. However, give some serious consideration to how much of your outfit might be useful for working outside in the elements. Consider this: you are almost certainly going to wind up wearing whatever is currently in your closet. After a collapse, you'll be forced to make do with whatever you've got on hand. If the only thing in your drawer is a pair of ankle socks that are oh-so-cute but aren't practical for everyday usage, you'll be the one to blame. We're not suggesting that you go out and buy a new outfit from scratch. In contrast, if your wardrobe is exclusively stocked with fancy suits and dresses, you may want to consider investing in a couple of pairs of scuffed boots, lest you find yourself weeding the yard while dressed in dress pants. Let's start with the toes and work our way up to the head.

Footwear

It is important to wear footwear that is both practical and comfy. Ensure that you have enough thick socks on hand to cushion your feet while also

keeping them warm and dry. Socks made of wool are ideal for these applications. Always keep in mind that many socks created today, particularly those found in budget retailers, will not be able to withstand multiple items of washing and severe wear. Instead of scrounging for the best deal, invest a few additional dollars in higher-quality products. If you don't already have a pair or two of nice work boots, we recommend that you get a pair or two while you're out shopping. Look for sturdy soles with decent tread and, ideally, some ankle support when purchasing your shoes. When it comes to going about the home and performing a few tasks, sneakers may be sufficient, but the chances are excellent that you'll be spending a lot more time working outdoors if a disaster strikes. In addition, you'll almost certainly have to deal with potentially hazardous waste such as shattered glass, and your typical tennis shoe isn't going to be up to the task of dealing with that. If you live in a region that gets heavy snowfall regularly, you should also invest in a pair of snow boots. While your standard work boots may be OK in an inch or two of wet, cold, and slippery snow, we're willing to wager your toes will be numb if the snow accumulation is much higher. It's important to break in your new boots properly after acquiring them. Wear them often to ensure that they become comfortable. When tragedy strikes, you'll have enough on your plate without having to worry about blisters and swollen ankles.

Bottoms

This gets us to the subject of trousers and the like. Blue jeans are a popular choice for many individuals when it comes to working outdoors, but you may find yourself regretting your choice when it comes time to hand wash them. Yes, they are comfortable and normally pretty tough, but they become very chilly and heavy when they get wet, and they take an eternity to dry out. We prefer cargo pants composed of a cotton mix to 100% cotton cargo pants. We enjoy them not because of any "tactical" considerations but for other reasons. We find them to be comfy, and the additional pockets are really useful. The essential thing to remember about work trousers is that they should be comfortable and not make you feel weighed down. Choose to purchase a couple of pairs of long underwear for usage during the colder months if you don't already have some on hand. These have come a long way since we were children, and they are considerably thinner and more comfortable now than they were then.

Additionally, shorts should be available during the warmer months. Once

again, durability and comfort are more important than how well they show off your hips and thighs. “Daisy Dukes” and other high-rise shorts aren’t the best choice for this situation. Invest in at least a couple of belts, even if your trousers and shorts are perfectly acceptable without them. A belt will be quite useful in allowing you to carry extra equipment. Leather belts are our personal preference, but fabric belts are acceptable as well.

Tops

Shirts and sweaters are perhaps the most common items of apparel that we all have in excess. If you include the male population members, the average number of shirts outnumbers shoes, which is understandable given the prevalence of shoes among women. As we’ve said from the beginning, durability and comfort take priority above the brand’s name and the fashion trend. You’ll want a decent mix of short-sleeve T-shirts, long-sleeve T-shirts, button-down shirts like flannels, and heavier sweaters or sweatshirts to keep you warm and comfortable.

Outerwear

If you’ve been following the clothing categories, you’ve probably noticed that a recurring theme has been to prepare yourself for spending a lot more time outside than you may be used to doing right now. In the long run, you may anticipate being involved in activities such as gardening, lugging water, cutting and stacking firewood, and other similar tasks and responsibilities. Due to this, you will be exposed to the elements much more frequently and for longer durations of time than usual. Outerwear serves as a kind of “coat of armor,” shielding you from the elements such as wind, rain, and snow. Even if you usually merely run from the front door to your vehicle, driving out of a driveway that you paid to have plowed, you may not have enough apparel to keep you warm.

One of the most effective methods of preventing heat loss is to keep your head covered. Consider your head to be a chimney, with the heat from your body billowing out of it like smoke from a roaring fireplace. Even when it’s raining, a wool knit cap will keep the warmth in. If you live in a region that receives extreme cold, you may want to consider including a face mask or balaclava in your winter wardrobe. Mittens keep you warmer than gloves, but they’re less useful for conducting duties around the house. In any case, be sure to keep your hands warm and protected.

Those inexpensive rain ponchos that you can purchase at the dollar store are just marginally better than a trash bag with a hole cut out for your

head. You should pay a little extra money to ensure that you receive something long-lasting and comfy. When it comes to rain gear, a hood is a must-have.

For heavier winter apparel, we recommend investing in a nice parka or a balaclava. What you'll want is something that allows you to move freely and isn't so bulky that it makes you feel like the Pillsbury doughboy. If the jacket includes a detachable lining, you get bonus points since you can alter the level of warmth to match the conditions. While you can expect to pay in the three figures for high-quality outerwear, you should also expect it to endure for a long time. Consider the following example: If you spend \$150 on an excellent parka that lasts you five years, you've made an annual investment of \$30. That isn't a terrible bargain at all.

Home, Your Shelter

Moving on to buildings, your house will most likely serve as your principal refuge in the event of a long-term disaster. It's got a roof, walls, and perhaps even insulation to boot. But when individuals resort to more rudimentary methods of staying warm, it increases the likelihood that space heaters and furnaces will not be operational, increasing the likelihood of home fires erupting. In addition to this danger, the fact that fire departments will soon be extinct adds to the likelihood of yet another calamity on top of the first disaster.

The use of smoke detectors and alarms is essential. Place one in or near the kitchen and one in or near the bedrooms, if at all possible. We also recommend that one be placed in the furnace room. Test them at least twice a year, and have a large supply of batteries on hand if they need to be swapped out. In addition to the fact that just a few of your other devices will utilize the standard nine-volt batteries used in the detectors, it should not be too difficult to prevent the extras from vanishing.

In addition, make sure you have one or more fire extinguishers in the kitchen at all times. Please place them in a location that is readily accessible in an emergency. When it comes to putting out grease fires, a package of baking soda will do the trick. Never pour water on a grease fire because it will encourage the flames to splatter and spread more. However, unless you are using an open-flame source of heating in a fireplace or woodstove, you should never use an open-flame source of heating inside your house.

The most important factor in avoiding carbon monoxide poisoning is

adequate ventilation. Keep your fireplace or woodstove in good working order by cleaning the chimney once a season. Chimney sweeping is not difficult if you have the proper tools and can properly access your roof. I believe it is something that you should learn how to accomplish now to know what you're doing in the future. Another thing to think about is to include at least a couple of tarps in your preparations. If your home's roof or windows are damaged, you will be glad you have them on hand. Instead of bungee cords, a paracord may be used to secure them in place. A tiny rock may be placed on the edge or corner of a tarp, the tarp folded over or around the rock, and the cord tied around the bulge of the tarp to provide a temporary grommet.

Keeping Warm without Using a Fireplace

Of course, many individuals do not have fireplaces or woodstoves in their houses, which is not ideal. You can still stay warm if you fall into this group, and there are a few things you can do to help. First and foremost, do everything in your power to keep the family limited to one or two rooms. If you have a two-story house, you should entirely block off the top floor. Congregating together will help to keep cold at bay since the combined body heat will be quite effective. Of course, you'll want to have plenty of blankets on hand. It should be OK for groups of two or three people to huddle together beneath a few blankets.

Warming bricks, wrapping them in towels, and tucking them under the covers is an ancient method that still works today. Just make sure you choose fire-resistant bricks to prevent the bricks from cracking and crumbling during the fire. Large stones might also be used, as long as they are not collected from a riverbank or shoreline, for fear that they contain water that could boil up to steam and cause the rocks to explode if they are exposed to heat. Handling the naked bricks before wrapping them up should be done with hot pads or oven gloves to prevent burns. Alternatively, hot-water bottles might be used similarly.

Keeping Yourself Cool in Off-Grid Living

Up until this point, we've been focused on our discussion on how to stay warm and dry in the event of a collapse. But what if the issue isn't excessive cold, but rather high heat instead? After all, being too hot may be just as dangerous as being too cold. Our bodies are built to function

optimally within a certain range of ambient temperature. For the majority of individuals, this temperature range is around 65°F to 80°F. If it's much colder than that, you'll want to wear a jacket; if it's significantly hotter, you won't want to move around much. As a result, how can you keep yourself cool in the summer months when your air conditioner isn't doing anything except taking up valuable window space?

Start by doing important activities in the early morning or late evening to avoid being exposed to extreme heat later in the day. Strenuous activities should be avoided during the warmest hours of the day if at all feasible. Take regular pauses and make sure you're drinking lots of water to keep your hydration levels up. To provide some shade while you're working, place a patio umbrella near where you'll be doing it if you have one accessible. Wearing a hat with a broad brim can assist in keeping the sun off your face and neck throughout the day.

Shirts and trousers in light colors will keep you far cooler than dark shirts and pants, and cotton will keep you much cooler than heavier textiles. The use of a small cotton scarf or bandana draped over the back of your neck and wetted down can also keep you cooler. We sweat because evaporation is a cooling process, which is why we become hot. Evaporation may be used to cool you down by simply sprinkling your skin from time to time. When you first move into a house, it is critical to do all you can to keep the inside as cool as possible throughout the day. When our bodies get very heated, they are unable to sleep comfortably. Furthermore, to maintain excellent health, our bodies need proper quantities of restful sleep. If we spend too long without getting a good night's sleep, whether it's due to the heat or for any other cause, our bodies aren't allowed to recoup from the previous day's activities.

The sun should be kept out by keeping your drapes and curtains closed throughout the day. In the evening, open the windows to allow cooler air to enter. If you have many windows across the room from one another, this will work best since it will allow for cross-ventilation. If your attic and walls aren't already insulated, you may want to think about installing more insulation. While this may seem paradoxical given that we often think of insulation as a means of keeping things warm, it prevents any cold air from escaping from the house. Furthermore, this will undoubtedly assist you in staying warm throughout the cold months. You may also think about putting a few trees on the east and west sides of your house to provide shade. As they mature, they will offer shade for the surrounding area. You'll have to be extra cautious to preserve the

trees in good condition. In the event of a grid-down situation, having a giant, dead tree fall on your house will not be pleasant.

While this may seem like a no-brainer considering the likely absence of functioning ovens and microwaves, cooking outdoors is recommended as much as possible. Because you're keeping heat sources outside the house, you won't be heating the space, which will save on energy costs. Because heat rises, if you live in a two-story house, seal off the top floor if at all possible. However, open the windows in the upstairs area throughout the day to let any heat that may be building up their escape. When it comes to long-term survival, even if most of us have a wardrobe full of clothes and a roof over our heads, we should consider the question of shelter when making long-term preparations. We must be prepared to take care of that roof, perform any required repairs, and ensure that all relevant safety equipment is in place before we begin. Working outside is something that many people are not used to doing. Consequently, they may not already be dressed in the appropriate clothes. In that sense, a little investment of as little as forty bucks at a secondhand shop will get you fairly well set up.

Chapter 11

Sanitation and Personal Care

Proper sanitation is critical to survival. Frequently, more people die after a disaster from poor sanitation than die during the initial event. Outbreaks of cholera, typhoid fever, or dysentery are deadly possibilities resulting from unsanitary conditions. Here, we will focus on essential sanitation practices when a crisis strikes.

Personal Sanitation

No matter the type of disaster you face, proper hand-cleaning and washing techniques can prevent the spread of disease. Maintaining good hygiene during an emergency is vitally important. Use proper handwashing techniques for hand-to-mouth sanitation. If you find yourself in a long-term disturbed area, maintain good hygiene by washing clothes in the battery-powered washing machine or by hand-washing clothes at least once a week, if possible. Even when power is out and water is scarce, it is possible to be clean and comfortable with a little creativity and planning. Hand-rub your skin with dirt-absorbent powder (dirt-absorbent, not dirt!), then wash with soap and water, if available. If so, do not use water that appears cloudy or has visible particles floating in it. Washing dishes or laundry in unsanitary water is dangerous not only because it removes the protective oils from your hands that are necessary for food preservation, but also because it contaminates your drinking water.

Sanitation of Foodstuffs

If you are unable to prepare food, wash all food in boiled water, preferably chlorine bleach. Chlorine bleach will successfully destroy all bacteria in the water, but will also destroy many other important chemicals in both water and food. Check the label on bleach, and use it according to the manufacturer's instructions. If possible, store your food in sealed containers. Do not use the chemical oxygen absorbers sold in most grocery stores for this purpose, as you need to ventilate the containers to prevent the chemical inside from killing off the food inside. If these chemical absorbers are unavailable, use bleach, starting with the containers you are using and moving everything else out of the room to allow the chemical to completely fill the room. Cover all foods that you do not want to fail. A bag of chips, for example, is very likely to fail, since it is full of moisture, but if you seal the bag with tape before storing it airtight, it will keep its form properly even when they are rotting. If you are in a crisis, you need to immediately get all of your non-perishable foods in the refrigerator. If you do not preserve your food properly before you need it, you will lose all of the food. This is why wars are fought over food. If food is stored properly, you will have food for months if not years. Even if this is also true of other disasters, proper culture and care of all food products must be done.

Sanitation of Potable Water

If you need water for drinking, cooking, bathing, or other immediate needs, never rely upon rainwater. Rainwater is contaminated; the rain-washing wind will take anything that it can carry, then send it right back into the city. Also, the local

area may not have been well-supplied with water filtration systems. In cases where people are well armed to deny outside forces access, they may refuse to give access to the well water to people who request it, as a symbol of sovereignty. Finally, if it is your supply, it may well be tainted.

Bedside Commodes

If you must use the toilet while there are no facilities, use this method. Make sure the water in the toilet bowl is not contaminated. If it is, presume that it is also contaminated in the pipes. Completely disconnect the “water supply” (be prepared to do this in a hurry!) before you use the bathroom. If you need privacy, there are several methods to reduce the chances that an attacker will see whether you are using the bathroom or if you may be located there. Place the toilet lid down on the toilet, or use a small wooden box or pot on the ground.

It is also possible to wear the same diaper over the toilet if you are using it to urinate. Feet are difficult to attack, but this is an example of building something with the full attention of your enemy. Do not worry about being heard. If a man were to enter a bathroom with a weapon, he would be unlikely to attack a person inside, because there would be little to be gained from the attack. If you must urinate, do so as quickly as possible, as it will pass from your system, and you will lose fewer bodily fluids to rot in the pipes. Build a door as a “window,” using a piece of wood for a door and a curtain as a window to keep light outside. Beyond this, cover all your toilet paper in the lid or pipe, or toilet paper cylinders. Do not look at the waste in the pipe, nor touch it. If the waste is in the pipes, it will very likely be significantly contaminated by many kinds of pathogens. If in doubt whether the waste is in the pipes, take the time to flush the toilet without

your waste in it. If it is in the pipes, this will drain them in the future.

Basic Sanitation Supplies

A supply of basic sanitation items will ensure you and your family's continued comfort and health. These items can be stored anywhere. This list should be enough to provide comfort and health for a family for a month if packaged carefully.

Toilet Paper: Get at least 80 rolls (the typical minimum for 50 people is 24 rolls). There are many "disposable" toilet paper products on the market; if you can't afford them, buy cheap paper towels.

Shampoo, Soap, and Body Wash: These items are rather cheap and effective if you can trust them not to be contaminated. For bathing, at minimum, see the first part of the first segment of this list.

Feminine Sanitary Needs: Washable panties, pads/tampons, and washable menstrual hygiene products, such as diapers. If you have the money, underwear is a good investment, as they typically have built-in holders, of which this is one.

Hand Sanitizer: Get a lot. If you like, you can make your own by creating your own supply of glycerin (which is effective as its own sanitizer, or preservative), or by making an alcohol solution (use soap shavings or similar organic product to help nourish the solution). Another option is to use a hand cleaner.

Shampoo and Conditioner: Get lots of this. You will likely need it. It is reasonable to use "no-use" products like hairspray or gel to make your hair look nice.

Diapers (Other Than Menstrual Hygiene): Diapers (likely made by a professional company, albeit typically a small business) should be rationed at a maximum of a week's supply

for a child, and a month's supply for a family. Make sure to have enough for adults as well. If possible, keep these items in a leak-proof container. A drop of urine on them is very likely to ruin the entire supply.

Toothpaste: Get even more of this than toothbrushes, or you may need to start over very soon.

Toothbrushes: Get lots of these, as well as floss. Even if these aren't available at all (such as sand and water and nail and twigs and many other unpleasant and dangerous substitutes floss and toothbrushes will be required to keep teeth—and gums—healthy.

Soap: Get plenty of this, and make sure you keep it. Businesses use deodorant soap (which can be used as such) like soap, and this is fine. But if you wish to keep your soaps from becoming contaminated, there are other options, such as making soap from scratch or making a solution from a mixture of castile soap and castile soap flakes. If you have castile soap flakes, shred them into a fine stream, and then allow this to sit for a week to a month. After a couple of months, there should be a solid paste, which can be used as soap.

Disinfectants: Get these. They are not harmful, and they will make cleanup much easier. Use them anywhere you fear germs.

Rubbing Alcohol: This can be used to floss, and this helps you remove “food” from your teeth. It can also clean a wound. You can also use it to clean your body.

Each family has different basic sanitation requirements. Carefully consider what your needs are and stock up accordingly. If there is a crisis in which you cannot purchase a supply of sanitation items in a normal store, your alternative is a store in a high-traffic sector of a city. For this, you will need to make a list of all of your sanitation needs, and combine them with a list of products available. These items listed should be items that you would maintain a reasonable supply of. In a crisis, these items will likely be slightly more expensive, but you

should still procure them. Have a handy reference on what to buy, and remember to keep some of the things you need for your survival in your emergency supply.

Chapter 12

Medical Emergencies

First aid and medicine are specific skills that have hard limitations. You can learn to do a lot for someone who is injured, but there are things like surgery that you just cannot do unless you are trained. You will likely put the person at greater risk by trying.

Of course, in an SHTF situation, we are going to be dealing with injury and illness with limited supplies and limited or no access to medical care. That is a serious consideration. When a child is suffering from an injury or illness in bed, and you do not have what you need to help them, everything gets very real.

My travels around the world showed me the austere situations that many people live in across the globe. The human body heals, and it is a marvel, but you should store the right kinds of medical equipment to help it along.

Building a Medical Cache at Home

Most retailers carry “Family” first aid kits. These kits are large and contain a lot of nothing. They are full of items that should be used to restock your first aid cache at home, but they are not a standalone solution in your home. Of course, having one of these is better than not having anything, but building a medical cache takes more time and thought than a small first aid kit you buy at the store.

Your medical cache will be crafted to meet your needs. You should consider your family members as well. This is the collection of first aid, medical equipment, and medications that you will need to care for your family when you become a doctor! That is a scary thing to consider, but it could quickly become a reality in an SHTF situation. The following list gives you an idea of the types of things you and your family would benefit from having in your first aid cache.

Bandages and Bleeding

- Medical Tape

- •Nitrile Gloves
- •Rolled Gauze
- •Gauze Pads
- •Trauma Shears
- •New Skin
- •5x9 Abdominal Gauze Pads
- •Styptic Powder
- •Tourniquets

Ongoing Wound Treatment

- •Splints
- •ACE Bandages
- •Rubbing Alcohol
- •Peroxide
- •Triple Antibiotic Ointment
- •Aloe Vera
- •Essential Oils
- •Irrigation

OTC Meds

- •Acetaminophen
- •Aspirin
- •Anti-Inflammatory Meds
- •Anti-Diarrhea
- •Cough Suppressant

Prescriptions

If you are on any type of medication, you need to sit your doctor down and talk to them about how you can get even more of your prescriptions filled. Maybe you can get three months of them in advance.

Of course, the bigger idea is to look at your health, diet, and fitness level and see how you can maximize these. You may just be able to get away from some of these medications with modifications to your diet and exercise.

The Bugout Medical Kit

We have already established that bugging in or living out an emergency

in your home is the best plan A that you can have. However, we wouldn't be preparing for much if we didn't have a plan B. Plan B for most preppers is going to be some kind of bugout. If your home becomes untenable, you will want an option that is your home away from home. You need a place where you can go to outrun the chaos and get back to living.

You will not be carrying your entire medical loadout with you on most bugouts. However, you still need solutions for injuries and illness during the bugout and at the BOL (bug out location).

Carrying medical equipment and first aid on foot is a lot of added weight, and you have to be smart about it. The best method for carrying serious medical preps on a bugout would be to either build or invest in an IFAK (individual first aid kit) for each family member. The IFAK will give you the ability to spread the weight out amongst the group. This is better than having one person weighed down with all the supplies, especially if your group gets broken up.

IFAKs can be purchased and should include bandages, tourniquets, pressure dressing, hemostatic agent to help the blood clot, and other lifesaving implements like chest seals. In an IFAK, you should also have simple Band-Aids and ointments to deal with simple wounds, cuts, and scratches.

OTC meds are also great to add to your IFAK. The small packets are the best for this. Be sure to include the things that your family needs. Always have an answer for pain, fever, diarrhea, and congestion.

You could also create a secondary medical cache that could be buried at a location along the way. This means you could carry very minimal first aid along the way and just pick up your medical cache at a particular location when you get closer to the BOL.

Dental Care

Dental care in SHTF situations is not as complicated as you might think. Now, dental surgery is just that, surgery. So, you should get this stuff handled before any foreseeable chaos hits. Schedule your surgery now if you need it.

Day-to-day dental care can be handled in several ways. It can be exciting to use survivalists and primitive tactics to care for your teeth and gums. You can just buy a tube of toothpaste every other week at the supermarket and then buy an extra toothbrush once a month. In no time, you will have the basics of dental care in large quantities. Throw some floss in there from time to time, and you will be well set up.

That said, we should also look at several ways that you can naturally affect your dental care in an SHTF situation.

Baking Soda

This is a great toothpaste when mixed with water. It is simple, cost-effective, and has whitening agents.

Ash

In Africa, it is very common for tribes to use the ash from their fire to brush their teeth. It might seem primitive, but many cosmetic companies have begun putting activated charcoal in some versions of their toothpaste.

Salt Water

Simple salt water can do a lot to irrigate and cleanse your mouth. Of course, this assumes you are storing plenty of salt!

Essential Oils

Essential oils can be added to things like baking soda to create an even better toothpaste.

SHTF dental is not a big issue unless you have a history of bad oral health. Take care of your teeth now! Get into the dentist and get things handled. If it comes down to SHTF dental surgery, just know it is going to hurt. If you know someone who has dental training, you should get to know them a little better!

EDC First Aid

In an SHTF situation in the suburbs, you might consider carrying first aid wherever you go. I have been carrying a kit of my own for years—a simple kit to deal with things you might need to deal with while you are out.

Carry things like activated charcoal, Swat Ts, Tourniquets, basic bandages, and some Band-Aids as well as some ointment, sunblock and bug spray, rolled gauze, and tape.

Instruction

All around the nation, there are tons of classes teaching advanced first aid and trauma care. These courses cost money, but they are hardly the only resource if you do not have the money to go to these classes.

Your community offers a free CERT class at least once a year to help the community learn first aid. This could be a training opportunity for you, and it can be a way to solidify your skills each year and also meet like-minded people.

Books

There is no substitute for hard copy information when it comes to medical and first aid. There are some books out there that anyone preparing for a medical SHTF situation should have in their library.

List of important medical books:

THE SURVIVAL MEDICINE HANDBOOK

Dr. Bones and Nurse Amy have been the voice in the prepping world for SHTF medical care. This was the first book written by Joe Alton M.D, aka Dr. Bones, and touches on everything you need to know about this topic. This is an all-in-one manual.

THE DOOMSDAY BOOK OF MEDICINE

Dr. Ralph Laguardia has put together an incredible book that touches on all aspects of health, wellness, and medical care through the lens of surviving Doomsday. This book goes way beyond simple medical advice and techniques. It also introduces natural remedies and things like using common household ingredients such as baking soda to treat injuries and illnesses.

ALTON'S ANTIBIOTICS

There are some illnesses and injuries that just require antibiotics. You cannot get around it. The average person has no idea what to use and how much of it to use. This book takes care of all of that. It even teaches you how to acquire antibiotics.

PREPPERS FIRST AID HANDBOOK

William W. Forgey is a veteran outdoorsman and a full-time practitioner of family medicine. This book is one of the most important. Learn how to deal with things as simple as bites and stings or as wild as building an off-grid medical kit. This book is a must-have for anyone interested in building a medical library for SHTF.

These are examples of great books that should be in your collection. Not to be confused with your first aid manual, these are designed to be for situations that call for more than basic first aid.

Chapter 13

How to Manage Energy Sources in a Crisis

We are mostly incapable of sitting quietly and enjoying the power loss. For most of us, these outages last hours at the most.

Have you ever contemplated what life might be like if the electricity went off and never came back on? Are you prepared for that? You might not even realize it, but electricity is responsible for so many things.

- Electric stoves
- Fridges
- Hospitals
- Communications
- Pumping gas
- Heating
- Air conditioning
- Entertainment
- Cell phones

Backup Power Options

Just because the power grid goes down does not necessarily mean you and yours must be out of power. Thanks to the motivation to fuel our planet with cleaner energies, we have been exploring many backup power options or even off-grid power.

There are plenty of people in this nation who live strictly off-grid and are not even tethered to the power grid or the water system. If you aren't planning on moving to an off-grid homestead anytime soon, you can still affect your response to short and long-term power outages.

Portable Gas Generators

The portable gas generator is probably the most affordable and most effective means of powering up the home during an outage. Portable gas

generators can be small systems that you can carry or larger systems on wheels.

For years, we have depended on a 5500-watt system in power outages. These give us the ability to turn on lights, television, and entertainment, keep the fridge going, and even power some fans in the summer. It is more than enough power to get through a short-term power outage.

The problem with a reliance on gasoline is that we are not capable of storing so much. This means you will eventually run out of gas in a long-term scenario.

Whole House Generators

The next level of generating electricity is a whole house generator that is often tapped into a natural gas flow. These generators are built into your home and will click on when the power goes out. People love these larger generators because they just keep normalcy rolling even when others are out of power.

The whole house generator is a serious investment and can cost tens of thousands of dollars to install.

In an SHTF situation, the whole house generator could make you a target if you have all your lights on and HVAC (heating, ventilation, and air conditioning) running while the collapsing world around you is struggling.

Solar Panels

Solar power is a very interesting backup power solution. Harnessing the power of the sun just makes good sense. Solar panels can be pieced together over time, or you can go with a professional company to outfit your home.

The solar panels themselves are not affected by an electromagnetic pulse. However, some of the components will be. Safely storing backup components will give you the ability to generate power even after an EMP.

Solar panels cost roughly \$1 per watt of energy generated, and DIY is not as hard as you might think. The most critical consideration in all of this is to ensure you get enough sun to power the batteries in your system day after day.

Wind Power

Wind power is another option when it comes to backup power. However, a wind power system can only really generate power if you have plenty

of fans and space, like a wind farm, or if you live in a place that is essentially windy all the time.

The wind pushes the rotating blades, and the electricity generated is stored in batteries. The trouble comes when the wind dies down. A wind power system is ineffective if you do not have consistent wind to blow those turbines or turbines high up enough to capture the wind above you.

Essential Items in a Power Outage

There are many items that you will need to consider in a power outage. Things like hygiene, food preparation, security, and sanitation are some of the biggest ones. Let's look at a list of essentials for which you will likely need to find alternatives.

Alternative Lighting

- Blackout kit
- Candles
- Rechargeable solar lights
- Flashlights
- Headlamps
- Oil lamps
- Natural lighting
- Changing your sleep patterns (go to bed when the sun goes down)

Alternative Cooking

Most stoves are electric, so you need a plan for off-grid cooking. The following is a list of many alternatives to electric cooking:

- Propane camping stoves
- Woodburning stove
- Outdoor grills
- Outdoor wood-fired pizza oven
- Alcohol stove
- Rocket stove
- Butane
- Propane
- Pressure cookers (fuel conservation)
- Solar ovens

Alternative Heating

- •Wood burning heaters
- •Electric space heaters
- •Fireplace
- •Propane heater
- •Alcohol heater

Chapter 14

Communications for a Crisis

The core foundation of your master action plan needs to be communication between your family members. When disaster strikes and you need to evacuate immediately, chances are going to be pretty good that not all of your family members are together at the same spot.

Could it be that disaster strikes in the evening when your family is all eating dinner together or on a Sunday afternoon when none of you are doing anything? Possibly, but you still have to prepare for the possibility that all of you will be spread out over the town.

This is what makes communication so critical so that each of you will be able to contact one another and thus get together before you evacuate the premises.

To ensure that each family member can get in touch with one another, you all need to have a contact card in your pockets, wallets, or purses at all times. This card needs to contain the cell phone numbers, e-mail addresses, and social media names of each member of the family. Each family member will need to have a cell phone, or at least guaranteed access to a cell phone, as well.

On a separate card, have the e-mail addresses and phone numbers for other contacts as well if not everyone in your family members can get in touch with one another. These other contacts should include grandparents, aunts and uncles, cousins, family friends, local authorities, and so on.

Chapter 15

Transportation for a Crisis

If you are planning to bug out after an emergency and need to travel long distances, then you may wish to consider getting a good bug-out vehicle. A bug-out vehicle is something more than a vehicle that would just get you from point A to point B. You might need to sleep in it, cook in it, and possibly live through some of the most dangerous moments of your life. Let's take a look at points you need to keep in mind when it comes to choosing a bug-out vehicle option that will help you overcome all the challenges of bugging out after an emergency.

The best bug-out vehicle will vary depending on the person and their circumstances. Let's look at each of these points individually to see how you can choose and incorporate a bug-out vehicle into your emergency bug-out plan.

Advantages

Greater Travel Distance

A vehicle allows you to travel further distances, faster. If your emergency bug-out plan requires you to travel a far distance, then you should consider this option. However, this doesn't mean you have to choose a distant bug-out location. You should always choose the best bug-out location but not based on the distance.

More Room for Supplies

A vehicle can easily carry more supplies and larger items than a person. When you have a good vehicle checklist as a part of your bug-out plan, then you can turn your vehicle into a mobile bug-out location. However, just because you can pack more supplies doesn't mean you should.

The goal is a good balance. Bring gear that will extend your independence and improve survival odds, but don't pack everything you can. Even if you pack supplies in your car, still have a BOB on hand in case something happens to your vehicle.

Additional Shelter Option

Even if you run out of gas or have other mechanical or electrical issues, a vehicle can provide shelter from rain and wind. If you can still run the vehicle, you can even have heating and cooling. A vehicle can shelter you from a storm without having to set up a survival shelter or make any modifications.

Planning the Best Vehicle

The best bug-out vehicle needs to have the following qualities to improve the advantages of a bug-out vehicle while also minimizing the disadvantages.

4WD

This is obvious when picking out a bug-out vehicle. It will vastly improve your options. A non-4WD car can break down if it needs to go off-road. When your bug-out vehicle has 4WD, then you can travel over more terrain and reach your bug-out location faster.

Modular Interior

Unless you are going to be bugging out in an RV, you should modify the interior of your vehicle to make it more tuned to survival. This means making room for more storage or converting it into sleeping quarters. While you want to improve and customize the interior as much as possible, you don't want to do anything to the engine or drivetrain.

If you customize in these areas, it will make repairs and part sourcing all the more difficult. When choosing a bug-out vehicle, reliability is key and having stock parts make scavenging much easier.

Diesel

Diesel engines have advantages over gas engines. For one, they are more fuel-efficient. Second, they offer more fuel flexibility since you can also run them on heating oil, kerosene, and some jet fuels. This offers you greater scavenging opportunities while bugging out in an emergency. Diesel fuel also has a greater storage potential than gasoline. Due to commercially available fuel stabilizers, diesel fuel can last ten times longer than gasoline.

Gas Mileage

A bug-out vehicle that gets low gas mileage is a sure way to run into problems. Gas is going to be in short supply after an emergency, and you may not have time to scavenge additional supplies while bugging out to

your new location. Ideally, a vehicle should be rated at 23–27 MPG to get good enough gas efficiency during your evacuation.

Easy Repairs

When choosing the best bug-out vehicle, the best thing to look for is reliability. You should be able to scavenge stock parts to do this. For this, you need to choose a vehicle that is widely used and has commonly available parts.

Trailer Hitch

This opens up additional options for your bug-out vehicle. You can include a trailer as a part of your bug-out plan if needed. Trailers provide you with more cargo space without compromising passenger seating, which is great if you are bugging out in a group. You can also abandon a trailer as supplies get used up to improve gas mileage.

Manual Transmission

This isn't necessarily a requirement, but it can be beneficial. Manual transmission improves reliability, gas mileage, and is easier to fix and replace than an automatic transmission. Manual transmissions also allow you to push start a car if you lose your keys or the ignition is burned out, improving your survival situation.

There are so many options that can go into finding the best bug-out vehicle. Knowing what works best for you is an important step in adding a vehicle to your bug-out plan. Just remember not to depend on your bug-out vehicle for survival. However, what if you don't have the money to buy a bug-out vehicle? Let's upgrade your current vehicle to make it survival-ready.

Conclusion

For those of us living in the modern era, our lives have never been so dependent on the outside world and its steady stream of goods and services. An interruption in that flow would mean rapid and irrevocable consequences for our society. Being prepared for an emergency will help you manage your resources more strategically with an eye toward long-term survival within your local area. Each of us should plan to survive a year or more without outside support. That includes stocking up on crucial everyday items as well as some less common supplies and developing skills that can put these things to use when times get tough.

There are many things to consider. Some of these are more practical than others, but all of them should be given at least a little bit of thought. The best preparedness plan is one that suits your individual needs and circumstances. You may not have room to store hundreds of gallons of water and cans upon cans of goods, but you can still be as prepared as possible with a realistic setup.

Preppers are individuals that tend to be preoccupied with the idea of disaster and are looking for a way to prepare for it. They tend to be more survivalism or preparedness, which is a type of self-reliance. It may consist of allocating resources (money and food) or coping mechanisms such as disaster preparation. It can be health-focused (e.g., exercise), economic-focused (e.g., hoarding water or gold), spiritual-focused (e.g., barter), or any combination thereof. Preparedness is a response to concerns about adverse events, both natural and manmade, that may threaten welfare in the future.

What is considered 'prepared' is affected by the population and their occupation, location, and access to resources. Preparedness generally consists of three general levels: basic needs, emergency response, and personal preparedness. As such, a level of preparedness may be seen as a continuum with various degrees or steps to take depending on the interests of the individual. The most extreme forms of preparedness are referred to as survivalism, prepper, or doomsday prepping (DODP).

Prepping can involve several different types of preparations. These can include things such as storing food and essential supplies, developing a survival kit, or preparing in special ways for disasters. It can also involve

building an emergency shelter and generally seeking out alternative forms of energy. In the case of prepping for a disaster such as a natural disaster, disaster preparedness may involve stockpiling enough food and water to survive if electricity networks fail. Growing one's own food is typically more expensive and time-consuming than purchasing it if it is not necessary, yet it does enable some degree of self-sufficiency for years, even during periods of poor weather.

Preparation in this sense may ensure a good outcome in life by helping to cope with inevitable problems. However, it can also be a psychological challenge and may prevent you and your family from getting the most out of life. There is a concern that some people may prepare for threats that are unlikely to come about or prove difficult to handle.

Preppers often have a great day-to-day appreciation for the utility value of items that don't have an obvious survival application in the short term. This is why they criticize their own side for not having sufficient preparedness. They believe that preparation for a disaster should be an all-inclusive process—to ensure that everyone in the family can be as comfortable and mobile as possible without having to rely on others.

A survival gear list does not attempt to provide information on how to obtain these items and does not recommend them to those seeking survival skills. This list does, however, give some general guidelines on where people should devote their efforts if they want to acquire these skills through training courses and books especially geared toward preppers.

Some people have looked at the prepping movement as a means of preparing for the apocalypse and thus making sure that you and your family survive. This is an extreme view of things, however, and one can hardly say that everyone who preps is looking for a lunar landing. Some people are simply trying to expand their skillset; others are looking to be more self-sufficient or make money from home.

Prepping is an activity that many people are interested in, but it's not something everyone should get into. It's worth noting that the original definition of this term was a “motion to advance certain proposals in the House on a non-Government or non-Party basis, which may include a call for additional members.” In short, it then means one does not expect others to help them.

BOOK 2
OFFGRID LIVING

**THE STEP-BY-STEP GUIDE TO
LIVING A FREE AND SELF-
SUSTAINING LIFESTYLE ON
YOUR OWN TERMS**

Introduction

You crave a life that is free of the restraints of a job that takes all of your time, basically making you a slave to the system. Part of the stress of working day in and day out and barely making ends meet is the fact it can and likely will get much worse one day. The economy is on shaky ground. All it takes is one catastrophe to send the country into a tailspin. What if your job is eliminated tomorrow and there isn't another on the horizon? Could you survive? Do you like living with an anvil hanging over your head not knowing when it is going to drop?

Living off the grid may not share many of the modern-day conveniences, and yet, people are flocking in droves to transition into this lifestyle. This drive is coming from a desire to break away from the established systems that many of us disagree with but live within anyway. Living off-grid is a new path to freedom in this modern age. It gives back control of things that we have had control over but only recently have lost!

Like never before in human history, more and more people have moved away from rural areas into cities. Despite the clear upsides to living in a city environment, such as convenient access to amenities, many people are now realizing that urban life comes with its own set of downsides as well. Many people struggle to get out in nature regularly because of the inconvenience of driving out of the city, plus lack of time from work commitments.

If you're not satisfied with modern, urban life, and you're looking to connect with nature and what it means to be a human, the off-grid lifestyle might interest you. But what is the off-grid lifestyle, and why do people choose it?

Chapter 1

Off-Grid Living

The Right Mindset

The off-grid mentality requires a balanced view of optimism and pessimism. You will need optimism to do the work and to believe in yourself that it can be done. It also needs pessimism because you will need to understand that things will go wrong—things that you cannot predict, and things that you should be able to anticipate. Your mantra should match that of the Scouts of America: Always be prepared. Just because your electricity is working doesn't mean that something won't happen to stop the electricity. Just because you have a car and you can leave doesn't mean that car will always work. Something happens to the car, and there is an emergency that requires you to get yourself or someone else to live with to a hospital, what is the plan B? If plan B fails, what is plan C?

The problem is that you can't anticipate, so you are going to have to figure that out. There are things you want to anticipate because you simply didn't know. You read this book and probably visited websites, read articles, and watched videos on the Internet, but there are things you know you don't know, like the weight of 14 ounces of mercury. There are also the things you don't know that you don't know. You can only learn these things when experience places them in front of you, and without any preparation for them, you will have to adapt and be creative. Attitude and mindset are intangible things that you need to equip yourself with.

One thing to keep in mind is what it means to live isolated or far away from other people. If you are from an urban or suburban area, there are a lot of things that you take for granted. You have to understand what it means to be self-reliant in the context of living far away from people.

One thing to remember: If something goes wrong on your property, you are the first line of defense. If something breaks down, you are the closest person able to fix it. You're not going to be able to rely on a

landlord to come and have a look at it later the same day. If you need professional help, you're going to have to call them up, and they're going to have to drive out to you.

If you're a good distance away from town, you're going to want to have big trips. That means any kind of shopping you want to do; you should just choose a day and get everything done all at once—that means buying in bulk and getting lots of stuff. That means also thinking well in advance about what you will need, not just what you want for dinner tonight. You can't just go downstairs to the Bodega and pick up a sandwich. When you go to town, be sure to maximize your time and get plenty of supplies.

If you were injured, you might be a good distance from a hospital. For this reason, we strongly recommend that everyone get some kind of first aid training, especially if you live far away from the nearest emergency room. Living alone far away from other people can be risky. If you are not healthy or not doing well, then you probably should have other people with you just in case. Something like a heart attack is a problem, or much less lethal if you can expect an ambulance to arrive within seven minutes. However, if the nearest ambulance is 29 minutes away, you might be in for a lot of trouble.

This also means self-defense. When you live in an isolated area, the chances that someone is going to come and mug you, break into your house, or rob you are lower. However, if someone does try to come to your house with intentions, the police may be very far away. For that reason, you are going to be your own first and last line of defense. That could be surveillance cameras or security lights that detect motion. That could mean being armed. The point is, if it's just you out there, it may mean that nobody's coming to help.

Not having stores and other people available to you quickly means you need to do what survivalists do. Any person who's into wilderness survival will tell you that you need multiple redundancies. That means if one of your pieces of equipment fails, you need to have a backup. When you are building your system, you are going to want to integrate multiple redundancies throughout it. That means multiple overlapping systems. If you can get electricity from two or more sources—if one of those sources goes down—you'll always have another one as a backup. If you can get water from more than one source, if you have a problem like a pump failing, then it won't be nearly as bad. This is especially true if you are relying on a car. If something goes wrong with your vehicle, and you

need to leave the property in a hurry, you aren't going to have a ride-sharing driver just down the block, so you want to make sure that whatever vehicle you use is in tip-top condition, and don't leave anything to chance.

You have to think ahead more than you would have while living in a city. You have to think further in the future about living without your food and about possible problems with your water and power. You have to think about your health and safety. When aid is always really close, you don't have to think about these things that much. When there's always a grocery store a couple of miles away, you don't think about storing your food to last through the winter. A huge part of living an off-the-grid mindset is not preparing for the worst—not because it's likely but because something bad always happens eventually. Like the various Scouts of America say, always be prepared.

How Do I Know If Off-Grid Living Is for Me?

Frankly, it might not be. Off-grid living is not for everybody. It takes a certain kind of personality to take on a project and commit to it. It takes a lot of self-reliance and eagerness to learn.

People have become very accustomed to convenience. Convenience is another word for time—as in saving time. Anything convenient saves time, but there is also a cost. Fast food is convenient. Ordering cheap things online is convenient. Sometimes, there are things more valuable than convenience. Also, the time that we are trying to save is just being wasted on other frivolous things.

These are some qualities that might determine if you are the kind of person who can do it. You don't need all of them, one is enough, but the more, the better.

Self-Starter

If you like projects, this is a great way to live. You will never run out of things to do. Many people make their home their primary hobby. Are you the kind of person who is thinking about a good way to fix a squeaky garage door? Or the kind of person who builds a shed? If you're the kind of person who loves keeping busy and loves to work with their hands, you are in luck.

There are always new ideas you have for additions and upgrades. Once your home is all put together, you'll start imagining other things you could build, such as a sauna or a guest house. Once you get done with

those, maybe you consider what it would take to build an artificial pond. If this sounds like you, keep reading.

Able to Follow Through on Commitments

You were meant to be someone who isn't a quitter. Depending on how you develop your land, there can be a large initial investment. It's possible to get started with \$10,000, but depending on some factors, it could cost more. If you aren't serious about it, then you could easily waste a lot of time and money.

Pioneers and homesteaders of previous centuries did it with a lot less than we have available. Lucky for you, there are more tools and technologies available to you than they had.

By definition, you won't have an infrastructure around you that has been built up over a century by thousands of people who were financed by governments and corporations. You have to develop your infrastructure from the bottom up. Over the long term, it can pay for itself.

This isn't like a month-long free trial at a gym or using a subscription service for a phone app. It's not the kind of thing you can half do by half measure. If you are a person who likes to finish what they start, and someone who doesn't rush into things, you have the right personality to live off-grid.

A Love for Nature

Last but not least, if you are looking to live off-grid somewhere that is far away from other people, you should be a person who genuinely loves nature. You are going to be surrounded by a lot of it.

Living off-grid means living in tandem with nature. You have to work cooperatively with it. Mother Nature decides when it rains, when the sun shines, and when the wind blows. While not everyone feels comfortable feeling at the mercy of nature, other people don't feel like they are at nature's mercy, but rather they are adapting to what nature prescribes. It's a very different attitude.

Maybe you like living in a city where it's easy to find things that you need within a five-minute drive, and you don't like the unpredictability of nature. If you like gardening and animals, you'll have plenty of time with them. If you are someone who loves hiking, skiing, fishing, hunting, and exploring, then this is where you want to be. Are you someone who loves campfires and loves to have their morning coffee on a porch overlooking a beautiful landscape? If so, you have come to the right place.

Pros

When you start your life off-grid, even your home starts to look different after a while. Herbs are drying over our sink and hanging from our walls. Rather than cans in the pantry, there are mason jars filled with the harvests of years past. Our curtains are hung on a piece of steel I folded decoratively with a hot forge and an anvil.

What once felt strange and new becomes part of your daily life. Feeding the goats, gathering the eggs, and tending to gardens, it all becomes part of a daily routine. When the time comes and you want a break, well, you got to find a pretty understanding house sitter! Vacation is something that you might not be able to do as much as you like, or at least not the way you're used to.

An off-grid lifestyle will offer you and your family all kinds of benefits. It will change the way you live, eat and look at the world. It will change the effect you have on the world! However, it is not all sunshine and lavender. There are some serious disadvantages to off-grid living, too. Let's look at both!

Cons living off-grid

Let's get the hard stuff out of the way first. This is where you have to go mentally to understand the limits of what you are willing to take on.

When it comes to off-grid living, you are responsible for everything! You might think that is pretty similar to homeownership but there are some serious differences. Of course, in a home in the burbs, you can call a repairman to take care of your problems or you can get a neighbor's help. When you are living off the grid, you might be very rural and all but on your own. That is something to remember!

If something in your solar power system stops working, you are going to have two options. The first is to get to work and fix the issue on your end; hopefully, you have spare parts. The second is to sit in the dark until you work up the energy to step up and complete option one! So, you don't have a lot of choices when it comes to taking action.

The conveniences that you might enjoy now are going to get further and further out of touch. If you like to eat pork fried rice on a Friday that is delivered by a smiling delivery boy, well that might not be a possibility.

There are limits to how far out the deliveries go. Your off-grid homestead might be off the delivery grid, as well.

That adds a level of concern to the whole picture. Now, we are on vacation, but we have animals to concern ourselves with the whole time! We have people in our home, and it gets pretty strange. So, vacation will never be the same. It's not to say it won't be possible, it's just to say that it will not be as easy as it once was.

One of the most astounding things that happen to you might be both an advantage and a disadvantage. This is a hard one to explain but it's real, so you need to consider it. There are things that you love, right now, that you will not even think of in the future. There are foods, activities, and entertainment that will all but disappear from your life.

What's more, is that it will not only go away, but you won't miss it! Maybe you loved football or your favorite fast-food chain and you couldn't imagine life without it. Sometimes living off the grid makes your desire for these things go away because you are too busy, you don't have TV or you get used to eating a certain way and you find yourself not even wanting the old treats that you used to. This can be an advantage and a disadvantage.

Feed is another part of your life that will balloon, and you may look at it as a serious issue that you might consider a disadvantage. You see, if you have a bunch of animals on your off-grid homestead, well, you are going to need to feed these animals. That could be chicken feed, turkey feed, hay for goats, or feed for other types of birds or ungulates but you will need feed all the time.

Of course, there are other new costs to consider, too. Setting up the cost of new power systems will be a good investment but still could be lots of money upfront. If these systems break you will have to pay for materials and learn to fix them, as mentioned. The only way to avoid these greater costs is maintenance.

You become the maintenance man for your home, water, power, and all other systems. That means that you not only must fix things when they break but you also need to keep up with these systems. Each month you will likely be inspecting one of these systems to assure it has all it needs.

Chapter 2

Where to Start (Planning)

Cost

Right off the bat, try to not make a full jump to a homestead immediately. It is expensive, unnecessary, and could cause you to quit before you get a chance to experience the real joys. Take small steps by educating yourself, procuring the land, and building pieces of what you need when having the money to do so. Think about remaining on the grid a little longer but living more frugally, putting money away as often as what you can to build your dream home. From these savings, you can start to develop your land, build your new home, or start buying the necessary equipment needed to get you off the grid.

You will also need to use this money to purchase farm equipment like seeds, animals, soil, resources, and equipment required to create an area where you can successfully cultivate food and raise livestock. Emergency money will also be necessary (Tyrell, 2017). You never know when urgent repairs need to be done.

Picking Land

Finding a plot of land to build on is the difficult part. It can be found anywhere. Thousands of homes are available for you to choose from. It may be overwhelming. All have various costs, and each has its own set of problems. Several important factors

should be taken into consideration while looking for property for off-grid living.

Water

Humans are unable to live in the absence of water. Even though this seems like a no-brainer, certain parts of the nation carry their water for kilometers to get to their homes, which is very hazardous in a survival scenario unless there is a reliable, pure natural water supply nearby. The reason for this is that transported water is not environmentally viable. To put it another way, the amount of gasoline and labor it takes to get the water, pump it, transport it, and then install it somewhere on your land is enormous. Dehydration and unclean conditions that may cause illness are risks in an emergency scenario. To get water in an emergency, you must leave your family for some time, and, technically speaking; it is not safe from a security point of view. As a result, unless you have a supply of fossil fuels on hand in case of an emergency, you won't be able to use them in the event of a shortage. Alternative fuels such as ethanol and biodiesel are available. Take care to ensure that your water comes from a clean and natural source, whether it's your well or one that's in a river, lake, stream, or natural spring. A robust filtration system and water reservoir for backup should be in place just in case the natural supply is contaminated or polluted in any way, as well.

Location

It's something you hear promoted all the time in business. When purchasing property for off-grid living, the same is true: your location is critical when considering energy production, growing climate, and personal choice.

The term off-grid describes a situation where you are not linked to the electrical grid and must rely on self-generated power, such as solar panels, wind turbines, or a mix of the two. It would help if you chose a place that is suitable for your desires and requirements.

Climate: Sun, Wind, Snow, Rain, Humidity

Your ideal property may be different from the next person, but if you're planning on producing your electricity, you'll need a location with lots of sunlight and wind. Some websites may assist you in locating locations that are more suitable for electricity production.

If you're looking for a certain demographic, geographic, or climatological combination, they have a wealth of data at their fingertips. Other than that, they offer a plethora of topographic maps, charts, and graphs with much more information than anybody could ever utilize in a single sitting.

Access

A good (non-litigated) easement or deeded access is a must when purchasing a property. This is the second most essential consideration when purchasing a property. A 100-acre parcel of land in a good area may be available for a fantastic price, but it may be landlocked (i.e., bordered by other private property) without access through roads or roadways. This would imply that you would be unable to accomplish anything on your land without first passing through your neighbor's property. Hopefully, you will be able to bargain with them, but you will have to go to court if not. However, unless you have a particularly wonderful property in the perfect location, it is not worth the hassle to purchase some of their lands to build your road to access your home. If you have the money, you could purchase some of their lands to build your road to access your home. You'd be better off simply searching elsewhere rather than going to all of that trouble.

Affordability: The Ability to Purchase the Land

When it comes to buying property, decide to go straight to the landowner's source. For a variety of reasons, you do not want to go via the banking system. The first and most important advantage of a lease option or contract for deed is that the

landowner receives a direct financial gain from the sale of the property. That is true, if you fail on your mortgage or lease, this might create an issue for them, but you aren't planning on doing so, are you? The second factor is credit. Many individuals lack credit to qualify for a conventional mortgage at all. Credit is the same as debt. And being debt-free is one of the primary motivations for stepping off the grid. Who would you want to be indebted to, and why? Which is more important: the bank or the landowner? Buying directly from the landowner has another advantage: it increases your chances of securing a better price and interest rate by negotiating directly with the seller.

How to find the perfect off-grid location

Life is tough when living off the grid, and many have been forced to return to an urban setting because they couldn't afford to do this. Others decide to hang onto their dream to remain off the grid but, because they are not aware of what the reality of living off the grid entails, they end up living lives that they are not happy with. It is one thing to have a dream, and a whole other to put it into fruition. People have been trying to live off the grid for years, and many of them are learning as they go, from watching and learning from the experiences of others. Those that learn from others are the ones that stand a better chance of living comfortably than someone who thinks they'll learn by themselves.

Before you consider living off the grid, you need to know about the mistakes that have hampered the living choices of many people. It is only by learning from their mistakes that you can guarantee that you will be successful. This is not to say it will be

significantly more straightforward, but you will be better prepared.

How to Choose the Ideal Off-Grid Living Location

Since off-grid living involves relying on the land, the ideal location should have the following essential resources to ensure you survive and thrive.

Water

It is impossible to survive anywhere without water. Water is life. This may sound like common sense, but you may find yourself swayed by the low cost of the land, outstanding scenery, or other perks of the land that you overlook the inaccessibility of water.

There are arid places in the country where the land may be cheaper, but you have to haul water for miles to your property.

And the cost of getting water onto your property under such circumstances is astronomical.

Think of it like this: You may have to leave your home to go and find water. Sometimes for days and your home is in a remote area. Speaking from a security point of view, you leave the rest of your family vulnerable and without your protection. If you take the vehicle to get water, they have no way to move around.

Hauling water is not sustainable, and you are at risk of unsanitary conditions, disease, and dehydration.

The location you choose needs to be close to a water source, and it should be easy for you to get the water to your property. But more than that, make sure that you have a water storage tank and

filtration system on the property as well. That ensures that your water is safe to consume in the home.

Building Materials

Living off the grid means you have to build a house to live in. Strive to find a location where you can access natural building materials to build the type of home you would like.

It is very costly to bring in other materials from elsewhere for the building.

So pick an area where construction is going to be cheaper. Depending on your preferred building material, consider a location that has:

Wood

Wood is necessary for all types of construction. Buying it from a lumberyard or a big box store is very costly. So, ensure that your chosen location has access to a wooded area nearby that can be a source of cheap lumber for building.

Earth

Constructing using earth is a technique as old as time itself. It is a building technique that uses earth, limestone, chalk, and gravel. Building using earth has lived through history, and in this case, you will use a mixture of different aggregates.

Did you know that rammed earth is found in many luxury homes because it is an excellent thermal material? It allows the sun to warm it in the day and releases the warmth slowly in the evening.

It is cheap to access the materials that go into the rammed earth when you live near them. This low carbon technique requires the earth materials to be placed in layers together with a binder. The layers are then applied using pressure into a durable, hard surface.

Some people also use the same concept to create building blocks from waste materials derived from quarries.

Straw Bale

Straw bales have become popular once again in the west after being used centuries ago. For example, 400 years ago, many houses in Europe either featured a straw-thatched roof, or the entire house was straw bales. Even when European settlers first came to America, they would put straw on the teepees to insulate the tents from the cold, especially in the cold season.

In this age, straw bales provide excellent load-bearing structural support to buildings, and they can be used simultaneously with other natural building materials like wood.

Not only is straw cheap and available, but it is also an excellent insulation material because it makes the walls thicker. And the straw bales can be made fire-resistant making them an excellent substitute for wood.

Best States for Off-Grid Living

The top ten states for an off-grid living are in the following order:

- Alabama
- Missouri
- Georgia

- •Tennessee
- •Texas
- •Louisiana
- •Indiana
- •Hawaii
- •Colorado
- •Arkansas

These states are the crème-del-a-crème of off-grid living because they offer the most freedom to live off the grid. The cost of living is low, the lifestyle is sustainable, and they have an excellent off-grid living community, among other considerations. They also are excellent and sustainable for agriculture, energy, and water.

The cheapest states are:

- •New Mexico
- •Louisiana
- •Alabama
- •Mississippi
- •Wyoming
- •Arkansas
- •Oklahoma
- •Arizona
- •Utah
- •South Carolina

From the property taxes to the cost of land, purchasing and maintaining land in these states is more affordable than in other states. That means that beginning the journey to off-grid living in these states may be more accessible if you are on a budget.

You may also find that shopping for food and other costs of

living issues are more affordable in these states.

Chapter 3

Different Off-Grid Living Spaces

RVs and Campers

Alternatively, an RV or campervan is a good temporary housing option that provides great protection from the environment and predators. They don't come cheap, but usually, they are equipped with everything you need from a kitchen area to a shower. If you are on a budget, look for pre-owned RVs that are not luxurious. You can buy older models since the function of the RV would be temporary living. There is no need for overkill here. A caravan is also an alternative if you can tow it to the location. It is a costly option because used campers can cost as much as \$20,000 for a basic one if bought from a dealer. You can score a cheaper unit if you search the classifieds or look for units that are being auctioned. In most cases, people use these two options as a medium to long-term homes while building more sustainable homes.

Permanent Shelter

Once you have a place for you to put your head, you can start the process of building a permanent home. This is a time-consuming process, and if you are planning on building the home single-handedly, consider options that are not labor-intensive. You must have the tools to match the type of building you want to construct, otherwise, it will take you a long time to get settled. Ideally, getting a few pairs of hands to help will go a long way to help you balance building with other activities around the homestead such as gardening. The home must be carbon-free or at least carbon neutral for it to be considered sustainable and eco-friendly. Classic off-grid homes are built using locally available materials. That is the spirit of the Maasai people. So without further ado, let's discuss some eco-friendly permanent housing options for off-grid living.

Earthen Brick House

You don't have to buy bricks to build a brick house. Only clay, water,

and some molds are needed to form the bricks. The eco-friendliest option is to make unfired clay bricks because fired clay bricks need heat to cure and this increases your carbon footprint. While fired bricks can endure wet conditions, unfired clay brick cannot and this requires the design of the house to include methods of directing water away from the structure when it rains. This makes unfired clay homes a bad choice if there is a flood or if your region regularly experiences wet conditions before the bricks are fully cured. Three to five weeks are usually required for the bricks to fully cure before high humidity becomes irrelevant to the structural integrity of the home. When it comes to strength, unfired clay bricks are inferior to fired clay bricks, but they do a better job at passive humidity control. Keeping this in mind, avoid placing heavy loads on the roof such as solar panels and water heaters on the roof because unfired clay bricks are not good at supporting heavy loads. If you decide to build your home using fired clay bricks, remember you will need to build a kiln and have access to large quantities of firewood to economically cure the bricks. This is bad for the environment, so be prepared to replace the trees you cut down for the firewood. Brick houses are quite common, and in this guide, we will not discuss how to build a brick house.

Vehicle

Old buses make great homes if they are converted properly. There are two main advantages that a bus has over a shipping container. The first is that foundations are not needed. Look for a bus that has its wheelbase intact. Even if the bus itself is broken, or won't start, you can easily get it towed to the property. Salvage the engine's radiator to make a geothermal air conditioning unit. The second pro is that you don't have to worry about windows and cutting door openings. Even if some windows are broken, as long as the opening is there you can easily replace the broken glass or permanently close the openings. If you need the space, buy a double-decker bus. They cost an average of \$25,000 on Mascus, and most of the buses are in perfect working condition. With renovations and insulation, the final cost can get up to \$40,000. On eBay and related websites, it is easy to find buses for less than \$5,000, and if your needs are basic, renovations might set you back another \$10,000.

Cob House

In my experience, living in a cob house is a dream. The living conditions are comfortable, and the structure is easy to construct. The materials used make it suitable as a permanent home in different climates. This was the major reason that influenced my decision to build a cob house

over an Earthship. Fibrous organic matter, such as straw, hay, and sawdust gives it good resistance to seismic activity, and the home is fireproof too. The con is that it is labor-intensive. I had to rely on members of the community to help me with the construction of the home. When used for structural load-bearing purposes, most building codes in the United States consider the cob material as unburned clay masonry. If you live in Pittsburgh, the Sota Construction Services headquarters is a cob house that you may be familiar with. Their innovative design along with other eco-friendly features led to the building being awarded the much-coveted platinum rating from LEED, an eco-friendliness rating agency in the US and Canada. You can find cob houses dotted across the world, especially in Europe and Africa, because this design has been around since time immemorial and its benefits are known.

Wattle and Daub House

One interesting thing I learned during my time with the Maasai people is that cows are a heritage for the Maasai people. Their cows are the most valuable asset, and they will do anything to protect this heritage. Besides being a source of milk, and rarely meat, cows provide an important element for building their homes. Cow dung! Wattle and Daub houses incorporate cow dung as one of the building materials. It is used to make the walls and sometimes the floor. The walls are made of woven material such as dried reeds or wooden strips which make up the wattle. Posts are used to support the lattice vertically. Daub, made of a combination of clay, cow dung, sand, grass, and other natural materials is plastered over the wattle to complete the walls. Wattle and daub houses last a long time. Medieval buildings older than 500 years still exist in the UK today. Properly designed wattle and daub houses require little maintenance and their use of simple materials also makes them cheap to build. However, the building process can be demanding, requiring additional help to make construction faster. You may also find it difficult to install standard fittings because the wall panels are difficult to make precisely using natural materials.

Log House

With a few hand tools, you can build a log house. Our ancestors did it with little difficulty, and if built properly the result is a comfortable home. It is a myth that log houses must be insulated. The thickness of the logs provides sufficient R-values, which is a measure of a material's ability to resist heat transfer. Logs that are 20 inches in diameter can

achieve R-30 values, meaning you won't need to worry about insulation if you live in a cold climate. Compared to more conventional housing built with timber, a log house is a more sustainable option if you have trees on your property and you can eliminate transport and processing. Processing wood into the timber used for conventional houses is an energy-intensive process that wastes the material by producing sawdust and offcuts. Since logs can be used whole in a log house, this processing is not necessary. This makes log houses very sustainable in comparison, especially if the trees used to make the home are replaced.

Building a log house is fast and cheap even when using hand tools. Most of the logs are used whole, meaning large sections can be completed in less time. The energy efficiency of the home is also remarkable, and studies show that log houses can be up to 20% more energy-efficient than a conventional home (National Association of Home Builders, 2021). Log houses hold up to the elements pretty well. You can find homes that are hundreds of years old across the world, with the oldest being a church in Russia that is reportedly 1,700 years old. When Hurricane Rita struck Eastern Texas, a large tree fell on a couple's house and the logs did a good job at holding the weight of the tree, resulting in little damage and no injuries to the couple. Peace and quiet are other features of log houses. The thermal mass of logs has acoustic properties that deaden sounds, and even though you won't be expecting much noise off-grid, it is comforting to know that you won't hear the terrifying sound of storms approaching whenever they occur.

Straw Bale Home

Similar to a cob home, straw homes are built using earth-based methods. The main building components for this method of construction are straw blocks which have a rectangular shape. The structural integrity of a straw bale house is based on the blocks of straw, unlike in a cob house where integrity is derived from the earth mixture. A layer of earth plaster is then used to protect the straw from the outside conditions by providing a non-porous seal. There are a couple of benefits to a home built using straw over a cob house. It takes less time to build a straw house than it takes to build a cob house, and the product has higher R-values, making them perfect in cold climates. This is because the air trapped within the straw is called dead air space, resulting in better insulation inside the home. This construction method is becoming popular to the extent that building codes have been developed. The International Residential Code (IRC) is widely used in the US, and this means that building permits are

easier to obtain if required by the local authority. The code specifies the construction method required for the building to pass, emphasizing that a certain amount of stick framing is required to support the roof and upper floor if the home is a multistory building.

Cabin Home

No off-grid living guide is complete without a discussion about cabin homes. They are the most popular type of housing because they are cheap and easy to build. You can easily build a 400 sq. ft. cabin for less than \$2,000. The main difference between a log home and a log cabin is that cabins are smaller and more intimate. Minimalism is the main idea behind a cabin home, and the simplest designs feature paneled wood that can be bought or salvaged from pallets. You will find that some people call these tiny homes log cabins, meaning they can also be built from logs, just like a log home. Paneled wood makes it easier to install plumbing and electrical cables. You can also fit standard windows on a cabin home better than a full log home. Other than this, there isn't much to talk about a cabin home. That is how simple it is to build one. Of course, some cabin homes need to be insulated because the thermal mass of paneled wood is lower than a full-sized log home. Later on in the book, we will discuss how to build a cabin home.

Chapter 4

Types of Sustainable Off-Grid Water Systems to Consider

Water

You cannot live without this precious resource. Ideally, you want to have some kind of natural water source on your property. However, this is not always possible, or your natural source isn't available all year round or is stagnant. You need to find ways to get fresh, clean, drinking, and potable water for your family and animals. Luckily, there are several ways for you to get water. Some methods may require the installation of a pump and pipes.

Collecting from Natural Sources

Why dig a well when you could draw water from a river that rolls right through your property? While collecting water from a natural source seems like the easiest solution to securing your water supply, in reality, it's not that simple. Many homesteaders do rely on a natural source for water, but there are several things to consider first to make sure it's safe and practical to do so.

Health and safety experts, such as the Wyoming Health Department, strongly recommend having surface water sources tested for contamination at least twice a year, and again any time you notice a change in taste, smell, or appearance. Water testing is usually conducted by a private company that will send you a pre-approved sterile bottle with a stabilizing agent included. You'll collect the sample on your own, following their instructions, and return it to the company for testing.

If there is no evidence of contamination, you still need to make sure that your water is potable before drinking it. Surface water is home to a wide variety of wildlife, as well as plant life and bacteria. A coarse filter is used to remove sediments from surface water, as seen in common gravity

filters. You should also treat the water with UV light to kill off any bacteria or mold. Furthermore, this is another situation where checking your local laws for deciding on a water source is important. While most states allow you to collect water from a lake or river on your property for personal use, others restrict this if the water is going to be used for agriculture.

Wells

In the distant past, people noticed that when they dug into the ground at certain places, the bottom of the hole would be filled with water. The deeper they dug, the more water would fill the hole, allowing them to continue drawing water for months, years, or even indefinitely. Therefore, the concept of a well was born, and people have been drawing water from underground sources ever since.

There are a couple of terms you need to understand before we get into our discussion of wells, both of which are defined briefly here.

An aquifer is a reserve of fresh water that exists beneath the earth's surface. The vast majority of fresh water on the earth exists underground, and much of it is found in these. Think of aquifers, not as caverns in the ground filled with water, but as water-saturated regions in the soil and porous rock. The goal of digging a well is to penetrate an aquifer in order to pump or draw the water out.

Collecting Rain

Many homesteaders take advantage of the rain to supplement their water supply, but if you're looking to do this properly, certain safety precautions should be in place to avoid getting sick.

Rainfall is measured in vertical inches, therefore, the more surface area you use to collect rain, the bigger your harvest will be. Simply placing buckets out in the rain will have very disappointing results. Looking around your homestead, you might notice that the roof of your house and barn has plenty of unused surface area. Gutters are placed along the edge of the roof to direct water as it rolls off and a storage container under the gutter spouts collects it. However, this method only works for a smooth roof, like a steel roof; regular shingles result in debris, such as leaves, dirt, and bird droppings in the water tank, allowing bacteria to proliferate wildly. While this is a problem with steel roofs as well, they can be more

easily hosed down between rainfalls. You can also fit a filter to the end of your gutter (don't forget to clean or replace this regularly!) and/or a first-flush diverter, which will divert the first portion of rainwater away from your tank or barrels. This allows the rain to give your roof a rinse and leads to less dirt ending up in your water.

The price of a large water tank for storage runs between \$500–1,000, and of course, the water falling out of the sky is free. First, flush diverters can be purchased on Amazon for \$76.65, while gutter filters are sold in packs of four for \$16.65.

Remember that just like surface water, you'll need to filter and treat your rainwater to ensure it is potable. Many people choose to use rainwater for non-drinking purposes.

It is not recommended to collect rain as your main water source, as rain is not always reliable. Remember that weather patterns are getting more uncertain as climate change progresses! As we saw above, contamination is also higher risk than with other methods. However, collecting rain can be a great way to get some extra water to irrigate your crops, and thus can be a valuable sidekick to your main water collection method.

While it's generally legal to collect rain for your usage, some regions restrict this. Look into your local laws before getting started to avoid getting hit with a fine.

Generating Off-Grid Power

Renewable energy has come a long way, but it isn't a fully mature technology. Like everything in life, there are trade-offs. They have pros and they have cons.

Solar and wind power can generate a tremendous amount of energy when the sun and wind are at their peak. This is great except for one big problem: They create more energy than is needed. The surplus energy can't be stored safely because battery technology hasn't been able to keep pace. When the solar panels aren't catching the sun or when the wind isn't blowing, they produce nothing. We need energy when we need it, not just when nature provides it.

On a municipal scale, this means that green energy still has to be supplemented with other energy, be it nuclear or coal. On a small scale, you can be flexible enough to make it work. Living off-grid means living on an electrical budget. You're going to want to get a good estimate of how much energy you need. If you can get an estimate of how much

energy you are using now, you can get a sense of how much energy production you're going to need in your off-grid home.

Naturally produced energy is about living on nature's schedule. When it offers you wind or sun, you take it while you can get it. If you are using naturally produced power from wind and solar energy, you are living on an electrical budget. You have to regulate your energy use because you can just use as much as you want and pay a bill for it later.

One way of handling this is by using the power when you have the power. This is called "opportunity usage" and is a very effective way to maximize your power. Schedule all of your heavy electrical activities for when the sun is up and the wind is blowing, and there will be no wasted energy. If you have a washing machine and dryer, and you have a sunny day, that would be an excellent time to do your laundry.

Solar

Solar energy is cheaper and more available now than it has ever been before. It's so common that it's no longer unusual to see solar arrays attached to the roofs of someone's home. Solar panels are made of crystalline silicon wafers. Contact with sunlight causes electrons to move about inside of them, and this flow of electrons is what generates an electrical current.

Big solar farms optimize the energy to drop in the sun by turning the panels automatically to always face the sun and have the optimal angle with more maximum coverage of the surface area of the panels. This is exactly how sunflowers operate—they always move to face the sun so they can get as much sunlight as possible.

You can build solar panels from scratch out of individual solar cells if you like. It's not too difficult. You start by creating a backing for the panel. You can use a wooden board, and you will need to drill holes and then at the right place so that wires from each cell can pass through the back. They are then wired together using a soldering iron. They should be attached to your backing individually so that they can be removed individually. If a single solar cell is damaged, it should be relatively easy to remove the single damaged cell and replace it without having to replace the entire thing.

Working with a professional who is a trained electrician with expertise in solar panel installation will be likely your best bet. They know all the laws and regulations, they are experts in their field, and they are probably going to get it right the first time. If you are a DIY person who knows a little bit of that electricity and is willing to learn a lot more, this

can be a great project for you to take on yourself. If you don't feel up to it, letting a professional deal with it is a good call.

For those living in places like the Pacific Northwest of America or Scotland, catching the sun won't be reliable. You can keep adding panels, but the better choice is to add other energy sources.

Wind

If you live out in the open in a windy place like Argentina, Perth, or Wyoming, the wind is a great option. If you live deep in the woods, you might not get enough wind to make it worth your while. Trees do a great job of breaking up the wind and giving you shelter from hurricanes and dangerously forceful winds. Unfortunately, it also means you can't get wind power.

A lot of areas do not like the look of windmills and regulate them. Like everything else, check the laws to make sure you're allowed to have them. Windmills also need to be mounted on polls. Usually, higher is better, as there is less obstruction from your buildings, hills, and trees. Around 20 feet should do the trick in most cases.

Geothermal

Geothermal is a very cool option with one major drawback: Getting it up and running can be very pricey.

Geothermal energy is not producing electrical power. It just makes heating and cooling easier and more efficient.

Geothermal works by drilling a deep hole in the earth and running water through it. The deeper into the earth you go, the less affected it is by the temperatures on the surface. In effect, the temperature is stable.

When it is ferociously hot outside, the temperature deep in the earth is cooler. When it is intensely cold outside, the temperature on the earth is warmer.

The more you want to change the temperature, the more energy you need. It takes more heat to make ice into a gas than it does to turn liquid water into a gas.

Geothermal works by splitting that amount of energy by meeting your energy need halfway. If you need to cool things down, the geothermal temperature gets you halfway from hot to cold. If you need it warmer, then it's the same thing.

Micro-Hydro

This is a very interesting option if your spot has running water. Unlike solar and wind, a moving river or creek is always moving. Depending on

the time of year, you'll get more or less power, but it's always there for you if you need it.

Reach out to the Geological Survey or Department of Agriculture. They may have data on the speed and force of the water moving through your property. If it isn't strong enough, hydropower might not be worth your time. If your water source does produce enough force, like every other improvement on your land, you should contact whatever local department is in charge of energy or natural resources and ask them about the rules for diverting water.

If you have a green light for those two items, you'll need yourself a generator, turbine, and piping. Consider yourself lucky because this is not an option that is available to most people living off the grid.

Gas-Powered Generator

A generator isn't anyone's first choice, but it's important to include. It uses gasoline—which is expensive and a pollutant—it's loud, and it smells bad. That said, you're going to want one.

You may need a generator to get by while you are getting yourself set up. Until your other power sources are up and running, you will need something.

It's important to have a generator in case of emergencies. Even if you seldom need it, you'll be very happy to have it when you do. As we discussed earlier, several overlapping redundancies are crucial. You'll want a generator just in case. If you accidentally leave your keys in your truck overnight and drain your car battery, you will be very grateful to have a generator.

Important note: Gasoline goes bad. Gas is perishable. It has a shorter life span than you might realize. If you have a spare plastic tank of gas, you will need to change it out periodically. Pure gas that is properly stored can last six months. Gas blended with ethanol lasts three months, so keep this in mind. You don't want to fill a tank with bad gas.

There are options for petroleum-based stabilizers to add to gas, which will extend its life to one to three years.

If your gas looks too dark or you see any sludge in it, it is old, and you can't use it. Putting old or contaminated gas can ruin the machine you're trying to power.

Chapter 5

Off-Grid Food

Growing Food

You're certainly going to want a garden. If you aren't using a full-scale farming operation, a garden is a fantastic option. To maximize the value and productivity of that garden, we strongly recommended that you build a greenhouse. Greenhouses are less difficult to make than you might expect and have a few very important effects.

A garden inside of a greenhouse is less vulnerable to animals. If built correctly and securely, you won't have to worry about foxes and rabbits sneaking in and eating your greens.

Plants prefer warmer environments. The greenhouse contains both heat and moisture so that the plants are warm without drying out. The roof and walls protect the plants from the elements. Some plants are very sensitive to heavy rainfall, and several days of bad rain could wreck a garden. Depending on what you are growing ultimately depends on what the optimal temperature is. If you are going to be growing several plants at once, make sure that their optimal temperature overlaps so that all of them can be happy.

You want to keep the greenhouse relatively humid, but try not to break the 90% mark. Too much humidity could lead to mold. Likewise, at night, if things get too cold, humidity can turn to frost and freeze your plants, so make sure that you are maintaining the heat during the night as well.

Every garden should have a few staple items. For a beginner, it's best to stick with plants that aren't too needy. Since you can maximize the heat and water levels, the greenhouse will extend the natural planting season, and you will be able to get more food in one year than you would otherwise.

Foods to Grow/Stock up On

Food storage is immensely important. Humans have developed many clever ways of keeping their food clean and safe long before refrigeration.

There are a few foods that are always good to have on hand. Even if you aren't living off-grid, it is just smart to have these in your home.

Rice

Rice has a long shelf life, and if properly stored, rice can last six months or longer. If you also keep it refrigerated, you can get twice as much time out of it. Brown rice is a great source of vitamins and fiber. Brown rice is the most nutritious, and if you're eating it to stay alive, just go where the nutrition is.

Rice is a staple food for more than half of the planet. That's a pretty ringing endorsement.

Sweet Potatoes

Everything we just said about potatoes is true of sweet potatoes. They are calorie-dense and have much more iron nutrient content than your average potato. The leafy greens that grow on them are also edible. They have a longer growing season, longer than almost anything else you will be raising. However, if you like sweet potatoes, they might be worth the extra time and effort.

Tomatoes

Setting aside the argument about whether it is a fruit or a vegetable, the tomato is a pretty easy plant as long as you give it ample water. They also like the temperature on the warm side. Tomatoes are great on so many things and can be turned into sauces, added to salads, added on top of burgers, and plenty of other applications.

Beans

The best friend to rice is beans. This is a well-known and well-traveled survival food. It's also very versatile and can be used in a lot of different ways. Dried beans can be stored for a long time and can be hydrated rather quickly just by soaking and heating them.

Beans are an excellent source of protein, and when complemented with rice, it forms a complete protein.

Nuts

They are an excellent source of protein and fat; dried nuts also store very well.

Cabbage

Yes, cabbage. It is low in calories, but it has a ton of nutrients including

B6 and C, and it is very fibrous. It's also very versatile because it can be used in salads. If you are into pickling, you can turn it into sauerkraut or kimchi, which is a great flavor addition and has a very good shelf life.

Corn

It's very easy to grow as long as the soil temperature stays high enough to allow for germination, and you have mature soil. If you can get those two things right, corn is very easy to grow.

Cucumbers

If you plan on pickling, you should have cucumbers. If you are just getting cucumbers for pickling, keep in mind that there is a specific type of cucumber called a pickling cucumber. The ordinary cucumber you're used to that you put on a salad does not work the same way, but you might also like regular cucumbers.

Potatoes

Everybody loves potatoes. It's a starchy crop that's high in carbohydrates, which is important for getting your calorie intake high enough. These are crops that you are trying to live off of, and calories are your body's fuel. Yukon Gold potatoes are probably the best choice.

Lentils

Lentils are packed with protein. It's very difficult to get a decent amount of protein from plant sources: Ask any vegetarian who is conscious of their nutrition. Lentils have around 18 grams of protein per serving—that is the same amount of protein as three eggs. Also, lentils are one of the oldest crops that have ever been cultivated by humans. It is ancient, and lentil soup is just delicious, so if you don't like lentils, start liking lentils.

Spinach

This plant is very easy to grow and packed with vitamins and minerals. For the adventurous, spinach can be stored by freezing it or dehydrating it and then crushing it into a powder. Now you have a powdered nutritional supplement available.

Berries

Everybody loves berries. Raspberries, cranberries, blueberries, or whatever kind of berry. They're all good. They have a lot of nutrition, they have a natural sweetness, and you can do a lot with them. You can turn them into jelly and incorporate them into nearly any dessert item you can think of.

Methods of Preserving and Keeping Food

For individuals who live off the grid to some degree or another, whether as a homesteader on a remote piece of property or as a city dweller, there are a few items that may come in useful at various times. No matter how far away from civilization you have traveled or how far you want to go, you will need nourishment. You can buy the essentials at your neighborhood grocery store if you live near enough, but many people who want to live off the grid prefer growing or harvesting their fruits, veggies, seeds, and even meat. The problem is, what do you do with an excess of something when you don't want it to go to waste? This is when having a variety of techniques for preserving your food comes in. Depending on the kind of food you're preserving, different techniques work better, and each has a different shelf life. Because of this, it's critical to mark your reserves clearly with the date they were created. If you're searching for inspiration, this will provide you with some ideas to get you started.

Drying/Dehydration

This technique is exactly what it sounds like. It will prevent the food from deteriorating if it is dried and removed from the environment. It will also keep it edible for far longer than it would normally be if it were eaten while it was still fresh. If you don't have a smoker, you may use a store-bought one; if you don't want to smoke your food at home, you can use an oven on a low heat setting or a dehydrator. Certain fruits and vegetables, such as different peppers, bananas, berries, apples, and so on, are particularly well suited to this procedure. It is also a fantastic technique for making jerky out of whatever cut of meat you want, and it will help you get more use out of your food supply over time.

Root Cellars/Cold Storage

Ideally, this should be a cold and dry environment. There are several options for storage, including an unheated cellar or pantry, a hole excavated into the earth, or any other location where you can guarantee that the food remains cold and dry to ensure that it stays fresh for a longer period. One should only use this technique for root vegetables, but it also works well with other foods such as dry maize and beans and onions and potatoes.

Canning/Preserving

This is a popular technique, and people use it to produce and preserve a broad range of goods, ranging from jams and jellies to salsa and preserved fruits, among many others. There are many methods for canning foods, each of which requires its own set of materials and is best

suited for various kinds of foods. High acid foods should be canned in a water bath or steam can, whereas low acid foods should be canned using a pressure canner. As a novice, you should learn more about pressure canning and steam canning before attempting any of these techniques. Also, always follow the health and safety instructions while using either method. This technique may be used to preserve a broad range of foods, including fruits, soups, jams, beans, jellies, salsas, and several other items. You may even make your preferred concoctions; make sure you know if the product is rich in acid or low in acid, so you know which canning technique to use while preparing it.

Pasteurization

The hygiene of your milking process is critical. Pasteurization isn't necessary for raw milk to be safe and nutritious; nevertheless, you'll need to be meticulous about barn cleanliness if you want this to happen. You may simply pasteurize your milk on the stovetop if you so choose. For 35 minutes, heat your milk to 140°F in a stainless-steel boiler. The milk will be ready after 35 minutes, so place it in an ice bath and let it sit there for the remainder of the time. Stir the milk continuously until it reaches a temperature of 40°F (4.4°C). Because it kills germs, pasteurization improves milk safety. However, using the wrong method may be much more harmful. Once pasteurization is complete, the milk must be quickly chilled to maintain its safety. Skim the cream from your milk after it has been chilled and perhaps pasteurized so that you may use it to make butter or another dairy product. To accomplish this, you may use a ladle to scrape the cream off of chilled milk, or you can buy a cream separator. After the milk has been separated, you may use the skim for drinking or baking, and the cream can be used to make a variety of delicious treats.

Freezing

It's a very straightforward process. You can freeze nearly anything, but certain things will work better if you do a little prep work ahead of time. Most veggies may be blanched before being frozen, which is a good option. As a result, they will remain fresher in appearance and taste. Blanching most vegetables requires just three minutes of boiling, followed by an instant cold bath. When it comes to frozen foods, most meats and fruits may be left as is, but for long-term preservation, you may wish to freeze the fruits in smaller quantities on cookie sheets first. The amount of freezer space you have and your ability to purchase more

freezer units are also factors to consider, but even a modest chest freezer may offer enough capacity to store a variety of delectable foods.

Fermentation

Because it is a safe food preservation technique, fermentation has been around since the dawn of time. Chopped vegetables in salty brine, stored in jars or porcelain crocks, can keep for a month or more. Jars that are kept at a lower temperature will survive even longer. Fermented foods have the additional benefit of being a great source of probiotics, which will aid in the development of excellent gut health and provide a welcome boost to the immunity of those who consume them. You can lacto-ferment just about any vegetable.

Smoking Meat

Smoking meat has been a traditional method of preserving meat since ancient times. It is possible to smoke both hot and cold tobacco products. Hot smoking is a technique that many people are acquainted with because of the widespread usage of home smokers. Hot smoking a brisket is a delicious method to prepare it, but it will do nothing to help it retain its nutritional value. Cold smoking, on the other hand, requires less equipment and is preferable. The first step is to construct a meat-hanging rack or device. One option is to utilize those foldable wooden racks intended to dry clothes in small spaces such as flats. Another option is to use a clothesline with stakes but be careful not to let the meat force the rope to dip near to ground or fire.

Make a shallow hole on the ground and start a fire there. Only hardwoods should be used. The use of softwoods, such as pine, will impart a poor flavor to the meat. If apples or hickory are available, use them to enhance the taste. You also don't want a big, roaring fire going in your room. You're looking for smoke rather than heat. If you want to add more wood to an already-burning fire, soak part of it in water beforehand. As soon as the fire starts to burn, start slicing the meat into strips approximately an inch thick.

Salting

Salt curing meat is a fantastic method to preserve meat for a lengthy period without electricity. Settlements and ship crews used to utilize this method to preserve slaughtered meats throughout the year in the olden days. It is still practiced today. You may keep raw meat at room temperature for months at a time by coating it with salt, draining it, and hanging it to age for approximately two weeks. This prevents germs from developing. Dry-salting produces an environment that is so severe

that bacteria cannot thrive, even the salt-tolerant bacteria necessary for Lacto-fermentation to be successful. throughout this procedure.

Immersion in Alcohol

In the same way, as salt and sugar do, alcohol pulls water from food, preventing the development of microbes. The ability to fully immerse tiny quantities of food in your preferred hard liquor will allow you to preserve them almost forever. Don't attempt to preserve an excessive amount of food in an insufficient amount of alcohol. Maximum water absorption is an important concept to understand. This food preservation technique is the most effective for producing flavor extracts and keeping foods with high acidities, such as fruit.

Trapping, Fishing, and Hunting

It is very common for people to use these activities as the foundation of their long-term survival strategy. Fewer than once-a-week trips to the woods can maintain a survivor's pantry well-supplied. This may work out for people who live in the middle of nowhere, far away from civilization. However, the rivalry will be fiercer than ever for those who reside in urban areas, suburban areas, or even small towns. Be prepared for woods to be hunted out rather fast, as well as tiny lakes being fished out soon. But it is not wise that you completely abandon your intentions to supplement your food source with wild wildlife.

Trapping

Trapping is the least energy-intensive of the three methods of obtaining wild meat for your meal. If you use traps, they'll work for you round the clock, but you'll need to keep an eye on them. In this case, it is recommended that all traps are inspected daily. Even though you don't want to spend a lot of time jogging along your trap path, you don't want to disrupt the animals you're trying to capture by doing so. There is a learning curve to playing the trapping or snaring game, just like everything else. Research the kinds of games that dwell in your region and then go out and find them. It is important to get to know them by learning about their eating habits, activity levels, and where they spend most of their time. You can only set the traps in the most effective locations if you have this knowledge.

Fishing

Sedentary activities such as sitting on the sand with a fishing rod in your hand are much preferable to doing nothing at all. In this case, however,

relaxing is not the goal; rather, the goal is to fill stomachs. Using trotlines and automated fishing reels can increase your chances of catching a fish. Trotlines are a method of fishing in which several lines are cast into the water at the same time. Most of the time, rivers or streams are used rather than ponds or lakes for their placement. A rope or other string is strung from one riverbank to the other, straight over the water's surface. Smaller lines, known as snoods, are dropped into the water at regular intervals throughout the route. Each snood comes to a close with a baited hook. Adding weight to each snood may be necessary for fast-moving rivers and streams to keep the bait from rising to the surface. The snoods mustn't get entangled with one another during play. Keeping them spaced apart based on their length is an excellent method to avoid this from happening. In this case, three feet apart on the mainline is appropriate...

Essentially, they function in the same way that yo-yos do. You bait the hook, drop it in the water, and reel it in. As soon as a fish is hooked, the action of the fish triggers the reel, which causes it to retract the line immediately. Fishing is another pastime that necessitates the completion of homework. You must identify which bodies of water in your region support sustainable populations of fish, as well as the kinds of fish that are there. This will assist you in determining the most effective methods of catching them, such as the kind of bait you use and the optimum times of day to fish. But the good news is that being equipped with basic fishing equipment is a rather cheap endeavor.

Hunting

Trotlines and snares, for example, aren't typically allowed nowadays, at least not in most places, for those of you who often go fishing. You don't want to get in trouble with the law by going out and doing anything stupid. Again, if the sort of long-term catastrophe that we're talking about occurs, those rules will very certainly become irrelevant. When seen in a different light, several existing laws may be transformed into useful advice and ideas for improving your chances of success. For example, hunters are well aware that shining deer is strictly prohibited in most areas. This pastime involves bringing a bright flashlight into the woods and exploring the area. You go to a field or meadow and turn on a lamp or other source of illumination. With your weapon, aim towards the location between two sets of eyes if you see them reflecting at you. Deer tend to stop in place when they notice the light, allowing the hunter to line up his shot. After a society breakdown, this might be an effective

method to significantly improve your odds of putting food on the table for yourself and your family. Keep in mind, though, that you may not want to limit your hunting efforts to just large game such as deer. You may indeed secure a large amount of flesh in a single shot, but you must also have a method of preserving that meat; otherwise, it will go to waste. Advice is to be ready to hunt anything, even if it's only a squirrel.

Chapter 6

Harvesting and raising animals

Raising animals off-grid

What kinds of animals will do best on an off-grid homestead?

The biggest thing that will get in your way when it comes to keeping animals is going to be space. If you decide to go full urban off-grid homestead, then your city will also become a big obstacle for you. However, keeping animals is easier and more rewarding than most people think.

Chickens

These are the best starter for anyone who has never kept animals for the process of food production. You can keep chickens as meat birds. These birds will be grown to a certain size and then butchered. Of course, you need someone in your home who is willing to do the butchering. That is the reality. It's not easy for everyone to just jump into the executioner role.

Don't fret! If the thought of killing chickens makes you woozy, well, you can raise them with the implicit goal of laying eggs! Eggs are such incredible food, and a small flock of hens can just overwhelm you with eggs. They can produce up to one egg per day. So, having 12 chickens means that you could find nearly a dozen eggs in your laying boxes each day!

Laying hens can quickly become a source of income if you want to sell the eggs at a market or to people around you. A flock of 2–3 dozen hens is pretty easy to manage with the right coop or coops and a good collection of laying boxes.

We like to dance with the devil here on our homestead. We have an active presence of dogs and people around the yard daily. This tends to keep the predators at bay, so we allow our chickens to free-range. This means they leave the coop in the morning and wander around the yard each day digging, eating bugs, and mingling. They love this life even if there is some risk. It makes for happy birds.

Goats

Goats are my next pick for top homesteading animals. Goats are a lot of fun and they are milk and meat-producing animals. Again, how much of that you participate in is up to you. Either way, goats are a cool animal that seems to fit in with the antics of an off-grid homestead. They have a lot more personality than you think.

If you are settling on land that you want to clear of brush, well, having a small army of goats to set loose in that brush will make a huge difference. They turn your brush into food and then into milk! That is a pretty impressive trade-off.

Small breeds like the African pygmy goat take up virtually no space in terms of building a barn, and they produce about ½ a gallon of milk each day! You could probably keep them in dog houses with doors if you wanted to.

You will need goat feed even if you offer up the brush around your property. So, you may need to be close enough to a place where you can buy animal feed. For dairy goats, you are going to look for things like alfalfa, alfalfa pellets, grass hay, and whole

oats. Of course, they may need something like a mineral supplement and clean water.

Be sure you get more than one goat because they are animals that love a companion or a group. Outside of that, your off-grid homestead should have a few goats on it.

Cattle

Cattle are one of the most popular animals to keep worldwide for meat and milk, but their large size can make them challenging for beginners. However, done right, a small herd of cows can be a great way to keep your family supplied with protein.

Cows can graze happily on rich pastures, but in most cases won't have access to enough grass to meet all their dietary needs. 2 to 5 acres of land per cow is required to grass-feed them which is not feasible for many homesteaders. If you're fattening a cow to be butchered for meat, expect to feed them 30–40 pounds of hay a day. A lactating dairy cow can eat as much as 100 pounds of hay a day. Oat and alfalfa feed can also be used to supplement hay and grass.

Meat cows are ready for slaughter between the ages of 12–24 months. If you know how to humanely and efficiently slaughter and butcher a cow on the property, you can save money by doing so. However, if you're new to the process, it's better to hire a professional to butcher your beef cattle, ensuring that the process is humane and that you get the most out of each animal. Also, check your local regulations because some states require animals to go to a certified processing facility or have a portable processing truck come to the farm.

When determining what breed of cow to buy, you have many options depending on what you're using them for. Brown Swiss cows are known for being easy to handle and great milk producers. If you're raising cows for milk and meat, consider the

Dexter or Holstein breeds, which are great for both purposes. The cost of one adult cow is approximately \$1400, but you can get cows for much less at auction, or by purchasing and bottle-raising a calf (though this is very time-consuming).

Chapter 7

How to Manage Waste

Methods of Composting

Everyone has various requirements, therefore at any one moment in time, techniques may be more appropriate for your present living circumstances, and you may alter your composting methods many times during your lifetime. Your requirements and surroundings vary over time. Therefore, it's important to know the advantages and disadvantages of several systems before implementing one. In contrast, what you consider a pro may be seen as a disadvantage by someone else. All you have to do now is figure out what will work best for you. They all function to various degrees for various reasons, some more effectively than others, and others are just different. You may have tried a few of these techniques before and are content with your results; alternatively, you may be searching for something to round out your system or a complete overhaul. This information should help you make an informed decision about your composter if you are in the market for a new one. Composting in the traditional backyard is accomplished in the following ways:

- Open-air composting (hot composting)
- Direct Composting (in-ground composting)
- More Composting techniques that have recently been developed include:
 - Commercial Composting
 - Tumbler Composting (A form of hot composting)
 - Combination Composting (Compost Composting)
 - Worm Farm Composting (Vermicomposting)
 - EMO Composting (Bacteria composting)
 - Mechanical Composting

Elements are generally required in most systems to produce compost.

- •Air
- •Water
- •Vegetable Matter
- •Worms
- •Carbon-nitrogen mix (brown and green waste)
- •Bacteria (EMO)
- •Soldier Flies
- •Other Beneficial Bugs

Other insects that aid decomposition, such as cockroaches (including maggots if you place meat in a compost pile—not advised for all composters save the compost).

Open-Air Composting

Traditionally, open-air composting consists of a mound of green and brown organic waste in your garden. The most common kind of bay built from whatever materials can be found is inexpensive and simple to put together. Alternatively, you might have a few bins inverted and sitting on the ground, such as the Gedye bin that you can get at a store; also utilized for water storage and heat capture are wire cages with pipes inlaid around the outside. After that, it may be put to good use as a water heater in environmentally friendly settings. Generally speaking, open-air composting is regarded to be a “hot composting” technique. When lesser amounts of trash are utilized, some people refer to it as “Cold Composting” since it does not generate the same heat level as traditional composting.

Perhaps it should be referred to as “Warm Composting” since the only way to fully cold compost anything is to allow it to decay in the refrigerator. And we’re all familiar with the scent of the refrigerator.

Direct Composting

Direct Composting is as simple as burying your trash on the earth. It is also, without a doubt, the most ancient and most efficient way of composting, but, like with all other composting techniques, it has its own set of shortcomings. This is because everything has to be chopped up before it can begin to degrade properly. It is necessary to bury fruit and vegetables. Otherwise, various garden creatures would be dug out, ranging from birds to rodents, and eaten. Furthermore, you must keep digging holes. It does, however, generate a large number of worms,

which subsequently contribute to the nutritional value of your garden and the improvement of your soil.

Tumbler Composting

It is available in various forms and sizes, ranging from single to double units, which you can buy at your local hardware shop for a commercial price. This is a wonderful method for many individuals, as long as you are physically fit and willing to turn it daily. The work for others may be difficult, particularly if you are in your later years. However, there are also automated ones available that make turning simpler. Two systems are required so that one may degrade completely before being emptied. The second one is being filled up as this is going on! This method may be beneficial when disposing of significant amounts of brown and green trash and when there is sufficient room to accommodate it. It is perfectly OK to use a bay system if you fill it with brown and green trash, but it is important to be aware of snakes and rats breeding in the warm compost.

Worm Farm Composting

The most popular and favored method of composting for many people is worm farm composting, which has the added benefits of producing compost and compost tea and keeping rats out of the compost. Compared to conventional composting techniques, the worms create castings concentrated in nutrients and reduced in nitrogen. Even if you don't have a garden, you may benefit from worm farms. Making your worm farm is something that almost everyone has attempted at some point and had various degrees of success with. Metal containers should not be used to house them since copper leaches out and becomes poisonous to the worms over time. Foam containers don't work for me since the worm juice chews through the foam, causing it to spill all over the place. If they are not placed directly on the ground, they create a huge mess, where nutrients may be absorbed straight into the soil. You may collect the juice in plastic containers. However, you must add a drain or rotate the containers to gather the worm tea. Avoid direct sunlight, frost, and rain, and choose a location that isn't too chilly. Worms may be fickle creatures, and if the circumstances aren't ideal or they're unhappy, they'll attempt to get out of their containers. It is recommended that you utilize worms that are native to your region. There is no way for me to tell whether they will live until you experiment with worms from different regions.

EMO Composting

When it comes to composting, EMO Composting, also known as

Effective Microorganisms, is a technique often used in the home, but it may be utilized by anybody who prefers this form of composting. The Bokashi is the most popular product utilizing EMOs, although other indoor systems may utilize it, and other systems include a carbon filter in the lid to filter smells. The majority of the time, you'll need two of them, so you can fill one while the other sits waiting. You may gather the juice and utilize it in your gardening endeavors. On the other hand, the Bokashi system does not allow you to use anything from your kitchen. You may purchase the EMO online from any of the numerous websites that offer the Bokashi System. If you want to assist the composting process in other systems, you may also utilize the EMOs in those systems.

Combination Composting

Combination composting, also known as compost composting, is a technique that incorporates elements of direct composting, open-air composting, vermicomposting, and EMO composting into a single system. All of the components of composting are used, and it is suitable for most home situations. Some individuals find it to be a source of difficulties. However, for me, the difficulties are fewer, and the benefits are more rewarding. According to the manufacturer, you can compost 'ALL' of your kitchen trash, not just some of it. As a result, you will have almost 50% less trash to dispose of each week in your municipal garbage cans. Fill it, forget about it, and then refill it when you're ready. Once a year, give it a thorough cleaning. It is more efficient and takes less effort than the majority of other composters. Furthermore, it enriches your soil by recycling all of your trash.

Commercial Composting

Commercial composting differs from backyard composting in that it utilizes a distinct set of ingredients. Compost is created in long rows utilizing various materials such as sawdust, pine bark, sand, ferrous sulfate, and perhaps some sulfate of ammonia, all of which are combined. Bagging is ready 6 weeks after it has been rotated 3–4 times a week for 3 days. The low-cost commercial compost has nothing in the way of nutritional value. Despite this, tiny independent commercial compost businesses provide a higher-quality product than the big commercial compost businesses. They are, on the other hand, costlier. Some farmers, such as McLeod's Agriculture, are also organically certified, according to the USDA. The adage "you get what you pay for" definitely holds when it comes to commercial compost. Soil conditioners

like clay or sandy soil benefit from the cheaper commercial compost. Alternatively, it may be combined with composted soil and used to fill a container plant. If you're going to purchase commercial compost, make sure it's a good propagation mix.

Mechanical Composting

In contrast to traditional composting methods, mechanical composting is a fast and efficient technique that utilizes energy to generate heat and rotate the contents to produce semi-composted trash in less than 24 hours. This system is ideal for hotels, motels, restaurants, hospitals, schools, kindergartens, and any other big institution that generates significant quantities of trash from many people, such as a hospital. It is a controllable in-house solution that eliminates the need to transfer your trash to municipal landfills. It is necessary to compost the trash further. Therefore, someone must collect the remaining contents for composting in a bay composting system. A smaller system may be more suitable for a person's private home, but it may be very costly and will need you to pay for energy on an ongoing basis. They have certain advantages and disadvantages, just like any other composter, but they generate semi-composted soil in a short period.

Off-Grid Waste Management

Waste management is very important and also one of the things we think about least when considering living off the grid. When you live on a plumbing and sewage system and have garbage collection regularly, you don't have to think about this very much. However, when waste disposal becomes your job to take care of, you will understand how important it really is.

DO NOT dump your septic waste on your property. It is gross, illegal, and dangerous. We're sure most of my readers already know this, but for the rest of you, don't do this. We don't care if animals use the wilderness as their restroom.

Trash

Anything that isn't compostable, biodegradable, or burnable, such as plastic, should be placed in a container and set aside. Since you don't have a trash removal service coming to your location, you will need to take it to a dump yourself or schedule someone to come and get it. Hopefully, the amount of this kind of waste will diminish over time, and these trips will become less frequent.

Burn

Some things are perfectly fine to burn such as wood or cotton, cloth, paper towel rolls, and dryer lint. Again, just like the water, don't set anything on fire that is going to create toxicity. Don't try burning plastic or metal with paint on it or something else that you wouldn't want to breathe.

When burning things, always do so responsibly. Don't start a fire if you live in a dry climate during a dry spell. In certain places like Wyoming and Colorado, starting fires can be very risky. If you are going to use a burn barrel, just be careful, and be sure to have a fire extinguisher close by.

We're sure we sound like a broken record but here it is: Make sure it is legal to burn your trash. Different places have different rules. If you're deep enough back from the road, probably no one will see you, but it needs to be said.

Septic System

Probably the most popular option is to install a septic system. If you have any kind of internal plumbing in your home, you are going to need this. A septic system is a gigantic tank buried underground just like a water tank, but instead of holding water, it holds everything you flush down the toilet. We don't want the septic system boiling, and we don't want it freezing. Either is going to be a worse disaster than bursting the water tanks, believe me.

Tanks have a hatch, and you will need to periodically have a waste removal truck come and suck out the waste that is stored there. Depending on the size of your tank and how many people live in your home, this could be only once every few years.

Outhouse

Outhouses are a very old way of doing things. They don't require any water and are very easy to build. It may not be surprising to know that most people don't want to use an outhouse. To use the bathroom, you're going to have to leave your house, and if it's in the dead of winter, that's not too fun.

If you don't want to live a life within our house, they might just be useful as a start-up way to have a restroom until you are completely building a more permanent one. If your properties are particularly large, you might find that putting in an outhouse at the far end will be helpful when walking around so that you don't have to hike all the way back to your home for number two.

Chapter 8

Tools to Have for Everyday Living

Essential Tools

The desire to live free from the monotony of daily life and be detached from societal institutions is not exclusive to those who want to live an unconventional lifestyle. There is no lack of romantic preconceptions about the off-grid lifestyle, and it is easy to see why. The job is tough, to be sure, but the work is also regarded as honest and even natural. The way of life necessitates the use of many traditional and unconventional instruments, and if you're serious about it, you'll need to be aware of them to be successful. It has been divided into four parts or goals for the sake of practicality. These are as follows: Harvesting, Health; Repair; and Everyday Life. You will learn more about each particular objective in each segment, which will be detailed and explained in more depth. Before we get started, it's important to understand what a tool is in the first place. As defined by the few dictionaries, a tool is anything we hold in our hands and use to do a task. Thus, rain buckets and cisterns—both of which help collect rainwater—are excluded. A cistern, on the other hand, isn't exactly what we'd call a portable gadget. The use of obvious tools is likewise prohibited. For example, those that are included as standard equipment in a typical toolbox. The idea is that this guide is intended to assist you in preparing using tools that may have otherwise slipped your mind.

Harvesting Tools

Harvesting is a term that may refer to the process of removing natural resources for human use. This may be anything from water to food to fuel to timber for various uses. In addition to the toolbox, make sure you have the following items on hand:

Shovel with a long handle and a round point: This versatile tool comes in useful for cutting wood and ice, as well as for excavating anything from ditches to footers to septic systems, as well as for laying the foundation for your gardening projects and other outdoor activities.

Cant hook: It's one thing to cut down trees, but it's another to move them. Cant hooks are lengthy grasping instruments that are used for grabbing things. Carrying wood with them is faster and simpler, which means less strain on your back.

Tools for Gardening: Establishing a self-sufficient food source is famously difficult to do. Doing something for the sake of achievement is far more enjoyable and useful. A piece of basic gardening equipment will go a great way toward assisting you. To make it easier to use, it should have ergonomic handles on the tools and include many different trowels and spray bottles and gloves, and pruning shears.

Rotary tiller: You may want to consider purchasing a rotary tiller if your garden is large enough to justify manual labor's expense and time commitment. Tillers work quickly to prepare the soil and convert it into a seedbed that is suitable for planting.

Buckets: yet another simple yet very useful multifunctional tool. When it comes to storage and transportation, buckets come in handy for anything from tools to water to compost.

Tarpaulin: Take advantage of its versatility by using it to shield yourself from the elements. It may also serve as a quick-drying barrier or to collect rainwater.

Tools for Health

Living off-grid allows us to be more in tune with the natural world and its rhythms and patterns. Unfortunately, this may also imply that we are exposed to an increased number of germs. The following items should be included in your first aid box, in addition to the usual supply of plasters and sterile dressings:

Antiseptics: They work by reducing the pace at which germs develop or infect the area where they are administered. For example, if you intend on doing some woodworking, you should apply antiseptic on your hands to reduce the likelihood of illness if the skin becomes damaged. When used as directed, bar soap breaks down viral membranes and removes harmful germs from the hands. Hands should be washed with soap regularly.

Tweezers: Splinters and ingrown hairs, but they're also great for removing makeup and facial hair. A simple yet fully functional, multifunctional health tool. It is not just about illness prevention that one should be in good health. Off-grid dwellers nearly always have to put in a lot of time working with their hands. This work, if performed without the appropriate equipment, may be harmful to the body over time.

Safety glasses: Your eyes should never be left to chance in whatever they see. The greatest thing you can do is get in the habit of wearing safety glasses whenever you can.

Earmuffs: At first glance, the sound of hammering, sawing, and utilizing power tools, in general, may not seem to be loud. However, over time, the cumulative noise pollution may hurt your hearing. Earmuffs should be worn daily, just as you would with safety glasses.

Fire extinguisher: If a fire breaks out unexpectedly when you live off the grid, you will most likely be at a disadvantage. In such a scenario, you'll need something to put out the flames as soon as possible. Keep in mind that you must choose the

appropriate fire extinguisher for the kind of fire that is most likely to develop.

Tools for Repair

The capacity to repair and handle most issues with little or no outside assistance is a real measure of independence. Many repair tools fall naturally under the category of ‘everyday tools (e.g., hammer, screwdrivers), including certain wood procurement equipment, such as a chainsaw. This collection of essential items will come in handy for everyone at some point in time:

Carjack: Flat tires are not only possible, but they are also likely to occur. Given the inherent distance of off-grid life and the likelihood that you’ll be relying on your vehicle as a primary mode of mobility, investing in a car jack makes sense.

Duct tape: Purchasers may choose from a wide variety of tape options. Waterproof, tear-resistant, and very durable are some of the characteristics associated with the best quality. Using duct tape will almost certainly be necessary at some time in your life. It’s a fact of life.

Carpenter pencils: This tool is useful for cutting boards, posts, and timber. Carpenter pencils come in useful if you ever find yourself in need of a little do-it-yourself maintenance.

Ropes: Holding everything together figuratively. It is much preferable to use a polypropylene rope since it is very strong and long-lasting. In terms of multifunctional tools, ropes are at the top of the list.

Electric sander: By eliminating splinters and smoothing off the edges of artistry, a sander makes a great deal of it possible. You may purchase mini sanders that look similar to clothes irons.

They are particularly helpful for sanding in tiny and difficult-to-reach areas of the house.

Tools for Everyday

Your off-grid existence may be made or broken by the equipment you use daily. It is important to consider them and to do so thoroughly. For example, although wearing walking boots may appear unimportant, the danger of damage is greatly increased.

Chainsaw: These motor-powered monsters are excellent for clearing brush and trees, as well as for chopping firewood, for obvious reasons.

Work gloves: It is essential to get high-quality gloves, and preferably several pairs of gloves. Find a brand that is long-lasting, well-insulated, and comfortable, and you will spare your hands from the agony of blisters and pains for years to come.

Walking boots: Ten years is the average lifespan of a decent pair of hiking boots. The finest ones have steel toes, are insulated, and are resistant to chemicals and cold weather. If you are performing a lot of physical labor, such as chopping and transporting wood, you might consider wearing steel toes to protect your feet from being crushed by a board.

Bicycle: Bike designs are so clever that our forefathers and foremothers will most certainly be riding them thousands of years from now. They are simple to fix when they break down, are environmentally friendly, and never run out of gas. A bicycle is a great mode of transportation for those who need to get there quickly.

Solar power: The Sun provides unlimited, renewable, and free energy. Doesn't it seem reasonable to you? Even small solar panels the size of a briefcase may now be purchased to charge

your batteries, run your mobile phone, and even heat water for a modest shower in four hours or less.

That's all there is to it. This is a comprehensive list, but it is an important list for those who do not follow conventional wisdom. Living off-grid requires the ability to be a jack of all trades, as well as a high level of preparation. Although the tools mentioned below will not solve all of your problems, they will be very useful as you get acclimated to your new environment.

Safety

Whether you're thinking seriously about taking up the homesteading life, taking steps to set up your homestead, or are already living the sustainable life you were looking for, you know that you want homesteading to be your long-term lifestyle. To avoid injuries, unexpected costs, and damage to your homestead's infrastructure, being aware of the common problems faced by homesteaders and the ways to avoid them is of the utmost importance. Staying safe and healthy on your homestead doesn't have to be complicated, but just like everything else, it does take a bit of planning.

Safety and Medicine

Having a first aid kit on site is essential, even if your homestead isn't overly isolated. A first aid kit will give you a chance to help injured people until they can get to medical care.

There are certain items that every first-aid kit should include:

- Adhesive Band-Aids, of various sizes
- Triangular bandages
- Roller bandages

- •Sterile gauze and tape
- •Antibiotic ointment (Polysporin)
- •Nitrile gloves
- •Antiseptic wipes
- •Blunt-tipped scissors
- •Scalpel
- •Breathing barrier
- •Oral thermometer
- •Aspirin and/or ibuprofen
- •Splint and elastic wrap

The first aid kit should be placed in a location where it is out of the way, but still accessible to every family member, including children. Marking the first aid kit, perhaps with reflective tape, will make it easier to find during the chaos of an emergency.

Conclusion

This way of life is also a lot cleaner. The energy is produced by using natural, renewable sources. The food is real and the water is in many ways better than what you get from the tap. It's a truly balanced way of life where you don't contribute to pollution.

In order to live off the grid, you have to make some sacrifices, though. Your entire consumerist mentality has to change. Things don't just get thrown away or replaced in this way of life. The idea is to always find new uses for old things. Once you get free of the understanding that when something gets old or broken it should be thrown away, the sky's the limit. You can allow your inner creativity to guide you. There are so many things you can do if only you open your eyes to the possibilities. You'll have to learn how to save and reuse. Efficiency is key.

Living off the grid means living a lot more freely. It means that you're self-sufficient and you produce your own energy, and food, and have an independent water supply. Your life doesn't hinge on the economy, the stock market, or anything that is going on in the rat race. This is true freedom in its most natural form.

Living off the grid is closely tied to the surroundings and the environment. This means that the landscape and the atmospheric conditions should always be used to your advantage. It also means that you have to maintain the house all the time so it requires some level of understanding of basic wiring and plumbing. You can't live off the grid without understanding this—your house is like a natural extension of yourself and you have to take care of it at all times.

Furthermore, we've seen that you don't have to rely on the grid for food, as you have the ability to raise plants and animals on your homestead that are free of industrial antibiotics and pesticides. With a supply of canning jars and a little creativity, you can not only feed yourself through the warmer months but also stock up for the winter, cutting your reliance on grocery stores down to a minimum.

We know that you're curious about moving off-grid, but at this stage, you're probably more than curious. If you didn't like the idea or didn't sound like it was for you, you probably would have stopped reading this

book halfway through earlier, but because you read it from the front to the back, you're still interested.

If you are so interested and have the means and opportunity, we would recommend that you take this on. This is not something we would encourage a half-interested person to do, but if you have made it to the conclusion of this book, you are feeling excited, and you are thinking about all the different projects that you could do and the only things you want to learn, then we say follow that instinct. Take it to its ultimate conclusion. Find your independence, self-reliance, and environmental consideration, and build yourself a place where you will be happy and free.

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BOOK 3
SURVIVAL FOODS TO
STOCKPILE

THE ULTIMATE GUIDE TO
FOOD AND WATER STORAGE
FOR ANY EMERGENCY AND
DISASTER

Introduction

Your family is too important to ignore, right? You wouldn't ignore them and not go grocery shopping or prepare meals for them, would you? What if you lost your job or there was a major natural disaster? Would you just not feed them? Imagine the unthinkable, like a war or civil unrest that leaves the entire community or even country in a state of emergency. Caring for and feeding your family is still going to be a priority, but it is going to be tougher without the benefit of grocery stores, fast food restaurants, or even the help of the government.

You would be completely on your own. Your family would be depending on you to feed them, even if the world was in chaos. With the state of the world in such turmoil, the last thing you need on your plate is a starving family. It would turn you inside out to see your family suffer unnecessarily. Yes, it isn't necessary because you can do things today to ensure they do have full bellies and the nourishment they need to stay alive. You can ensure there is food to put on the table to keep your family going until things mellow out or you find a reliable resource of food.

By taking the time to start creating a prepper's pantry today, you can eliminate a great deal of stress and frustration if you ever find yourself in financial dire straits or facing an uncertain world. Nothing in this world is a guarantee. Just because you have a full pantry today and plenty of money in the bank to buy more food, it doesn't mean it will always be that way. Prepping is about preparing for an uncertain future. We never know what is around the next corner. Do what you can to make sure your children's bellies are full and you will not have to hear their cries for food.

Chapter 1

Food Stockpiling



Types of Stockpiles

There are several sorts of stockpiles that are kept at various levels for various purposes. Three primary types are important to differentiate and comprehend. These are the following:

Public Stockpiles—owned, managed, and monitored directly by governments through state-owned corporations like the Food Authority of India, Bernas in Malaysia, Bulog in Indonesia, Public Warehouse Organization for Thailand, and National Food Authority in the Philippines.

Private Stockpiles—private firms have sole or entire control, but both the government and the private owners can supervise and co-administer them. The Philippines is an example of a country where the government monitors and reports on private stockpiles.

Governments in other countries, such as Singapore, can utilize their discretionary powers to guarantee a minimum amount of private stockpiles that must be maintained for quite a set length of time. In such cases, governments might use publicly available

private stock information to make proactive decisions to ensure food security for their citizens.

Household Stocks—directly held by small producers /consumers, yet subject to government oversight to some level. Many nations do not routinely monitor consumer inventories at the home level, but it's done through frequent surveys where they do (as in the Philippines). Household stocks have just been the strategic disaster preparedness program in earthquake—and tsunami-prone countries like Japan, where certain three-day food rations, including water, were stockpiled, allowing survivors to stay for external help from first responders.

Survival Foods for Emergency Situations

First of all, we have got to ask ourselves, what are survival foods? Well, survival foods, as the name suggests, are non-perishable foods that help provide adequate or approximately adequate nutrition in times of emergencies. They are rich in nutrients and high in calories and do not get spoiled so quickly. They are failsafe during natural disasters such as earthquakes, hurricanes, floods and storms, pandemics, or wars that do not give much prior notice before they unleash themselves on the sons of men.

To maximize your chances of satisfaction during these periods, foods you buy should be long-lasting, nutritionally dense, and easy-to-prepare foods, particularly those that do not require any cooking at all, as power or gas supply may be disrupted during emergencies.

To make the best combination, you have to prepare ahead, especially if you live in areas prone to natural disasters. Your food combination should make a roughly balanced diet. You may

choose to buy ready-made packs of emergency foods sold in stores around or go for the usually cheaper and usually more fun option of selecting the constituents yourself. You should select varieties of grains such as brown or white rice, proteins such as dried beans, dried meat, and powdered eggs, as well as vitamin sources like dried or canned fruits and veggies, and oils. Also, it is wise to store as much water as possible.

Necessary Equipment and Tools for Food Storage

Several kinds of tools and equipment are used in the packaging and preservation of food items for storage. Basic kitchen equipment like knives, trays, cutting boards, colanders, measuring cups and spoons of different sizes, funnels, and weighing scales will be needed to make the different commodities into appropriate storage forms.

The major tools are those directly involved in the storage and preservation, and they can be used for both short-term purposes as well as long-term. Most of these are simple tools including metal cans, plastic buckets, and others. General precautions to take with these containers are to make sure that they are properly washed with warm water and soap and adequately dried. We do not want to risk any contamination of the stored foods or contact with water as microorganisms are capable of growing in the slightest moisture.



Metal Cans: especially *Number Ten* tin cans are arguably the

best containers you can use for storing dried foods such as grains, beans, and flour. Overlooking the fact that they cost more than other storage containers, they provide superb protection for preserved foods. They keep oxygen out of whatever is kept in them as they are very airtight. Oxygen absorbers can also be used in these containers to absorb any trace of oxygen that squeezes in during packaging. These things are also durable and reusable. One major disadvantage is that they eventually yield to rust, especially if they come in contact with water.

Plastic Containers: are cheap and available all over the place. You can buy from stores or even get some for free from restaurants around. They come in different shapes and sizes. They are also reusable and can stay for quite a while. The major drawbacks are that, unlike metal cans, they cannot completely keep out moisture and oxygen. This is why oxygen absorbers cannot be used with them. Another thing is that these plastics cannot completely keep out rodents. The ones with really sharp teeth may successfully make holes in them after a while. Owing to this, they cannot be used to keep food for as long as metal cans, but they will still do a really good job of protecting your foodstuffs.



Mylar Bags or Pouches: are flexible and can fit into small spaces, making them useful in the preservation of food items. They can keep oxygen and moisture out, but they do not keep out rodents as well and are scarcely reusable. Mylar bags come in different sizes, allowing you to select from a wide range of

capabilities to suit your need. They are easier to carry, totally reusable, and airtight, hence they keep oxygen out but they do not keep the rodents out as they can easily chew their way in unless combined with other methods of packaging. After a successful packaging of the food items, they have to be shielded from rodents, which are a major source of damage to the food items.

Glass Jars: are also inexpensive options and can be used several times over. These containers can be used for the storage of small quantities of food. Glass jars are also a very efficient storage method, but ensure that they are properly stored as botulism is very much on the table with this storage method. The major challenge is that they may get broken, especially when carelessly handled. Clean them well before use and arrange them in boxes or on shelves.

PETE Bottles: can be easily acquired from different sources. However, they have limited storage capacities and must be kept away from rodents. As a general precaution, they should be thoroughly cleaned before usage to prevent them from being the source of contamination or infection for the foodstuffs we are attempting to preserve. Also, they do not totally keep oxygen out and, for this reason, they must be combined with some form of treatment. PETE bottles are reusable and can easily be gotten from several sources. Make sure they are well cleaned and dry before use.

Suitable combinations of these storage methods can also be used. For instance, the food to be stored can be placed in a Mylar bag that can be used in combination with a plastic container; PETE bottles can be neatly arranged in other containers too. It stands to reason that a combination of two storage capacities will be more effective than a single storage method. At least, if rodents really want the foods in them so badly, they should do more work.



Refrigerators: Help to keep food at very low temperatures for as long as possible, provided there is a stable power supply. Fresh foods and frozen foods such as fish, meat, as well as fruits, and vegetables can be safely preserved there.

Building shelves and cabinets in your pantry will definitely help maximize the use of space. It also makes navigation easier. You won't have to disorganize and rearrange everything every time you take something out of there. Never mind the fact that it presents a clean and eye-soothing appearance to whoever beholds it.

Short-Term and Long-Term Food Storage

Generally, getting food for the short term may not pose so much of a challenge. You only have to get as much nutritious food as possible for yourself and your family and you probably already have a mental list of things you usually buy, with maybe one or two additions. It is usually a mosaic of the usual foods you eat every day. In fact, it is more advisable to stick with what you are already used to if you won't be stuck indoors for long, usually three days to about a week.

When storing for the short term, you should consider obtaining foods that can be stored in the refrigerator, do not require so much cooking, and contain enough calories. Make sure you store under cool and dry conditions, as heat and moisture destroy food items faster and reduce their nutritional value.

You may also choose to apply long-term methods for your short-term food storage. No one's going to crucify you for that. When storing food for the long term, it is important to use the right containers and treatment methods as well as the most suitable food items. Not all foods can be stored forever. Foods that survive the most for years are high-quality foods with little or no moisture content (usually less than ten percent). Also, they must have very minimal levels of oil. Brown rice for instance, in stark contrast to white rice, cannot stay unused for years as it has more oil content in its bran. With appropriate treatment methods, however, nearly any food item can be forced to last for a couple of months, maybe even for years.

Use storage containers like Number Ten Cans, Plastic Containers, Buckets, and other long-term storage materials. Oxygen absorbers, dry ice, diatomaceous earth, and many other treatment methods can be trusted as effective in keeping your food safe for long.

Rotating Your Stockpile

Rotating your stockpile isn't difficult, but it does require good organizational skills. You want to eat the food that's closest or just past its package date and replace it. Why? Your stockpile will always be its best in terms of nutrition. While most foods technically last way past their "best by" date, they lose nutrients as time passes. You don't want to end up with a stockpile that offers no nutritional value. You also don't want a stockpile that's so old, you're not 100% sure something is safe to eat. Getting sick is the last thing you want during a crisis.

Digging into your stockpile regularly also allows you to catch any storage problems before they ruin all your supplies. This saves you money in the long run. You'll also get to eat some of

the foods you don't normally use, so you can be sure you like them.

What about water? As you know, water doesn't expire, but if possible, you always want your water to be fresh. Some preppers recommend rotating your water supply every year or so. You can use it for drinking, washing, or cooking and then replace it. This also lets you check on your water to make sure you've been storing it properly. If you forget to rotate a supply, but you know it's sealed and safe, you don't have to stress about it too much. It is more about its freshness than anything else.

Tracking the Pantry



The key to maintaining and rotating your pantry is staying organized. Keep a list of all your items and write down their package dates. Some preppers write the package date in large letters directly on the item as well, so they don't need to refer to their master list every time. You can also set yourself reminders in a digital calendar, so you'll be notified when a date is coming up.

As soon as you use an item, write it on a list so you know you need to replace it. Do you need to replace it right away? You don't need to make a special trip to the store to get a single can

of tomatoes, but don't wait too long. You want your stockpile as complete as possible at all times because you don't know when an emergency might arise.

Chapter 2

Water Stockpiling



While you can live for quite a while without food, you will die in only a few days if you do not have water. Your prep must focus first on the water—collecting it, storing it, and then filtering a fresh supply when your stored water runs out.

How Much Water Should You Plan on Initially?

Well, that depends on how many people are in your family, the weather conditions, and the type of activities that you will be doing. Based on an average family of four under typical emergency conditions, you will need about twelve gallons of water for 72 hours—that is twelve gallons of water for each person per day.

But, if the temperatures are very hot or you are going to be very active during that time, you will need approximately double that amount. You will also need water for cooking during that period.

Five Basic Water Storage Tips

Whether you are going to be packing the water in your bug-out bag or

keeping it in your retreat, bunker, or shelter, it will need to be stored correctly and safely.

The wrong material could mean contamination or leakage, and neither does anyone any good. You must have the right material to store your water based on your needs and your location. Not all materials are created the same.

Tip Number One: Know Your Materials

Several materials could be considered for your water storage. Plastics are often the first choice because the containers are lighter to carry. But plastics can be dangerous if they are not the right kind—you can't just grab the first thing you find and fill it with water and hope for the best.

Milk jugs for instance are almost hopelessly impossible to clean out and can be contaminated with milk proteins even after they have been rinsed countless times.

Other materials can break on the road or break because of temperature changes. Some can be too heavy to carry on long journeys. You must know your materials so that you can make the safest choice for your water storage.

PLASTICS

All plastics for food and water must be listed as food-grade safe. Look on the bottom or the side of the container. You will see a triangle of arrows indicating that it is or could be recycled. Inside of the triangle will be a number—for the container to be considered safe for food or water, it should have a number between one and seven.

The best plastic container will be the number two container which is made of a plastic called high-density polyethylene or HDPE.

The others that are considered to be safe for food or water storage are number one (PETE), number four (LDPE), and number five.

Some containers marked with a seven might be considered safe while others are not. If you are not sure of the safety of your container, it is best to err on the side of caution and not use it.

GLASS

Again, not all glass containers are created equally. The best glass for food and water storage is borosilicate glass, which is most commonly known as Pyrex.

This type of glass can handle temperature changes and is fairly resistant to breakage. Be warned, there is a form of glass that calls itself by the

Pyrex name but is made of the lesser quality soda-lime glass and does not handle temperature changes or extremes as well.

An example of this glass is Mason jars as well as the home canning jars that are meant to look like Mason jars but do not perform like them.

Make sure that the jars that you choose can handle canning situations, including pressure cooking, or they are not the real deal.

Any glass that is subjected to extreme conditions can break or crack, which can lead to leaking or more obvious flaws. This glass could also have small flaws inside of the container, which can become breeding grounds for contaminants.

STAINLESS STEEL TANKS

A stainless-steel tank may seem expensive at first but over its lifetime, it will more than pay for itself. Most well-made tanks will last roughly forty years or more depending on circumstances and location.

These types of tanks are the best to use for collecting rainwater and storing it for filtering and use when freshwater has been used up.

Tip Number Two: Preserving Your Water

Water must be stored correctly so that it does not become contaminated. For longer-term storage, it must be preserved or small microbes can breed and cause illnesses that can lead to even more serious medical conditions. If you are storing tap water, you may not need to add anything to it because most cities add chlorine as part of their system anyway.

If you are using any other type of water for longer-term storage, you will need to add bleach or iodine. Use bleach for stored water and iodine for possibly contaminated drinking water at the point of use.

CHLORINE

There are several ways to add chlorine to your water for storage so that it is safe when you are ready to drink it. The simplest is to use liquid bleach making sure that you are using the type that is listed as 5.35% chlorine content without any kind of additives or scents. This will kill virtually all of the bacteria that could potentially cause illness.

To do so, add two drops of the liquid bleach to every two quarts of water you are storing. At this point, you should smell the chlorine, but if you do not, you may need to add slightly more. Start with another drop to two drops and that should do the trick.

When you are ready to drink this water, open the container and let it

stand for thirty minutes or more. (You may need to leave it open for 45 minutes or more if you added the additional drops of bleach.)

Chlorine must be stored at temperatures that are fairly stable and never go below fifty degrees or above seventy. You should note that after one year, the bleach will start to degrade. Chlorine that is listed as 6% sodium hypochlorite will degrade even faster and must be replaced after three months.

CALCIUM HYPOCHLORITE

An even better option than liquid bleach is called calcium hypochlorite or its more common term, “pool shock.” This has a longer shelf life and can treat more water as well. You can buy this in two forms, the dry and the hydrated.

The hydrated is safer for the average person to handle, but the dry can be stored virtually forever.

You must find the pool shock that is 68–78% calcium hypochlorite without any additives like water softeners (which may be listed as anti-scaling agents on the label).

To use the pool shock for water storage, you must create a treatment solution first.

DO NOT DRINK THIS SOLUTION!

Be sure to carefully label the solution with the proper warnings and instructions for usage. The solution will be one teaspoon of the shock to every two gallons of water. When you are storing the water, you use the solution in a ratio of 1 to 100—one part of the solution to every 100 parts of the water you are storing.

Again, do not drink the storage solution. Used in this way, a single pound of pool shock will effectively treat as much as ten thousand gallons of water.

IODINE

Iodine is more effective than bleach at killing giardia lamblia, which can cause giardiasis. It is also better for use as a treatment for water that you are about to drink rather than as a storage treatment. Iodine should be used for water if you are not sure of its source or how it was stored.

It works best in warmer temperatures and the bottle must be stored away from direct light. Iodine should always be kept in a dark-colored, glass bottle.

There are several cases where iodine may not be helpful or should not be used. Anyone who is allergic to shellfish is at a higher risk of being

allergic to iodine as well. Women who are over the age of fifty, as well as anyone who is or may be pregnant, and people who have known thyroid conditions or are taking the medication lithium should speak to a doctor before using iodine.

A third option, portable aqua water treatment tablets should be included in the bug-out bag as an emergency backup.

Tip Number Three: Where You Store Your Water Is Important Too

What you store your water in and how you store it is important, but where you put your water is equally important. All stored water must be kept away from extreme temperatures and should also be kept out of direct sunlight.

A dark closet might be a good choice if you do not have an underground shelter to keep it in, but you have to consider the possible hazards that you might face.

Will the area be protected from things like earthquakes, fires, or floods?

Tip Number Four: Water Has a Shelf Life

Even with proper storage, in the perfect location, and the right storage material, your water has a shelf life and must be rotated and replaced.

The typical shelf life for water is about six months or so—all of your materials that you are prepping, water, food, medications, and more, should be clearly labeled so that you know when they were put into your storage and when they are set to expire. Rotate your stock so that items that are near their expiration date are brought to the front to be used up so that they do not go to waste.

Tip Number Five: Think Beyond What You Drink

Remember, you will need water that goes beyond just what you are drinking each day.

You will still need water for bathing, cleaning your dishes and utensils, and the food preparation surfaces. You will also need water for first aid purposes.

To get an idea of how much water you might need to realistically store, keep track of your daily water use for a few days and average the amount out.

Chapter 3

Essential Foods for a Correct Nutrition

Foods may be perishable or non-perishable. As these terms suggest, perishable foods do not last so long as non-perishable foods that may stay unspoiled for years. This variation in lifespans is because food items have different nutrient content. The amount of water and oil in a portion of food appears to be the most important factor in determining longevity. The less of these two present in a commodity, the greater the chances of them staying long on the shelf.

Grains

Soft and Hard Grains



Speaking of essential foods that last very long, grains such as rice are the first to peep up in the mind, especially because they have low water content. Soft grains such as quinoa, barley, and rye as well as hard grains like wheat and millet can last for as long as eight to ten years. They may even stay longer, provided they are adequately protected away in airtight storage containers, especially those obtained from stores and supermarkets that sell food items in long-term storage. White rice particularly can last for as long as twenty years if stored appropriately.

Pasta

The key idea about long-lasting foods is that they contain little or no moisture at all. The different kinds of pasta fit the bill. Those obtained from retail stores should not be used beyond their shelf life of about two

years. However, some particularly dry ones can stay uncompromised for as long as ten years. Yes, they truly last that long.

Hardtack

Also called pilot bread and ship bread, hardtacks may not be as inviting as brown cakes, but they definitely cannot be left out of this venerable group of long-lasting foods. They are more or less everlasting and they served as the staple food on ships for decades. They were even given as food for soldiers during the American Civil War. Besides, they can easily be made from readily available ingredients such as flour, and maybe salt or sugar, as your imagination pleases.

Flours

Flours, especially those made from wheat, can prove to be really indestructible, staying dandy for decades. They are better stored though in the unground form, as their longevity drops drastically after grinding. You should store them as grains and turn them to powder only when you need to.

Rolled Oats

Oat is most commonly obtainable as oatmeal and is usually in canned containers. Depending on the manufacturer, canned oatmeal can stay for about one to two years, as far as storage guidelines are followed. The most important guidelines you will see are to keep them at room temperature and to keep away from moisture or oxygen in a cool, dry place. It is always very helpful to store such water-sensitive foods with oxygen absorbers.

Proteins

Beans



Being the cheapest source of protein, beans are one of the most valuable food items in many countries. Several cultures combine beans and rice in very creative and interesting ways to supply needed protein and fibers.

Dried or canned, they can remain viable for as long as five years. Store them sealed away with oxygen absorbers and they will be fine. Longer than five years, however, dried beans get really difficult, as they usually require prolonged periods of cooking. Canned beans, as with other canned foods, should not be used beyond their expiration dates because of the risk of botulism.

Meats

Meats are of different types and can be preserved in different ways. Most meats are fresh, just dried, freeze-dried, or canned. While fresh meats appear to make the best delicacies, they cannot be relied upon at all in the long term. This is why, in storing meat, the best option is to get them dried yourself. That way, you can vouch for the integrity of your preserve. In any case, dried meats are available at stores and supermarkets, and they usually last for about two years, under normal storage conditions. Freeze-dried meats on their own part can stay for a whopping fifteen years. Canned meats like corn beef, spam, and chicken can go indestructible for one to five years, depending on the manufacturer. Always ensure the cans are intact, to prevent any unpleasant surprises.

Lentils

Lentils are technically in the legumes family and are richly packed with protein and fibers. Like beans, they usually do not last for more than five years, and that is in the dried form.

Eggs



Oh, eggs! In natural form, they glorify the food and stimulate the taste buds. If you want them for the long-term though, you will have to settle for the powdered form. Powdered eggs have to be purchased from professional long-term storage manufacturers. They can last up to 10 years if stored under ideal conditions.

Pemmican

Pemmican is a blend of lean dried meat in powdered form mixed with

melted fat. They are not too delicious but they can be the savior in dire situations. If stored properly, they can stay unspoiled for four to five decades. Surprised? That's no myth anyways.

Nut Butters

Groundnuts mixed with butter. Always good and ready to eat, they do stay for a while too. In powdered form, we can talk about fifteen years. When they are in glass jars, however, do not raise your hopes too high. They usually give up after about twenty-four months.

Fruits and Vegetables



Fruits and vegetables such as cabbage, broccoli, and roots such as onion and potato are veritable sources of numerous vitamins, fibers, and several other important nutrients.

Dried Fruits

Fruits are most tasty in their raw, natural forms. Nothing beats that taste, not when you are munching your favorite. As with other food items though, if they are to stay around for longer periods, they have to lose their moisture. Dehydrated apples, strawberries, and others can stay for about twenty years, that is if the dehydration is well done. Reliably dehydrated fruits, like other food items, can only be obtained from companies that produce long-term foods.

Freeze-Dried Fruits

Freeze-drying is also known as lyophilization or cryodesiccation. Freeze-dried fruits can last for nearly as long as dried fruits if stored under the right conditions.

Canned Fruits

Canned fruits tend to keep their yummy taste for a while and manufacturing companies stipulate that they can stay for about two to three years. For maximum preservation, it is best to religiously follow storage instructions.

Dried Vegetables

Vegetables are of different types including salad, fruiting, shooting, and squash vegetables. Others include roots such as potatoes and bulbs such as onions. They are sure sources of delicious nutrition. In fresh unprocessed form, shelf-lives are not the same, owing to the difference in water content of individual veggies. When dried, however, dehydrated vegetables may last for decades. Dried onion, for example, stays for close to ten years if stored right.

Freeze-Dried Vegetables

Freeze-dried vegetables have an average lifespan of about five to ten years.

Canned Vegetables

If manufacturer storage instructions are religiously followed, canned foods generally may last for two to three years.

Dried Potato Flakes

Potatoes are most commonly stored as flakes. These may last up to fifteen years. Just store in a cool, dry place away from light.

Dried Corn

Dried corn can last forever. This is especially true when kept away from water and moisture.

Fruit Leather

Also called fruit rolls, they are one of the ingenious ways humans have designed for preserving fruits. These fruit snacks will last for about a year if stored in the freezer.

Oils



Coconut Oil

Coconut oil stored in securely airtight containers can stay for as long as one to five years. When they get exposed though, they will not hold out

for that amount of time. Oils go rancid when they get spoiled, so it is hard to miss when they become unusable.

Olive Oil

Just like coconut oil, olive oil is viable for about two to five years. They must be stored in a cool, dry place and at room temperature. Do not use them once you notice that they have gone rancid.

Clarified Butter

This is also called ghee, and it is commonly used in cookeries. Unopened, you can have them safely for about two years. They can be stored at room temperature or stored in refrigerators.

Other Essentials

Tea



This item appears to defy expiration. Loaded with several health benefits, it stole its way into the menu of many families since time immemorial. Manufacturers commonly sell them stored in bags and for about two years, your beverage is safe.

Coffee

It looks like beverages just do not fancy getting spoiled. Instant coffee and freeze-dried coffee can be preserved for more than twenty years. They can stay for untold years if stored in a freezer.

Cocoa

If they are safe in airtight containers, powdered cocoa may last for as long as two years, even more.

Milk

Milk is best stored as a powder in dry, airtight containers. In this state, they may last for fifteen years or more. Like oils, they begin to smell rancid when inappropriately preserved, indicating that they have become unsuitable for consumption.

Honey

Raw honey, besides making food sweet, serves several other nutritive functions. Thankfully, they can be left unspoiled for donkey years, as long as they do not get in contact with water. They may, however, crystallize after a while. This is nothing to worry about, as you only need to place them in moderately warm water to get your honey back.

Sugar

Sugar, like honey, is used as a sweetener. To stay long, they must be dry and kept in a cool place away from light. Sugar attracts all kinds of ants, so efforts must be made to ensure that they are out of reach to these industrious crustaceans.

Syrups

Maple syrup and corn syrup can be left in the store for as long as possible. Store in a cool, dry place in airtight containers. To prolong their shelf lives, they should be kept refrigerated in a freezer.

Salt

Salt is the greatest seasoning agent of all time. It doesn't need any special preservation techniques, as it is a well-known preservative. It can be kept at home indefinitely. Care must be taken though, that it is not contaminated with poisonous agents. It should be stored in airtight containers as it may attract moisture from the surrounding environment. Unprocessed salts such as Himalayan salt are most suitable.

Other food items include alcohol, vinegar, herbs, spices, bouillon, soy sauce, and baking soda.

Chapter 4

Supplement

Vitamins and minerals are fundamental components for our bodies to grow, develop, and function properly. Every vitamin and mineral plays a unique purpose in keeping your body healthy. Certain nutrients can be toxic in excess or insufficient amounts. The infographic below explains some of the health advantages and food sources for the vitamins and minerals your body needs.

All of the required vitamins for good health are normally found in a well-balanced diet. Before beginning a new vitamin or mineral supplement, speak with your doctor.

Vitamins



Vitamins are categorized into two groups: fat-soluble and water-soluble.

Fat-Soluble Vitamins

Animal products and fat-containing meals include fat-soluble vitamins, such as milk, butter, vegetable oils, eggs, liver, and oily fish. Our bodies can store fat-soluble vitamins, so we don't need to consume them every day. Having far more of these vitamins than we require might also be detrimental. Fat-soluble vitamins include vitamins A, D, E, and K.

Water-Soluble Vitamins

Fruit, vegetables, milk, cheese, and grains are all good sources of water-soluble vitamins. Heat or exposure to air can both kill them. When cooking, they can also get lost in water, especially when boiling food. Water-soluble vitamins can be preserved by steaming or grilling and using cooking water to flavor soups and stews.

Because water-soluble vitamins are not deposited in the body, we must consume them frequently. If we consume more than we require, the excess is excreted through our pee.

Water-soluble vitamins include vitamin C and the B vitamins:

- •Thiamin (vitamin B1)
- •Niacin (vitamin B3)
- •Riboflavin (vitamin B2)
- •Folic acid (vitamin B9)
- •Vitamin B6
- •Vitamin B12

Vitamin A

Retinol is another name for vitamin A. Cheese, eggs, oily fish (such as mackerel), milk, fortified margarine, and yogurt are all good sources of vitamin A.

Vitamin A is also abundant in the liver. However, because it is such a nutrient-dense food, you may want to limit your intake if you currently eat it once a week. Because of the quantity of vitamin A in the liver, you should avoid eating it if you're pregnant.

Vitamin A is a fat-soluble vitamin, which indicates it may be absorbed via the skin. This means you won't require it every day because whatever vitamin your body doesn't require right away gets stored for later use. Your everyday diet should supply you with all of the vitamin A you require. This is what it is:

- •Men should take 0.7 milligrams every day
- •0.6 mg per day for females

Vitamin D

Vitamin D deficiency is quite dangerous. Vitamin D is necessary for muscle and bone health and has a variety of functions. Sunlight is the most important source of vitamin D. Because vitamin D is only found in a few foods, getting enough from vitamin D-rich foods or fortified foods alone may be difficult.

Oily fish and eggs are great providers of nutrition. Breakfast cereals and spreads that have been fortified are examples of other food sources.

Vitamin B1 (Thiamin)

Vitamin B1, commonly known as thiamin, is contained in almost all

foods. Good sources are pork, vegetables, milk, cheese, peas, fresh and dried fruit, eggs, wholegrain bread, and fortified breakfast cereals.

Thiamin is a water-soluble vitamin, which must be consumed daily because it is not stored in the body. Your everyday diet should supply you with all of the thiamin you require. This is what it is:

- •Men should take 1 mg each day
- •Women should take 0.8 milligrams per day

Thiamin serves a variety of roles. It, for example, collaborates with other B-group vitamins to aid in the breakdown and release of energy from meals and maintain the health of nerves and muscular tissue.

Vitamin B2 (Riboflavin)

Riboflavin, often known as vitamin B2, is a B vitamin that can be found in modest levels in various foods. Milk, eggs, fortified morning cereals, rice, and mushrooms are all good sources.

Because UV light can damage riboflavin, these foods should be kept out of direct sunlight as much as possible. Riboflavin is a water-soluble vitamin that must be consumed daily because it cannot be stored in the body. Your everyday diet should supply you with all of the riboflavin you require. This is a rough estimate:

- •For men, 1.3 mg per day is recommended
- •Women should take 1.1 mg each day

Riboflavin serves a variety of purposes, such as helping to maintain the health of the skin, eyes, neurological system, and mucous membranes; helping to generate steroids and red blood cells; and may aid in the absorption of iron from meals.

Vitamin B3 (Niacin)

Vitamin B3 is another name for niacin. Beef, pork, chicken, wheat flour, flour, eggs, and milk are all good sources of niacin.

Niacin comes in two forms: nicotinic acid and nicotinamide; both found in the diet. Niacin is a water-soluble vitamin, which must be consumed daily because it is not stored inside the body. Your everyday diet should supply you with all of the niacin you require. This is a rough estimate:

- •For men, 17 mg per day is recommended
- •Women should take 13 mg each day

Niacin serves a variety of roles, such as helping the neurological and digestive systems stay healthy by producing energy from the meals we eat.

Vitamin B6 (Pyridoxine)

Pork, chicken, turkey, fish, bread, whole cereals (oatmeal, wheat germ, and rice), eggs, soya beans, vegetables, peanuts, potatoes, milk, and some fortified breakfast cereals all contain vitamin B6, commonly known as pyridoxine.

Vitamin B6 is a water-soluble vitamin. Because it cannot be kept in the body, you must include it in your daily diet. Your everyday meal should provide you with all of the vitamin B6 you require. This is a rough estimate:

- •Men should take 1.4 milligrams per day
- •Women should take 1.2 milligrams per day

Vitamin B6 serves a variety of purposes, such as allowing your body to utilize and store the energy from carbohydrates and protein in our diets aids in the formation of hemoglobin (a substance that carries oxygen around the body).

Vitamin B9 (Folic Acid)

Vitamin B9, often known as folate in its natural form, is a vitamin belonging to the B group. Folate is a water-soluble vitamin, which must be consumed daily because it is not stored in the body. It is present in small amounts in a variety of foods.

Folate is one of the most important vitamins in expecting because it helps us build red blood cells. Women should take extra folic acid during pregnancy to protect their babies from neural tube disorders like spina bifida. This is crucial during the first trimester of expecting.

Vitamin B12

Vitamin-B12 can be present in almost all meat products and some algae, such as seaweed. Meat, salmon, cod, milk, cheese, eggs, yeast extract, and several fortified breakfast bowls of cereal are all good sources.

Adults requiring about 0.0015 mg per day should receive enough vitamin-B12 from their diet if they eat meat, fish, or dairy products. On the other hand, Vegans may not obtain enough vitamin-B12 because it is not found in vegetarian foods (such as fruits, vegetables, and grains). As a result, they may become deficient. Vitamin B12 serves a variety of roles, such as assisting in the production of red blood cells, and the

continuation of a healthy neurological system aids in the release of energy from food required to metabolize folic acid.

Vitamin C

Ascorbic acid (vitamin C) is found in a wide range of fruits and vegetables. Peppers, broccoli, Brussels sprouts, sweet potatoes, oranges, and kiwi fruit are good sources.

Vitamin C must be ingested daily because it cannot be stored in the body. Your everyday diet should supply you with all of the vitamin C you require. Adults require 40 mg per day. Vitamin C serves a variety of roles, such as aiding in the absorption of iron from the diet by helping to protect cells and keep them healthy

Minerals



Minerals can be present in various foods, including cereals, bread, meat, fish, milk, dairy, nuts, fruit (particularly dried fruit), and vegetables.

Some minerals are more important than others. Calcium, magnesium, potassium, phosphorus, sodium, and chloride, for example, are more important than iodine, selenium, iron, zinc, and copper.

Tasks of Major Minerals

One of the most important functions of major minerals is to keep the body's water balance in check. Sodium, chloride, and potassium are the most active in this regard. Calcium, phosphorus, and magnesium are three other key nutrients for strong bones. Sulfur aids in the stabilization of protein structures, including those found in hair, skin, and nails.

Tasks of Trace Minerals

Trace minerals perform multiple functions. Listed below are a few examples:

The most well-known function of iron is to transport oxygen throughout the body. Fluoride helps to build bones and prevent tooth decay. Zinc aids in blood clotting is necessary for taste and smell and boosts the immune system. Copper aids in the formation of various enzymes, one of

which aids in iron metabolism and the production of hemoglobin, which supplies oxygen throughout the body. The other trace elements have equally important roles, such as preventing cell damage and creating or boosting the action of critical enzymes.

Chapter 5

Food Safety and Sanitation

Without electricity or a safe place to store food, then it can become unsafe. Bacteria in foods can grow rapidly at temperatures between 40 and 140 degrees Fahrenheit. If you consume these foods, you can become very sick. Thawed foods can often still be eaten if they are still cold in the refrigerator. If it still contains ice crystals, it can be re-frozen. Just remember that if you doubt the safe nature of the food, then you should throw it out. Consider the following conditions of food safety after a disaster.

- •Keep all food in covered containers
- •Keep all cooking and eating utensils clean
- •Throw away any food that contacts contaminated floodwater
- •Throw away food that is at room temperature for two or more hours
- •Throw away food with an unusual odor, color, or texture
- •Avoid foods from cans that are swollen, dented, or corroded, even if the contents look safe to eat
- •Avoid eating any food that looks or smells abnormal, even if the container looks normal
- •Don't let garbage accumulate inside for sanitation and fire reasons

Refrigerated and Frozen Foods

After a loss of power, perishable food from a refrigerator should be used first. Food in a refrigerator is generally safe after a power outage as long as the power isn't out for any more than four to six hours and if the inside of the refrigerator doesn't go above 40 degrees Fahrenheit for more than two hours. It is best to use an appliance thermometer to monitor the temperature inside the refrigerator. To maintain a cold environment, you should open the door only when necessary. However, be especially careful with foods such as meat and poultry or foods containing milk, cream, sour cream, or soft cheese.

The following refrigerated foods can be kept at room temperature for a few days, but their quality will deteriorate rapidly:

- •Butter or margarine
- •Fresh fruits and vegetables
- •Dried fruits, coconut, and nuts
- •Opened jars of salad dressing, peanut butter, jelly, relish, taco sauce, barbecue sauce, mustard, ketchup, or olives
- •Hard and processed cheeses
- •Fruit juices
- •Fresh herbs and spices
- •Flour
- •Fruit pies
- •Bread, rolls, cakes, and muffins

The following should be thrown away if they are left at temperatures greater than forty degrees Fahrenheit for longer than two hours:

- •Raw or cooked meat, poultry, or seafood
- •Milk/cream, yogurt, and soft cheeses
- •Cooked pasta or pasta salads

- •Custard, chiffon, or cheese pies
- •Fresh eggs and egg substitutes
- •Meat-topped pizza and lunch meats
- •Casseroles, stews, or soups
- •Refrigerated cookie dough
- •Cream-filled pastries

You should also discard any refrigerated foods that are moldy or have an unusual odor or appearance. Never taste any foods that you suspect are unsafe.

If you have a full and well-functioning freezer, frozen foods can be kept frozen for up to two days after a loss of power. This is if the freezer temperature was at zero degrees Fahrenheit or less. A half-full freezer will keep things frozen for about one day. Again, an appliance thermometer will help you monitor the inside temperature of your freezer.

Dry Ice

Dry ice is useful to maintain adequate freezer temperature when the power is out for more than one day. However, there are some precautions you need to take when using dry ice. You should use three pounds of dry ice per cubic foot of freezer space. Avoid direct contact with the skin for dry ice. Dry ice will burn the skin and isn't for consumption. Dry ice should be wrapped in brown paper for longer storage and separated from food with a piece of cardboard. You should also have adequate ventilation for carbon dioxide in areas where you are using dry ice. Make sure you don't cover the air vent openings of the freezer.

Additional Tips

If your freezer isn't full when the power goes out, then you should group packages to ensure a cold temperature. Meat and poultry should be grouped to one side on a tray so the juices won't contaminate other foods as they begin to thaw. As with the refrigerator, open the freezer only as necessary and work quickly when it is open to maintain as cool a temperature as possible. It can be a good idea to keep a list posted on the door that tells you what's in the freezer and refrigerator, so you know what's inside without opening it.

Before refreezing foods, you should check for evidence of thawing. Any food that still contains ice crystals can be refrozen. Thawed foods without ice crystals, which have been at 40°F or less for two days or less, can be cooked and then refrozen or canned. Once the power goes out, you can't rely on odor or appearance to determine the safety of refrigerated or frozen foods. Discard any perishable food if you suspect it has been at room temperature for over two hours.

Chapter 6

Food Preservation



Every single type of food has its own methods for being stored. Storing food properly for each type of food is essential because this is how you can prevent that food from spoiling. You must never attempt to preserve or store food in a method that is not approved for that variety of food because you are running the risk of allowing harmful bacteria, such as *Clostridium Botulinum*, or the bacteria that causes Botulism.

Below, you will find the best methods for storing each different type of food safely. Again, you are going to want to pick which kind of preservation you use based on what you plan on using that ingredient for later. For example, if you're going to be able to cook a steak, later on, turning all of your beef into beef jerky is not the right choice. Consider how you intend to use your harvest before preserving it so that you can use it for its intended purposes later on.

Meat

Meat can be preserved in a variety of ways, and how you preserve it will affect the taste, texture, and how it can be used later on.

The following ways are approved for storing different types of meats:

Smoking: This method is most common in red meats, though it can be done in poultry, too. It will create a drier, chewier texture in the meat itself. You will also notice the flavor of the wood that was used to smoke it. Smoked meat should be consumed sparingly as the smoke itself contains carcinogens.

Salting: Salting, or curing, is an old-school preservation method that can

still be used. Salt requires more time and effort, but it is cheap. It is often used for meats like bacon or pastrami. You can also salt and then smoke meats as a way to enhance flavor.

Brining: Brining is another traditional preservation method. Brine is made of water, sugar, and salt, and it is poured over meat as the meat is held down at the bottom of the brine using a weighted crock. This method can also take up a lot of space.

Canning: You cannot water bath can meat, but you can pressure can it. Meat is not acidic enough for water bath canners. Any type of meat can be pressure canned, and this method is the simplest as it requires no further work to preserve it. When you are ready to consume the meat, you open the jar and reheat the meat itself. Canned meat is cheap to make, and the preservation process will turn even tougher meat cuts into tender, delicious meat.

Dehydrating: This method is easy, cheap, and healthy. Electric dehydrators or solar dehydrators can be used. You should buy the largest dehydrator you can afford, so you are not running several batches through a smaller dehydrator. Dehydrated meat can be eaten as is. It will need to be stored in vacuumed sealed packages until you are ready to eat.

Stored In Lard: If you are storing an animal with a lot of fat, like a pig, you can store it in a crock with lard. This method works the same as brining, except you are using lard instead of brine. The lard completely surrounds the meat and prevents air from getting to it. It is cheap and effective and requires no special equipment.

Freeze Drying: Freeze driers are expensive, so this is not a practical method for most people. However, freeze-dried meat can be stored for a long time, it is lightweight, and the food retains nearly all of its nutrition. These foods are also great if you need to evacuate in case of an emergency because they are so light. Freeze-dried meat can be rehydrated by adding it to a liquid and cooking it, though the texture will be very different from other meats.

Freezer: The freezer is a great way to store meat. Make sure you store it in heavy-duty freezer bags or containers so that it does not become freezer burnt. However, if meat does become freezer burnt, it can be used to make a stew or other similar recipes, so long as the freezer burn is not too bad. Frozen meat stays closest to its raw form, which means it can easily be dehydrated and incorporated into virtually any recipe.

Seafood

Seafood needs to be preserved carefully as it is more finicky and more prone to bacteria and parasites that are unsafe for humans. It is important to properly clean and preserve your seafood to avoid contamination or getting anyone sick in the process.

The following methods are approved for safely preserving seafood:

Freezing: Freezing is generally the most popular method for storing seafood. For lobster, freezing is the only safe way to store seafood. Seafood tends to be especially prone to the development of bacteria, and the meat is so delicate that preserving it in other ways can damage the meat. However, there are, of course, exceptions to this.

Brining: Seafood can be brined in salt before being stored. Varieties like herring, salmon, rockfish, and mackerel can be brined and kept for up to 9 months using this method.

Drying: Drying is a popular way of storing fish, and it can be stored for up to 2 months this way. Most varieties of fish can be dried. Once a fish has been dried, it can be crushed as a condiment or rehydrated by adding it to a soup recipe.

Smoking: Smoking a fish is a great way to preserve it while creating a delicious texture and flavor. Most fish can be smoked, though salmon and oysters are particularly common varieties for smoked seafood options.

Canning: Fish should only ever be canned in a pressure canner as water baths will not safely can them for you. Fish are not acidic enough for water bath canners. Virtually every variety of fish can be canned except for lobster. Canning a fish will make it incredibly juicy and will make it delicious to enjoy later on. Plus, it retains its ability to be used in a variety of recipes this way.

Vegetables

Vegetables are fairly easy to preserve, though different varieties will require different types of preservation methods. Leafy greens, for example, are hard to preserve because they are so full of water content and delicate that they can quickly deteriorate in most storage methods.

The following methods are approved as safe ways to preserve your vegetables:

Drying: Dehydrating vegetables removes the water content from them so that they can be safely stored. You need to make sure dehydrated

vegetables are completely dehydrated so that they do not develop bacteria. Food needs to be at least 95% dehydrated before it is considered shelf-stable, and it will still need to be stored in a proper container.

Canning: Like meat and seafood, vegetables are not acidic enough to endure water bathing. You will need to use a pressure canner to can your vegetables properly. Most vegetables can be stored this way safely for quite a long time. Note that vegetables stored this way will be quite moist, so you will not be able to retain the fresh, crunchy texture this way.

Pickling: Pickling vegetables requires you to have an acidic base such as vinegar to store your vegetables in. Not all vegetables will taste right when they are pickled, though you can pickle a wide variety of things. Cucumbers, asparagus, bell peppers, beets, carrots, cauliflower, fennel, ginger, green beans, mushrooms, onions, parsnips, hot peppers, radishes, rhubarb, squash, and turnips can all be pickled, among other things.

Fermenting: Fermenting is a process where you convert carbohydrates to alcohol or organic acids. You do this using salt, whey, or another starter culture to a vegetable as brine and letting the food sit in the brine so that it ferments. Fermented foods are incredibly healthy, as long as they are done right, and they are quite easy to do. Most foods should be able to be fermented relatively easily.

Freezing: Freezing is a good way to retain the freshness of your vegetables. When you freeze vegetables, you may need to blanch them or flash freeze them to freeze them effectively. In some cases, you may need to do both.

Oil Packing: Oil packing vegetables means that you are essentially storing vegetables in oil. Oil creates anaerobic conditions, meaning that virtually no air can get to the vegetables inside, which results in them being stored safely. This process can be used on tomatoes, eggplants, herbs, onions, and olives.

Salting: Like meat, vegetables can be salted to cure them, too. Salting vegetables is done in a different means than salting meat because the content of vegetables is so much different. However, it does cure and preserves them all the same.

Fruit

Fruit is similar to vegetables in that it is fresh and grown out of the

ground. However, fruit is more acidic than vegetables, which means fruits can be preserved in a couple of different ways, too.

The following methods are approved as safe methods for preserving fruit:

Drying: Like vegetables, fruit can be dehydrated. Dehydrated fruit can be consumed as is, it can be added to recipes, or it can be rehydrated and consumed that way. However, rehydrated fruit will not taste the same as it did before it was dehydrated.

Canning: Fruit is one of the only things that can be done safely in a water bath canner, aside from some recipes that are meant for pickling. With fruit, canning can be used to preserve the whole fruit, or it can be used to allow you to break down the fruit into other things, such as jams, jellies, juices, salsas, and sauces, which can then be canned and stored.

Pickling: Believe it or not, fruits can be pickled! Blueberries, cherries, grapes, mangoes, peaches, strawberries, tomatoes, and watermelon can all be pickled and stored.

Fermenting: Fruits are less likely to be used in ferments as vegetables are unless you are making wine, of course. However, fruit can be fermented. It typically takes much less time to ferment fruit because it is already acidic. It can take up to 48 hours to ferment fruit, while it can take several days or even a couple of weeks to ferment vegetables.

Freezing: Freezing is a great way to store your fruits. Most fruits will freeze well. Fruits will not need to be blanched before being frozen; however, it can benefit to cut them up and flash freeze them first. Certain fruits like citrus, tomatoes, bananas, and watermelon do not freeze well because they become mushy and gross once they are defrosted. However, if you only plan on using them in smoothies or baking recipes, it may not be such a big deal to freeze them. However, there are better means of storing them.

Dairy

Dairy products can be preserved in a variety of ways. With that being said, not all dairy products are the same, so you are going to need to preserve them properly to be able to use them. Also, you are seriously going to need to consider what you want the dairy for, as most preservation methods will drastically alter the flavor and uses.

The following are approved and safe methods for preserving and storing

dairy products:

Freezing: Freezing is the most dependable way to extend the shelf life of dairy products, including eggs. With that being said, once you freeze a dairy product, it will separate, and it will never taste quite the same, even if you stir it up afterward. It will still be good for baking, or survival means, however.

Dehydrating: Eggs can be dehydrated in a food dehydrator and, when done this way, can be stored for months. Cheese can also be dehydrated. Eggs will need to be recooked before they can be used, while cheeses can be crushed into a powder and dusted on top of foods for flavoring means.

Wood Ash: Wood ash will increase the shelf life of both eggs and cheese. Eggs stored in hardwood ash can last for up to a year, while firm cheeses can be stored for about three months this way. Note, however, that cheeses will start to taste like ash after about three months.

Oil Storage: Softer cheeses like mozzarella and feta cheese can be submerged in olive oil and stored for quite a while, although they will still need to be refrigerated. If you oil eggs first, they can be stored at room temperature for up to 5 weeks.

Wax Storage: Hard cheeses like cheddar can be coated in wax and stored outside of the fridge in a cool, dry place.

Bulk Foods

Airtight Containers: Most bulk foods just need to be stored in sterile, airtight containers. For smaller amounts of an ingredient, you can use sterile Mason jars. For larger ones, you can invest in larger containers that are usually used in grocery stores or restaurants. Containers are usually made from HDPE or high-density polyethylene and are easy to sterilize and keep airtight.

Dried Foods

Airtight Containers: Like bulk foods, airtight containers are often the best way to store dried foods. Sterile Mason jars or larger bulk containers can be used for any dried food.

Vacuum Sealer: Vacuum sealers are great for dried foods, especially those that may still have a small amount of moisture in them, such as

raisins or other dried fruits or meats. Vacuum sealers are the best way to ensure that absolutely no air gets into your food so that you can keep it stored and safe for a long time.

Chapter 7

Meal Plans and Menus

When most people stock up on food for a rainy day, they never think a rainy day will actually come. But what happens when the disaster really occurs? To beat any disaster, you should be well prepared in the way you will handle the situation. You should have a clear plan on how you will use your food stock and for how long. In some instances, you may have to come up with a plan as soon as the disaster happens. The plan will not only help you use the food carefully but will also provide guidance on which foods to use in which order.

Your family food plan should fulfill the following objectives:

- The plan must provide a timeline within which the food in the pantry should be used. If the disaster seems like a situation that will stay around for a long time, food rationing is allowed.
- The meal plan should decide which foods should be used first and the ones to come last. This decision is entirely based on the vulnerability of the foods. Those that are highly perishable should be given priority.
- The meal plan should factor in the meal preferences of family members and possible allergies. Those who are strictly vegan want to stick to vegan foods to avoid getting into a health crisis in the middle of a disaster.
- Although the perishability of foods is an important factor to consider, the meal plan should ensure that all members of the family eat a balanced diet.
- All special groups, especially children, must be given priority in the preparation and preservation of foods. While adult family members may survive longer on a non-balanced diet, children's feeding needs must be strictly considered.
- Based on the duration of the disaster, meal plans should be prepared weekly. If you notice that certain foods are running out, try adjusting the menus on your meal plan to ensure that the family keeps fed with healthy alternatives. From the foods in our pantry

above, each diet has several options. While fresh fruits and vegetables may get used within the first month of a disaster, dried fruits and fruit juices may stay for as long as three months. With your priorities right and a plan in place, the family should never miss a balanced diet.

Weekly Meal Plan

I will try looking at a general meal plan based on the foods we have stocked in our pantry above. These foods may not be very ideal since every person has their preferences. If you happen to have a widely different selection of foods, you may still go ahead and use your meals instead of the ones in my plan. Meals have alternatives, and each person has the freedom of choice for the foods they want in their diet.

	Carbohydrates	Proteins	Vitamins	Fats
Breakfast	Dried crispy crackers for breakfast.	Eggs and sausages with fresh milk should be used in the first weeks.	Fruit juices and vitamin supplements. You can also prepare smoothies from fruits, milk, and dried fruits.	Peanut butter, margarine, and frozen bacon.
Lunch	Ready to eat cereals like oats, Kashi, fat pasta, etc.	Canned proteins such as beans, freeze-dried meatballs, and canned hamburgers.	Dried fruits act as the best snacks. Vegetable salads and fruits are also a good option. In the first month, fresh fruits such as apples are ideal.	

Dinner	Uncooked instant grains such as rice for lunch and dinner.	Freeze-dried eggs, dried ground beef, canned beef taco filling, smoked dried fish, etc.	Vegetable soups, canned fruits, vegetables, and salads. Start with fresh vegetables and salads for the first weeks.	Avocado, cheddar cheese, and other types of cheese.
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As you can see from the list above, there are diverse foods that can be included in the meals. Depending on what you have in your store, you should be able to distribute your foods depending on the type. Each day of the week should see the use of most types of foods.

Steps to Prepare Your Meal Plan

A meal plan is simply an order in which you wish to use the foods available in your pantry. This does not mean that you get the exact food to cook on a specific day, but it is an orderly way of planning how to cook and use the foods you have stocked. The following steps should help you prepare your meal plan.

Gather everything you will need in preparing the meal plan. These include a book, a pen, and stickers. Stickers are important in providing labels. The book and pen are used to note down meals and times in your book. You may also prepare your meal plan on your computer, although this is risky in case the disaster leads to power loss.

Once you have your books and pen, prepare a list of all the foods you have in your pantry. The initial list should be a rough one, with an indication of the food type and expected expiration date. For easy work, I distribute my foods into carbohydrates, proteins, and vitamins in the order of their expiration dates.

For the best outcome, a meal plan should be prepared each week. This helps account for foods that are running out.

Once you have your full list of available foods distributed based on their nutrition value and expiration dates, prepare a table with the days of the week.

Label your rows with the days of the week and columns with the type of meal for the day, such as breakfast, lunch, and dinner, as shown below.

Day	Breakfast	Lunch	Dinner
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

Once you have your blank table like the one above, start filling it with dishes based on your family preferences. After you allocate a certain dish to breakfast, use your labels to mark it as the dish for breakfast, lunch, or dinner. This helps keep the pantry organized. Push the foods that will be used constantly to the front rows, where you can access them easily.

Rationing Ingredients

The thing with meal planning is that it does not account for specific ingredients. When planning your meals, you should be aware that some ingredients may be more used than others. When you are adding foods to the meal plan, you will notice that some foods are replicated across the week. For instance, you may need butter to prepare breakfast, lunch, and dinner. This is a problem that can be addressed during shopping. If there is a specific ingredient or food that is used more than others, make sure you purchase it in significant amounts.

Leave Room for Flexibility

The meal plan is prepared for your family and not the other way round. Do not start forcing people to live according to the meal plan, even in a situation where things don't seem to be working. This is particularly crucial for those with young kids. Young kids may completely refuse to eat a specific food. If this is the case, always have room for flexibility.

To accommodate flexibility in your meal plans, consider the following:

- Consider having more than two options for the main dish each day. For instance, if you have to choose between chicken and fish

for Thursday dinner, family members may have an option even within the limited stock in your pantry.

- Factor in the personal preferences of all family members. For the best outcome, you can try balancing the preferences of all family members.

Include Leftovers in Your Plan

In a situation where you are trapped inside due to a disaster, it is crucial to remember that food must be reused. This is the best time to reschedule meals in case there are plenty of leftovers. Every day's meal plan should be adjusted based on leftover foods.

For instance, in case you are left with plenty of ground beef from the previous night's dinner, use it to prepare some tacos or shepherd's pie for the next night. This way, you get to save food that could have been used for the next night. It is such ideas that call for flexibility within the meal plan.

Peppers Pantry Menus

A meal plan is not the same as a menu. The meal plan just gives suggestions of foods that can be prepared on a specific day at a specific time. For instance, a meal plan suggests that you can have canned chicken, beef, or chicken for dinner. While all these dishes are good options for the main dish, they are not accepted by all. Some do not use red meat and will want to avoid beef at all costs. Some individuals do not feed on poultry and may want to avoid chicken at all costs. Most importantly, some people do not use meat at all. This calls for more details in creating menus for your pantry foods.

Here are the main pantry menus to consider when stocking up on your foods:

- All family regular dishes menu
- Children under 5 menus
- Vegetarian menu
- Gluten-free menu

For the whole family menu, you can sit down with your family and come up with a menu that works for all. Remember that some family members may not be so happy with the foods available. However, given that the

menu is for a difficult moment in life, they may be forced to make compromises on their favorite foods.

Children under 5 Menus

If you will not have a meal plan for the entire family, at least ensure that you have a plan for children under the age of 5. They are more vulnerable to malnutrition than other family members. If you have young kids, your shopping should also factor in their needs. For instance, we know that kids take more milk than adults. Ensure that your milk supplies are slightly above what you would have in your store for a rainy day. While condensed and powdered milk is not recommended for children, on a day where options are limited, they become the primary dishes for the young ones.

For the children under 5, the following items should be included in their daily menu:

- Breakfast cereals with milk should be available on their daily breakfast menu
- Plenty of fruits and proteins on their midday menu
- Plenty of fruits and proteins on their dinner menu

You have the freedom to play with the dishes available. Remember that children may be slightly choosy than adults. Do not force children to stick to a menu they do not feel comfortable with. As long as they feed on some fruits and proteins, they will be fine for the few days of the disaster.

Vegetarian Menu

If you are a vegetarian or if your entire family feeds on vegetarian dishes, your pantry shopping list should be made up of vegetarian dishes. The vegetarian menu is not an easy one to prepare. Below are some menu ideas for a vegetarian menu.

GRAINS & PASTA

For vegetarians, grains and pasta are the major sources of proteins. This is an option that should be explored by all people, given that grains last longer than meat products. Canned meats can last up to 12 months or more, but they will get out much faster as compared to grains. Dried beans and other grains can stay around for as much as two years. Even if the disaster was to last a year, grains are a safe option for proteins.

Many dishes can be prepared in terms of grains and pasta. For instance, stir-fry for vegans and classic pasta are all dishes that can be prepared

from basic pasta and grains. The pasta is usually served with frozen vegetables, which is a good option for completing the nutritional needs of the dish.

If you have not stocked enough grains and pasta in your pantry, here are some ideas to add to your list of foods:

- •Quinoa
- •Wild rice
- •Couscous
- •Rice noodles and whole wheat pasta

As you can see, all of these grains are healthy and good sources of proteins. Some are very strong carbohydrates that can be served to the growing kids who need the energy to keep on playing around.

BEANS & LEGUMES

Beans and legumes are the perfect sources of proteins in a disaster situation. As mentioned, beans do not get bad fast, as is the case with other types of proteins. They are also important sources of fiber. The other types of lentils you should consider adding to your list include:

- •Black beans
- •Chicken peas
- •Kidney beans
- •Pinto beans

All these products can be purchased canned or dried. If you purchase canned beans, you can be sure they will stay around for a very long time. If you purchase them dry, you will get value for money, but you should be prepared for long hours of cooking.

JARRED & CANNED GOODS

Vegans do not have so many options when it comes to protein sources, but they do have other options. Jarred and Canned foods work well for a situation where access to fresh foods is limited. Vegans can do with jarred coconut milk, tomatoes, pizza sauce, marinara sauce, olives, etc. As you can see, sauces are very vital in all aspects. Even non-vegans will need such sauces to keep life interesting in the house in case of a disaster that distracts shopping.

NUTS, SEEDS & NUT BUTTERS

Nuts and seeds are a good option for all vegans as well as non-vegans.

Nuts can be used as snacks and desserts and can also be added to salads. Some seeds and nut butter can be served for dinner for vegans. The best source of fats and fiber for vegans is almonds and almond butter, which can be served for breakfast, lunch, or dinner. Peanuts can be taken for breakfast, while peanut butter is the perfect spread for toast and may be added to other dishes. It is also a good source of fats and other nutrients. The nuts and butter you can add to your food pile include:

- Hazelnuts
- Cashews
- Pecans
- Flax seeds
- Almond butter and seeds
- Chia seeds

SUPER FOODS & PROTEIN POWDERS

For children and vegans, the use of protein powders is recommended. It is not easy to stock proteins for periods longer than six months. If you are going to need your pantry stock for a period longer than three months, managing the situation with protein powders is necessary.

Superfoods and supplements can be made part of regular diets. For instance, if you are preparing breakfast but do not have any eggs or sausages for proteins, you could simply mix some protein supplements in your cookie dough. This way, you get your family fed up with rich proteins without having to rely on cereals, beef, or poultry products.

Proteins can also be made available in drinks, mostly smoothies that can be prepared from fruits and cereals, cookies, and other common dishes.

Among the protein powders and superfoods you may want to consider include:

- Hemp hearts
- Cacao nibs
- Chia Seeds
- Dark Chocolate
- Protein powders

FLOUR & BAKING

Baking is a great idea for those who will be staying indoors with kids. Whether you are vegan or not, baking is one of the best ways to pass the

time while creating high-energy and nutritious foods for your family. Since flour can stay on the shelf for several months, it is a great option to stock up. You can use your flour to prepare different types of pastries that will keep your family fed for the longest time possible.

The best option for bakers is all-purpose flour or whole wheat flour. With all-purpose flour, you can be sure that your kids get the maximum nutrients from the food they eat.

If you suffer from gluten allergies, you should opt for gluten-free flour, which can be purchased from most local stores. Whichever flour you settle on, it is also important to purchase some sweeteners that will make your cooking great.

Gluten-Free Menus

For those who are gluten intolerant, it is vitally necessary to pick gluten-free foods for your pantry. In most cases, it is not easy to come across plenty of long-term gluten-free foods. This is because most stores stock regular foods with little regard for special needs. If you are going to stock gluten-free foods, it is advisable to look at gluten-free specialty stores.

The biggest problem for gluten intolerant individuals is that they cannot find foods that can be stored for long. Most grains have shells around them that are rich in gluten. Grains like corn can last as long as 25 years on the shelf as long as they are treated and have their shell. When the shell is removed, the corn may only have a lifespan of 5 years.

GLUTEN-FREE MEALS

Some gluten-free foods can be purchased off the counter and used at home for a long period. Here are some of the food menu options you may want to consider:

- •Use gluten-free flour mixes to prepare drinks at home for your children for a heavy breakfast
- •Use brown rice as your main dish since it contains no gluten. Brown rice has a shelf life of up to 3 years and can be served alongside gluten-free stews, sauces, and salads
- •Oats and dry corn can be used as grains that can be cooked and served directly
- •Other grains that can be preserved and used later include millet, buckwheat, and oats

GLUTEN-FREE BREAKFAST

There are several dishes you may use for a healthy breakfast. First on the list are potato flakes and dried milk powder. Milk powder can be mixed with some water to make some warm milk to be taken alongside the potato flakes.

GLUTEN-FREE LUNCH AND DINNER

In the section for lunch and dinner, there are plenty of options. You can either prepare beans or other legumes served with brown rice or corn. You can also rely on dehydrated fruits and vegetables.

Food Prepping with Dietary Restrictions

Today, when it comes to food, things are very different. There is a range of food intolerances, allergies, and special diets. More and more people need to eliminate entire food groups from their diet. In some cases, these food allergies can be deadly in the case of anaphylactic allergies. Other times, it is simply a matter of extreme digestive upset. And yet other times, it is because of moral or religious reasons. Since the standard emergency food storage is full of grains, peanut butter, and powdered milk, you need to take special considerations, precautions, and steps to prepare an emergency food storage for those with dietary restrictions. Be prepared; it is a bit more complicated.

Food Allergies

When it comes to food allergies, preparing can be as simple as stocking an alternative; but can also be difficult if you need to keep the offending ingredient out of your food supply entirely. If you have a life-threatening food allergy, you won't want the ingredient in your home. Anaphylactic shock needs immediate medical intervention, which may not be readily available after a disaster. At the least, you should also stock a supply of up-to-date EpiPens, cortisone, and antihistamines.

Dairy Intolerance

Also known as lactose intolerance, this condition is rarely life-threatening. However, it can make those who suffer from it feel terrible. Most people need to purchase more expensive, highly processed non-dairy milk alternatives. However, for emergency food purposes, you can choose to make your own non-dairy milk from pantry ingredients. If this is the case, then you'll need to have a stockpile of rice and almonds on hand.

Celiac Disease

This is almost the peak of wheat-related ailments in the world today. Those who suffer from this ailment are highly sensitive to gluten in any form. For those with a serious form of this condition, they can't eat gluten even in moderation without causing serious long-term health effects. Those who are gluten intolerant don't have as severe effects, but they can still be highly uncomfortable. Some associated symptoms include digestive upset, bloating, aching joints, skin problems, and more. Most emergency food storage plans include a lot of wheat and flour, but if you or a family member suffers from a gluten condition, then you should focus on stockpiling gluten-free grains such as rice, organic corn, quinoa, and oats.

High Blood Pressure, High Cholesterol, and Heart Disease

For those who suffer from the above condition, it is a good idea to stockpile less processed foods. Most processed foods contain high levels of sodium and saturated fats, both of which can be dangerous for those with the above health conditions. While these conditions can be kept under control with medications, often, these medications aren't readily available during situations where you are forced to rely on your emergency food pantry. Therefore, your diet mustn't exacerbate your health issues.

When you or a family member suffers from one of these health conditions, it is a good idea to avoid or limit stockpiling the following foods:

- Hydrogenated oils such as those usually found in highly processed foods
- High sodium foods, you can always add salt as needed
- Sugar and/or carbohydrates since these have been proven to elevate triglyceride levels. This can cause cardiac issues or fatty liver disease

Rather, you should stock up on storage foods that are as pure as possible. This means focusing on lean meats, vegetables, fruits, and whole grains. We'll talk more about how to preserve some of these items in a little bit.

Diabetes

When it comes to a short-term emergency, this may not be a big issue. However, if there is a long-term emergency, then carefully preparing for those with diabetes can be a life-and-death matter. Since diabetes is a complicated condition that depends on the individual's unique health situation and other underlying health issues, it is best to consider diabetic

nutritional needs and speak with your doctor before stockpiling appropriate foods for a diabetic.

However, it is important to consider how a diabetic processes food. Carbohydrates are processed almost the same way as pure sugar and can have a major impact on blood sugar levels. This means that a diabetic family member won't be able to consume a large stockpile of grains. Most diabetics' diets will be focused on proteins and fats, with as few carbohydrates as possible. It is also important to keep caloric intake relatively low and spread the food out to six small meals a day. Other diabetics will need small frequent meals that are high in fiber, low in fat, and low in carbohydrates. It is also key that the diabetic person remains active.

Vegan/Vegetarian

Some diets are restricted to nothing that comes from animals, while others will still consume dairy products or eggs. If you have someone who is vegan/vegetarian, you should accommodate protein sources that don't contain meat, such as beans, grains, legumes, seeds, and nuts. Plant proteins need to be stocked in a wide variety to get the amino acids needed to provide good nutrition. Quinoa is a great non-meat source of protein with amino acids that are great for storage.

Religious Restrictions

Some faiths have certain food restrictions, often involving meat. Depending on your family's beliefs, you may need to take into consideration kosher or halal food along with restrictions on pork, game, and some types of seafood.

Special Stockpiling Needs for Dietary Restrictions

When it comes to the above-listed conditions and their specific dietary needs, there are a few things you need to do and keep in mind when choosing an emergency food stockpile.

Larger than Normal Stockpile

While most focus on a three-day supply of food for an emergency, for those with food allergies, it is a good idea to have more food on hand than others. There are too many risks to not having appropriate food. The shelter may not be able to offer safe food options. Things may take longer than expected to return to normal. There may be a lack of access

to emergency medical treatment if someone suffers ill effects. Depending on your individual needs, it is a good idea to double the amount of food in your first level of emergency food storage.

Preparing Your Own Food

When it comes to dietary restrictions, some emergency food companies offer prepared meal kits for those with dietary issues. However, to get the best deal and safest option, you should consider preparing your own emergency food supply. There are a few options that exist for this.

The first thing is to consider the differences between freeze-dried and dehydrated foods so you can determine which method is best for your food preparation:

- •A dehydrator will cost only a couple hundred dollars, while a freeze dryer can cost thousands
- •Freeze-dried food has a longer shelf life and allows the food to retain more nutrients
- •Dehydrated food can be smaller since it shrinks as water is removed
- •Freeze-dried food is easier to prepare since you only have to reheat it, while dehydrated food takes longer to absorb water
- •Dehydrated food can be eaten as is, while most freeze-dried food needs to be “prepared” with water

A third option to consider if neither of these works is canning. Canning is a cost-effective and long-term storage option for those with dietary restrictions. The types of food that you can can will depend on the equipment you have. A lot of high acid foods can be made safe for long-term storage by simply processing them in boiling water for the proper amount of time.

Canning low acid vegetables and things like stew are going to require a pressure canner. However, these often don't cost too much.

Keep the Right Supplies

In addition to food needs, those with dietary restrictions also need to worry about cross-contamination and proper food preparation. If possible, it is best to prepare the food in the container it is stored since this is the safest way to prevent cross-contamination.

When it comes to food preparation supplies, you should use gear made from sturdy metals or tempered glass. Porous materials such as wood can be easily scratched, and materials like plastic and cheap metal can have

small pockets where allergens can hide even after routine cleaning. The same applies to storage containers and eating utensils.

Saving Costs through Preserving Foods

Preserving foods may seem expensive if you look at the up-front cost. Still, the reality is that if you break that cost down over time, you will discover that the overall price is much lower than your average grocery bill. Further, there are many things you can do to help you minimize the costs associated with preserving food.

First and foremost, you need to realize that the “available all the time” mentality is something that was instilled in us by the very supply chains that are presently having a hard time managing our current global affairs. Commercial greenhouses, unnatural growing situations, and access to a worldwide market all resulted in suppliers being able to offer you any food you want, whenever you want, and often at a fairly reasonable price. This is not how it “should” be, though, and when it comes to preserving your own food, following this system can be costly. It can also destroy the flavor and quality of your preserved foods by resulting in you preserving food that is low quality, to begin with, or that may be filled with harsh chemicals that were used to make it grow.

Learning how to buy with the seasons means that you can buy your food as it is in stock from local suppliers. If you can preserve that food as soon as possible, there is a very short window from the item being harvested to the item being preserved. Doing this ensures that your food is of the highest quality, is as fresh as possible upon being preserved, and that it lasts much longer. Your food is going to taste better and cost far less, as well.

In addition to buying your foods in season, buy them from local growers and farmers. Local growers and farmers will often offer you the best prices on supplies, especially if you are buying them in bulk because you are sending so much business their way. Plus, you will be stimulating your local economy. You will know exactly where your food has come from and how it was grown, which are two significant benefits when it comes to surviving a global crisis such as the one we are in right now.

Other ways to save money on sourcing your food for preservation come from knowing where you can generally go to buy produce and groceries for cheaper. These places are well-known for offering great deals and

discounts, all of which can help you save more money while preserving food for yourself and your family.

The following list of resources is sourced from “A Year Without the Grocery Store: A Step by Step Guide to Acquiring, Organizing, and Cooking Food Storage” by Karen Morris. This shares all of the best places to buy your supplies, with the cheapest possible price tag on them:

- •Online co-ops
- •Bulk food stores and the bulk section of regular stores
- •Online food storage companies
- •Latter-Day Saints canneries
- •Restaurant supply stores

You can also cheapen your items by couponing and by buying in bulk as much as possible, as this often creates a situation where you are paying less per item.

Chapter 8

How to Stock Up on Pet Supplies

As your furry pals are at risk, you must pay more attention to their everyday needs. Stock everything you need, from food to routine treatments to supplements, to keep your family safe and healthy during an emergency.

Treatments for Fleas and Ticks

With a pandemic wreaking havoc on a big population, lockdown appears to be a long way off. And, with ticks and fleas as one of the hazards (since the house provides the ideal habitat for their growth), the pet owners must stock up on flea and tick medicines ahead of time.

It's pointless to wait for the emergency to end before ordering popular Advantage, Frontline Plus, or even the Bravecto chew. Because, in these extraordinary times, when everything is coming to a standstill, inventories may run out. As a result, it's a good idea to keep a supply of your dog's or cat's monthly tick and flea medication on hand.

Supplements for Joints

Pet owners must be well-prepared to maintain their animals active and nimble. The soreness and inflammation in your furry

pal's joints are brought on by the chilly shivers. Pet parents are the best people to ask about this. So, grab a newspaper and get a healthy assortment of joint care products for your furry friend.

Products for Dental and Ear/Eye Hygiene

Fundamental protective measures specify that you should protect your nose, eyes, and mouth and your pet is no exception. It is essential to maintain your pet's ear, eye, and dental hygiene throughout the emergency. Don't ever let your guard down; obtain a dental kit, as well as ear and eye care treatments, to keep your dog or cat's hygiene in check in such a dire circumstance.

Food for Pets

Don't surrender to emergency fear and go without the most basic necessities of life. Yes! You guessed it correctly! Like how you supply your house with nutritious and economical foods, you should do the same for your pet family. It's critical to have those packs of healthy diet wet or dry dog/cat food on hand. Stocking the pet pantry, however, does not imply storing food. It's critical to consider your pet's nutritional plus specialized requirements. There are many different types of pet available food, depending on your pet's specific requirements.

Chewy Toys

Keeping your furry pals entertained and active while they are restricted inside the confines of your home is a difficult task that

you will not be able to complete on your own. As a result, get some chewy toys that could not only make your dog cognitively stimulated but would also keep him occupied for a long time, allowing you to cope with your furry companion during the downtime.

Pet Food and Treats Should Be Stored Correctly

Pet food plus treats should be stored properly to preserve their nutritional content and to have information ready in case of a problem. Proper storage also keeps your pet from consuming too much of his own food or getting into the cat's strict diet food. Overeating and consuming food intended for another pet might result in health issues like vomiting, diarrhea, or more serious illnesses.

Follow these safety recommendations for keeping pet food plus treats to help maintain your pet healthy:

- •Pet food plus treats should be kept within the original jar or bag. In the event of malfunction or recall, you'll be able to quickly access the UPC code, brand and manufacturer, lot number, and "best by" date.
- •If you wish to keep dry pet food within another container, dump the entire bag inside the container instead of pouring the kibble straight into it.
- •If you want to transfer your dry pet food to another container, make absolutely sure it's clean, dry, and has a secure cover. A cover helps to keep the food fresh while also preventing your pet from eating it.
- •To remove remaining fat and crumbs from the storage

container's surfaces, wash and dry it between completing one bag of the kibble and then filling it using another.

- •Dry pet food plus unopened canned food should be kept in a cool, dry location. The temperature must not go beyond 80 degrees Fahrenheit. The nutrients may be broken down if exposed to too much heat or moisture. If the pet is particularly persistent or cunning when it comes to getting into his pet food, keep it in a safe place.
- •Refrigerate or discard any unwanted or leftover canned or pouched pet food as soon as possible. Keep your refrigerator set around 40 degrees Fahrenheit.
- •After each usage, wash as well as dry bowls of pet food and scoop utensils. Water bowls should be cleaned regularly.
- •Keep pet treats inside a secure area to avoid your pet from consuming the entire supply at once.
- •Like many other foods, pet food plus treats could be contaminated with hazardous germs that cause foodborne diseases. By following the above safe handling practices, you may reduce your chance of contracting a foodborne disease from tainted pet food.

Chapter 9

What to Avoid When Stockpiling

Common Mistakes to Avoid When Storing Foods

As you start planning how to start your survival stockpile, there are certain mistakes many beginners make that you should be aware of. Some of these mistakes might seem like “common sense,” and yet a lot of people still make them. This usually happens because they don’t realize that they are making mistakes or they didn’t learn enough about the process before starting. To avoid the most common rookie mistakes, you need to know them first.

Rushing into the Process

If everything you have read thus far has made you feel excited to start your survival pantry, that’s great! But you still need to go through the planning process before you start. Rushing into things like purchasing food preservation equipment without first learning everything you can about a specific method of preservation or buying tons of food right away isn’t ideal. You might realize that the equipment you bought isn’t required for the preservation method you have chosen later on, or you might discover that the food you bought doesn’t store well. Such realizations can make you feel frustrated or overwhelmed. And you might give up even before you start!

Planning without Action

On the other hand, making so many plans but not taking action isn’t ideal, either. Why spend so much time and effort coming up with the perfect plan when you won’t follow what you have written down? Right after creating your plan, set a date when you will take the first step in your plan. Also, include easy, actionable steps in your plan so that you will feel more motivated with each step that you accomplish.

Stocking Up on the Same Types of Food

To have a great inventory of stocks, buy a large selection of food to store. This is especially significant for long-term storage foods. Think

about it: if you only buy the same types of food, you will end up eating the same thing every day when disaster strikes. Apart from getting tired of eating the same food, you will also receive a lot of complaints from the rest of your family as they also get tired of what you're serving.

Another mistake is stocking up on too many foods that have the same storage requirements, especially if you have limited space. For example, if you only have one freezer at home, it's not recommended to only buy foods that need to be stored in the freezer. Instead, purchase foods that have different storage requirements so that you can store your survival foods in different areas around your home.

Purchasing Random Food Items

When purchasing food for your survival pantry, only go with foods that you have already tried. Imagine how you would feel if you buy foods that are unfamiliar to you only to find out in the future that they don't taste good. Also, while you should put an effort into searching for ways to save money, you shouldn't buy random food items just because they're on sale. Remember that you need to plan what you will buy first and then bring that list with you when you go to the supermarket.

Including Complex Foods

Another common mistake is including foods that are difficult to prepare or cook. Foods that require a lot of water, take a long time to cook, or are difficult to prepare. Remember that when it's time for you to rely on your survival foods, you will have a lot of other things on your mind. Chances are you won't have the time or patience to go through many steps just to have a quick meal. Also, make sure to include the right tools and equipment in your storage area. For instance, if you have a lot of canned goods, make sure you have a can opener stored with them. These useful items will make your life a lot easier in the future.

Not Including Comfort Foods

While it's important to stock up on nutrient-dense foods, this doesn't mean that you aren't allowed to store some of your favorite comfort foods, too. Remember that you will need your survival foods when faced with disasters or emergencies. In such cases, having your favorite comfort foods can bring you joy and ease your stress even for just a few moments.

Storing Food in Unsafe Locations

You have already learned the importance of finding the perfect locations to store your foods. There are ideal places to store survival food and

there are certain places that you shouldn't even consider. Some examples are:

- •An attic
- •A bathroom
- •A laundry room
- •An outdoor shed
- •A garage

Keep in mind that the best locations are cool, dry, and with low humidity. Placing your food in the wrong locations will cause them to get spoiled easily, which could be devastating, especially when something bad happens and you discover that you cannot consume any of the foods you have been buying and storing.

Stocking Food and Forgetting All about It

Even if you find the perfect place, make it a point to check your stocks regularly. Simply stocking food and then forgetting all about it isn't being prepared. It's just hoarding. Checking your food regularly is essential, as it allows you to rotate your stocks and replace any foods that are about to go bad.

Only Focusing on Food Preparedness

Preparing your survival food inventory is one of the most important steps of emergency preparedness. But it isn't the only step. Once you have established your survival food pantry, focus on the other aspects of preparedness too, such as:

- •Preparing individual "go bags" that contain all the essentials for each member of the family
- •Preparing an emergency binder that contains all of your family's important documents
- •Coming up with a plan for what you will do when a disaster strikes

It's also a good idea to stockpile items you can use to barter with other people. Apart from food, such items can include things like batteries, small flashlights, lighters, and more. Being prepared for emergencies and disasters involves different aspects, and you need to work on all these aspects to make yourself truly prepared for the unexpected.

Worst Foods to Include in Your Survival Pantry

When it comes to storing food, the methods you use to preserve the foods play an important role in their shelf life. Virtually all types of food can be stored, but there are certain restrictions and limitations when storing certain types of food.

Short-Term Storage Only

There are many types of foods you can include in your pantry, but you would have to rotate them more often because they only last for a couple of weeks or months. Some examples of such foods are:

- Cereals
- Dairy products
- Dried fruits
- Graham crackers
- Maple syrup
- Mayonnaise
- Nuts
- Salad dressings
- Saltines
- Vegetable oil

Foods That Shouldn't Be Canned

Canning is an excellent method of food preservation. However, certain foods shouldn't be preserved through canning, as they won't last long and you won't be able to check if they are still okay until you open the can or jars they are stored in. Some examples of foods that you shouldn't be canned are:

- Cakes or bread
- Dairy products like yogurt, sour cream, buttermilk, and butter
- Fats like oil or lard
- Grains like wheat, barley, rice, pasta, and oats
- Most types of nuts
- Some types of vegetables like Brussels sprouts, cauliflower, lettuce, and eggplant

- Thickeners like tapioca, cornstarch, and flour
- Thick fruit or vegetable purees

While you can still preserve these foods through canning, it's not recommended to include them in your stockpile.

Overcoming the Challenges of Storing Food

Since there are many rules and guidelines when it comes to storing food, you won't encounter too many challenges, especially if you can avoid the common mistakes mentioned at the beginning of this chapter. Probably the biggest and most common challenge you will encounter is food spoilage.

Oxygen

You have already learned how oxygen absorbers are essential to extend the shelf life of food. The reason for this is that molds and bacteria need oxygen to reproduce and grow in food. This gas also acts as a catalyst for the occurrence of enzyme reactions. Therefore, if oxygen somehow gets into the foods in your stockpile, they can easily go bad. But this doesn't apply to all foods. Foods that are most susceptible to the effects of oxygen contamination are the ones high in fatty acids and fats.

Light and Heat

Throughout this book, you have read recommendations about storing food in cool and dark areas. The reason for this is that when foods are exposed to light, they can undergo a process called photo-degradation where their quality gets compromised. While you can still eat these foods, they will lose some of their vitamin content and may become discolored, specifically the parts that have been directly exposed to light. But when foods are exposed to heat or unstable temperatures, they can become unsafe to eat.

Enzymes and Microorganisms

Bacteria and other types of microorganisms can grow in your preserved food once they get into the containers. And if these microorganisms can get into the containers, chances are, oxygen can get into the containers, too. The problem is that while the micro-organisms feed off the food in the containers, they start producing and excreting waste products. These

waste products cause the foods to smell bad, which is when you know that they are already unsafe to consume.

Most microorganisms require oxygen and water to grow and thrive, which is why the best way to prevent these microorganisms from contaminating your food is by sealing the containers well. But there is one bacteria—*Clostridium botulinum*—that can grow and thrive even without oxygen. This is why it's important to pre-cook food first before preserving or heating the food adequately (as is done in pressure canning) to kill this bacteria. Otherwise, consuming food that's contaminated with this bacteria will cause botulism.

Another issue you may encounter is when certain reactions occur with enzymes that are naturally found in food. For example, fruits ripen because of certain enzymes. However, in the presence of moisture and oxygen, the enzymes might have certain reactions that will eventually cause food spoilage. Fortunately, you can destroy these enzymes using heat. Again, pressure canning is an effective way to get rid of these enzymes as it involves heating up the jars before sealing. Food preservation methods that limit water and air can also produce the same effects on enzymes.

Vermin and Other Pests

Unlike the other factors mentioned, pests won't cause preserved food to get spoiled. But they are equally damaging since they can feed off your preserved food, then cause contamination. Vermin and other pests usually carry diseases in their mouths, so when you notice that any of your food items have been chewed on, discard those right away.

No matter how careful you are, there might be times when these factors might still get into your food stores and compromise the quality of your food. This is why it's very important to keep checking so that you can immediately deal with any issue caused by these factors as soon as they arise.

Chapter 10

Bonus: How to Stockpile Medicines for an Emergency

Two main points need to be addressed for medical issues in a survival scenario. The first is supplies, while the second is knowledge. Some medical supplies and first aid items can be stockpiled to ensure readiness, although it should be noted that even medications could have a shelf life. This is particularly true for certain prescriptions, including antibiotics and insulin, although even over-the-counter drugs do have a limited time of viability. This can make it very important to update supplies regularly in non-emergency situations so that the resources are present when needed.

Basic first aid supplies can be gathered and stored, although kits can vary based on individual needs. If prescriptions are needed for any existing condition, it can also be important to ensure that refills are kept current, in case a survival situation occurs. First aid kits should also be kept in non-permeable and non-reactive containers that are either stored with the rest of the supplies or are easy to grab and transport.

These should contain the following:

- Sterile gauze and bandages
- Hydrogen Peroxide
- Rubbing alcohol
- Anti-bacterial gel
- Sterile needle and suture thread
- Analgesics (aspirin, ibuprofen, etc.)
- Medical tape
- Splinting supplies (tongue depressors or even popsicle sticks)

First aid kits can be further customized, so long as the supplies that are included have a longer shelf life. Accommodations for infectious diseases may need to rely upon knowledge for attending to these conditions.

In a disaster situation, it is important to remember that hospitals and relief stations will oftentimes be filled with many people. A standard medical kit that you would buy from stores is typically not enough. It would be advantageous for one to stock up on hospital-grade bandages and medicine and know the uses for each one. These supplies can be the difference between life and death.

The other aspect of medical considerations for a survival scenario will come down to having the presence of mind to know what to do. It is highly recommended that at least one member of any group should take the time to gain this experience in advance. This can usually be gained through classes at a community college or through the Red Cross.

Some of the basics that should be a part of the knowledge base include:

- •Basic first aid
- •CPR and life-saving techniques
- •Anatomy and physiology
- •Infectious diseases
- •Herbal and alternative medicine

The last type, of course, can also be included in survivalist education and can be vital, especially in cases where long-term situations are faced. Herbal tinctures can often have a longer shelf life than pharmaceuticals, as long as they are stored in a cool and dark place. Further, several naturally growing or cultivated plants can provide medical relief for everything from pain and broken bones to colds, flu, and other diseases. Having the knowledge of which healing plants to use, and how to prepare them, can offer a renewable way of taking care of long-term concerns in a survival situation.

This can also be important for people who require prescriptions for existing situations. Gaining the knowledge about possible alternatives for these medications may be a necessary part of planning, and needs to be considered in case a survival situation extends beyond just a few weeks.

Conclusion

We are not God. We are humans and we live on earth just like other species. We are prone to natural and manmade disasters and during such emergencies, panic is common. It can be seen from history that people usually die during such situations more out of panic and because they were not prepared to survive.

In cases of emergencies, even if they survive the disaster, they are prone to die of starvation, attacks from animals or humans, insect bites, thirst, injuries, and illnesses. Therefore, it is very important that you prepare a survival stockpile for you and your family and also an emergency backpack for every member of your family.

This way, you will be ready to face any situation of emergency and your family will survive for longer than others who did not prepare for such situations.

You should learn the methods of cooking, smoking, and how to use firearms and first aid methods beforehand. The time you will invest in learning these methods will never go in vain during emergencies. You won't only be able to save yourself but also others.

Also, do not forget in the end that you are human; you should be helping others who are in need. This will not only give you happiness in your heart, but if you die of starvation in case of longer disasters, you will die peacefully that at least you helped someone.

Glossary

Preppers use acronyms to communicate with fellow preppers. When you start adopting this lifestyle, you need to know the prepper's vocabulary to describe kits, gears, places, and anything necessary for survival. Preppers need to use terminologies so that they can save time in describing what they need to do or have. After all, every second saved during an emergency crisis is crucial for the survival of preppers. Below are the common terminologies that you need to know if you are going to adopt this lifestyle.

BOB: This refers to a **bug-out bag**, which is a portable kit that contains items that you need to survive for seventy-two hours. It is also called grab bag, battle box, go bag, or GOOD (Get Out Of Dodge) bag. The things included in a BOB include enough food for 72 hours, water purification supplies, a first aid kit, battery, professional emergency literature, maps, sanitation supplies, clothing, medications, documents, a Swiss army knife, compass, and cash.

BOL: This stands for **bug-out location**, which refers to a retreat place, refuge, or rendezvous that preppers go to during an emergency. Before an emergency situation, preppers scout for a BOL and inform family members or the preppers network how to get to the location in case of an emergency.

BOV: It stands for **bug-out vehicle** and is a customized survival vehicle that contains everything that preppers need to survive. They look like war vehicles as they possibly come with artillery, huge storage spaces for stockpiles and supplies, as well as state-of-the-art navigation tools.

Crunch: This refers to a long-term major disaster.

EDC: It refers to **everyday carry**, which means what individuals carry in case a disaster happens while a person is out and about.

EOTW: This stands for **the end of the world**. It is also similar to TEOTWAWKI, which means **the end of the world as we know it**.

GOOD: This refers to **getting out of dodge**, which means fleeing the urban areas in case there is a big disaster.

INCH bag: This acronym stands for **I'm not coming home bag**. It is similar to the bug-out bag, but it is usually kept near the individual so

they don't have to return to their residences in case there is an emergency. Most people store their INCH bags in their cars.

SHTF: This refers to **shit hits the fan**, which preppers use to describe any kind of disaster situation. It is also similar to WTSHTF, which means **when the shit hits the fan**.

WROL: This stands for **without rule of law**, which is used to describe a lawless state of society.

YOYO: This means you're on your own.

Zombie: Contrary to what most people think, the term zombie does not refer to the flesh-eating monsters that we see in zombie apocalypse movies. It refers to people who are unprepared to deal with emergencies. They also refer to incidental survivors who might feed on the preparations of preppers.

Useful Links and Where to Buy Offline and Online Tools for Stockpiling and Preserving

Amazon.com is to credit (or blame) for transforming the way people shop. The e-commerce behemoth's limitless virtual aisles, apparently infinite selection, and fast same-day delivery aid save time, allowing us to do anything from watching movies to getting groceries from whole foods without having to leave the house. You can support a variety of solid Amazon alternatives by shopping online.

- [ThriveMarket.com](https://www.thrivemarket.com)
- [HiveBrands.com](https://www.hivebrands.com)
- [Grove.co](https://www.grove.co)
- [PublicGoods.com](https://www.publicgoods.com)
- [PackageFreeShop.com](https://www.packagefreeshop.com)
- [WorldMarket.com](https://www.worldmarket.com)
- [Chewy.com](https://www.chewy.com)
- [UncommonGoods.com](https://www.uncommongoods.com)
- [Instacart](https://www.instacart.com)
- [Target.com](https://www.target.com)

BOOK 4
SURVIVAL MEDICINE
HANDBOOK

THE ULTIMATE HANDBOOK
TO BE PREPARED FOR AN
EMERGENCY INCLUDING
FIRST AID SKILLS AND
NATURAL REMEDIES

Introduction

A lot of things can happen that might result in chaos and turmoil. It is advisably prepared with all necessities that will increase their chances of survival should such misfortunes occur. Social disruption can be a result of a war, political unrest, or natural calamities thus necessitating the possession of a survival medicine handbook.

What most people don't know is that with unrest comes a lot of life-threatening challenges. Some of these difficulties might be in the form of finding clean water, proper medical attention as well as food. However, with the survival handbook at hand, it would be a tad easier to not only survive but also thrive in such unfortunate situations.

Endurance training would come in handy for survival thus getting help with the same wouldn't be such a bad idea. Thankfully, there are plenty of authentic institutions all over the world that teach how to not only survive but thrive when facing any difficulties.

If you cannot access these training facilities or might be having some problems with raising the training fees, then you can always get free information and training via the internet. Apart from getting the necessary training on the set of invaluable skills needed to ensure your survival, it is also important for you to discipline yourself mentally.

Mental discipline and conditioning will help with your survival as you will manage to remain calm, especially when under pressure. That way, it will be possible for you to make rational decisions that will go a long way in helping you stay focused and make clear-headed decisions.

When a prepper has the proper survival medicine handbook, it will be a tad easier for you to know how to react in certain situations with confidence as well as the necessary technical know-how. You will also know what kind of items, medicine, and gear you can use to ensure that you are always staying a couple of steps ahead of the mishap at hand.

You will also know how to improvise in the face of a life-threatening challenge, and this will, in turn, save you (as well as others) from a lot of trouble. As the dictum states, 'it is better to be prepared than sorry that you didn't'. It is, therefore, a smart idea to always learn as much as you can about survival medicine and proper survival tactics as early as possible.

Desist from bingeing the kind that waits for the situation to exacerbate before starting to learn. There are plenty of situations that your survival skills could come in handy save for situations of unrest.

You can also get to use your particular skill set when out camping in the wild, during a car breakdown, or personal attack. If you apply yourself in the right way, you might end up saving numerous lives which is what survivalism is all about.

First Aid Skills to Learn



We will start looking at some of the practical applications of first aid and some of the basic techniques that you may benefit from knowing how to perform. It's an excellent idea to get some hands-on experience with these techniques and read about them; this will help you ensure that you are doing it right and improve your ability to perform the technique.

Now, let's look at how to perform some first aid!

How To Perform CPR



Before we start, it is vital to note that CPR is to be used during a breathing or cardiac emergency, and it is among the more intricate first aid maneuvers to perform. It can damage the person's ribs and should only be used when necessary.

Suppose a situation is dire enough to need CPR. In that case, you should also look for emergency services for the patient as soon as possible, even if it may be challenging.

The first advised step of CPR is always to call 9-1-1 or get someone else to do this. If you are not currently somewhere that emergency services can reach you, you should still get in touch with them, as CPR is often required consistently until an ambulance arrives.

CPR For Adults

The advice varies depending on whether you have undertaken formal CPR training or not. If you are not familiar with CPR, it is always better to attempt it than do nothing, but you may wish to stick to chest compressions. We will provide the complete method below.

Before performing CPR, check that the area is safe and see whether the person is conscious. Tap or shake the patient's shoulder and loudly ask if they are okay. If the person does not respond, begin CPR.

Roll the patient onto their back on a firm surface and ensure that the airway is unobstructed.

Begin the C-A-B approach. This stands for Compressions, Airway, Breathing. Compressions are intended to restore blood flow, and this is where you should begin.

Kneel next to the patient's shoulders and place the heel of one hand over the person's chest, between their breasts.

Place your other hand on top of the first hand and then lean so that your elbows are straight and your shoulders are directly above your hands.

Press down hard, compressing the chest to at least 2 inches down, but not further than 2.4 inches. Use your body weight to press, rather than just your arms.

Allow the chest to spring back, and then push down hard again. You should aim to push at a rate between 100 and 120 compressions per minute; this is surprisingly fast. It is a good idea to practice this to find the rhythm.

Continue doing this until help arrives. If you are trained in CPR, you can move on to the following steps, Airway and Breathing. If not, stick with compressions only.

Airway: start by opening the airway once you have performed 30 compressions. You should do this by placing your palm on the person's forehead to tip their head back and then gently lifting their chin with your hand. This method will be demonstrated in first aid training. It opens the airway and ensures that the person can breathe.

Breathing: you can breathe for the other person if you have been trained how. We will cover mouth to mouth and mouth to nose in the following

section. This should ideally be done using an appropriate CPR filter but can be done without in emergencies.

CPR For Children Between 1 and 12 Years Old

It is crucial to understand that CPR for children is similar but not the same process. When tilting the child's head back, be careful not to go too far, as children have more delicate airways than adults do.

You could seriously injure a child, especially a young child, if you use the full force of your body weight to administer compressions, so be careful. The chest should be compressed to about 1.5 inches to 2 inches (generally 2, but less for young children), and you will not need as much force to achieve this. Some CPR professionals will recommend just using one hand rather than two.

This advice applies to children up to 12 or those that weigh less than 121 pounds.¹

CPR For Babies Under 1 Year

If you are traveling with an infant, it is advisable to take a special CPR course. Babies are considerably more delicate than adults or even young children, and there is an increased risk of doing damage by performing CPR.

Start by checking that the baby is unresponsive by tapping the soles of its feet and shouting nearby (not directly in its ear). If it is not breathing, tilt the infant's head a short way back to look like it is sniffing the air. Next, place two fingers in the center of its chest and begin compressions to about an inch and a half deep. Do not put too much force on the baby's chest.

It should be noted that performing CPR takes priority over calling emergency services for babies and children, especially if you are far from help. Both children and babies have higher resilience and a greater chance of survival if CPR is begun immediately, so don't hesitate before you start. If someone else is available, have them call the emergency service line. If not, contact them when able.

How to Perform Mouth to Mouth, Mouth to Nose





It is essential to have proper training before performing the mouth-to-mouth or mouth-to-nose aspect of CPR, as there is a greater risk of doing damage if you are untrained in this area. If you cannot afford training, stick to doing compressions in the event of an emergency, and do not risk mouth to mouth, especially with a child or baby, which is likely to be more vulnerable.

However, if you have had the training and are simply rusty or would like a written reference, you will find the steps below.

The same method is used for mouth to nose, but it is better to do mouth to mouth unless the individual's mouth has been injured. If possible, use a specifically designed filter for this part of CPR.

Mouth to Mouth for Adults

Open the airway using the head-tilt, chin-lift method after performing 30 compressions.

Pinch the patient's nostrils shut if you are performing mouth to mouth. Cover the patient's mouth with yours, sealing your lips together to prevent any air from escaping.

Give one rescue breath, lasting for one second, and watch to see if the patient's chest rises as you do so. If it does, give a second breath, lasting one second.

If the chest does not rise, repeat the maneuver to open the airway and give a second breath. Do not give a third breath.

Resume chest compressions.

A complete cycle is considered 30 compressions followed by 2 rescue breaths. Keep cycling until help arrives or the patient begins to move. If the patient moves before help arrives, you should still ensure that they are seen by medical professionals as soon as possible. Keep them lying still and stay with them.

It is important not to breathe too hard or too often. Stick to 2 one-second breaths per cycle.

Mouth to Mouth for Children

The same method applies, but you must be particularly gentle with

children. Their airways are more fragile, and you need to ensure that the head is not tipped back too far. Breathe gently and keep cycling breaths with compressions. You should still do 30 compressions for every 2 rescue breaths.

Mouth to Mouth for Babies

Again, the same method applies, but a baby will require even more care. Tilt the head only a little way, and be very gentle when providing the rescue breaths. Simply puff up your cheeks and blow into the child's mouth, rather than breathing with the full force of your lungs.

Keep the rate of compressions the same: 2 breaths for every 30 compressions.

How to Put Someone Into the Recovery Position



Learning how to put someone into a recovery position is a crucial aspect of first aid, and it is one of the first things you should look at. A person who is unconscious but breathing and not in a life-threatening situation should be placed in recovery. This ensures that the airway is kept clear and open, so there's no risk of fluid or vomit choking the individual.

Note that the recovery position should never be used if there is a risk that the person has a spinal injury. If you suspect you are dealing with a spinal injury, do not move the person, but if you need to open the airway, put your hands on either side of the head to support it and gently lift the jaw. Do not jolt or reposition the neck. People with spinal injuries should not be moved except by emergency services. If this has occurred while you are far from help, keep the patient warm and stay with them, but do not attempt to move them or allow them to move.

Follow the below steps to put someone in the recovery position:

Check that the area is secure and there are no immediate threats to safety.

Roll the person onto their back on a flat surface and kneel beside them.

Take the arm nearest to you and extend it out away from their body until it is at a right angle. Their palm should be left facing upward.

Lean across them and take their other arm. Guide it across their body and place the back of that hand against the cheek closest to you, and hold it

there with one of your hands. Their arm will be resting across their chest. If it is their right arm, their hand should be touching the left cheek, and vice versa.

Use your free hand to take the person's knee on the far side of their body and draw this up to a right angle.

Gently tug on the bent knee so that the person rolls over onto their side. Their bent arm will now support their head so that it doesn't flop, and the extended arm will prevent them from rolling further. Check that the bent leg remains at a right angle to the body to offer more stability.

Gently tip the person's head back slightly and lift the chin to open the airway. Check there are no obstructions and that the person is still breathing.

Remain with the person until you can deal with whatever has caused them to pass out. You may need to call for help from other members of your group or inform emergency services. Ensure that the person stays warm and do not leave them unattended.

How to Perform the Heimlich Maneuver



Choking is a danger that people face everywhere, so it's one you'll need to account for no matter where you are going off the grid. It is also where a quick reaction and a correctly performed maneuver can mean the difference between life and death. There is rarely time to call emergency services or even another person (although if multiple people are on hand to help, someone should contact emergency services while others assist the patient). Choking is a particular hazard for young children, who often put small objects in their mouths, but anyone can choke. You should learn the signs of choking before you travel. These include:

- Lips and nails turning blue
- Flushed skin turning pale or blue
- Squeaky noises when attempting to breathe

- •Scrabbling at the throat
- •Inability to speak
- •Passing out

If you are dealing with an adult, encourage them to keep coughing if they can do so. This may dislodge the object. If not, you should perform the five-and-five maneuver, an updated version of the Heimlich maneuver, including other steps.

It can be done as follows:

1. Get the patient standing up and step behind them.
2. Lean the patient forward and wrap your arm around their chest. The upper body should be parallel with the ground.
3. Strike the heel of your hand against the patient's back between their shoulder blades five times.
4. Place your arms around the patient's waist and make a fist with one of your hands, the thumb resting against the patient's navel. Take the fist in your other hand and push it both inward and upward against the patient's abdomen, as though trying to lift the patient off the ground. Do this five times sharply.
5. Repeat steps 3 and 4 until the blockage is dislodged and the patient can breathe again.

If you are not familiar with the back thrusts, it is possible to just perform the Heimlich maneuver. However, the two methods used together may prove more effective.

If your patient cannot stand alone, straddle their waist and follow the abovementioned method.

Heimlich for Yourself

If you are choking and unable to get help, you can employ a similar technique:

1. Place a fist above your navel.
2. Grip your fist with the other hand and bend over a hard surface like a chair.
3. Shove your fist inward and upward sharply.

Heimlich for Pregnant Women

There's a much greater risk of harming a pregnant woman using the usual method, so instead:

1. Place your hands higher up, at the base of the breastbone, rather than the navel.
2. Perform the same abdominal thrusts described above. Be cautious of the woman's stomach.
3. Repeat until the blockage is dislodged.

Heimlich for Children

You can use the same method given above for children old enough to stand but kneel behind them. Most people recommend using abdominal thrusts only for children as there is less risk of damaging internal organs.

Heimlich for Babies

Follow the below method when dealing with a baby choking:

1. Sit down, rest your forearm on your thigh, and rest the infant across it face down. Support the head and neck with one hand, and lower the head below the infant's body.
2. Gently but firmly strike the infant's back five times using the heel of your hand. Be careful not to strike the infant's head.
3. Turn the infant over to face up but keep the head lower than the body. Press two fingers against the infant's breastbone and compress it five times to about 1.5 inches in quick succession. Let the chest rise in between each compression.
4. Keep repeating until the blockage is dislodged.

In all cases, if you are not successful in dislodging the blockage or if the person loses consciousness, you should move on to CPR until emergency help can reach you.

How to Take Somebody's Pulse



Taking a person's pulse is suitable in many medical situations, and it is a skill that you should practice. The rate of someone's pulse will help you to determine how well that person's heart is working. Changes to the pulse can indicate a range of issues, although it's important to note that a pulse also naturally varies according to the person's rate of exercise.

There are two ways to measure a person's pulse: you can put your

fingers on their wrist or neck.

Measuring on the Wrist

1. Hold the person's arm up straight and face their palm upward.
2. Put your first and second finger on the wrist, near the base of the patient's thumb.
3. Use a clock that will count the seconds to determine how many beats you can feel in one minute (you can count 30 seconds and multiply by 2 if this is easier).

Measuring on the Neck

1. Put your first and second finger on the side of the neck, just next to the windpipe (the soft hollow area)
2. Again use a clock that will count the seconds to count how many beats you can feel per minute.

If you cannot find someone's pulse, move your fingers around and press a little harder. It is hard to detect a pulse in some people. Most adults have a resting heart rate of 60 to 100 beats in a minute, although this varies depending on several factors, including medication, stress, age, fitness, etc.

It's a good idea to measure the resting heart rate of your various group members so that you know what their pulse rate should be and whether it is normal. Keep a log of this in your first aid kit, and discuss any abnormalities that you expect to see (e.g., if someone has a heart condition or takes medication that would alter their pulse) so that everyone is aware of this.

An irregular pulse can signify many different things, but knowing how to measure it is the first step. Be aware that a person's pulse is likely to be made less regular and significantly faster when they exercise.

Making Supportive Splints And Slings



There will be times when you need to support an injury, and creating a splint or sling correctly can make a big difference to the injured party. Splints and slings are intended to stabilize injuries, support the limb, and reduce the risk of further injury. You may often need both together, although sometimes an injury will only call for one or the other.

Often, these will be followed up with proper medical care when possible. For example, you may splint a broken arm until the patient can be got to a hospital, but you shouldn't neglect to take them to a hospital afterward, even if their pain levels are tolerable. Without x-rays and assessment by a trained medical professional, it's impossible to know if the bones are straight and in an excellent position to heal. It's also impossible to know if you are dealing with a break, a fracture, or just a bad sprain. Make sure you attend a hospital as soon as is feasible, no matter how good your splints and slings are.

How to Make a Splint

Splints are usually intended to stabilize broken bones and help with severe sprains. Their purpose is to immobilize the joint to reduce movement and provide support. You can splint many parts of the body, but commonly, you will be splinting a wrist, arm, ankle, or another joint to stop it from moving.

You can often find the materials needed for a splint in the environment, but you should also have equipment in your first aid kit. You will need:

- •A strong stick
- •A plank
- •A towel
- •A newspaper

You will usually attempt to immobilize the injury by splinting from above it to below. For example, an injured wrist can be splinted by running a stick from the elbow to the hand; the stick immobilizes the wrist and prevents the injury from being jostled.

Let's look at how to make a splint. Before you start, it's worth noting that you should not attempt to realign the injury if it looks crooked; you may cause grave damage by moving broken bones around. A hospital will set an injury later; all you aim to do is immobilize it to reduce the risk of further damage and minimize the pain. You should follow the steps below:

1. Deal with any bleeding. A splint should not be applied over a

- bleeding wound, as it is not intended to be sterile, prevent bleeding, or soak up the blood. Put pressure on the wound until the blood stops, and apply disinfectant and gauze if necessary.
2. Pad the injury. You can do this using cotton balls, bandages, cloth, or even a towel or newspaper if necessary.
 3. Place the splint in position. It should run from an uninjured joint to another uninjured joint if possible. You can splint the forearm by getting a longer stick than the forearm and splinting from the wrist to the elbow. Some joints are tougher to splint than others but do your best to immobilize the injury.
 4. Tie or tape the splint in place. Do not put ties or tape around the injury site; apply them at the uninjured spots to provide support. Ties should be firm, so the splint is held close to the body, but not enough to risk cutting off circulation.
 5. Keep watching for reduced circulation. As an injury swells, it is easy for a splint to become too tight. If any areas become pale, tinged with blue, or notably swollen, loosen the ties. A faint pulse is a further sign that the knots are too tight. Similarly, if the patient says it is painful, try loosening them slightly.
 6. Encourage the injured person to lie down or sit down while the shock passes, especially if they feel faint. Elevate the legs slightly and tilt their head below the level of their heart if possible. Wait until they feel better before you try to move them, or there is a risk of them passing out.

Keep checking on the splint regularly until a doctor has assessed the person. If it becomes tight, loosen it to avoid circulatory issues.

Chapter 1

Mild Emergencies



A mild emergency might not seem like something you need to be overly concerned with preparing for, but that isn't the case at all. “Mild” doesn't mean unimportant in this context.

A mild emergency can be intense and painful. Instead, “mild” simply refers to emergencies that are not (usually) life-threatening. However, you still need to know how to handle them.

In this chapter, we will cover all sorts of issues that you may encounter that are usually relatively minor but which can develop into something major if you do not know how to deal with the problem. You should find everything you need here, from teeth problems to fainting to infections.

Dental Problems

So many things can go wrong with a person's teeth that we now have dedicated doctors assigned purely to their care and treatment—dentists. However, when you're off the grid, you need to be your own dentist to a degree, and it's essential not to overlook oral issues because they can be exceptionally painful and miserable if not treated. Being prepared is crucial.

There are a lot of dental issues that can arise, so let's look at them below.

Dental Hygiene

Ensure that everyone in your party understands good dental hygiene, as this can go a long way to combating dental issues. Each member should have a toothbrush with a few spares and toothpaste. Flossing is also essential.

Teeth should be brushed twice a day, and flossing should be completed once to prevent issues, including gum disease, rotten teeth, and more. Encourage good dental hygiene as much as possible.

Tooth Decay

Tooth decay will occur quickly if the teeth are not properly maintained. Bacteria will soon build up inside the person's mouth and permanently damage the teeth, leaving tiny holes that infection can get into.

This may be immensely painful and can happen without the person knowing until the infection sets in. The decay will continue if not treated.

Survival Dental Kit

You should have a dedicated dental kit to use off the grid and know how to use it.

This kit ought to contain:

- •Headlamp
- •Sterile cotton balls
- •Dental picks
- •Gauze
- •Toothache drops
- •Clove oil
- •Temporary fillings
- •Mixing bowls
- •Sterile gauze pads
- •Sanitizing wipes
- •Dental floss
- •Painkillers
- •Dental wax
- •Extraction forceps
- •Surgical gloves
- •Tweezers
- •Dental mirror
- •2 spatulas

Make sure that you have enough supplies in your kit to treat multiple dental emergencies, especially if you plan to be off the grid for some time.

Toothache

Toothaches can be minor or major, but they are close to debilitating at their worst. They can cause headaches and sleep problems, and they will not resolve themselves. The nerves inside the pulp of the tooth are among the most sensitive in the entire body, so toothache has the potential to be worse than almost any other pain.

Toothache is usually caused by tooth decay, a broken tooth, infected gums, a damaged filling, an abscess, tooth removal, or tooth eruption (new teeth coming through). It may be accompanied by throbbing and swelling and the infection draining.

You may be able to treat toothaches with warm salt water, clove oil, cold compresses, and pain medication, but the cause of the issue will also need to be addressed. Some causes, such as tooth removal or tooth eruption, may solve themselves as the skin heals, while others will need treatment.

Fillings

Many adults have fillings, and if a filling comes loose while you are off the grid, this will expose the tooth to re-infection and damage. You will need to learn how to temporarily fill a tooth using the instructions in your kit or by watching videos online. The aim is not to create a perfect filling but to temporarily patch the hole until a dentist can be seen.

Abscesses

Mouth abscesses are extremely painful and occur because of infection. An abscess may look like a pimple. Do not pop it. The patient should brush and floss as much as they can until they visit a dentist. Salt water rinses, clove oil, cold compresses, and garlic can all help deal with an abscess if visible. Rub or rinse them onto the infection, and see a dentist when possible.

If the infection goes down, the patient should continue using salt to sterilize their mouth and minimize the chance of the infection growing again.

Broken Teeth

Broken teeth can sometimes be repaired. Current advice is to find the broken fragment and store it in milk until it can be reattached. If you have dental cement in your first aid kit, you should use this. The patient should then see a dentist when possible.

Loose Teeth

Good dental hygiene is necessary if a tooth is loose but still attached. Brushing and flossing, gargling with salt water, avoiding sweet drinks, or

using a straw will all help. Loose teeth can be caused by poor dental hygiene, osteoporosis, injuries, plaque, and more.

In some cases, medication may be prescribed to deal with loose teeth, but it is best to get professional guidance as soon as possible. In the meantime, avoid touching the tooth, brushing it hard, or putting any stress on it.

Knocked-Out Tooth

If a baby tooth has come out, leave it out. If an adult tooth has come out, current advice is to clean it (no more than 10 seconds under cold running water), place it back in the socket if possible, bite on a clean handkerchief, and see a dentist. If the tooth cannot be replaced, put it in milk. The tooth must not be allowed to dry out.

Teeth need to be repositioned in the mouth within 30 minutes if possible. If an emergency dentist cannot be reached within this time, you may be able to splint the tooth yourself, attaching it to the surrounding fixed teeth, but this is far from ideal. The tooth may reattach itself within a couple of months. As soon as it is feasible to see a dentist, do so.

Tooth Removal

Don't remove a tooth unless it's necessary. It has exposed nerves if it is constantly hurting, loose, and/or broken. If you think it's likely that you will need to attempt tooth removal, it's a good idea to get an experienced dentist to show you how before you travel, if possible.

You will likely need two forceps (one upper universal and one lower universal), an elevator to loosen the tooth, and a probe.

If possible, you should use a local anesthetic (check the patient is not allergic) or provide painkillers. Explain everything you are doing to the patient and know when they are likely to feel pressure.

Make sure you have a good working light.

To remove a lower tooth, you will push it down and pull it up, so position your patient on a low stool. To remove an upper tooth, you will push it up and pull down, placing your patient on a high seat.

Make sure your hands and tools are sterile and use clean gauze to stem the blood. You may need to hold a cold compress to the face to reduce swelling.

Note that you should only remove teeth if you have some experience and as a very last resort. Otherwise, leave the tooth in place and prioritize visiting a dentist.

Bites and Stings

Bites and stings are other major hazards of living off the grid, and it's imperative to take some time to learn about the bites and stings of the creatures you might encounter. Learn how to identify them, keep appropriate treatments in your first aid kit, and ensure you know how to administer them.

The first thing you should do is remove any debris in the wound, whether this is a stinger or hairs (e.g. from a caterpillar). If there is a tick, remove this by using a pair of tweezers without squashing the tick or pulling its head off. When the wound is clear, wash the area with soapy water.

Next, get a cold compress or an instant ice pack, and place it against the injury. Hold it on for 10 minutes or more to bring the swelling down. Elevate the affected area if possible, and don't let the patient scratch at it. Don't add vinegar or bicarbonate of soda, as this isn't likely to help. Over-the-counter painkillers can be taken, along with over-the-counter cream for insect bites or antihistamines.

Choking

Choking is a risk wherever you are, so learn the common symptoms and how to perform the Heimlich maneuver and the five-and-five maneuver. This is something that every adult party member should do.

Headaches

Most headaches can be treated by drinking water, taking painkillers, and possibly lying down in a dark, quiet space. Placing a cool, damp cloth on the forehead can further alleviate pain.

Many headaches are either tension headaches or migraine headaches. Tension headaches will not cause nausea and are not usually worsened by activity. Migraine headaches can cause nausea and sensitivity to movement and may also cause other symptoms, such as loss of vision on one side, numbness, tiredness, etc. Migraines may not be helped by standard painkillers but should pass eventually.

If headaches recur regularly, follow a head injury, are extremely bad, or cannot be solved with medication, it's worth seeking medical advice.

Foreign Objects in the Nose or Ear

If something gets stuck somewhere, the apparent course of action is to remove it, but this can sometimes do more harm than good. Let's explore how to deal with objects getting lodged where they shouldn't.

Nose

Close the unaffected nostril and gently blow out of the nose to try and dislodge the object. Don't poke at an object with cotton swabs or tools or try to inhale the object. Try to breathe through the mouth until the object has been removed. If the object can be seen, gently try to get it out with tweezers, but only if the risk of further injury is low.

If the object cannot be easily removed, seek medical care.

Ear

If the object is visible, try to use tweezers to remove it. Don't poke at it with other tools, as these may push it further in. Grip one edge with the tweezers and gently tug.

Alternatively, tilt the head to one side so gravity pulls the object downward and may dislodge it.

An insect can be removed by pouring warm mineral oil into the ear in some instances but shouldn't be used for any other objects. Tilt the head so that the afflicted ear faces up and tip a little mineral oil in. Don't do this if the eardrum may be perforated or if there are ear tubes in place.

Seek medical assistance if you cannot remove the object or if the ear is bleeding or painful.

Fever

Fevers are a common symptom of many illnesses, so it's essential to know how to treat them. They are the body's attempt at protecting itself, but they can occasionally be dangerous themselves. A fever is a reading over 100°F (taken orally). Usually, the treatment just involves relieving discomfort and promoting rest.

Treat a fever by:

- Encouraging the patient to drink water
- Using a lightweight blanket for chills
- Providing ibuprofen or Tylenol (consult with a doctor first for children under 6 months old)
- Encouraging the patient to rest as much as possible

For babies, you should get medical care as soon as possible. For older children, teenagers, and adults, it's usually okay to wait for a fever out unless the patient has trouble breathing or swallowing, is vomiting a lot, has chest pain or a severe headache, is suffering dehydration, or has a fever but no sweating. If these symptoms arise, consult with a doctor over the phone, or take the patient to the hospital.

Don't try to lower a fever artificially. Cold baths and rubbing alcohol should be avoided. Lightly sponging the forehead with lukewarm water is okay.

Eye Trauma

Eye injuries are alarming and need conscientious treatment to reduce the risk of further injury. Get the patient resting comfortably and tell them not to try moving their eyes or head. Ideally, they should keep their eyes closed to reduce the risk of movement and further injury.

Next, cover the eye with a clean eye pad. Do not attempt to remove any debris from the eye, but pad around the socket to reduce pressure. The person then needs to be taken to a hospital as soon as possible.

Nosebleeds

Nosebleeds can be minor or severe, and they are common. It's valuable to know how to handle them. Get the patient to sit up straight and lean forward a little way to reduce blood pressure in the nasal veins and prevent swallowing the blood.

Get the patient to blow their nose gently and then spray a nasal decongestant if available. They should then pinch their nostrils shut and breathe through their mouth for 10–15 minutes. They can do this for a further 15 minutes if the bleeding continues. Emergency care may be needed if the bleeding lasts for more than 30 minutes.

If the nosebleed results from an injury and there is a risk that the nose is broken, you should try to get the patient to emergency care if possible. Applying ice and cold compresses will help reduce the swelling and pain if you cannot get the patient to a hospital straight away.

After a nosebleed, the patient should avoid bending down or blowing their nose for a few hours.

Fainting

Fainting has a variety of causes that may require the patient to get checked over by a doctor, but knowing what to do at the moment is crucial. Fainting can cause the patient's pulse to slow down temporarily and is often caused by reduced blood flow to the brain. Fainting will usually cause a person to fall to the ground and may also be characterized by sweating, cold skin, pallor, and a slow pulse.

You should respond by getting the patient to lie down as soon as possible to reduce the risk of further injuries. Next, check whether they were injured (if they fell when they fainted). Treat any injuries that you find.

Kneel beside the patient and raise their legs. Place their ankles on your shoulders, as this will encourage blood to flow back to the brain.

If possible, increase the amount of fresh air available and prevent bystanders from crowding around. Allow the patient to rest for a few minutes, and then ask if they feel ready to sit up. If they do, ensure that they move slowly and lie them back down if the faintness recurs. If it doesn't, get them to sit quietly for a while to reduce the risk of a second fall and wait. Ensure there are people ready to catch them when they stand up and keep an eye on them for the rest of the day.

If the person passes out and remains unresponsive, call emergency services and check that the patient's airway is clear. If they stop breathing, perform CPR.

Sunburn

Prevention is notably better than cure when it comes to sunburn, so make sure you have sun lotion suitable for all party members. However, it is easy for sunburn to happen even when careful, especially if you spend a lot of time outdoors. You can further minimize the risks by ensuring that everyone has lightweight, long-sleeved shirts, appropriate hats, and gauzy scarves that they can use to deflect the sun's rays when necessary.

If a sunburn occurs, you should start by cooling the skin, either with a cool bath or a damp towel. Next, apply an aloe vera lotion or gel or something similar to soothe the inflammation. Encourage the patient to drink water to rehydrate themselves.

Pain relievers can be taken, and the patient should avoid further sun

exposure. Covering up is one of the best ways to reduce the risk of sunburn, especially if the patient frequently forgets to apply sun lotion. Avoid breaking blisters. The area should be cleaned with gentle soap and water when they break and then covered with gauze. Keep the site clean and make sure it is healing well. If a rash begins, contact a doctor for advice.

Gastroenteritis

Gastroenteritis is usually not too serious, although it can be unpleasant. It's usually caused by consuming contaminated food or water but can occasionally be a side effect of medication, or a result of eating an allergen. It can last for up to ten days and has the following symptoms:

- Stomach cramps
- Chills
- Fatigue
- Headaches
- General aches
- Diarrhea
- Nausea
- Vomiting
- Low-grade fever (up to 100.8°F)

It's not usually dangerous save for vulnerable people and can often be prevented by good hand-washing routines. It can be passed from person to person or transferred on surfaces, foods, and water. If a member of the party has it, make sure to implement strict washing routines, avoid sources of water that you don't know the safety of, and regularly sanitize kitchen areas.

You can help a patient with gastroenteritis by getting them to drink lots of water to avoid dehydration, which is the most dangerous element of this complaint. The patient can take over-the-counter medications for the symptoms and rest as much as possible. They should avoid eating for a while if they feel sick and then choose bland foods that are easy to digest.

If the symptoms get worse or blood appears in the patient's vomit or diarrhea, the person should see a doctor.

Sprains

Sprains are a common injury and can be very painful, even though they are not usually serious. They occur when two ligaments are torn or stretched, and they will often result in a warm, swollen, red area that is difficult to move.

Fortunately, sprains are easy to treat through rest. You should encourage the patient to avoid moving the joint much for 48 hours. Wrap an ice pack in a towel and apply it to the swelling for up to 20 minutes, but no longer; This can be done up to 8 times per day, but make sure you give the skin a break from the cold between each application.

If necessary, a compression bandage can support the injured area for a few days. Painkillers can be taken to ease discomfort.

It is crucial to verify that a sprain is not more serious, so make sure the patient goes for an x-ray if they are still in pain after a week, feel numb or tingling sensations, if the limb looks misshapen, or if there are any signs of infection.

Hyperventilation

Hyperventilation means that the balance of breathing is upset, and the person is exhaling more than they are inhaling. They will quickly run out of carbon dioxide, and this will cause the blood vessels that connect to the brain to narrow.

In severe cases, hyperventilation can lead to the patient passing out. It's usually a response to stress or a phobia but can occasionally be connected with depression or anger.

If someone in your party is hyperventilating, encourage them to purse their lips as they breathe to help slow the breathing down. They may also find it helps to breathe into their cupped hands or a paper bag. They should try to take belly breaths, not shallow chest breaths, and they may find that it helps to hold their breath for a few seconds.

Other options include breathing through one nostril and then the other in a pattern or walking briskly and breathing through the nose. All of these things may help to calm an attack.

In the long term, stress reduction and relaxation techniques effectively combat hyperventilation. Encourage the patient to exercise, meditate, and follow up with a doctor if they still have serious problems.

Constipation

An uncomfortable condition can have many different causes, but it is relatively treatable. A patient who is suffering from constipation should be encouraged to:

- Drink at least 8 glasses of water per day
- Try a little coffee, as this can help with bowel movements (but a lot will cause dehydration)
- Limit high-fat foods
- Exercise regularly
- Eat more fiber
- Massage the abdomen

Some medications cause constipation, but it may also be down to lifestyle choices. It's better not to treat it with laxatives if other options are available, so try the above. Soft fruit is often helpful, and many people turn to prunes and pears to keep their digestive systems moving.

Dehydration and Diarrhea

Diarrhea is a symptom of many illnesses and complaints, and on its own, it is uncomfortable and unpleasant, particularly in off-grid situations where washing facilities may be limited. However, it brings a much more dangerous issue: dehydration.

Mild dehydration can be treated using first aid techniques. For major dehydration, you should aim to get the patient to a medical facility as soon as possible, as this can be life-threatening. For mild dehydration, try the following:

- Encourage the patient to drink water or other liquids (preferably not caffeine-based). It's best to avoid full-strength fruit juice and other soft drinks, but some liquid is better than none. Get the patient to take small sips.
- Offer an oral rehydration solution if you have any available. These contain liquid, salts, and minerals, replenishing what the body loses due to diarrhea.

Drinking more will not increase diarrhea, so the patient should not be

concerned about this. The patient should also eat if they can, replacing lost nutrients. Avoid fatty foods, and opt for fiber-rich ones instead. Foods high in electrolytes, protein, pectin, and potassium will all help.

Skin Rashes

If a member of your party has a skin rash, take some time to try and identify it and check whether it is an allergic reaction and whether it poses any risk of anaphylaxis. If it does, treat it as an allergic reaction and act accordingly.

If the rash is the result of touching a poisonous plant or insect, use the following steps:

- Clean the rash with soap and warm water for 10+ minutes, using a soft cloth.
- Take a cool bath if possible, and add oatmeal if available, as this is soothing.
- Apply an anti-itching lotion up to four times per day.
- Wash clothes thoroughly in hot water to remove any remnants of the irritant.

The patient should see a doctor if the rash spreads to sensitive areas, shows signs of pus, or becomes more irritated/itchy. Don't cover up or allow the rash to be rubbed or scratched.

Infections

Cuts and scratches, even minor ones, can get infected, and it's vital to know how to handle an infection. In some cases, minor infections can be treated without antibiotics, but it is good to have some in your first aid kit to deal with more major infections.

A wound is infected if it:

- Becomes more painful than when it was inflicted initially
- Swells
- Turns red and hot at the edges
- Oozes yellow pus
- Becomes itchy

The infection will be localized to begin with but will spread. It can get deep into the tissues and cause sepsis if it is not treated. This medical emergency requires hospitalization: it has many different symptoms but usually involves a high fever, mottled or pale skin, fast breathing, sleepiness, and abnormally cold skin. If you think a patient has developed sepsis, they must be taken to a hospital as soon as possible.

More minor infections can be treated as follows:

1. Wash the injury site well.
2. Soak the injury in water as hot as the patient can tolerate (without burning their skin). Repeat this step multiple times throughout the day. The patient will likely find that it relieves itching and tension in the wound and makes it more comfortable.

You can then do any of the following:

- •Apply over-the-counter antibiotic creams.
- •Apply diluted (using a carrier oil) tea tree oil to the site.
- •Apply honey to the site.

These will hopefully address the infection. Keep a close eye on it, and if you see a red line traveling away from the injury, get medical help. It is a sign of lymphangitis, which can be severe.

Chapter 2

Serious Emergencies



In this chapter, we're going to start looking at some of the more significant emergencies you might face while off the grid. It's important to remember that where possible, you should contact emergency services or transport the patient to a hospital personally; do this as soon as you can, even if it will take time. Many of these problems cannot be treated at home and will need emergency care; the information below is intended to help address the immediate care and increase the patient's chances of recovery.

Shock

Shock can be life-threatening because it prevents the vital organs in the body from getting enough oxygen. The symptoms of shock include:

- Gaspings
- Nausea/vomiting
- Weak pulse
- Gray-blue skin
- Sweating
- Restlessness/aggression
- Unresponsiveness

Shock is usually caused by severe bleeding, loss of bodily fluids, spinal injury, severe allergic reaction, or heart issues.

Start by treating the cause of the injury if possible (stem bleeding, etc.).

Lie the patient down and lift their legs to increase blood flow to the vital organs. Loosen tight clothing, and cover them with a blanket. Reassure the patient, stay with them, and make sure they stay responsive. Begin CPR if they stop breathing and wait for help to arrive. The patient should not eat or drink anything.

Smoke Inhalation

Smoke inhalation needs to be treated seriously, as it can kill. Its symptoms include:

- Chest pains
- Confusion
- Fainting
- Blue/gray skin
- Hoarse breathing/speech
- Headaches
- Shortness of breath
- Coughing

Patients with heart or lung conditions are more in danger of death from smoke inhalation. Try to remove the patient from the area with the smoke if possible, and get them somewhere with fresh air. Check that they are breathing, and perform CPR if not. If you have an inhaler available and the patient is breathing, use the inhaler.

Burns

Burns are a risk in almost every off-grid setting, especially if you use open fires, gas cookers, etc. Follow these steps if a burn occurs:

- Stop the burning process by removing the person from the area, dousing the flames, or smothering them.
- Remove anything touching the burnt skin (but don't pull it away if it has stuck).
- Cool the area using cool or lukewarm water, which should be done for 20 minutes. Don't put ice, cold water, or greasy substances on the burn.

- •Keep the person warm using a blanket, especially if you are cooling a large area.
- •Cover the burn with plastic wrap in a single layer (do not wrap the limb/burnt area).
- •Give the patient pain relief.

The patient should then go to a hospital unless the burns are minor. Electrical burns and chemical burns should prompt an immediate hospital visit.

Cuts and Wounds

Most cuts and wounds will require pressure and bandaging to stop the blood flow.

The basic approach for sealing a wound is:

1. Remove the patient from danger if necessary.
2. Apply pressure using a clean, absorbent pad. Press the cloth against the wound, and add a second absorbent cloth if it soaks through. Keep doing this until the bleeding stops.
3. If possible, lift the injury site to reduce the bleeding and keep applying pressure for at least a few minutes to allow the blood to clot.
4. If the bleeding doesn't stop within fifteen minutes, arrange to get the person to a hospital.
5. Once the bleeding stops (if the patient isn't hospitalized), clean the wound with warm water and remove all dirt and debris. Pat the wound dry.
6. Close the wound using gauze, glue (minor wounds), butterfly bandages (minor wounds), sutures, or staples. The latter two should only be used if help is more than 12–24 hours away, as they can be dangerous if misapplied.
7. Keep regularly inspecting the wound for signs of infection and to make sure it is healing. Get the patient to emergency care when possible unless the wound is minor.

Severed Finger/Toe

The faster emergency care can be sought in this situation, the better, as severing or partial severing may affect the functioning of the hand/foot in the long term. In the short term, the injury should be dealt with as follows:

1. Rinse the injury gently with clean water or a saline solution.
2. Cover the injury with sterile gauze.
3. Elevate the injury above the head if possible to reduce swelling and bleeding.
4. Put gentle pressure on the injury to slow the bleeding.

You should not attempt to remove jewelry.

If the digit has been totally severed, find the missing part and:

1. Rinse it with clean water or a saline solution.
2. Cover it with damp gauze.
3. Put it in a clean bag (waterproofed), and then put that bag in another clean bag, and place them on ice. Take it to the emergency room.

If you are dealing with more than one amputation, put the digits in separate bags. Don't get the digits wet, but keep them as cool as you can without directly resting them on ice.

You will likely also need to deal with shock if this situation arises. While waiting for the ambulance, get the person to lie down and keep them warm.

Head Injuries

Head injuries can be severe and may result in spinal or neck injuries. If someone in your party has injured their head, you will need to call for help and assess the injury. You should look for:

- Confusion
- Headache
- Dizziness/nausea
- Loss of responsiveness
- Scalp wounds
- Loss of memory

To treat a head injury, get the patient to lie down with their feet elevated and then follow the below steps:

1. Place a towel-wrapped ice pack against the injury to reduce swelling. Keep it there for up to 20 minutes.
2. Assess the patient's alertness level, determining how responsive they are and how confused they are.
3. Treat any wounds by applying clean gauze and gentle pressure.

If the patient is drowsy, vomiting, or confused, they need to see a doctor as soon as possible. If they appear clear and coherent, continue to monitor them and do not leave them unattended for several hours at least. It is best to get all head injuries assessed at a hospital if possible, as internal damage may have been done even if the injury looks minor. If this isn't feasible, keep monitoring the patient for any changes over the next few hours and days.

Concussion

A natural result of some head injuries, concussions are a common type of brain injury. A concussion involves a short-term loss of mental functionality. The symptoms include:

- A brief loss of consciousness following the injury
- Confusion, delayed answers to questions, blank expression
- Short periods of memory loss
- Short-term blurry vision or visual disturbances

You cannot diagnose a concussion off the grid, and a patient that shows these symptoms will need emergency care. In the meantime:

1. Get the patient to lie down with their feet elevated.
2. Apply a cold compress (wrapped ice or a cold, wet towel) to the injury for around 20 minutes. This should be done every two to four hours. Never place ice directly on the injury; it must be wrapped first.
3. Offer painkillers, but do not give the patient non-steroidal anti-inflammatory ones (e.g. aspirin, ibuprofen), as these may cause bleeding.
4. Allow the patient to rest but ensure that someone is with them for

the first 48 hours after an injury (if they cannot be taken to the hospital at this time).

5. Don't let the patient do anything strenuous until they have been assessed and cleared by a doctor.

Poisoning

Poisoning is the result of inhaling, swallowing, or touching certain substances. The party members most likely to be vulnerable to poisoning are children, who are both more likely to consume things they shouldn't, and more susceptible to harm because they are smaller. However, both adults and children can be poisoned, particularly if you take up foraging while off the grid. Always use reliable resources if you are going to forage for food, and never eat something that you cannot identify with 100 percent certainty.

Poisoning symptoms can vary but generally include at least some of the below:

- Vomiting
- Drowsiness
- Confusion
- Burns, swelling, or redness around the mouth
- Breathing difficulties

You should try to identify what has caused the poisoning and keep a sample of the plant, food, or other substance. If it was a packaged product, keep the packaging. Call emergency services, and follow the advice below.

For ingested poison:

1. Remove as much of the poisonous substance from the person's mouth as possible (if it is still there). The person may rinse and spit, but do not let them swallow any of the water they rinse with.
2. If applicable, read the packaging and follow any instructions related to poisoning.
3. If the person is dizzy or drowsy, place them in the recovery position. If they vomit, make sure their airway is clear.
4. Begin CPR if the patient stops breathing.

For inhaled poison:

1. Move the person into fresh air as soon as possible, away from the poisonous substance.
2. Place them in the recovery position and make sure the airway is clear.
3. Begin CPR if the patient stops breathing.

For poison on the skin:

1. Remove contaminated clothing (use gloves to avoid getting poison on your skin).
2. Rinse the skin for up to 20 minutes with lukewarm water.
3. Place them in the recovery position and make sure the airway is clear.
4. Begin CPR if the patient stops breathing.

For poison in the eye:

1. Flush the eye using lukewarm or cool water for 20 minutes or until emergency services arrive.
2. Get the patient to keep their eyes closed after this time while waiting for assistance.

If you believe your child has swallowed a button battery, prioritize going to the hospital even if they seem fine. These batteries can cause internal burning in a concise space of time. Doctors will locate the battery and determine what action to take.

To reduce the risk of poisoning, keep medical supplies out of reach of young children. All medication should be kept in the original packaging so that it is not mixed up, and anything decanted into another bottle must be very clearly marked and labeled. Avoid decanting wherever possible as information about side effects and drug conflicts may be lost.

Heatstroke

Heatstroke can be life-threatening. It may cause damage to vital organs, including the brain. Anyone who works in the heat or is exposed to hot weather for too long can suffer from heatstroke.

The common symptoms of heat stroke include:

- •Headaches
- •Fainting
- •Flushed skin
- •Rapid breathing
- •Rapid pulse
- •Confusion, slurred speech, agitation
- •Vomiting
- •Nausea
- •Heavy sweating or hot skin
- •Fever higher than 104°F

You should take action by calling emergency services and immediately seeking ways to cool the person down. You may be able to do this by sitting them in a cold bath, spraying them with a hose, getting them into a cool shower, or sponging them with a wet, cold cloth. Ice packs can be placed in areas with lots of blood flow, including the armpits, the neck, and the groin.

You can also fan the person while misting them with cold water or wet a sheet and cover the person with it. The faster you can cool the person down, the more you will reduce the risk of damage to their brain and other vital organs.

If the person can drink, give them some cool water to help them rehydrate. Avoid caffeine, sugar, or alcohol. Icy drinks may cause cramping and should be avoided too.

Be prepared to perform CPR if necessary.

Get the patient to a hospital when possible, even if the danger has passed, so that the damage can be assessed.

Hypothermia and Frostbite

On the opposite end of the scale, hypothermia and frostbite are serious risks if you are working in a cold environment, especially with inadequate gear. It is always good to have a supply of warm clothing and survival blankets available when traveling in winter, even if it rarely gets freezing. If your power supply goes down and you do not have access to wood, these could save your life.

Knowing how to treat hypothermia and frostbite is also crucial. We will cover hypothermia first.

Hypothermia

Hypothermia can prevent the patient from thinking clearly, which makes it particularly dangerous, as they may not realize they are getting too cold. All party members should be aware of the risks and the symptoms of hypothermia before working in a cold environment.

Common symptoms of hypothermia include:

- Shivering
- Fumbling
- Confusion
- Exhaustion
- Slurring speech
- Memory loss

You should treat hypothermia as fast as possible. If you suspect someone has hypothermia, get them into a sheltered place and take their temperature. If it is below 95°F, try to call emergency services. Next, follow these steps:

1. Remove the person's clothes if they are wet.
2. Focus on warming up the central parts of the person's body. The chest, groin, neck, and head are the best places to focus on. You can do this by using heat pads, electric blankets, or even skin-to-skin contact.
3. Provide a warm, non-alcoholic drink if the person is conscious and can drink it safely.
4. Keep the person dry and wrap them in a warm blanket. Include their head, as a lot of heat is lost through the head.
5. If the person falls unconscious and stops breathing, perform CPR. You should keep doing this even if the patient does not respond and seems dead. A patient can be resuscitated when emergency services arrive. Keep warming the person up as you perform CPR.
6. If the person wakes up again, keep them warm and do not leave them unattended. They need to be assessed by medical professionals when possible.

Frostbite

Frostbite is an injury caused by exposure to extreme cold. It can cause permanent damage and even amputation. Its symptoms include:

- •Loss of color in the affected area
- •Loss of feeling in the affected area
- •Skin that feels waxy or firm

Frostbite usually affects the toes, fingers, cheeks, chin, nose, and ears. You should treat frostbite in the following way:

1. Get the person to a warm room/shelter. If the frostbite is in the toes/feet, don't let the person walk if this can be avoided, increasing the risk of permanent damage.
2. Put the frostbitten area in warm water. Never use hot water. It should feel comfortable to unaffected body parts. If you don't have warm water, use body heat. Frostbitten fingers can be tucked into a warm armpit or cradled in warm hands.
3. Avoid using heat packs, stoves, lamps, or other extreme heat sources. Because the area is numb, there is a high risk of burning.
4. Keep warming the digits until feeling returns to them. When possible, get the patient checked by professionals.

Note: you should not rub or massage frostbitten digits. This will not help and can cause damage. Do not rub snow onto these areas either, as this will make them colder.

Fractures

A fracture can be challenging to diagnose without being able to take an x-ray, but if you see any of the following symptoms, a fracture is quite likely:

- •Difficulty moving the limb
- •A grating noise
- •The sense that the bones are rubbing together
- •A limb that appears bent, twisted, or short
- •Deformity
- •Swelling or bruising
- •Signs of shock
- •An open wound with the bone sticking out (also known as an "open fracture")

You should treat fractures in the following way:

1. Cover any open wounds in sterile, absorbent cloths and put pressure around the wound rather than over the break. When the bleeding stops, secure a clean dressing over it.
2. Get the patient to sit quietly and keep still while splinting the injury. Remember, the purpose of splinting is to immobilize the joint.
3. Pad the injury and place the splint in position, making sure that it runs from one uninjured joint to another if possible. Tape the splint in place, being careful not to cut off the circulation.
4. Get the person to lie down, especially if they are shocked or dizzy. Allow them to stay there while the shock passes. The person can take pain relief and use ice to reduce the swelling.
5. Keep monitoring the injury. It may be necessary to loosen the ties if the limb swells. If the fracture is on the arm, creating a sling may make the patient more comfortable and further help immobilize the injury.

When possible, a fracture should be assessed by a doctor. This is not as much of an emergency as life-threatening injuries, but it should still be prioritized. If the bones are not in the correct position, the injury will heal poorly and may cause long-term pain. X-rays, setting, and a proper cast may be needed.

Broken Bones

A broken bone should be treated the same way as a fractured bone, as they are much the same thing. Follow the above steps to immobilize the injury and get the patient to a hospital when this becomes possible.

Electrocution

If you think a member of your party is in contact with a live piece of equipment, do not touch them, or the electricity may transfer to you. Turn off the power source, or separate it from the person using an insulating material (e.g. wood) or by using rope to pull their limb away.

When you are sure that contact has been broken, perform CPR if the patient has passed out and stopped breathing. Avoid moving them unless it is necessary for safety. Even if the patient seems okay, you should not leave them unattended. Call for help and keep the patient warm.

You can also cover any burns with sterile gauze, but little other first-aid help can be given at the scene.

Drowning

Be aware that drowning does not usually involve screaming and splashing. It happens quietly and quickly, with the person dipping below and above the surface a few times, often silently. Implement safety procedures whenever your group is near water and assign someone to watch for anyone struggling. Avoid swimming in adverse conditions.

If you pull someone from the water, you should:

1. Check whether the person is breathing. Tilt their head back and feel for breaths, and if you can't detect any, do the following:
2. Have someone call for help, and then begin CPR. You should be delivering 30 chest compressions at a rate of about 100–120 per minute.
3. If the person does not respond, tilt their head back and seal your mouth over theirs. Gently pinch their nose and blow into their mouth. Repeat this twice to deliver 2 rescue breaths. Begin a cycle of 30 compressions to 2 breaths until the patient responds or help arrives. If you are not confident delivering rescue breaths, do chest compressions only.
4. If you are treating a child or infant, start with 2 rescue breaths, and give compressions at a rate of about 100 per minute. Continue until the child begins breathing or help arrives.

Chapter 3

Emergencies Related to Permanent Medical Conditions



A person with a permanent medical condition can sometimes find themselves in an emergency medical situation resulting from their chronic illness. We will look at how to deal with some of the more common emergencies resulting from chronic health conditions such as epileptic seizures, heart attacks, and severe allergic reactions.

Heart Attacks and Chest Pains

Heart attacks occur when the flow of blood to the heart is blocked. Blockages may be caused by blood clots, blood plaque (cholesterol) in arteries, or collapsed blood vessels. Treatment during the first 90 minutes of an attack greatly increases the chance the person's life will be saved.

While not all chest pains are a sign of a heart attack, it usually denotes a medical condition and you should ensure that the person gets medical attention.

Symptoms for Both Genders

- Discomfort and pain in the chest area; or a feeling of pressure, tightness, or an aching and squeezing sensation at the center of the chest for more than 15 minutes
- Pain that spreads to the shoulders, arms, neck, back, jaw, teeth, and sometimes the abdomen

- Indigestion, heartburn, nausea, vomiting, or abdominal pain
- Shortness of breath
- Dizziness, fainting, light-headedness
- Sweating

A racing or irregular heartbeat

Specific Symptoms for Men

Most men experience cold sweats while pain may travel down their left arm.

Specific Symptoms for Women

Women tend to have more indistinct symptoms such as nausea, stomach upsets, dizziness, tiredness, shortness of breath, jaw, or back pain.

Treating Heart Attacks

1. If the medication is available, give the person an aspirin, or if they have a doctor's prescription for nitroglycerin, then ensure they take the correct dosage at once. Aspirin reduces the incidences of blood clots and reduces damage to the heart if the person is experiencing a heart attack.
2. If you don't have access to medication and the unconscious person is not breathing and you find no pulse, begin CPR. Press hard and fast in a rapid rhythm of 100 to 120 presses a minute.

Stroke

When a blood vessel in the brain bursts or is blocked, a person has a stroke. With its oxygen and blood cut off, the affected part of the brain begins to die, and the body functions that part of the brain controls are not available to the person. For instance, they may not be able to speak if their speech centers are affected.

It is important to know the signs of stroke and to act fast as brain damage can occur within minutes of the stroke. Receiving medical help quickly not only reduces brain damage but also makes full recovery possible.

Signs of a Stroke

- Sudden weakness, numbness, tingling, or loss of movement in the face, arm, or leg, particularly on one side of the body.
- Sudden vision loss in one eye: blurred vision, dim vision, or no vision

- •Sudden speech problems
- •Sudden confusion and no understanding of even simple statements
- •Sudden problems with movement or balance; loss of bowel and bladder control
- •Sudden severe headaches unlike those usually experienced
- •Quite often, most strokes are painless.

FAST is a simple way to remember the symptoms of stroke:

- •F—face drooping
- •A—arm weakness
- •S—Speech difficulty
- •T—Time to call 911

Treating Stroke Victims

1. Ensure they are in a safe, comfortable position and environment. Lay them on their side with their head supported in case they vomit.
2. Check their breathing. If they stop breathing, administer CPR. If they're having trouble breathing, loosen tight clothing such as ties and scarves.
3. Reassure them by talking to them in a calm tone.
4. Keep them warm. Cover them with a blanket.
5. If they are weak, particularly in a limb, don't move them.
6. Observe the person for a change in their condition. Be prepared to tell emergency operators and responders the person's symptoms and when they first appeared. If the person fell and hit their head, mention that as soon as possible.
7. Perform CPR as needed.
8. Stay calm and alert.

What Not to Do in the Case of Stroke

- •Don't allow the person any drink or food.
- •Don't drive to the hospital. Wait for emergency services.
- •Don't give the person any medication.
- •The key to stroke treatment is getting hospital treatment as soon as possible. Patients that are taken to the hospital in an ambulance get

diagnosed and are treated much quicker than a patient not arriving in an ambulance.

Seizures

Seizures may be caused by epilepsy, a reaction to an incorrect medication, or other medical or traumatic reasons.

Signs and Symptoms

- •Loss of consciousness
- •Muscle contractions and convulsions
- •Weakness
- •Clouded awareness
- •Loss of sensation
- •Fidgeting
- •Strange sensations in the stomach
- •Confusion and sleepiness after the seizure

In the Event of a Seizure

- •You aim to keep the person safe until the seizure stops.
- •Loosen any clothing around the person's neck.
- •Lay them on the floor.
- •Don't attempt to restrain them or put any objects in their mouth.
- •Clear the area and ensure there are no hard objects nearby.
- •Stay with them until the seizure stops.

Severe Allergic Reactions or Anaphylaxis

A severe allergic reaction (anaphylaxis) can be life-threatening as it may cause a shock, a sudden drop in blood pressure, or interfere with breathing.

People with allergies may experience reactions minutes after exposure to the allergen. Sometimes there can be a delay before anaphylaxis occurs or even no apparent trigger.

Signs and Symptoms

- •Skin reactions include rashes, paleness, red skin, itching or hives

- Swelling on the face, lips, eyes, or throat.
- Constriction of the throat with wheezing or trouble breathing
- A weak and rapid pulse
- Diarrhea, nausea, vomiting
- Dizziness, fainting, or losing consciousness.

Treating a Person with a Severe Allergic Reaction

You aim to help the person use their allergy medication, assist them with breathing if necessary, and get them to a medical care facility.

1. Ask the person if they are carrying an epinephrine auto-injector (EpiPen, Auvi-Q, or others) to treat an allergy attack.
2. If the person has an auto-injector, ask them whether you should help them inject the medication. This is usually done by pressing the auto-injector against the person's thigh.
3. Lay the person down on their back. Keep them still.
4. Loosen tight clothing and cover the person with a blanket. Don't give them anything to drink.
5. If they are vomiting or bleeding from the mouth, turn them to their side so the fluids can drain and they won't choke.
6. If the person stops breathing and shows no signs of coughing or other movements, begin CPR. Do uninterrupted compressions of about 100 every minute until paramedics arrive.
7. Get the person emergency medical treatment. After anaphylaxis, monitoring at a hospital is usually necessary as symptoms can reoccur.

What Not to Do

- Don't delay treatment by waiting to see if symptoms improve. Seek immediate emergency treatment. In severe cases, death can result within half an hour.
- An antihistamine pill isn't a sufficient treatment for anaphylaxis. While they may relieve symptoms, they can't fight off the damage a severe allergic reaction does to the body.

Asthma

Asthma is so prevalent that every ten seconds someone in the world is

having a potentially life-threatening attack. (NHS Choices. 2019) Their chances of having a severe attack are greatly reduced if they are on the right treatment.

Signs and Symptoms

Take action when the following signs and symptoms worsen:

- Coughing, wheezing, tightness in their chest, or breathlessness
- Their usual reliever or inhaler isn't helping
- Feeling too breathless to talk, eat, or sleep
- Breathing rate is going up and they still cannot catch their breath
- The person's peak flow score is lower than normal
- Children, in addition, may complain of chest or stomach ache.

Treating an Asthma Attack

1. Sit the person upright (not lying down), and coach them to take slow, steady breaths.
2. Reassure them and help them remain calm as panicking will worsen their condition.
3. Encourage them to take long, deep breaths. This helps to prevent hyperventilation by slowing down their breathing. Have them breathe in through their nose and out through their mouth.
4. Help them move away from the trigger and into clean air or an air-conditioned place. The asthma attack could be triggered by dust, cigarette smoke, or the smell of chemicals such as ammonia, chlorine gas, or sulfur dioxide.
5. Give them a hot caffeinated beverage. This may help open their airways a little and provide relief for a short while.
6. Let them take one puff of their usual inhaler every 30 to 60 seconds for a maximum of 10 puffs.
7. Repeat every 15 minutes.
8. If their condition improves, they don't require emergency medical care, but they do need to consult their doctor as soon as possible.

Tachycardia or Heart Palpitations

Heart palpitations occur when the person feels as if their heart is pounding, or fluttering, at an alarmingly high rate. These palpitations may last for a few seconds and may occur at any time.

While not all palpitations are caused by a heart condition, they can be caused by other factors that put stress on your heart, such as illness, dehydration, general stress, exercise, caffeine, pregnancy, illegal drugs, or tobacco products.

Treating Heart Palpitations

In most cases, no treatment is needed. You can help alleviate the person's condition by

1. Trying relaxation techniques
2. Giving them water to drink water
3. Encouraging them to do vagal maneuvers
4. Encouraging them to avoid stimulants
5. Restoring electrolyte balance

Hyperglycemia

One of the two conditions resulting from diabetes, hyperglycemia occurs in any age group when a person with Type 1 diabetes runs out of insulin. As their bodies don't produce insulin, they are dependent on their insulin injections, pumps, and injection pens.

Hyperglycemia develops slowly over a few hours or days and often leads to a diabetic coma which must be treated in the hospital.

Signs of Hyperglycemia

- Sweet breath with a fruity smell
- Hyperventilation or rapid breathing and pulse
- Drowsiness
- Warm, dry skin.

While you can't treat a diabetic coma and hyperglycemia, your priority is to call for immediate medical care and to monitor the person. If they lose consciousness and stop breathing, give them CPR until medical help arrives.

Hypoglycemia

The second condition resulting from diabetes known as Type 2 hypoglycemia usually occurs in mature people or those suffering from

obesity. As their body's sugar and insulin shift out of balance, they become distressed and more ill.

Hyperglycemia develops fast if a meal is skipped or the person has exerted themselves too much. This condition often occurs in recently diagnosed diabetics who are still adjusting to their insulin regime and new lifestyle.

Signs of Hypoglycemia

- •Weakness, faintness, or hunger.
- •Muscle tremors
- •Weak pulse
- •Palpitations
- •Cold clammy skin
- •Sweating
- •Confusion, irritability, or irrationality
- •The person may be aware of their condition and history of diabetes and carry medication or wear a bracelet
- •Responses grow erratic

Treating Hypoglycemia

Your priority is to raise the blood sugar level of the person as fast as possible, then finding medical care.

1. Sit the person down as soon as possible.
2. If the person is carrying sugar, glucose, or candy, help them ingest them. If the person has no sugar products on them, give them two teaspoons of sugar, a hard sugar candy, a cup of regular soda (not the diet variants), or fruit juice.
3. If the person is recovering well, feed them more food and drink and allow them to rest.
4. Once they're feeling much better, help them do their glucose test if they carry a personal kit, or to find medical help.
5. Monitor the person.
6. If the person doesn't respond well to sugar intake, look for other conditions for their distress and stay with them until professional medical care arrives.

Chapter 4

Environmental Causes

Some natural disasters arrive with a warning, while others do not. Though you can't always avoid disasters, you can most certainly think ahead to protect your loved ones and community.

Earthquakes

They are some of the most common types of disasters that are bound to occur. You can recognize an earthquake by the shaking of the ground. When earthquakes occur it is a good idea to look for open space and go stand or relocate to that spot. Get away from trees, electric poles, buildings, and so on. These may fall and you might die or get severely injured. You can also get under a sturdy desk or crawl under a good bed. This will reduce the chances of things falling on top of you. If you do not find any structures like this, it is a good idea to sit against a wall with your knees up and your head locked between your knees. This will get rid of any falling debris. The debris will not hit your head, which can affect your brain. If you live in an earthquake-prone zone, then it is best to protect yourself by constructing your house with lightweight material. This will prevent injuries during earthquakes. Avoid using glass as decorations if you happen to live in such areas. Use fasteners and tapes to secure paintings and other sorts of wall hangings, this will minimize the loss of items, and also they will not fall on you.

Volcano

Volcanic eruptions are not very easily recognizable though there are three types of volcanoes. It is a good idea to know which category of volcano the mountain or hill located in your region is. If it does happen to be an active volcano, then you can recognize an oncoming volcanic eruption through the behavior of animals as they usually flee and are more sensitive to such things. When a volcano erupts it is a good idea to stay indoors. Buildings usually don't run the risk of burning down and so it is best to stay indoors. When a volcano erupts remember to shut and seal all openings including windows or else wear protective goggles and a mask to prevent inhaling toxic fumes. This can cause burns and you might even die from these burns. They also happen to be highly cancerous so always remember to wear your safety gear. Ensure you have sufficient water in your house and store these waters away from walls in the basement. People often think that the volcanic ash can't reach them if they are situated in a high-rise building. However volcanic ash can reach great heights and hence always remember to remain indoors.

Cyclones

Cyclones usually occur when there is low pressure around the water bodies. They may seem like a problem for the oceans but they can result in heavy winds and torrential rainfalls that can severely affect you. If you live near the coast or have a house that overlooks a water body you can check the movement of the waves and recognize the cyclone. If animals manage to get away, you know a cyclone is approaching. In these scenarios, you can expect a power cut and a shortage of supply of basic amenities. Stock up on food and water if you happen to be living in areas

where the onset of cyclones is more. Try to store non-perishable ready-to-eat food. Stock up on candles and have working flashlights. Carry a cigarette lighter with you, as they will help you to navigate during times of power cut. Get away from the house if you have to and reach a high lying area that may be near your residence. If the water body starts to flood you won't have to deal with it. Stock up on all the medicines especially flu tablets as flu usually breaks out during cyclones. It is also a good idea to carry satellite phones as these do not rely on the mobile towers of the regular phones and you can communicate better. Always take your survival kit along with you.

Landslides

A landslide can occur at any point. This is a common phenomenon that occurs in hilly and mountainous regions of the world. Though they are sudden, they usually occur due to rainfall and avalanches. When this happens it is a good idea to either be indoors or flee from the area. Avoid traveling when there are heavy rains and at the first sight of a drizzle, get shelter. If you must travel during chilly weather, carry adequate amounts of acid and salt as this helps to melt the snow. It is also a good idea to take the same steps as in an earthquake. Get into an open space. If you cannot get into an open space, get under a sturdy table or a strong bed to avoid debris falling on top of you. Have enough provisions like water and food to get you through.

Tsunamis

Tsunamis are the enormous waves that are caused because of disturbances under the surface of the water such as earthquakes, volcanic eruptions, or even a landslide. These are also referred to

as seismic sea waves. A tsunami is capable of traveling at a speed of more than a hundred miles per hour and the waves can be over 100 feet high. All tsunamis are dangerous but they might not similarly strike all the coastlines. Tsunamis are often generated due to major earthquakes. If a major earthquake or a landslide occurs close to the shore, the first wave might hit the coast way before a warning is issued. You can take a few steps that can help you in protecting yourself, your family, and even your property from the unpleasant effects of a tsunami. You should prepare a survival kit and make plans with your family for alternative routes of evacuation and communication in case of a tsunami. You should know the height of the area you are residing in above the sea level and its distance from the coast. If you are a tourist, then you should familiarize yourself with the tsunami evacuation protocols.

In case of an earthquake, you should turn on your radio and wait for any tsunami warnings. When a tsunami warning is issued, you need to evacuate immediately, if you have any pets, take them along. Move to higher ground ASAP. You should head inland, away from the coastline. Stay away from the beach in any case. Think about saving yourself and not your valuable possessions. Nothing is as precious as human life. You can assist your neighbors who might need special assistance, especially elderly people and infants. Once the tsunami has receded, you can head home only after the local authorities have issued an order saying that it is safe. You should understand that a tsunami is a series of enormous waves. Do not assume that you are out of danger just because one wave has passed; the second wave might be more dangerous than the first one. You can always head to a public shelter in case you feel unsafe at home or when the evacuation warning has been issued.

Avoid areas that were hit and you would want to stay away from such areas because your presence might hinder the rescue operations that might be in the way and would put you directly

in harm's way. Stay away from all the debris. Check if you got injured and get the necessary first aid before you start helping others. If you think someone needs to be rescued then call for professional help, don't try brave rescues. You can provide any special assistance that others might need. Also, stay tuned in to your radio for further announcements. If you notice that any particular building is surrounded by water, then steer clear of the. Be careful when you are re-entering your home or any other buildings. The Tsunami water can cause cracks and damage the foundation of the buildings. Always wear protective clothing and be very careful when you are cleaning up.

Winter Storms and Extreme Cold

The danger that the winter weather might pose differs from region to region. But those who reside in areas that are prone to extreme winter weather need to be prepared for the worst. Winter storms could occur in the form of mild snow or even a heavy blizzard. Most of the winter storms are often accompanied by extremely low temperatures and sometimes strong winds and freezing rains as well. The primary concern during these conditions would be the ability to generate heat, keep the phone lines open, and the power flow going. At times due to such severe weather, the power supply is generally cut for a few days and even the phone towers are down. You must be prepared for this weather because most of the deaths that are caused due to this weather are because of traffic accidents on the dangerously icy roads and also of hypothermia. Before winter sets in you should get an emergency kit prepared and remember to include rock salt, shovels, gloves, sand, snow removal equipment, and heating fuel. Not just this but you will also need warm clothes and blankets to keep yourself warm.

You will have to make a communication plan with your family

regarding the methods that you can make use of for communicating when the normal modes of communication are down. You will also need a radio and extra batteries to ensure that you can keep getting information about the situations outside and also to receive any alerts from the local emergency authorities. You will need to minimize your travel and if you have to travel then ensure that you have got your emergency supplies kit in your vehicle as well. Bring your pets inside when the weather gets harsh. You should get your vehicle winter-ready. Get your mechanic to check the levels of antifreeze, the battery and the ignition systems, fluidity of the brakes, and the exhaust system to ensure that there aren't any leaks or broken pipes, fuel, and air filters, heater, and also the defroster. You will also need to install tires that can handle the rough weather, repair any problems in your windshield, ensure that the thermostat is working, and check the oil levels. The emergency kit in your vehicle should have a snow shovel, extra batteries, water, flashlight, spare batteries, a battery-powered radio, a small broom, food supplies, blankets, and a first aid kit. Also carry some rock salt, rope, flares, and a fluorescent flag. You will also need to winterize your home and get all the necessary insulation in place to ensure that your house can also handle the winter storms. During winter storms or even extreme cold, you should stay indoors, when heading outside, wear sufficient layers of protective clothing, tread carefully, don't overexert yourself, keep yourself dry, and keep checking for signs of frostbite.

If you detect signs of hypothermia, then try getting the body temperature up and seek medical help. Don't travel unnecessarily and even when you do have to travel, ensure that you have informed someone of your plan to travel, the route you are likely to take, and also the time of arrival along with the name of the destination. Conserve fuel at home. If you are stuck on the road, then either you can wait for rescue if a safe location is not nearby or you don't have the suitable clothing to step

outside. Pull off the highway and remain in your vehicle, conserve your fuel and try exercising a bit to keep your body temperature normal but don't overexert yourself. After the storm passes by your home might lose power and heat for a few hours or even a couple of days. In case your supplies run out you should head to the nearest public shelter and wait. You should protect yourself from frostbite and hypothermia, keep wearing loose clothing of several layers and stay indoors as much as possible.

Chapter 5

Pandemics

In a biological pandemic, evacuating may not be a viable option. Once the infection reaches your area, your travel may be restricted. To plan an appropriate response to what is happening around you, you will need to know who or what is spreading it and how it is being spread. Knowing the who, what, and how of transmission can greatly help you plan to avoid it. It will determine what type of equipment you need to be prepared, and what type of isolation measures, if any, you will take.

For insect vectors, such as yellow fever from mosquitos, go out when the pests are least active. Often the insects will either be more active in the day, at night, or at dawn and dusk. Keep your home sealed by closing windows and chimney flues, and opening doors only when necessary. Spray insecticide around your home and use proper insect repellent on yourself and others. If repellents are not available, smoke is generally a great method of keeping insects away. Use tightly bound bundles of dried, fragrant plants like cedar branches, sage, or pine needles to produce an incense to keep flies and mosquitos away from your camp.

For human vectors, isolation is the best method. If you must venture into the outside world, take precautions like keeping travel to a minimum and sticking to the essentials: work, supply runs, and home. The Filtering Facepiece Respirators (N95) are a great way to avoid breathing in any dangerous particulates in the air. Thick nitrile gloves help you avoid skin contact with potentially infected surfaces. The thicker the glove, the better (6 ml or thicker), as they are less likely to tear.

Practice good sanitation measures. Wash hands thoroughly and use alcohol-based sanitizers after potential contact. When reentering your home, remove your shoes and never wear them inside. Keep your windows shut if there are common walkways near your home. Do your best to decontaminate any outside items you bring into your home by applying sanitizers or soaps to the outside packaging.

It is critical to maintain your immune system during these times. A strong immune system might make the difference between becoming infected, symptomatic, or not. Have vitamin C, vitamin D, and zinc supplements on hand, or consume fresh fruits, nuts, and fatty fish. Get plenty of sleep and stay calm. Both stress and lack of sleep negatively impact immune function.

Flu-Like Viral Pandemic

Flu-like viral pandemics are transmitted by coming into contact with the respiratory droplets from coughs or sneezes that remain in the air or on surfaces. Many viruses originate in animals and are considered highly contagious.

Prevention is key. Wear an FFR (N95) and gloves when in public. Avoid public gatherings and practice regular hand washing. Eat healthily and sleep well to keep your immune system functioning. Drink plenty of water. Include immunity-building supplements like vitamin C in your regimen.

Handwashing



Soap acts as a “surfactant.” This means that it allows water molecules to pass through and break up materials like oils and fats. Soap penetrates the dirt and oil layers on our hands and rinses contaminants away since they can no longer stick to our skin. To be sure that you’ve broken the surface tension of the contaminants and then rinsed them completely away from your skin, lather your hands for at least 20 seconds and rinse thoroughly.

The following are the most common symptoms of flu-like viral infections. Note that this list may change or grow as experts learn more.

AVIAN FLU	SWINE FLU	COVID-19
Fever (but not always) Chills Cough Sore throat Runny or stuffy nose Watery, red eyes Body aches Headache Fatigue Diarrhea Nausea and vomiting	Fever Chills Cough Sore throat Runny or stuffy nose Watery, red eyes Body aches Headache Fatigue Diarrhea Nausea and vomiting	Fever Cough Sore throat Runny nose Body aches Fatigue Shortness of breath or difficulty breathing

Pregnancy and Childbirth



Dealing with pregnancy in the group can be particularly challenging when living off the grid. You will need to be particularly vigilant about problems, and it is wise to ensure that you are never more than a few hours from help at the most, in case you need medical intervention.

A pregnant woman should take on less strenuous work, particularly bending and lifting, as the pregnancy progresses. They should also be more vigilant about food poisoning, contaminated water, and staying safe from temperature extremes. They should make sure they are still following up on regular appointments to check that everything is going smoothly, even if this means making long journeys to the nearest city.

If the woman intends to give birth off the grid, this requires a whole new level of preparation and careful consideration before the decision is taken.

Childbirth is a naturally occurring process, and thousands of babies are born each day without serious complications. Normally, childbirth occurs at a planned location (for example, at a birthing center or hospital, or at home with a midwife). Emergency childbirth occurs when childbirth takes place in an unplanned location (for example, at home or in a car on the way to the hospital). This is not an uncommon occurrence, as the process of giving birth (labor) can be very quick. Let's take a look at labor in more detail.

Labor can be divided into three main stages:

- **Stage 1:** The cervix relaxes in order to prepare for the baby to pass through.
- **Stage 2:** The baby is born through contractions and the mother pushing.
- **Stage 3:** The afterbirth (placenta) is delivered.

Thankfully, complications from childbirth are now rare. However, if a complication occurs it can be life-threatening for the mother and baby. For example, severe blood loss after birth is a serious medical emergency that requires urgent assistance to stop the bleeding and prevent shock. Emergency 911 operators can provide specific instructions to recognize and manage complications of childbirth over the telephone. Always call EMS if concerned and follow the instructions of the operator carefully. When dealing with an emergency childbirth situation, your main focus should be on remaining calm and supporting the mother. There are very few interventions you need to perform unless specifically advised to by an emergency 911 operator or a medical professional. Try to gather some clean towels to dry the baby with when he or she is born; these can also be used to keep the baby warm.

Signs and Symptoms of Childbirth

- The presence of regular strong contractions
- A sudden gush of fluid from the vagina (known as water breaking)
- Lower back pain

First Aid Treatment for Emergency Childbirth

1. Call EMS or a midwife.
2. Remain calm and reassuring.
3. Maintain the mother's dignity and control the scene (for example, ensure any bystanders move on).
4. Assist the mother into the most comfortable position, usually lying down.
5. Childbirth should occur naturally. Do not pull on the baby's head to speed up delivery. Encourage the mother to push with each contraction.
6. Receive the baby with a clean towel or sheet.
7. Thoroughly dry the baby and place him or her on the mother's chest. Ensure the newborn baby is kept warm.
8. Do not cut the umbilical cord.

If the baby does not appear to be breathing normally, attempt to stimulate the baby by drying and warming. Ensure the airway is open and clear. Check for the presence of normal breathing. If the baby is not breathing normally, immediately update EMS and begin cardiopulmonary resuscitation.

The afterbirth (placenta) will deliver naturally after the child is born. This process can take up to sixty minutes. Never pull on the umbilical cord to speed up delivery of the afterbirth.

Severe Blood Loss

Uncontrollable vaginal bleeding following childbirth is a medical emergency, and you should not delay in calling for EMS if the mother is bleeding. She may develop signs and symptoms

of shock. While awaiting the arrival of EMS, uterine massage can be performed as a temporary measure:

1. Explain to the mother that you are going to place your hands on her abdomen.
2. Firmly massage the lower abdomen.



Perform a uterine massage to control severe blood loss after childbirth.

Chapter 6

Medications

A good Prepper can collect the necessary medical provisions beforehand so that they don't end up at a disadvantage in the midst of disruption. Again, they don't have to have the prior medical knowledge to do this the right way. As a matter of fact, the only thing that one needs to do is research the meds that they might need when in the wild and they are ready to go.

Getting to collect all of these medical supplies is critical because it ensures that you are set for just about any infections circumstances throw at you. There are quite some things that will keep you from getting your hands on the medical supplies which might include flooding, fires, natural calamities, political as well as civil wars.

Apart from having the knowledge on the particular medication that you need, it is imperative for you to also train on how to administer prescribed medication. People of different ages, heights, and weights are expected to take an appropriate dosage of medicines to have the very best chances of survival.

Being a Prepper requires you to dedicate your life to learning as much as you can so that you have the opportunity to improve with time. Without further ado, here are some of the medical supplies that a survivalist needs to have at their disposal in the face of a calamity:

Oral Antibiotics—These are imperative since you might develop infections in your mouth due to some reasons. Some of the reasons might include injury, poor oral hygiene, or the food you are eating. Either way, if you choose to ignore an oral infection, then you most definitely are preparing yourself for a calamity on top of a calamity. Other over-the-counter antibiotics that you might want to have in your medical bag include Stool Softener, Oral Rehydration, Aspirin, Ibuprofen, Antihistamine, Acetaminophen (Tylenol), Cranberry Extract, Dramamine, Bismuth Tabs, Sudafed, and Throat Lozenges among many others. All of the above-stated medications have different rules and prescriptions. That means you ought to do a lot of research to get everything right for your sake. Remember to consult your physician in

case you have allergies because experiencing an allergic reaction is the last thing you might want to experience when out in the wild. The equivalent of oral antibiotics, as we will talk about in a moment, is fish meds so you might want to learn about that as well.

Ace bandages—Injury is prone while out in the wild. You will, therefore, need to have clean bandages for dressing wounds after cleaning and sterilizing them with some alcohol to prevent dirt re-entry. Ace bandages come in different sizes (all of which a Prepper should have for their own and others' sakes). Survivalism is all about surviving through improvising and repurposing. So having these bandages in different sizes and lengths can come in handy in ways a Prepper never imagined. That said, all responsible Preppers need to have them stashed in their emergency bag in readiness for a rainy day.

Alcohol Pads—These are to sterilize wounds, cuts, blisters, or the sharp object that you are about to use for medical purposes. Without alcohol pads, it would be dangerous to perform any emergency surgery because there is always higher contamination out in the wild which increases the chances of re-infection. Thankfully, alcohol pads can be found over-the-counter whether in a pharmacy or any convenience store near you.

N-95s Masks—These covers are usually necessary when it comes to keeping off dangerous gases thus keeping people healthy. If you aren't careful with the way that you carry yourself in the wild or in a polluted environment, you might end up inhaling toxic gases that will make you sick, sooner or later. Since prevention is better than cure, having a reasonable number of N-95s Masks in your emergency or medical bag will always work in your favor.

A Snake Bite Kit—While out in the wild, people are susceptible to snake bites as well as poisonous bites from other animals. It is, therefore, a brilliant idea for a Prepper to always be well ahead of the game with a snakebite kit to contain the situation within the shortest time as a snakebite is time-sensitive. With the knowledge of how to detect, contain and treat snakebites, a Prepper might end up saving the day just by stepping up. It is also important to note that the snakebite kit has to be used within a matter of seconds or else it will be deemed useless.

Syringes—A syringe is an essential piece of medical equipment that you need in the administration of medication intravenously. You should always ensure that they are kept sterilized before you get the chance to use them. A Prepper should also learn how to correctly fill the syringes with the right amount of medicine and get to inject them properly.

Different types of needles are used for various purposes which go on to say that for you to be an effective Prepper, you will have to make an effort to learn all the above.

Aqua Tabs—These tablets are vital when it comes to cleaning and purifying water for drinking, cooking and bathing. Water in the wilderness is dirty, polluted, or infected with disease-causing microorganisms—or might have all the above. With Aqua Tabs at your disposal, you will most certainly have some clean, purified water for your consumption in a matter of minutes. It would be wise for you to keep in mind the importance of carrying them around as well and not waiting to do so at the last minute.

Antibiotic Ointment—you can either have ointments such as Neosporin (or an equivalent) that you can use for protection against bacterial infections on your skin. You will also be required to have some anti-fungal ointment for protection against fungus infections that thrive especially in wet and humid conditions. That said creams such as Miconazole which is an adamant anti-fungal cream could be used to combat fungal infections as soon as they are detected. As a Prepper, you should have some lotion and cream kit that you can carry around at all times.

Clotting Powders—One doesn't have to have a clotting disorder to require clotting particles. In a case where an artery has been severed, bleeding is uncontrollable, and that would call for Celox or Quikclot to be used as fast as possible. Clotting powder needs to be applied over the cut for it to work quickly and efficiently. Once the powder has been used, the next thing will be to remain calm to reduce pressure so that the blood can stop oozing. You can then clean the wound or cut using some alcohol and carefully dress it. You can also stitch it if there is a need to do so but you have to make sure that you use sterilized equipment for that.

Tourniquet—This is also another critical, over-the-counter First Aid medication for severe bleeding. Just like the above-stated clotting powders, you will be required to apply them on top of the injury for it to take effect immediately and efficiently. Don't forget to clean the wound and carefully dress it to avoid further infection. Later, take some antibiotics to keep you safe from an infection that might have occurred through the cut.

Antibacterial Soap—A Prepper needs to prepare to fight infections any chance they get because the chances of getting sick out in the wild are higher than at home. Using antibacterial soap for bathing, washing hands

and clothes can save you a lot of trouble since it kills virtually all kinds of bacteria. When making a purchase, only go for the brands that are considered the best for the best results.

ABD Pads—These pads are necessary when it comes to dressing a wound to keep it clean and away from your dirty surroundings. The appropriate size for the ABD pads is 5X9 if at all you are looking to use it as efficiently as intended. But it is always convenient to regularly carry different sizes if possible since you might want to repurpose for some reasons. If you have no clue as to how you can go about using the ABD pads, then you can always use the internet or ask a physician for help.

A thermometer—It is important for you always to check your temperature once you start feeling under the weather. A rise or a drop in temperature can be a sign for you to carry out a self-examination immediately. You might be sick, or it might be the environmental changes causing the sudden temperature change. If the drop in body temperature, as indicated by your thermometer, is because of freezing temperatures, then you will be required to put on warmer clothing. If your temperature is rapidly rising, it might be because of a fever that is caused by an infection. Either way, a good Prepper should know how to accurately conduct self-examination and reach a solution as fast as possible.

Antiseptics—These solutions will help you clean up and get rid of disease-causing bacteria that might be breeding on your skin. You need to research and only use the best antiseptics on the market so that you can keep your body safe from infections as effectively as possible.

Sutures—These are very useful in maintaining a particular area on the skin away from contamination, moisture, and dirt. The recommended size is 3-0 and above since the smaller sizes might not be as effective as required. But you can always have the different sizes packed in your medical bag for the sake of having options. Increasing your odds is always a good thing particularly when survival is required.

Oral Airways (OPAs)—These are recommended particularly for those who have allergies since OPAs are usually handy when it comes to saving a life during an allergic reaction. The OPAs keep the airways open allowing breathing before the Benadryl, Epi-pen, or other allergy medications kick in. Apart from having the OPAs in your possession, you must take the time to learn about how best to use them.

A good Prepper is to have a list of prescribed medications tucked away in an Advanced Prescription Medical Kit. It might be somewhat

complicated for one to come up with the perfect medical prescription list but with enough practice, nothing is impossible.

Always remember to carry your medical kit in a dry, watertight medical bag to avoid water from percolating through and destroying your meds together with your chances of survival.

Your medical kit also has to be very well organized to ensure you have an easy time finding whatever it is that you are looking for. Also, remember to keep updating your medical kit from time to time so that it cannot only be accessible but also have everything that you need in order to survive.

Chapter 7

Alternatives to The First Aid Kit Material

Hypothermia

If there are no blankets or space blankets available, consider using aluminum foil if it is at hand.

Burns

If you don't have water to cool the burn, use any other cool liquid such as juice, beer, milk, etc. Any harmless liquid will do as your priority is to cool the area until you have access to cold, running water.

Remember, the burn should be cooled for at least twenty minutes for the treatment to be effective.

If you don't have cling film to cover the burn, use a clean plastic bag such as a carrier bag, freezer bag, sandwich bag, or similar. These items won't stick to the burn and will prevent infection.

Plastic bags are well suited to covering a burned hand or foot.

Broken Bones

If you don't know what padding to use for broken bones, use clothing, blankets, etc. Or hold the injured part yourself. A half-

rolled magazine held by duct tape can serve as a makeshift cast or protection for a limb for short-term transport. Popsicle sticks make good finger splints.

Heavy Bleeding

If you don't have dressing pads to put on the wound, use a clean t-shirt, or clean tea towel, sanitary pads, or clamp the person's hand over their injury.

Your priority is to put pressure on the wound to stop or slow down the bleeding.

Diabetic Emergency

If you don't have glucose tablets, use orange juice, a few sugar cubes, candy, or packets of sugar. Alternatively, use any regular fizzy drink, except diet beverages.

Head Injury

If you don't have any ice cubes, use a packet of frozen peas wrapped in a tea towel. Alternatively, use clothing soaked in cold water and wrung out. A half-collapsed baseball cap can be used as a temporary neck brace. Push the back of the cap in so the front of the cap with the peak creates a cradle (just as many stores stack them). Fit the cap with the peak facing the person's chest so that the rest of the cap cradles their chin. Secure the cap with duct tape.

Eye Injury

Use a paper cup to protect the eye if no eye shield is available. Secure it with duct tape. Ensure you don't tape over hair, if possible.

Conclusion

After all, is said and done, the world must have Preppers because they help a great deal in increasing the chances of survival in all kinds of tough and risky situations. It is also vital for more people to develop that all-important Prepper mentality so that at the end of the day, we all have an increased chance of surviving irrespective of whatever situation is thrown at our faces.

It is continuously necessary to master the art of remaining calm since it is a crucial requirement for making clear-headed, lifesaving decisions. Mastering survival medicine is needed whether it is human-made or naturally occurring medicine. These dreaded calamities have a knack for hitting hard when least expected.

So, everyone must be thoroughly prepared by reading the signs that precede these situations and plan in advance. Thankfully, it is quite easy for anyone to become a Prepper.

All you need to do is make sure that you are taking the necessary lessons and practicing on a regular basis. Consistent practice is the only way for you to become better at survival. With time, you will gain the experience and the essential skills to make crucial decisions that can as well be a matter of life and death.

Being a good Prepper or Survivalist needs a lot of training and research. That means that you need to make use of the internet as well as books. Getting to attend seminars hosted by fellow Preppers in a bid to receive as much information as possible can help a great deal.

Always learn how to keep updating your knowledge, especially on naturally occurring remedies and how to administer them properly. Knowing where to find the wild medicines and knowing how to use them for your survival are entirely different things.

It is for that reason a critical step to learn how to prepare and apply these medicines that occur naturally in the wild as you may end up saving a lot of lives. Once again, you can get the opportunity to use the internet to do your research on the medicines within your locality.

It is important to be physically fit at all times so as to improve your performance during such trying situations. Always jog every morning before starting your day, do a lot of cardio, and if possible, hit the gym a

couple of times a week. Being physically fit will help you in maneuvering through rough and dangerous terrains and at the same time boost your endurance levels.

By doing so, you will always thrive in everything that you do in the name of survival. You will also have more confidence as a Prepper because your knowledge of wild medicine and food is vast and intact. Once again, it is easier to sign up for survival training since it is cheap, very common, and necessary.

For the umpteenth time, always remember to work as hard as possible and learn new ways of improving yourself. You can also shift from gym to body training so that you can end up boosting your physique as well as general performance while you are out in the wild.

Get to find a good physician to carry out a full body check-up. That way, you will always have a much better chance of getting ahead and not being caught up when you aren't ready. If you have some disease, then having the right medication can be the difference between life and death.

You must bring your entire family for the checkup. It would be devastating for one of your family members to develop some health complications while out in the wild, and you cannot help them. It is also important to get immunity booster shots so that you and your family can stay clear of opportunistic ailments such as dysentery.

Any experienced prepper will tell you that there is strength in numbers since you can share information at all times and make sure that you have a shot at surviving. That said, it is important to always be prepared for the worst outcomes and it's never too late to become the kickass prepper that you have always wanted to become!

BOOK 5
KNOT TYING FOR
BEGINNERS

THE COMPLETE STEP-BY-
STEP GUIDE TO
MASTERFULLY TYING ALL
TYPES OF KNOTS

Introduction

You're finally going out with friends on the lake, and you pull to the other side of the shore. You want to settle in with the green grass and sunshine, but you can't leave the boat. If you do, you're going to be in real trouble later when it's time to go and your boat is drifted to the middle of the lake.

You want to go for a hike, but the cooler is on the table and the car's a long way back on the trail. You don't want to attract any bears or other unwanted wildlife, but the forest is beckoning and you have no time but now.

You need to get the groceries home, but you went a little overboard today, and you can't exactly get the top of the back hitch closed. You don't want to drive away with it open, for fear you're going to lose some of the things you purchased. But you can't get it all to fit with the way your car is built.

In all these situations and many others, the ability to tie a good knot would come in handy. Just to be able to secure it down while you finish with the rest of your day, only to come back later and pick up where you left off.

It sounds so nice. But you only know how to tie one kind of knot, and you have seen it comes untied on so many occasions, you hate to think of what would happen if the incident were to be repeated now. If only there was a way you could enjoy yourself with the full assurance your knot would stay in place.

With the right knot, it will. It's just a matter of getting that right knot and applying it when you need it. You want a knot that's going to last, but one that you can tie and untie quickly.

“How am I going to tie a knot that I can get undone when I get home?”

“How am I going to tie a knot that I know is going to stay in place?”

“How am I going to tie a knot that I know is going to hold?”

If you have never tied knots like these before, you may be feeling a little anxious. But that's where this book comes in. In it, you are going to learn everything you need to know about tying knots.

I am going to show you the secret to tying a variety of knots and giving

you the power to enjoy your freedom without worrying that your knot is going to be too loose—or too tight.

Settle in with some cord and get ready to practice. Your knot tying is going to change your life, and you're going to love every second of it.

So, let's get started.

Chapter 1

Knots

Practical Applications of Knot Tying

Knot tying can be used in the following situations:

Knots are instrumental for carrying out outdoor activities such as:

1. Mountaineering

- Camping—e.g., making some camping tools and setting up tents
- Hunting
- Sailing/boating/seamanship/ canoeing

2. Knots are also frequently utilized in arts and crafts; the most common instance is in macramé. Macramé grew as a primary craft during the 1970s. Examples of the most popular knots in macramé are the overhand knot, clove hitch, spiral stitch, square knot, and lark's head knot.

3. Truckers utilize the trucker's hitch to gain a mechanical advantage when securing a load.

4. You can use this skill in making makeshift tools as well; for instance, the munter hitch, which you can utilize in fastening, and the bowline knot, which works ideally as a rescue loop.

5. You can further apply knot making in forming a high line, nearly identical to the zip line, which can be utilized in moving injured people, supplies, or inexperienced people across ravines, crevices, or rivers.

NOTE: It is worth keeping in mind that the systems described above generally call for using various suitable knots tied appropriately.

You may use the knots in combination as well to create intricate items, such as netting and lanyards.

Materials Required for Knot Tying

When it comes to tying knots, the only essential materials you need are rope, cord, twine, or some other material you may have to tie the knots on.

Rope Selection: Rope for Practicing Knot Tying

You can use nearly any rope available online or in a hardware or marine store to practice knot tying.

While you can use nearly any kind of rope, it is essential to note that not every type of rope is simple to handle; some are too slippery or too stiff, and others are just too costly. There's also no single rope that is ideal for all knots.

For example, a beer knot needs tubular webbing, a Brummel splice needs a hollow braid, and a 3-strand eye splice needs a 3-strand twisted rope.

Having said that, as a beginner, below are the guidelines and recommendations to help you in selecting a suitable rope for practicing the common knots:

The Correct Rope and Size

Select a rope that is not too slippery or shiny and is flexible. The strength varies according to the task for which it is intended.

The most suitable is in the range of 6-12 mm ($\frac{1}{4}$ " to $\frac{1}{2}$ "). A size within that range allows for the knots to be unfastened and the rope reused, and for every knot to be scrutinized easily.

Ropes to Avoid

Steer clear of polypropylene rope that is usually traded in yellow or blue for the towlines of water skis. The knots are not able to hold well, and the rope is not comfortable to handle.

Avoid the enormous spools of 3 mm ($\frac{1}{8}$ ") twisted 3-strand nylon and the high-priced modern strings traded for their extraordinary designs. It is more reliable to use a thin braided line.

As we talk about the types of ropes, it is also important to mention the best fibers for use. There are two main fibers:

Natural Fibers

Ropes made from natural fibers can preserve the knots, and the 3

stranded variations are ideal for splicing. Manila and tarred hemp are both natural solid fiber ropes that are great for learning to tie knots. Manilla rope is made from manilla hemp, which is extracted from the leaves of the abaca plant, and tarred hemp is hemp rope that has been coated with tar to protect its natural fibers. They both hold their shape when utilized in splicing and form an elegant ultimate splice.

Unfortunately, such rope might not be easily accessible to you, particularly in your desired size, because it is expensive—aside from being federally illegal.

The other challenging thing with working with these ropes is that their ends can't be simply burnt to avoid fraying; you'll need to secure them with a constrictor knot or tape or, better yet, whip them.

Synthetic Fibers

The synthetic fiber cord that is often readily available is nylon rope. While you can seal the raw end using heat, you'll need to be extra cautious because any contact with your skin results in a rapid burn, and the nylon will melt at over 200°C.

You can practice any of the conventional knots using nylon rope, and the 3-strand variation may also be utilized for an eye splice, short splice, and back splice. The main limitation when using this rope for splicing is that the fibers for all strands have a tendency to get messy, which makes the ultimate splice seem untidy.

Alternatively, clothesline rope features a plastic coating which makes it quite inflexible and suitable for knotting.

As for the braided cord available in marine stores that generally includes an outer sheath and inner core, it is perfectly ideal for learning, but it is unnecessarily high-priced as well.

You may also use Polyethylene and polyester (Trevira®, Terylene®, Dacron®).

Since we now know the ideal type of rope to use and the ones to avoid, next we will be covering the impact that knots have on the strength of a rope:

Effect of Knots on Rope Strength

Regarding knot tying, the strength of a rope refers to its strength to hold the knot plus the weight of the load securely. When you tie a knot, it

weakens the rope you are using. A knotted rope mostly fails near the knot or at the knot when you strain it to its threshold.

The resistant, crushing, and bending forces responsible for keeping the knot together also results in an unequal strain of the cord fibers and eventually cause reduced strength. So, what can we do to preserve the power of the rope and make it as effective as possible?

Below are some helpful tips:

- •It is imperative to stretch (pull tight) and dress (make neat) all knots before using them to ensure that they don't come undone during operation.
- •Do not stand or walk on the rope.
- •Avoid dragging the rope since abrasion can severely affect sheath life.
- •Do not disfigure or compress the knot.
- •Avoid leaving your rope under tension for a prolonged amount of time.
- •Never add kinds and twists when coiling/bagging the ropes.
- •Unfasten all knots once through with your ropework.
- •Never leave your cord exposed to sunlight as the ultraviolet radiation from the sun damages the string.
- •Make sure always to leave a tail end of at least 100 m.
- •Use a rope protector or pad up your ropes to safeguard them from sharp edges.
- •Clean your ropes as necessary: rinse them using clean, freshwater, then dry under a shade to prevent them from getting exposed to UV radiation.
- •Always secure the end of your rope with a stopper knot while leaving a safety length of 1 meter to prevent slipping off when rappelling to the ground.

What Makes a Good Knot?

Being able to tie a knot is one thing; tying the knot correctly is another. Below are the qualities of a good knot:

Strength

Knot efficiency, also referred to as relative knot strength, is the breaking strength of a rope with knots in contrast to that same rope's breaking

strength with no knots. To determine a knot's efficiency, we first need to consider many factors, which makes it even harder to determine the exact value of a specific knot.

Examples of such factors are the size of the rope, the style of the rope, the type of fiber, how you dress the knot before loading, whether the knot is loaded repeatedly, how rapidly you load the knot, whether the rope is dry or wet, and so forth).

The efficiency of a conventional knot typically varies between 40 to 80 percent of the initial rope strength. As a result of the declining effects of knots (like shock loading, damage, and aging), practical users need to leave out a significant safety margin in the rope selected for a certain function.

Security

The security of a knot refers to the ability of the knot to hold its shape together. A knot may still give way even though the rope remains intact. A knot that can stay put even when exposed to a wide range of unfavorable conditions is perceived as more secure than knots that don't.

Below are the main ways through which a knot may fail to stay together:

- **•Capsizing:** Capsizing or spilling a knot is where you alter its shape and reorganize its sections, often by yanking on certain ends. The knot's capsized structure usually can provide a bit of resistance to unraveling or slipping. Some knots tend to capsize easily or even unexpectedly when you use them incorrectly. For instance, when you misuse a reef knot (square knot), like a bend, capsizing can be very risky.

In other instances, some people capsize the knots to fasten another knot, like the "lightning procedure" for creating the bowline knot. Typically, we fasten other knots like the Carrick bend in one shape, and then they undergo capsizing to achieve a more powerful and stable structure.

- **•Sliding:** Some knots are meant for gripping other items; when such knots shift equivalently to the clasped item, this is described as knot failure. Whereas it is not the knot itself that fails, it still stops achieving its desired purpose.

For example, when you tie a common rolling hitch across a railing, then you pull parallel to that railing, it may endure up to a particular pressure before it begins to slide. This issue can occasionally be fixed by modifying the knot to be tauter before you subject it to any load;

however, the case typically calls for a rope of different material or diameter or a knot with additional wraps.

- **Slipping:** This is where the load causes enough pressure to yank the cord back into the knot in the direction of the weight. The more that this continues to happen, it reaches a point where the working tail slips through the knot, then causes it to unravel and fail. This process can worsen when the knot is repetitively struck against solid items like flagpoles and masts, dragged over a rough surface, or continually let slack and strained.

Slipping can happen even with knots that are firmly fixed when you first subject them to a lot of pressure. You can moderate this by leaving a rope allowance at the working tail beyond the knot, then cleanly dress the knot and tauten as much as you can before you load it. Occasionally, the use of a backup knot or stopper knot can keep the working tail from slipping through the knot; however, it is better to use a more secure knot if you notice the particular knot in use to be prone to slipping. To maximize safety, life-critical applications usually call for backup knots.

Releasability

All knots vary in the energy required to unfasten them once they are loaded. Knots like the water's knot that are hard to unfasten are known as jamming knots or are said to "jam." On the other hand, knots like the Zeppelin bend, undone with minimal effort, are called "non-jamming" knots.

General Guidelines for Knot Tying

Practice Makes Perfect

Start your knot tying with a simple knot. Not everyone can master advanced knots quickly and that is okay. Practice the eight basic knots first as they are the basis for all other knots. Practice those eight knots until you can do them without having to look at instructions. You are ready to learn new knots once you can make the basic knots from memory. The more you practice making knots, the easier it gets. Do not give up—just try again.

Work Neatly

Knots are precise and clean. Making knots requires that your work area be clean, too. Ensure your workspace, such as a table, is tidy and does

not have anything on it that might be pushed over the edge while working on your knots. Wipe the surface to remove any dirt before you start.

Sometimes, your knot-making will happen outside. You might be on a camping trip, at the side of a river, or even just sitting on the grass to practice. It is still important to keep your area neat and clean. Remove any stones, rocks, or sharp objects that may damage your rope. If possible, lay down a tarpaulin or other ground cover before you handle the rope and start making knots.

Handling the Rope

A rope stays usable and strong if you look after it properly. Never drag a rope as it causes scuffing, especially on abrasive surfaces. Rather, pick up the rope and carry it to where you need it. Check your rope for any damaged sections before you start making knots. A good practice is to keep a notebook and write down the date that you purchased a new rope. Make a note every time you use that rope so that you will know when it has been used a lot. Replace the rope when it starts showing signs of damage or weakness.

Sometimes, cutting ropes are necessary. You might cut a rope because it is too long. Some people cut the rope when they finish making a practice knot as they want to keep it in their collection. Other times, people cut a rope to remove a weak section. Wrap some tape around the area where the cut will be made. Make several repetitions of the tape to ensure the edges of the rope do not unravel after cutting.

Making Knots

The best knot for the job is usually the simplest one that will keep your objects secure and prevent slipping. Smaller knots frequently work better because there is less scuffing of the rope, but always consider loads and other factors when choosing a suitable knot. Do not handle the rope too much as it causes scuffing and friction. Do your best on your first attempt even if it takes longer to master the knot.

Cleaning Your Equipment

Clean ropes and lines are the best ones for tying knots. Always clean your equipment after using it. Wash your rope with mild soap and lukewarm water. Rinse the rope properly and then let it air dry. Do not use hot water or harsh chemicals as it weakens the rope.

Storage

Store your knot supplies in a designated spot. Both synthetic and natural

fiber ropes require a dry and clean storage space. Braided and multistrand ropes store well when coiled and placed in a storage container. Remove any kinks or knots before you store the item. Sometimes, large ropes are stored on spools or moving platforms to facilitate the transport of a rope to another location. A good option for smaller ropes is to store them in bags or crates that keep out dust, insects, and sunlight.

Taking Care of Your Rope

The most important material in knot tying obviously is the rope. In certain situations, a good rope could be the only thing between life and death. You must take good care of your rope to avoid accidents due to a faulty or weak rope.

Hold your rope off the ground. Lift your rope so that it does not touch dirt, oils, chemicals, and debris. This material can damage the fibers of the material and weaken the yarn. For rope climbing, when using it outdoors, you would ideally like to put them on a tarpaulin to protect them from the ground.

Keeping your rope off the ground when not in use also prevents people from stepping on it, which can damage the fibers and grind dirt.

Keep the rope away from the sun and excessive heat. While most modern, high-quality ropes are treated to prevent UV damage, you want to hide your rope away from the sun when you are not using it. Excessive heat can also weaken the rope, so do not store it on a warm roof or roof.

Clean your rope as needed. If your rope gets dirty, wash it in cold water with mild soap. Rinse with cold water to remove soap. Turn it off and let the air dry. Do not expose the rope to the sun to dry it or use a heater to speed up the process. Make sure the yarn is completely dry before wrapping and hanging.

Check the rope for damage. After using your rope, do a quick inspection for damage.

Are there extremely cloudy areas?

Do you see or feel cuts?

Do you see or feel straight points?

Does the rope become stiff?

Can you see the core?

Do you see discoloration when exposed to the sun and/or chemicals?

If the answer to any of these questions is yes, you will probably need to pull the rope. If the wear is on the end of the rope, it can be saved if you are whipping.

Change the climbing rope regularly. As a climber, your rope is often the primary thing that prevents you from falling to your death. As a result, you want to make sure your yarn is shaped like an end. Climbing rope manufacturers have prepared climbing rope retirement plans so that you do not use the rope that may be broken:

- •After falling with excessive loads or other damage: immediately
- •Frequent use (weekly): 1 year or earlier
- •Regular use (several times a month): 1-3 years
- •Occasional use (once a month): 4-5 years
- •Rare use (1-2 times a year): 7 years

To keep track of how often you use the climbing rope, it is recommended that you mark the rope with a tag at one end (e.g., “Rope A”) and then record the dates you used it in a diary.

Never stand on a loop of rope that may suddenly tighten, e.g., anchor line or tow line. You have two legs when you are born. Keep them. This applies to all parts of the body, fingers, hands, and the like; watch out for coils and small loops. Even a small line that wraps around the finger can cause serious injury when put under sudden pressure. And, deliberately avoid wrapping a line/rope around your arm for better grip. You may find that your rope has it instead of having it.

Due to the knots, turns and imperfections, assume that even the brand-new rope will have an efficiency of no more than 50% of its nominal strength. And when dealing with critical loads, you must understand the magnitude of a reasonable safety factor.

Chapter 2

Overhand Knots

The Overhand Knot is a distinct knot with its own properties. It is also the basis for both tying and remembering many knots. For instance, the Overhand Knot is the base for two important series of stopper knots, the figure eight series, and the multiple overhand series.

The Multiple Overhand Series

The multiple overhand series is made by increasing the number of wraps in the spine of the knot. After making an Overhand Knot, pass the running end through the loop of the knot multiple times, making a different knot in the series every time.

When tied this way, these knots change shape as they are tightened. If you tighten them by pulling on both the running and standing parts, the belly wraps around the spine until all you can see is the barrel shape of these wraps. They can also be tightened by manually wrapping the belly around the spine, which causes the spine to unwrap to a single crossing. These knots have many properties in common, including both high security and difficulty in untying when tightened.

Another way to tie this series is to make the desired number of wraps, and then pass the running end through all of them, leaving it already in its final form. The Double and Triple Overhand Knots are often tied this way. Knots of this series all have a right—and a left-handed version.

These knots are also sometimes called Barrel Knots or Blood

Knots—the latter possibly because they were tied to the lashes of a cat-o'-nine-tails to help the flogger draw more blood from his victim. Another version claims the name comes from causing bleeding fingers from tight knots in fishing lines.

Where to Start?

Knots in the overhand series are the starting points of many other knots, bends, hitches, and loops. Some bends are made by interlocking Overhand Knots, some hitches are started with an Overhand or Figure Eight, and many friction loops and fishing knots are based on Multiple Overhand Knots.

For the series of stopper knots mentioned here, increasing the number of wraps will not increase their cross-section area. For a wider knot, use a different knot or double the cord first.

There are many advantages to tying knots that are based on others. They are certainly easier to remember because there is so much less to recall. By making it easier to keep many possibilities in mind, you can make better choices for what is needed. When one knot is the basis for another, it is also easier to check your progress as you complete the knot.

Overhand Knot

Step 1: Pass the running end around the standing part, making a loop, and then pass it through the crossing turn.



Step 2: Tighten the knot by pulling on both the standing part and the running end.



Besides being the foundation of many different knots, the Overhand Knot has many distinct properties of its own. For example, it weakens most cordage it is tied in by 50% or more, and tightening it down can damage the fibers of some ropes. Consequently, it is tied in a nylon fishing line to test for brittleness. If the fishing line has lost any of its flexibility, it will break very easily as you tie an Overhand Knot in it and tighten it with a quick jerk from both sides. Fishermen take care not to accidentally let an Overhand Knot form in their line so as not to lose half its strength. Once it's tied, the knot is difficult to undo. It should only be tied in small cordage or thread if it is not meant to be untied.

Double Overhand Knot

This knot is the first in the multiple overhand series. It starts with a Simple Overhand Knot, and then the running end is passed through the crossing turn a second time, making the belly-and-spine appearance you see in Step 1.

Step 1: Lay down the rope with the running end facing left. Move it down and twist to make the belly, bringing it up over the right side of the standing part.

Step 2: Run the running end up and under the standing part, making two overhand loops.



Step 3: Tighten the knot by pulling on both the standing part and the running end.

Twisting the ends in opposite directions will either help the belly wrap around the spine or impede it, depending on which way they are twisted. The Double Overhand, like all knots in the series, is very secure and difficult to untie.

Boa Constrictor

Also known as the Boa Knot, the Boa Constrictor forms an even more tenacious hold than the regular Constrictor Knot.

Step 1: Begin by forming two crossing turns.



Step 2: Overlap the crossing turns and twist one end over by a half turn.



Step 3: Place over the end of a pole, as shown. (The ends can be folded up to ease placement.)



Step 4: Tighten by pulling the ends in opposite directions.



To learn how to tie this knot around a bar without access to an

end, first tie it with this method, place it over a bar or pole end, then untie it with just one end to see how the wraps and tucks are made.

Double Overhand Noose

Also called the Poacher's Noose, the Poacher's Knot, and the Strangle Snare, this knot is a very good general-purpose noose to learn.

Step 1: Tie a Double Overhand Knot with the running end over the standing part.



Step 2: Tighten as shown.



Because the Double Overhand Knot can hold tension when tightened down, the loop opening will not close down until it is pulled on, which helps to explain its nefarious past with poachers. Knots that make use of the Double Overhand structure remain very useful today due to their high security even when tied with slippery synthetic cordage. The Triple Overhand version of this knot is even more secure.

Guy Line Hitch

A “guy line” is a rope or wire used to hold a pole, antenna mast, or tent in place. There is generally more than one guy line, and

when the Guy Line Hitch is used, the length and tension of each can quickly be adjusted.

Step 1: Make an Overhand Knot some distance from the end, so that you leave enough running end to pass around the object and then back to the Overhand.



Step 2: Pass the running end back through the bottom of the Overhand Knot.



Sometimes two Overhand Knots are tied next to each other in the standing part. The running end is passed through the first one to provide the grip and the second one to hold the end down.

Tie two Overhand Knots in the standing part, and tuck the running end into the second one.



Like the Taut-line Hitch, the Guy Line Hitch is meant for a support line and not for serious hoisting or rescue and safety lines.

Hangman's Noose

This noose is also called Jack Ketch's Knot, named after a well-

known hangman. It handles shock loads and is also a handy way to store rope.

Never toy with the Hangman's Noose, and be particularly careful with it around children. Nooses can also be highly offensive in some situations and should *only* be used where there is a specific reason for them.

Step 1: Fold the running end back along the standing part, and fold the new running end back on itself. Wrap the running end around the standing part, moving from bottom to top.



Step 2: Tuck the running end through the top bight.



Step 3: Put tension on the knot by pulling on the bottom loop.



Honda Knot

Also called the Lariat Knot and the Bowstring Knot, this knot can be used to make an especially small loop because it is circular instead of oval, like most loops.

Step 1: Tie an Overhand Knot, then lead the running end back through it, finishing with another Overhand Knot at the tip. Then

tighten down the first Overhand Knot. The second Overhand locks the loop.



Step 2: If a running loop is desired, the Honda Knot itself can be tied around its standing part.



As you pass the running end through the Overhand Knot in Step 1, it helps to remember that Overhand Knots have three openings. To be tied correctly, you must lead the running end through the opening closest to the loop, and take care that it stays in this part when tightening. If the lead slips into the middle part, the knot will not be secure.

The Honda Knot makes a good low-friction running loop. It's worth noting that the Honda Knot is tied in the same manner as the Guy Line Hitch. It is how they are used that makes them different. The Honda Knot is used when a locking loop is desired, and the Guy Line Hitch is used when the size of the loop will need to be decreased one or more times, thereby shortening the line it is tying off. If needed, however, the Honda Knot can be adjusted in size by changing the place on the locking Overhand Knot. This adjustability is why the Honda Knot has been used to attach bowstrings.

Pile Hitch

The Pile Hitch is very quick and easy to tie, as long as you're working at the end of a stick or pole.

Step 1: Pass a bight of rope around a post near the edge.



Step 2: Open up the bight to pass it over the two standing parts and through the top of the post.



It helps to learn to tie the Pile Hitch before going on to the Icicle Hitch which is an extension of the Pile Hitch.

Slipped Overhand Knot

You start the Slipped Overhand Knot the same way you begin tying the Overhand Knot, with one variation—the last tuck is made with a bight of the running end so that the very end is not pulled through the crossing turn. This is what you do when you tie the bows in your shoelaces.



Pass the running end around the standing part, making a loop; then, make a bight in the running end and pass it through the crossing turn. Pull on the standing part and the bight to tighten.

Whereas the Overhand Knot can be difficult to untie, this knot can be untied simply by pulling on the running end to take out the last tuck, just as you do when you untie shoelaces. However, this trick does not work with all knots, as not all knots can be released by letting out the last tuck.

Slipped Noose

This knot is similar to the Slipped Overhand Knot. The difference is that the last tuck is made with a bight of the standing part, instead of the running end.



Pass the running end around the standing part, making a loop; then, make a bight in the standing part and pass it through the crossing turn. Pull on the running end and on the right loop to tighten.

It is important to learn the difference between the Slipped Overhand Knot and the Slipped Noose. Each one will serve you as the starting point for other knots.

Surgeon's Knot

Used by surgeons to tie off blood vessels, the Surgeon's Knot works well with small and slippery tying materials. Because the first crossing is double, it holds tension better than a Half Knot while completing the top half of the knot.

Step 1: Make the bottom half of the knot with two crossings instead of the single crossing of the Half Knot.



Step 2: Finish the top half with a single crossing, as for the Reef Knot.



If you wish, you can also tie the top half of the Surgeon's Knot with two crossings.

Timber Hitch

Just as its name suggests, the Timber Hitch is traditionally used to hoist or drag logs or poles.

Step 1: Start by tying a Half Hitch.



Step 2: Continue making additional wraps, as shown.



As you can see, this hitch will work best if you place strain on it along the direction of the object the rope is hitched to—it will keep the knot tight.

Barrel Hitch

If you want to lift a barrel or other short cylindrical object on its side, the Barrel Hitch can do the job of hoisting it.

Start with a strop or length of rope tied in a closed loop. Pass the end of the loop around the barrel and then through the other side of the loop. Spread the loops apart under the barrel for more stability.



Barrel Sling

The Barrel Sling will host a barrel while keeping it upright.

Step 1: Stand the barrel upright in the middle of a short length of rope, and cross the ends together on top, making an Overhand Knot around the barrel.



Step 2: Spread the crossed parts of the Overhand Knot over the sides of the barrel, then tie the ends together to serve as a hoisting sling. A Fisherman's Knot or Hunter's Bend will work well to complete a closed loop for hoisting.



Make sure that the sling is symmetrical on the barrel before lifting.

Half Hitch

There are two basic ways of making a Half Hitch. It can be tied off with a running end, or it can be tied off with a bight, which makes it a Slipped Half Hitch.

Step 1: Bring the running end around the ring and then around

its standing part. Then, tuck the end inside the crossing turn, next to the ring.



Step 2: Another option is to make the last tuck with a bight, making it a Slipped Half Hitch.



The Half Hitch makes a very quick and temporary tie-off. It is also tied as the first step of other more secure hitches. The slipped version unties completely with just one pull.

Chapter 3

Bowlines, Sheet Bends, and End Loops

Ashley's Bend

This knot is named after Clifford W. Ashley, who first introduced it in his book, *The Ashley Book of Knots*.

Step 1: Take the first cord and make a crossing turn.



Step 2: Take the second cord and use it to lace another crossing turn through the first cord.



Step 3: Form the final tuck by bringing both running ends through the center together.



Step 4: Tighten down the cord, forming Ashley's Bend.



Ashley's Bend is very strong and secure when used to join similar ropes. It does not slip even when brought under severe shock loads, but can be untied easily when desired.

Backing up Bend

You can make a bend more secure by tying down the running ends. Backing Up is a good method for bends like the Surgeon's Bend, where running ends exit parallel to the standing parts.

Tie down the running ends of a Surgeon's Bend with a Half Hitch on each side.



This extra tie-off can also be an Overhand Knot. When you make bends with climbing rope, you may also consider using Triple Overhand Knots as a backup—the extra tie-off will make the knot safer and will keep the running ends of the knot from waving around.

Bowline Bend

If it happens two ropes that need to be joined are greatly dissimilar in size or material—or both—a bend may not be a safe and secure solution. Instead, what you can do is join the two ropes by forming two loops. If a loop is tied in one end, and a loop is tied in the other end so that it passes through the first one,

then together they make a bend. If both loops are Bowlines, then the result is called a Bowline Bend.



Here are two interlocking Bowline Loops.

Butterfly Bend

Also called the Straight Bend, this knot has the same form as the Butterfly Loop, and can even be tied the same way if the ends are attached.

Step 1: Place two ropes side by side—one on the right and one on the left—and cross the running ends, forming loops.



Step 2: Use the right-side cord's running end to make a second loop.



Step 3: Use the left-side cord's running end to make its second loop as well.



Step 4: Tighten down the knot by pulling apart the two standing parts and tugging down the running ends.



You can also tie the Butterfly Bend by tucking both ends at once, holding one in each hand. It is quicker than it sounds. Use the Butterfly Bend to tie similar materials. It is strong, secure, and unties easily.

Zeppelin Bend

The Zeppelin Bend, also known as the Rosendahl Bend, is a good sailing bend to learn.

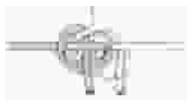
Step 1: To start, place two ropes together and use one of the running ends to make a loop as shown in the illustration.



Step 2: Next, separate the standing parts, moving one of them (the one at the end of the rope that did not form the loop) under the looped running end and over the other running end.



Step 3: Use the same rope's running end to make the final tuck.



Step 4: Tighten down the knot, leaving short running ends to stick out perpendicular to the ropes.



The Zeppelin Bend is very strong and secure when used to join similar ropes. It unties easily even after being under great strain.

Interlocking Overhand Bends

Four of the bends in this chapter—Ashley's Bend, Butterfly Bend, Hunter's Bend, and Zeppelin Bend—consist of Interlocking Overhand Knots. Although each of these knots can be tied without reference to their overhand structures, they are illustrated here for the sake of the completeness of these very superb bends. As you can see in the following illustration, an Overhand Knot has three internal openings that can interlock with other knots. Making an Overhand Knot at the end of one rope and then interlacing another Overhand through it can tie any of these bends.

A right-handed Overhand Knot



Hunter's Bend



Ashley's Bend



Zeppelin Bend



Butterfly Bend



Can you see the Interlocking Overhand Knots in each one of these bends?

Bowline Loop

Commonly referred to as the “Bowline,” this loop knot has been in such widespread use that it is also referred to as the “king of knots.” It is still in much use today, and with a little caution can be used in the newer synthetic materials.

Step 1: Make a crossing turn.



Step 2: Bring the running end up through it, and then behind the standing part.



Step 3: Twist the running end around the standing part and back down through the crossing turn.



Step 4: Take out all the slack to make the loop secure. As you tighten the knot, make sure you pull on all the leads.



Step 5: You can also tie the Bowline Loop with an extra hitch, especially if you want to increase security.



There's another way of tying the Bowline—by laying the running end down across the standing part. It's a quicker start, and you can tie the loop one-handed.



If you want the Bowline Loop to be a quick release, try the Slipped Bowline instead by making the last tuck with a bight.



The Bowline Knots are secure, but to maximize safety, make sure you leave at least twelve diameters' length of running end after the knot is tightened, and tie the loop with an extra hitch, as shown in Step 5.

Butterfly Loop

Also called the Alpine Butterfly, this loop is strong, secure, and easily untied after being put under strain. It's a great loop for use anywhere along a rope and holds well even with the strain put on both standing parts.

Step 1: Twist the rope twice to make two adjacent crossing turns.



Step 2: Pull down the outer turn.



Step 3: Bring the middle of the loop up through the center of the other crossing turn.



To tighten the loop, pull on all the leads. As you can see, the Butterfly Loop ties very quickly with just a little practice.

Directional Figure Eight

The Directional Figure Eight is an excellent loop that can be tied to the end of a rope to be used as a fixed loop, or anywhere in the middle where the pull will be along the direction of the rope.

Step 1: Start by making a bight, then fold it back along one side.



Step 2: Pass the bight behind the standing part and back under the first crossing turn, exactly in the manner of making a Figure Eight.



Step 3: As you tighten the knot, the final loop will lay in the direction that strain will be placed on it.



The Directional Figure Eight can be tied so that the loop points right or left. The steps illustrated here result in a left-pointing loop. To tie a right-pointing one, start the first tuck in the opposite direction. A good rule of thumb to remember is that you start the first tuck in the opposite direction from which you want the loop to lay.

Double Bowline

The Double Bowline is similar to the Bowline Loop, but it's started with a double-crossing turn.

Step 1: Start with a double-crossing turn.



Step 2: Finish the knot just like a regular Bowline (see previous).



Also called the Round Turn Bowline, this version can provide more security, especially if the rope used is very slippery.

Figure Eight Loop

The Figure Eight Loop is popular with climbers due to its distinctive look when tightened, which helps to determine whether it is tied correctly. For a high level of security, the running end can be secured to the standing part with a Triple Overhand Knot.

Step 1: Begin by folding over the running end to make a bight, and use it to form a Figure Eight.



Step 2: As you tighten the knot, the bight will form the loop.



Strong and secure, the Figure Eight Loop can also be tied around an object by making a regular Figure Eight Knot leaving enough running end to bring around the object and then back to trace through the Figure Eight toward the standing part.

Overhand Loop

The Overhand Loop is a very common way of tying a loop. It's quick to tie and is especially useful with very small cordage like thread or string. It is difficult to untie after being under strain, so it is usually used when it is not meant to be untied.

Step 1: Begin by folding over the running end to make a bight.



Step 2: Tie the bight in an Overhand Knot, forming the Overhand Loop.



Note that the Overhand Loop can be tied near the running end or in the bight. If a Double Overhand is tied instead of a single one, it makes an excellent loop for string or fishing line.

Triple Crown Loop

The Triple Crown Loop Knot is much easier to learn if you have tied the Crown Knot.

Step 1: Start with a bight, separate the end into two bights, and lay the standing part over one of them, making the first part of the crown.



Step 2: Fold the right side of the loop over the standing part.



Step 3: Fold the left side of the loop over the right one and through the crossing turn.



Step 4: Pull the standing part and both loops evenly to get the final form.



Strong and secure, the two loops of the Triple Crown Loop Knot can take strain independently. If the knot is tied closely to the end, tie off the shorter standing part to the longer one with a knot of your choice—it will make the knot more secure. After tying

the Triple Crown Loop, you can turn it over and crown it again if you like.

Triple Figure Eight

This loop is similar to Figure Eight Loop. To start, you'll need to fold over the end of the rope, forming a long bight.

Step 1: Use the doubled-up rope to start tying a Figure Eight Loop.



Step 2: Pull through a bight of the doubled line.



Step 3: Take the loop end and wrap it around the top, and then tuck it back down with the other loops.



It will take a little practice to get a feel for how many lines to use. Each of the three loops can be made of a different size. Climbers use this knot to belay or fasten a line to three anchor points.

Portuguese Bowline

Before you start practicing this knot, review the steps for tying the regular Bowline Loop (see once you learn the Bowline, this knot is quick and easy to remember.

Step 1: Start as you would tie a regular Bowline, then use the running end to make a second loop.



Step 2: Continue the same as you would with a Bowline.



Step 3: Finish by making the final tuck.



With the Portuguese Bowline, you'll have two loops that can be adjusted in relative size after the loop is tied, but the strain on both must be equal.

Triple Bowline

Another version of the Bowline Loop is tied using a doubled-up rope.

Step 1: Starting with a bight, tie the doubled-up rope just as you would the Bowline.



Step 2: Finish by tightening.



This loop knot is also good for fastening to multiple anchor points. It is easy to remember, and with a little practice, you can make each of the loops different sizes.

Chapter 4

The figure of Eight Knots

The figure-eight series contains frequently used knots. This series begins by making the crossing turn that would be used for an Overhand Knot and then increasing the number of times the running end is wrapped around the standing part before passing once through the loop. Twisting this loop an increasing number of times before threading accomplishes the same thing. This series of knots are often used to stop a line from passing through an opening.

Figure-Eight Knot

This knot is started like the Overhand Knot, but here the running end makes a complete round turn around the standing part before passing through its loop.

Step 1: Use the running end to make a crossing turn, and pass the end under the standing part.



Step 2: Twist the running end up and through the crossing turn.



Step 3: Tighten the knot by pulling on both ends.



If you wish to use the Figure Eight Knot as a stopper knot, modify Step 2 by pulling the standing part while pressing against the base of the knot on that side. When the Figure-Eight Knot and similar stopper knots are tightened this way, the running end will point to the side at a right angle.

The Figure-Eight Knot is frequently used as a basis for other knots. It is much easier to untie than the Overhand Knot and is not as damaging to rope fibers. Because the Figure-Eight Knot has a distinctive “figure-eight” look, it’s easy to check to make sure it’s tied correctly. This is one of the reasons it is popular with rescue work. It is used on the running rigging of sailboats to keep lines from running through leads and pulleys.

Figure-eight Follow Through Loop



Method:

Step 1: First tie a loose figure-eight. To do that, make a loop and then bring the tail under the rope and through the loop.

Step 2: Then, follow the original figure-eight with the tail and exit the knot to create the follow-through figure-eight.

Step 3: Tighten the knot, so that the outside loops tighten next to the adjoining turns.

Step 4: For the stopper, wrap the tail once, then cross over the

wrap and feed the tailback down under both loops to create the stopped knot.

Figure-eight Loop on a Bight

Note: This is essentially a standard figure-eight but instead of a bight is passed through the loops instead of a tail.



Method:

Step 1: Take a large bight and create a loop.

Step 2: Pass the bight under the rope and back up through the loop.

Step 3: Tighten down in the same fashion as the previous figure-eight.

Slipped Figure-Eight Knot

If you want your Figure-Eight Knot to release quickly, modify it by making it into a Slipped Figure-Eight Knot. This knot is tied to a different version of the Figure-Eight Knot.

Use the running end to make a crossing turn by twisting the end down and over the standing part and underneath it. Then, use the bight of the running end to pull it through the loop.



You can release this knot simply by pulling on the running end.

Chapter 5

Crossing Knots.

The Timber Hitch



Method:

Step 1: Take one end of the rope and cross it over the other end.

Step 2: Take the tag end and wrap it around itself several times. You will get the rope looking like the one in the image below. That's all! You will notice that the harder you pull on the longer end, the more secure the knot will be.

Taut-Line Hitch



Method:

Step 1: So, you have a rope regularly tied to, say, a tree, and then you wrap it once around another tree. Now, take the leading edge and put it over the rope and then you are going to come up and around once and then another time on the inside.

Step 2: That's twice, and then you are going to cross over, and

you are going to go in the opposite direction under and through. And that's your taut line.

Anchor Hitch

Also called the Fisherman's Bend, even though it is a hitch and not a bend, the Anchor Hitch is commonly used to tie a rope to an anchor.

Step 1: Start with a round turn and pass a Half Hitch through both turns.



Step 2: Finish with a regular Half Hitch.



The Anchor Hitch stays secure when the rope drifts and the strength of pull changes. For larger boats, this hitch is relied on for repair more than a permanent connection. You can make the Anchor Hitch more secure by seizing the running end to the standing part (see Appendix A for information on seizing).

Oysterman's Stopper

The Oysterman's Stopper Knot begins by tying the Slipped Noose.

Step 1: Tie a Slipped Noose, making a tuck through the loop.



Step 2: Tuck the running end through the noose.



Step 3: Pull the standing part to trap the running end with the loop.



Step 4: As you tighten the knot, you should get the finished Oysterman's Stopper.



When tightened down, the face of this knot has a unique trefoil appearance. This knot is wider than the overhand stopper knots. An alternative way to tie this knot is to make a Bowline Loop, made so small that it is right up against the knot. It will be facing the wrong way but can be reversed if, while there is still a bit of slack, the center is pulled through the middle by bracing the knot and pulling on the running end. This reversal is called “capsizing.”



Reef Knot

Also called the Square Knot, this knot has been in common use for centuries for tying packages and bundles of all kinds (not to mention shoelaces). It is also used to tie bandages because it lies flat, making the dressing more effective and comfortable.

It should be said that the Reef Knot is notorious for easily coming undone, to the point that it is used in magic tricks to give the appearance of “magically” untying two ropes without effort. It is especially unstable if the ropes used are of different sizes of materials.

Step 1: Pass one end over and around the other, making a Half Knot, just as if you were tying an Overhand Knot with two ends of the same piece.



Step 2: Tie a second Half Knot by tucking the right end over the left one.



Step 3: Pull on both ends to tighten. Note that each end will exit next to its standing part.



As you tie the Reef Knot, it may help you to say to yourself, “Left over right, right over left.” To loosen the knot quickly, jerk one of the ends over the knot away from its own standing end, causing the knot to capsize. There are two common mistakes made with this knot. One is to make both Half Knots the same, making a very poor Granny Knot, and the other is to use this knot as a bend, which is not reliable.

Running Bowline

You can tie a Running Bowline by tying a Bowline around its own standing part or by tying a Bowline the usual way, and then pulling a bight of the standing part through the loop.

Step 1: Tie the Running Bowline by tying a Bowline around the standing part.



Step 2: The result: Running Bowline.



If you make a fixed-loop knot like the Bowline or any other fixed-loop knot and decide the loop part is not big enough, just turn it into a running loop knot and have the loop as big as you need it. Because the fixed-loop part does not lock onto or grip the standing part, the noose will slide open easily even if great tension is placed on the sliding loop.

Clove Hitch

This hitch ties quickly, but should not be considered a permanent connection or be used for safety or heavy loads.

Step 1: Pass the running end around the object, cross over the standing part, and then pass the running end around the object again; then tuck it under the last crossing.



Step 2: Tighten the knot around the object. Because the Clove Hitch can be tied in the bight, you can use any section of the rope to make the hitch that slides over posts.



Step 3: Make two crossing turns and pass one in front of the other.



Step 4: Place the formed double loop around the object to form the Clove Hitch.



The Clove Hitch Knot is also the basis for other knots, and the last tuck can be slipped if a quick release is desired.

Icicle Hitch

John Smith of Surrey, England, first demonstrated the Icicle Hitch by using it to suspend his weight from a tapered wooden fid that was hanging point-down from the ceiling. Like finger cuffs, this hitch will shrink to grab strongly, then loosen easily when the strain is taken off.

Step 1: Start with a good length of running end and make a

crossing shown here.



Step 2: Cross the running end to the left and behind the pole.



Step 3: Bring the running end around the pole, tucking it under the crossing. Complete four turns, tucking the end each time.



Step 4: After the fourth turn, also tuck the running end under the first loop so that both ends exit together.



After you are finished, use the running end as the end that will take the strain. This will allow the hitch to have its tenacious grip. Do this either by leaving a large excess of running end or by extending it by making a bend to another rope.

You can also tie the Icicle Hitch near the end of a pole, like the Pile Hitch. To see this, first tie it near a pole end with the method shown previously, then pull the bight over the end as if you were untying the Pile Hitch, and you will see the setup for this method. When checking to see if you have tied it correctly, keep in mind that this hitch is basically an extended Pile Hitch.

Chapter 6

Other Useful Knots

Slip Knots for Strong Holds

When you tie a knot, you want it to stay tied until you come back and untie it. With these knots, you can rest assured your knot is going to be in place until you're ready for it to come apart.

Practice tying each of these, and work on getting them done quickly and securely. They are handy for a variety of reasons, trust me.

Flemish Bend



How to tie it:

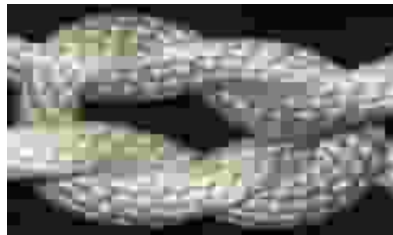
You are going to need two ropes for this knot, and you will start with tying a loose figure-eight knot in one of the ropes. Now is when this knot gets tricky, and you must pay attention to ensure you do not make a mistake.

You have one rope with a loose figure-eight knot in it, now you must take the other rope and carefully pass it through this first figure eight. You are going to work through the same pattern as

you did with the last rope, only this time you are going to do the pattern in reverse to hold it all in place.

Once you have the reverse of the knot against itself, you can finish the knot by pulling both ends tight.

Granny Knot



How to tie it:

You are going to use two lengths of rope to create this knot or one long length of rope that has been folded over itself.

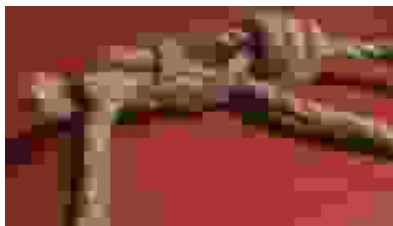
Start with the ends of the ropes, and loop one end over the other, going from left to right.

Make sure you leave plenty of room at the ends of the rope when you complete this first pass.

You are now going to take the two ends you have just looped over each other, and turn them back against each other. This time, you are going to loop them through each other again, going from left to right once more.

Now use both hands to pull on all four ends of the rope you have in place. This is going to secure the knot against itself, sealing it in place.

Double Bow Line



How to tie it:

This knot requires a lot of rope, so ensure that you have enough to work with before you begin. If you ever find yourself in a situation in need of a knot such as this without enough rope, simply default to the normal bowline.

Using the end of the rope, you are going to make a loop, then follow this loop with another loop. You are going to now overlap the two loops against each other. Wrap one of the loops around the main body of the rope, then push it through the first loop you have made on the rope.

You are going to slide the end of this loop up and over the loop you have just created, followed by pulling it tight to secure the knot in place.

Nail Knot



How to tie it:

You will need two lines of rope for this, or the main piece (such as a nail) and another length of rope. To create this knot, you are going to lay both ropes against each other, preferably with something such as a nail between them.

Take one of the ropes and pass it over and around the mainline of the other rope, as well as the nail. You are now going to wrap this in place several times (at least six) around both the nail and the other rope.

Pull out the nail from the center now, and gently slide the end of the rope you have just used to wrap this in place through the center of the loops. This is going to take some patience, and it

may work best if you use some sort of lubricant to slide it through the main part of the rope.

Once you have worked this line through the rope, pull it tightly on both ends, and secure it in place.

Rope Splice



How to tie it:

You will need one long length of thicker rope for this knot. To achieve it, you will start with forming two holes within your rope, manipulating the cords of the rope to form this shape.

From here, you are going to pass the end of the rope through the second hole you have formed (the hole that is further away from the end of the rope.)

Go ahead and pass the end of the rope through the near hole as well, as this is going to twist the fibers of the rope and make them easier to work with. You will now take the loop you have formed from the first part of the hole, and push it through the hole that is closer to the end of the rope.

Pull tightly, securing this loop in place through the hole of the rope as tightly as you can. This is going to take both hands (and possibly the help of a companion) to accomplish, but once you get the rope secured in place, it isn't going to move.

That's it! Use the tightened loop you have just made as a holding base for another rope to pass through, giving yourself a secure knot in the line and extending the rope further.

Knots for Lashing

For our ancestors, a simple lashing meant the difference between swinging a sharp rock and swinging an ax. This skill remains important today, if not for axes, for lashing together poles and tying up packages and bundles.

Lashing Bundles

Wrapping and securing bundles is a form of lashing, so package ties (also called parcel ties) are included in this chapter. You can use lashing bundles to secure a single object, like a box or rolled-up sleeping bag. Or you can group a stack of items, like books or newspapers. The rope or string itself can serve as a handle to lift the object. String or small cordage is often used in place of wire to bundle items in industrial applications, because the wire can do more damage to any machinery it gets caught in.

Lashing Poles

Lashing two or more poles together can be very useful for both construction and repair—to give more length or to make scaffolding, ladders, or makeshift furniture. Poles can be lashed parallel to each other or at right angles.

The key to making a pole lashing is the concept of the frapping turn. While the multiple wraps around two poles provide the structural strength that a lashing needs, the frapping constricts the wraps and creates the tension that holds them in place. If the poles are tied together parallel to each other as in the Shear Lashing, the wraps must be loose enough to allow a couple of frapping turns to pass between them.

Shear Lashing

Also called Round Lashing, this method will bind two poles parallel to each other.

- Anchor the rope to one of the poles with a Clove Hitch.



- •Wrap the rope around both poles with light and even tension, leaving enough space between them for the frapping turns. Continue making wraps until you cover a distance that's about twice the width of a single pole.



- •Make two frapping turns and finish with a Clove Hitch.



- •If the lashing is not too tight, the legs can be spread to use as “sheer” poles.



If the poles need to be spread to make an A-frame, make sure the tension is moderate. If they need to stay very rigid with each other, try using more than one Sheer Lashing. Three poles can be tied similarly, with frapping turns between each pair of poles.

Transom Knot

The Transom Knot is a good way to tie two sticks perpendicular to each other if you want a lashing that is not bulky. The ends can be cut off close to the knot.

- •Arrange the two sticks so that one is laid across the length of the other, and tie them together with a Double Overhand Noose Knot.



- Tighten the rope by pulling the ends in opposite directions.



The top part of this knot has the same crossings as the Constrictor Knot, which is why this simple little knot grabs so well.

Square Lashing

If you are making scaffolding or other large square frames, Square Lashing is the method to use on the corners that meet at right angles.

- Arrange two poles at a 90° angle to each other. Anchor one end with a Clove Hitch and start wrap, as shown.



- Make four wraps, passing over the pole at the top, and under the pole at the bottom, keeping each wrap tight.



- Make two frapping turns, staying in front of the back pole and behind the front pole, just as you would do with a Sheer Lashing.



- Tie off the remaining end with a Clove Hitch.



Note that no slack needs to be saved for the frapping turns, so keep tension on at all stages of this knot.

Diagonal Lashing

Whereas Square Lashing would be used to attach poles at right angles, Diagonal Lashing is used to keep two crossed poles rigid with respect to each other. Scaffoldings made with a combination of these two lashings are very rigid and secure.

- Cross two poles diagonally, and make a Timber Hitch around them.



- Pull the Timber Hitch tight and make three vertical wraps around the center.



- Cross over and make three more wraps around the opposite diagonal.



- • Make two frapping turns, below the upper pole and above the lower pole, just as with the Sheer Lashing. Finish with a Clove Hitch.



Parcel Tie

The Parcel Tie is a good method of tying a package or a stack of books or newspapers.

- • Tie a Bowline Loop at the end of a length of rope.



- • Pass the rope around the package and through the loop, then lead it around the package again, but at a right angle to the first crossing.



- • As you cross the length of rope with the running end underneath the package, maneuver it to tie a Crossing Knot (the illustration here is the view of the underside).



- •Next, bring the running end around to the front and pass it through the loop again.



- •Finish by securing the end with two half hitches.



Thanks to the properties of the Crossing Knot (a knot made by one rope around another at the point where it crosses it, then continuing past it), you should have no problem lifting the bundle by pulling on the knotted rope.

Marling

This type of lashing relies on Marling Hitches to hold the contents of a bundle firmly in place.

- •Start by securing the rope around the end of the bundle with a Timber Hitch. Lead the running end partway down the bundle, make another wrap, and tuck the running end over and under, as shown.



- Continue with a few additional wraps along the length of the bundle. To secure the last Marling Hitch, tie one or two Half Hitches.



Informing each Marling Hitch, the running end is brought over and then under. If you tie each by going under then over, they form a series of Half Hitches, making a parcel tie called Single Hitches. Using Marling Hitches holds the bundle more securely, but takes longer to untie.

Chainstitch Lashing

Chainstitch Lashing holds well on bundles that are awkwardly shaped or that flex. You can also use it for decorative purposes.

- Make a Timber Hitch at one end of the bundle. Fold a bight in the running end close to the Timber Hitch and then pull another bight through it after first passing it around the bundle.



- Continue passing new bights around and through the previous bight. To finish, pull the entire running end through the last bight (instead of another bight) and secure with two Half Hitches.



Though it may look complicated, Chainstitch Lashing ties quickly once you get the knack.

Chapter 7

Stopper Knots

Stopper knots, also known as terminal knots or knob knots, are tied at the end of a cord. In its strictest sense, the use of the word knot refers to a stopper knot.

A rope with a knot tied at the end of it is a completely different object than a rope without one. It is easier to hang on to, it cannot be pulled through the same size openings, the end will be less inclined to come unraveled, and it will look different, too. All these changes in the properties of the rope are accomplished with a simple stopper knot.

Basic Usage

To stop a cord's end from running through a small opening is part of how a stopper knot earns its name. By “stopping” the rope, the knot allows us to suspend something from it. If the cord runs through a lead or pulley, a stopper knot can keep the line from running out, or unreeving. This is commonly done on a sailboat, where the Figure Eight Knot is used for this purpose. It also stops the end of the thread from passing through cloth and similar materials in needlework.

A simple stopper knot is often used to make cordage easier to grasp, whether you make it with the string doubled through the end of a zipper, or with a larger rope to get a better grip. Several stopper knots can be tied, and spaced out, to give many handholds. When tied in the ends of many cords as if all one cord, it provides a way to keep them gathered.

What's It Used For?

There are many other uses for stopper knots. They can make the end heavier to use for throwing. Heaving knots are for weighting the end of a rope to assist with throwing the rope. Often a smaller rope is thrown between a boat and the dock and then used to pull a heavier one over. The same technique is used in many circumstances to get a heavy rope in a hard-to-reach place. In getting a rope over and between two particular branches high in a tree, a rope can be thrown over all of them, and then another can be thrown across it between the branches, from a different angle, 90° if possible. In this manner, the second rope will pull the first down between the two branches. Two common knots for weighting the end of a line are the Heaving Line Knot and the Monkey's Fist.

Stopper knots can be used as mallets with a soft striking surface, or they can be treated with shellac to harden them. They also use up the line to make it shorter. Both the Heaving Line Knot and the Monkey's Fist have some turns that use up line. Depending on how much shorter a cord needs to be, anything can be used from an Overhand Knot to a long Heaving Line Knot or even a coil. They can prevent the end from fraying, although whipping the end, as shown in Appendix A, is a neater solution. Stopper knots are used for decoration, and a knot at the end of a cord can be used as a reminder of something.

Multistrand Stopper Knots

Knot Tyers long ago figured out that the strands of three-stranded rope can be unlaidd and then tied together to form simple or complex stopper knots. These knots are characterized by simple and easy-to-remember patterns for tying and their woven

appearance. On square-rigged sailing ships, these knots were used to stop hands and feet from sliding on ropes. They can also be tied by binding two or more separate cords together. Multistrand knots are also used as a form of decorative knot tying. Some knots, like the Matthew Walker Knot, can serve both decorative and functional purposes.

Multistrand stopper knots can be made in many variations just by using the Wall and Crown Knots. They can be combined in various orders and can even be doubled to make a larger knot. To double them, retrace each strand along a previous strand's path. If a Wall and then a Crown is made, the ends can be tucked down the center from the top and then cut off where they come out the bottom. Then, when someone asks what you did with the ends, you can say that you “threw them away.”

Stopper Knots

We will now look at the examples of stopper knots below:

Monkey's Fist



It is also known as the monkey's paw. This knot has been in use for quite some time, where it adds weight to the end of a heaving line to facilitate easy tossing of the heaving rope precisely where it is required. A heaving line is a very light rope tossed between the dock and ship to haul another heavy-duty rope to the correct position. The monkey's fist is also useful in door stopper weights, decorative curtain tiebacks, keychain fobs, and

cufflinks. The rope's thickness and the number of turns you make determine the size of the knot.

When utilized in decoration, a spherical item like a tennis ball, marble, or golf ball is usually positioned at the core of the knot to achieve a flawless round shape and add more weight to the knot.

You can also use the monkey's fist knot for skydiving and rock climbing. In places where metal rings can damage soft rock, rock climbers jam the monkey fist knot into rock cracks to hold the weight of their bodies. Also, due to its more consistent firmer nature and because it is more durable than the outdated rope handle found on parachutes, skydivers frequently use them in their ventures.

How to Tie Monkey's Fist Knot

Step 1: Grab the long-running end of a rope and create three wraps around your fingers. With the first series of wraps held in place, create three additional turns to pass outside the center of the initial three wraps.

Pass the running end across to one side of the initial series of wraps to complete the step. This ensures that the running end is positioned correctly for the following step, requiring you to slide the rope's tail through the preceding wraps.

Step 2: Passing from within the knot, form three more wraps around the series of turns you had created in the step before. Confirm that each step has an equal number of turns.

Finishing: Now, you can insert a round item at the core of the wraps, or you can tuck the rope's standing end with either a stopper knot at the tip or without. Start the tightening process by slowly working on every wrap, beginning from the next stopper knot buried and completing with the other rope end.

Note: For the first couple of wraps, ensure that you pull gently. The monkey's fist is worked multiple times till you achieve your

ideal size. For the final tightening of the entire knot, use an awl or a small screwdriver to help you through.

Barrel Knot or Blood Knot



We mostly use the barrel knot to join scraps of monofilament nylon line to each other as it maintains the line's strength. The knot is suitable for a situation where you have collected fishing lines of distinct lengths and diameters that have been tossed away along the beach, lake, or riverbank, and would like to create a stronger and long enough line for fishing or any other activity. You can also use a blood knot in sailing as a decorative stopper knot.

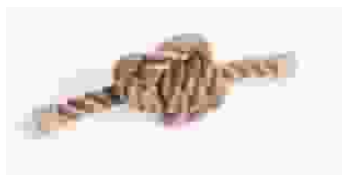
How to Tie a Blood Knot

Step 1: Overlap the lines' ends to cross each other. Twist one cord across the other to make five turns. Lead the running end back in the middle where both lines were crossed.

Step 2: Rework the same process with the remaining end, wrapping the exact number of turns in the opposite direction.

Step 3: Gently yank the cords in contradicting directions for the turns to come together and wrap. Trim the ends near the knot.

Stevedore Knot



It is also called a double figure-eight knot. We usually fasten this

knot close to the tip of a rope. It is believed that the stevedores (dockworkers) utilized this knot in offloading and loading their ships.

Large blocks were required to lower and lift cargo on and off the ship, which called for large stopper knots to keep the ropes from slipping through the blocks. The stevedore knot can remain intact even when loose and is non-jamming. This knot is tied in almost the same way as the figure-8 knot (hence its alternative name), except that the running end creates an extra turn around the standing end before slipping it back into the original loop in the exact way you would a figure-8 knot

Other Stopper Knots

Ashley's stopper knot

Double overhand knot

Slip knot

The figure of eight knot

Crown Knot

The Crown Knot is very similar to the Wall Knot (see further), except for the direction of the running ends, which go down rather than up.

Step 1: Take the three strands of the rope and tuck each one down through the loop made by another strand.



Step 2: Tighten the knot by pulling on the strands.



This knot is rarely tied by itself unless you keep on tying this knot to cover a cylindrical object.

Matthew Walker Knot

This is another decorative knot that requires separating the rope you're working with into three strands.

Step 1: Begin the Matthew Walker Knot by making a Wall Knot (see further), tucking each end up through the next bight.



Step 2: Continue by making another tuck.



Step 3: Snug down by pulling each of the strands repeatedly.



Another way to tie the Matthew Walker Knot is to lay the strands in successive Overhand Knots.

Step 1: Use one strand to make an Overhand Knot.



Step 2: Continue making Overhand Knots with each consecutive strand.



As you pull on the strands to tighten the knot, make sure you do it gradually and evenly. The outer bights must be coaxed into place to wrap around the knot in the proper form. Gently brush them with your hand to assist them in wrapping around the knot, while gradually and evenly taking out the slack.

Chapter 8

Survival Roping Techniques

Fire Starting Tinder

The fine fibers that make up synthetic rope are an excellent fire starting tinder. Take a short section of rope and tear it apart to the individual threads. Create a loose bundle similar in density to a cotton ball. Prepare the rest of the fire with this tinder, kindling, and fuel at the ready. Apply a spark or flame to the makeshift tinder.

Fishing (Gill) Net

Pull the core lines from a length of a 550 Paracord, triple the width of the desired net. Tie the casing line (from which the core lines have been removed) between two trees with a Mooring Hitch on either end. Use a Girth Hitch or Prusik Knot to tie the midpoint of each core line to the outside casing. Space the core lines 1-2 “(3-6 cm) along with the outside casing. Tie adjacent core lines with a Flat Overhand Bend or a Sheet Bend to create a diamond pattern gill net. Finish the outside edges of the net with additional Paracord casings.

River Crossing

Find the shallowest, slowest crossing point possible. Release all

of the backpack buckles in case of a stumble. Tie a rope to the first person crossing with a Bowline with a backup knot. Have the team hold the first person's line in case the person loses their footing.

Splint a Broken Limb

Use boards, heavy sticks, trekking poles, or tent poles and place them on either side of the limb. Wrap straps or rope around the limb and finish the ends off with a Square Knot.

Trapping and Snaring

In a long-term survival situation, food will become an issue. Take the core strands of quality 550 Paracord and use them to trap or snare small game. Use the Honda Knot for the snare. Always respect local hunting and trapping regulations.

Best Rope Throwing Technique

- Before crossing the line, you must attach one end of the rope to the other side of the water. Knowing the right way to throw a rope will increase the distance you can throw.
- When throwing a rope, in most cases you should aim to throw an excess.
- If you want to hold one end of the rope (usually the case) be sure to fasten it to something.
- **Note:** It is a good idea to straighten one end even when throwing the whole string into one. If your shot does not exceed the obstacle, you can withdraw it. If this happens, remove the safety tip and your friend can pull it off.

- •Tie a cap knot with weight or volume to the edge to be thrown. Wrap half the rope in the palm of your right hand and the rest in your fingers.
- •To fix it, stop at one end or attach it to something.
- •Take the coils you made in your fingers with your left hand. When starting, release the right coil one second before the left.

How to Properly Throw a Rope

- •Release the right coil one second before the left.
- •Make sure to turn back when throwing a heavy string on a branch.

Conclusion

The word ‘knot’ stems from the Old English *cotta* meaning ‘knot, tie, and a noose.’ Knots are everywhere, and they’re an amazing resource for sailors, mountaineers, campers, and other adventurers. They help people trap fish, hold up tents, and even assist first responders in building emergency shelters.

But knots don’t just exist in the outdoors. Knitting enthusiasts have been using them for centuries to craft everything from sweaters with intricate stitches to breezy summer tops that keep you cool while you watch the sunset. Some can take days to master, but once you know how to tie a knot, you’ll be able to create anything from lace collars and decorative cuffs to dainty lanyards for keys or necklaces. A knot is an older representation of a tie. The ancient Egyptians used knots to secure material around support or other objects before wrapping it with string.

For most applications, each of these knots is sufficient to secure the rope. However, more complicated structures are needed for stronger bonds in ropework or when three-dimensional structures are required.

Knots are not just useful in life; they happen to be an important part of many day-to-day tasks. A wide variety of knots can be employed for various purposes, from tying down cargo to attaching one end of a rope to another. You might even need them for your household chores. If you’re a traveler, you probably have a few knots in your back pocket for rope and tie or untie knots.

Many different types of knots can be tied using these methods. The key is that they all use the same method.

Glossary

Understanding the words used in knot tying is necessary before you start making knots. These words are found frequently in knot tying and knowing them makes it easier to learn and discuss knots. Remember these words and their meanings. It is okay if you forget; simply come back to this page for a reminder.

Backup knots: A backup knot is a secondary knot tied into a rope to secure the first knot. It prevents the main knot from coming undone.

Bends: A bend is a knot that joins two segments of rope together.

Bight: A bight is the middle part of any rope that has no crossings anywhere in its length. A bight usually makes a half circle extending into a long “U” shape.

Binding knots: Binding knots hold objects together or compress a single object by joining together rope ends or tucking the rope under turns in the knot.

Bitter End: The bitter end is similar to the working end of a rope but it is usually attached to a bit, which stays on the inside of a vessel.

Capsizing: A knot capsizes when it collapses and cannot function properly. This may happen if the knot was tied incorrectly, the load was too heavy, or the chosen ropes were unsuitable for their intended purpose.

Clockwise: Clockwise means moving the rope the same way as a clock’s hand, which is from left to right.

Coil: A coil is made by looping the rope into circles of the same size, each lying on the top of its predecessor.

Cordage: A cordage is any type of rope or yarn that consists of several strands woven together

Counterclockwise: Counterclockwise means moving the rope in the opposite direction to the movement of a clock’s hands; in other words, from right to left.

Crossing turn: A crossing turn occurs when the loop of a rope segment crosses over itself, which creates a circular shape.

Elbow: An elbow occurs when the rope crosses in two places close to each other. It is usually made by adding an extra twist to a loop.

Foundation knots: Foundation knots are strong, figure-eight-shaped knots that are easy to untie but take the strain off the rope.

Hitched: To hitch refers to attaching a rope to another rope or object, such as a tree trunk or buoy.

Lashings: Lashing is a way of binding two or more objects together by wrapping a binding material, such as rope, around them so that they are secured and have limited movement.

Loop: A loop is a basic shape in knot tying created when two parts of the rope cross themselves. A loop is often made in the bight of a rope.

Loop knots: A loop knot occurs when the ends of a rope cross each other in a circle form.

Overhand: An overhand movement occurs when crossing the working end of a rope over the standing end.

Round turn: A round turn forms when wrapping a rope entirely around an object so that it is fully encircled and secured.

Seizing: A seizing is a knot connecting two segments of rope next to each other, which usually creates a loop.

Splice: Splicing happens when twisting the ends of two ropes and weaving the strands together to produce a stronger join.

Standing end: The part of a rope that is not used to tie a knot. The standing end is sometimes called the standing part.

Stopper knots: A stopper knot is a knot made at a rope's end to stop it from moving through openings and to prevent the rope from unraveling.

Turn: A single round of a coil is called a turn.

Underhand: An underhand movement happens when crossing the rope so that the working end is underneath the standing end.

Whipping: A whipping occurs when tightly wrapping a thin cord or heavy thread around the rope's end to prevent fraying.

Working end: The working end is the part of the rope that is used to tie the knot. It is sometimes called the working part or running end.

Many people across the world make knots and use ropes. These individuals have different cultures and speak various languages. Some people use slightly different terminology from that described above. Oftentimes, the words mean the same thing, but they are applied differently in a specific setting. The terminology in this book includes generally accepted terms, so you should be able to understand other people when they talk about knots.

Suppliers

https://www.amazon.com/Arborist-Strength-Polyester-Hoist-Rigging/dp/B08J4JPK5F/ref=sr_1_5?crid=2V6931IPAHN9&keywords=rope&qid=1648110990&srefix=rope%2Caps%2C496&sr=8-5

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BOOK 6
SUBURBAN AND HOME
DEFENSE

THE COMPLETE GUIDE TO
PERSONAL PROTECTION
WITH EASY AND REALISTIC
DEFENSE TECHNIQUES TO
KEEP YOU AND YOUR FAMILY
SAFE

Introduction

When you are concerned about your home's security, what would be your first response? How can you ensure that you can leave your residential, or private residence for that matter, with the confidence that even in the case of an intrusion, it will be able to withstand it?

Self-defense, or to be more technically accurate, personal protection, is a complicated topic. Because, by nature, it is a very individualized thing, there is no one-size-fits-all solution. In addition to the fact that we all have different, often constantly changing physical abilities, the tactics and techniques we can employ to defend ourselves are also defined by the laws in the areas where we live and travel to. What's appropriate for one person in one place may not work for that person's next-door neighbor or even that same person operating in a different area.

Given the current security condition in numerous ranges, it would be great if you were in a position to guarantee that you could withstand any sort of robbery events on your private property and how the intruder can be exasperated before even trying to invade your private residence. In the case of a spontaneous home invasion, most people would react as the person pictured above. That is to mean that you will be looking for an alternative means to be able to deal with the intruder with the hope of containing the incursion with ease and acumen.

There are different courses for one to guarantee home security without needing to utilize firearms. As much as you would be enticed to use elective weapons to manage similar incidents, the anticipation of such an incidence is a more thoughtful approach to managing the circumstance. No matter who you are or where you live, remember that the "soft skills" of awareness, avoidance, de-escalation, and boundary setting always apply. These universal skills should not only be your first line of defense. They should also complement everything else you do to keep yourself and your family safe and should be seamlessly integrated into all your other training.

Chapter 1

The Pillars of Survival



Preparing to Protect Your Home and Community in SHTF

Traveling around the world and throughout this nation, I have seen how people live and how safety and security play out differently in different areas. Some communities are guarded by gates, walls, and armed security. I have visited other places on the planet where villages are little more than grass and mud huts with minimal (if any) security.

Throughout history, we have been a people of fortifications and borders. Most nations realized that active military and secure borders were essential to remain secure and sovereign. Kingdoms of the past went as far as building many walled defenses where attacking forces would have to hurdle several walls to breach the city.

We are living through a time of extraordinary peace in our nation. Sure there are criminals, and there will always be criminals, but we are safer now than ever before. Of course, in SHTF, that can all go away, and things can get ugly in a hurry. You do not need a three-walled defense around your castle, but

there are some simple steps you can take to make your home significantly more secure. We are going to discuss the essential security principles in this chapter.

The Importance of Security in SHTF

It is hard for Americans to understand a situation that would be labeled as SHTF. After about two weeks, what would the world be like without law enforcement, food, water, and medicine? Can you imagine the chaos in the streets? We have only had glimpses of what this might look like, and it is terrifying. Look back to events like the '92 riots in LA or the events following Hurricane Katrina's fallout. These glimpses give Americans pause, but few take action to fortify their homes or establish anything beyond a few weeks of vigilance.

To put it simply, most Americans are not prepared for widespread civil unrest. We are untrained and inexperienced. That is a testament to our society and the relative peace we have seen in recent decades. I need you to understand that you and those around you will become the security detail in an SHTF situation. All the layers of protection, from the police to alarm systems, will dissolve, and no one will be coming to help you. That is the level of importance of this chapter.

The 3 D's of Home Defense

Thanks to our innovative military, there is a system in place that makes almost every aspect of emergency preparedness easier. When it comes to security and defense, there is one easy system for anyone to understand and act on. These are the 3 Ds of home defense and security:

- •Detect
- •Deter
- •Defend

Using these three principles, you will be able to take actionable steps on any threat to your community or home. Once you have a plan, everything gets a lot less nerve-racking.

Detect

The detection of a threat is the first step in this system. This identifies a problem, a person, a group, or something else that just does not fit. There are two degrees of detection. The simple version is peeking out the blinds and seeing someone walking the streets late at night that you do not recognize. My mother was a champion at this method! She was always in those blinds. You could also actively detect threats by using cameras, trail cameras, or even drones to monitor your property.

You can look at detection from the standpoint of a homeowner. How best can you detect threats from your home? However, detection truly works best at the community level. A community threat detection system can be as simple as a communications network like the Nextdoor App and a few vigilante neighbors. As long as you can detect and report, you have a powerful system in your community. Here are some great tools for detecting threats in and around your home:

- •Optics (binoculars, monocular, night vision)
- •Security cameras on the home
- •Trail camera
- •Other community members
- •Late night and early morning walks

Perimeter Alarms

Detection is step one to understanding the nature of the threat you face. It could be an immediate threat, or it could be someone scoping your home or community out. Without detection, you could be unaware, and then it might be too late to react. There is a reason that we place defense at the end of this system. Detecting and deterring can be very careful.

If you decide to neglect these, it will also be awfully hard to be in the most advantageous position. You can identify a threat through detection and deterrents and give yourself ample time to consider the best way of dealing with that threat.

Deter

When you think about an SHTF scenario in suburbia, you go right to the AR15 and an ample supply of ammo. You invent a terrifying threat in your head, and when you consider the quickest way to mitigate that threat, whether that be a bunch of guys at your doorstep or a single intruder breaking in to steal food or to hurt your family.

Deterrents are practical and straightforward, and they can go a long way when it comes to avoiding severe security threats. With the overreliance on firearms, it is easy to forget that they could begin to fire rounds back when you start firing rounds at a person! Better than any tricked-out rifle is the ability to force the mind of a criminal to look away from your home without taking any action yourself. This comes from careful and strategic deterrents that have a psychological effect on the people casing your house.

This might all sound way too complicated. Maybe you are not a strategic person, but you like the idea of avoiding a firefight and

setting your home up in such a way that the bad guys avoid it. To simplify all this talk of strategy, I will give you one sentence to consider. Your home should be less desirable than the other houses on your block! It all comes down to desirability. Take a look at the homes around yours. Focus on them. Maybe take a walk and look at the yards, fences, and entrances to the houses. Then you need to start thinking like a criminal.

- •Which house would be the easiest to break into?
- •Which house could you break into without being seen by others?
- •Which house provides the best way out without being seen?

These are all the types of things that criminals consider when they are casing a property. If they see a home with no cars in the driveway and is empty most of the day, there is potential there. You can rely on the sad reality that most Americans take ZERO precautions when attempting to deter criminals. This means that every step you take to set up deterrents will put your home lower and lower on the list of desirable properties in your neighborhood for criminals. It will be tiny tweaks here and there that make your home safer. You could argue that building giant walls around the home might be too much of a deterrent.

It is possible to fortify your home overly. The right number of deterrents puts criminals off, but a serious obstacle piques their interest and makes them wonder, *what are they protecting in there?* The perception might be that “something valuable is hiding behind those bars and walls.”

Security System

A quality security system can act as a deterrent. Good criminals

will know how to work around it, but you should broadcast it if you have a good system so the bad guys know.

Secure Windows

The easier it is to get in, the more likely people will get in. If a bad guy has to rattle and wrench at the windows, they run the risk of being seen or waking up the homeowner.

Good Lighting

Motion lights and floodlights are great ways to keep your doors visible. High visibility at the front and back doors makes criminals nervous. They do not want to be seen coming or going. Bright lights will keep them from picking your home.

Gates

If they can walk right up to your home without hopping fences or opening gates, that's a good day for criminals. A gate is another level of deterrence.

Clear and Open Yards

Yards that are filled with bushes, trees, and junk will provide a criminal with all kinds of options. The more hiding spots they have on the way to your side window or backdoor, the more likely they are to target your home.

Cars in Driveway

Does someone work from home? If there is a car in the drive and someone milling about at all times, then criminals will keep on walking by. The last thing most criminals want is any interaction with the human element. Even if you take 2 to 3 of these deterrents and focus on them, you will make your home more of a sanctuary. You will have a completely unappealing home to society's worst elements, and that is precisely where you want to be.

Fortifying Your Home

When it comes to fortifying the home, you can wade into the realm of fantasy if you aren't careful. You could find yourself trying to turn your home into a bunker from which you can fight a war. That is the wrong train of thought.

Chapter 2

Critical Event Categories



Home Defense Plans

Home defense is the act of defending one's dwelling from attack. Defense strategies are based on the security, mobility, and versatility of the defender's home and their weapons. Home is the only place where a person is safe and secure. So, a home should be the safest place on earth. But it's not always the case in today's world. One needs to take care of their home as much as possible to keep their family members safe and secure. Home security includes physical security and psychological security because some intruders tend to find weaknesses in human psychology while intruding into the home of someone.

Psychological security will prepare you mentally for any such incident so that you won't lose your cool while defending your family members, loved ones, or home. Psychological triggers are fear, anger, and adrenaline rush, which are mostly responsible for a negative outcome in any kind of self-defense situation.

Physical security is the protection of the home, including outer walls, doors, windows, and most importantly, the house itself. Your mobile phone can be handy in many cases while defending

your home, but it is not a permanent solution because it can be quickly snatched away by an intruder.

A house with large windows and openings will also make an easy target for any intruder, so you need to ensure that all entrances of your house are protected with effective locks so that no one can enter your home from outside. Your interior walls should be well built to have sufficient strength to resist any kind of force an intruder might use on you. So, this is an important factor that should be addressed before choosing the best home defense product/plan for your home.

We should be planning our home defenses to have an efficient and quick response in case of any intrusion. Planning a home defense doesn't need to be complicated. It doesn't require too much time and money to put plans in place. Some of the most important things that we need to consider are the following:

- *Security*: Determine the best possible way for you and your family/loved ones to stay secure while at home, which includes security measures such as locks, alarms, bars on windows and doors, etc.
- *Mobility*: Once you plan how your home will be protected, you should also plan on ways how to reach your home in case of an emergency—by phone or car, or even walking (even if it is only short distances).
- *Physical fitness*: Your physical fitness should be well maintained if you have to navigate your way through your home during an emergency. You should be able to navigate in a dark room or any hole or crevice that may be present in your house.

Home Defense Weapons

Home defense weapons come in different shapes, sizes, and

weights depending upon their usage and purpose. As already said, there is no single best home defense weapon as it all depends on your need, budget, and locality. An example of a commonly used home defense is a knife or a blade. They can be ideal for self-defense because they are portable and safe if used properly. The preferred way in self-defense is to be used as a last option because of its high risk. Don't ever use a knife to defend yourself against an intruder unless necessary or you are not sure what will happen next. Many incidents have occurred because of knife attacks, and many people have lost their lives in such attacks. Using a blade during times of stress creates an imbalance that can cause serious injuries or even loss of life.

In some places, carrying weapons in open view can be considered illegal, so you need to carry your weapon concealed under normal daily clothes. This is why so many countries and states have banned the carrying of lethal weapons openly after certain incidents, which caused undesirable consequences for the people and various countries. These are some weapons that can be used for home defense:

- *Chemical weapons:* Chemicals like chlorine gas and pepper spray can help you keep away intruders from entering your house, but these are not preferred much nowadays because chemicals such as chlorine gas and pepper spray can also cause harm to the user or anyone who is near them in case of its use.
- *Physical weapons:* We can use different types of physical weapons for self-defense.
- *Batons:* These are nonlethal weapons that can be used for self-defense. The most common and popular version of the baton is the police nightstick.
- *Sap gloves:* They are light-weighted weapons used by police officers for self-defense and personal protection.

These gloves are filled with lead shot or sand, making them a powerful impact weapon.

- *Baton attachments:* We can use different types of attachments to make our baton more efficient and effective in the case of home defense. Some of the most popular additions are knives, stun guns, impact grenades, etc.
- *Firearms:* They are used for self-defense in some instances when we can't use any other kind of weapon. There are various kinds of firearms that are used for hunting, sports shooting, and self-defense.

There is no single best home defense product/plan for everyone. It all depends on your location, budget, and what situation you need to defend your home from. For example, if you live in a high rise or a house with multiple floors, you can use an alarm system that will go off and alert the police at their nearest location, who will come to check out the situation. If you live in a rural area with no emergency services nearby, you can use a stun gun as your home defense weapon and stun the intruder until the police arrive at your place.

You should also keep in mind that police usually take time to arrive at the spot of any emergency, so it is better to be prepared with your own home defense weapons and plan before an intruder enters your property.

Home Defense Products

Before deciding on what home defense products are best suited for you, you should consider your personal needs. In other words, home defense products should be chosen according to your own personal situation. So, there cannot be any home defense product that can suit everyone's individual needs. Home defense products usually fall into two categories:

- *Defensive weapons*: These products are used to remove or keep away an intruder from entering your home or otherwise harming it. They are used to incapacitate the intruder and to stop him from harming your family.
- *Offensive weapons*: Offensive weapons are hand-held weapons that can be used in case of defense or offense. They are usually carried by the homeowner as a means of self-defense against intruders, burglars, and other criminals.

There are various kinds of home defense products we can use for our own protection; let us have a look at them one by one:

Home Security Products

Home security products are devices that help in maintaining round-the-clock protection around our house. There are various kinds of security products available today that will help you defend your home from intruders. The first thing that you should ask yourself is whether your home needs any type of security system installed or not.

Suppose your home is protected with a sound alarm system, and you have other physical security products like bars on windows or steel doors in place. In that case, you don't need any kind of home security system, but if your doors, windows, and walls are not protected with strong locks or have no protection at all, then installing a home security system can be a good idea.

Home security systems are mostly electronic in nature, so you should make sure that it has backup batteries that can be used in case of power failure. Many types of home security systems are available today that come with different features and advantages.

Wireless Security Systems

Wireless security systems are best suited for homes and or commercial buildings because they don't require any complicated wiring and the best thing is that they can be installed easily. For example, if you are looking for a wireless

doorbell system for your home, then there are various kinds available in the market that you can buy depending upon your budget.

- •*Wireless door chime*: This system helps in alerting the person at the door, so they can open up and receive their visitor. It usually comes with a backup power supply in case of power failure.
- •*Wireless home security alarm*: These alarm systems let you know when there is an intrusion and burglary attempt around your home. It helps send signals to the concerned authority so they can come and save you from any kind of danger.
- •*Home security systems with backup batteries*: Backup batteries are used for saving data on computers or other devices. Here, it is used to protect your home from intruders. These types of security systems have backup batteries that can be used in case of failure in the power supply.
- •*Wireless home security alarm systems*: These are the systems that transmit your signal to the concerned authority through a wireless network so that they can come and save you from any kinds of danger.
- •*Home security cameras*: These are the surveillance cameras that let you know about things happening at home. It is very simple to use because it works with electricity, no wires required. It is also helpful in monitoring unauthorized intrusions, and they keep a record of all your activity so that you can check.

A Home Defense Plan

A home defense plan should include activities, times, and

locations of your family members, which will vary from one household to another. List of signs, sounds, or attacks that can be used as an alert system. This includes sounds that could be used as an alarm system, such as ringing the doorbell during normal times, during the night, or under heavy rain or thunderstorm when it won't disturb anyone else. It should also include the following:

- **Home defense weapons:** They will vary from one household to another and will also depend on the intruders. So, it's better to keep a prepared list of your home defense weapons and their location to avoid being worried about locating them in an emergency situation.
- **Home defense routes:** They will also vary from one household to another. You need to know where your family members are at any moment while being attacked by an intruder and what route they took during such an attack. In case of a fire or flood, or any other emergency situation involving more than one family member, there should be predefined places where these people can meet up.

These are some of the essential factors that should be taken into consideration to defend your home from intruders. However, these are not the only factors that you should consider, but these are some of the most important ones.

Tools and Kits

- *Police alarm:* This is one of the most critical measures that you can use to keep intruders at bay. You can find many different types of police alarms that are more effective if they are installed professionally.
- *Strobe light:* They are important to give an intruder a chance to run away without getting caught by you or your

family. Its bright light and sound will add to the confusion which surrounds the moment when someone is trying to break into your home, giving them a chance to escape before they get caught.

- •*Laser alarm*: This is another important item for home security; it effectively prevents or repels burglars.
- •*Fencing*: It is one of the good ways to keep intruders from getting into your property; it also protects your property from the elements such as high wind and cold. You can choose from different kinds of fencing depending upon the area where you live and the amount of money you have.

You can always find these additional home security measures in the market today. They will protect you and your property from intruders at any given moment. Many of the leading companies offer a variety of home security systems for different kinds of uses, whether it is kids, seniors, or even pets. We have shared some of the popular home security systems that are very effective and easy to set up. If you want to know more about these systems, you can go online and read through all the reviews we've posted for each system so you can decide which one's best for you.

It's important that you consider your own personal security before installing any kind of home security system or anything else for that matter. This will ensure maximum protection for you and your loved ones. These are some of the security measures and alarm systems that will make our homes much safer so that we can feel secure in our homes without any fear of intruders.

Chapter 4

Neighbors and Defenders



A United Neighborhood Is Stronger Than a Divided Neighborhood

Your chances of survival in a disaster scenario will always be higher when you work with your neighbors versus working against them. It really is that simple. If people within your neighborhood turn against each other (including you), it will be for one simple reason: to take resources. For example, you may be very well supplied in your home in terms of food, water, first aid equipment, ammunition, and other essentials. If word about gets out and knowing full well that the vast majority of your neighbors are not going to be as prepared as you are, they're going to turn on you in an attempt to take what you have to feed and care for their families.

Seemingly ordinary people will do desperate things in desperate times to survive. Your next-door neighbor, who you knew as being very kind-spirited and generous, for instance, could suddenly turn into a savage shell of what they once were in an attempt to steal your gear. Furthermore, once your neighbors begin turning on one another, your entire neighborhood becomes vulnerable to outside forces such as raiders or angry mobs.

Rather than having a neighborhood where everyone is fighting against one another in a desperate attempt to survive, your neighborhood instead needs to come together to take care of one another and work as a team. I call this idea the "castle alliance concept."

Have a 24/7 Neighborhood Watch

Set up a system so that you always have people watching all corners and sides of the neighborhood. The security guards you designate need to be armed and have some sort of a system to alert the rest of the neighborhood (a simple flare, bell, or gunshot may suffice). Your entire neighborhood needs to be watched all the time literally, so a rotation system where people are assigned to keep watch at different times of the day is the best system to go with.

Stay in Touch With the Local Authorities

Even in a disaster scenario, the police department, fire department, and city council will definitely be up and running and trying to maintain order. There's also a significant chance that the National Guard or other military units may be called in as well. If this is so, collect the names of authority figures and distribute them among those in your neighborhood. Stay in contact with them, ask what you need to do, and don't hinder them as they do their job.

Securing Your Neighborhood

In short, blockading/fortifying your neighborhood, having a full watch 24/7, and staying in touch with the authorities are the three best things you can do to ensure that your neighborhood is secured after a disaster starts.

The Castle Alliance Concept

Why do I call the idea of your neighborhood becoming unified and working together with the castle alliance concept? The reason harkens back to the Medieval Ages in Europe. Castles dominated the political, economic, social, and geographic landscape back then. Not only were castles constructed at strategic positions geographically, but they also served as the central political and economic hub of the area. They were where kings, queens, and other nobles lived, where they conducted business, and where their militaries were primarily stationed at.

Though every castle and its leaders and people were independent (or at

least most of them), they formed alliances with one another to resist enemy forces and make one another stronger. In times of war and emergencies, they would exchange resources such as soldiers, money, and equipment to support each other. The castles that maintained these alliances with other castles were the ones that held strong against invasions from barbarian hordes or armies from enemy countries. Meanwhile, the castles that failed to forge these alliances and tried to go it alone were usually the ones that would fall the soonest and change hands the most often.

As with the castles, each house is independent with its own human resources and resources..., and each home is allied with each other, and you trade people, guns, food, water, and first aid equipment as needed. Imagine the angry mobs and raiding parties that will surely exist in a disaster scenario like the barbarian hordes who have come to plunder you. The castles that stood alone were always the ones that fell to the barbarians first, and all the same, the homes in your neighborhood that stand alone will be the first to fall to raiders and mobs as well. But the castles that kept alliances and came to each other's aid in times of need were the ones that held strong, and the same will be true for the homes and families in your neighborhood.

Let's say that a devastating long-term disaster (such as an EMP attack) has taken place. One night, you hear gunfire coming from the edge of your neighborhood and realize that one of the homes is under attack from an outside raiding party desperate for food and supplies. You and the rest of your neighbors have two choices in this scenario: you can do nothing and let the home fall (and likely allow the family of that home to be tragically killed in the process), or you can rush to the scene to help defend the home and then further reinforce it after you have repelled the invaders.

In fact, once word gets out that your neighborhood is well fortified and united, the chances of you being attacked in the future are more minimal. In short, a united neighborhood is always stronger than a divided one. And unity doesn't just mean that you agree not to fight one another. It means that you both voluntarily agree to exchange resources and come to each other's aid during an emergency as well.

But while the idea of a unified neighborhood may sound great in concept, it may also sound idealistic or improbable in terms of reality. How can your neighborhood become unified if you and your neighbors don't agree to work with one another in the first place?

Why Your Neighborhood Needs to Form a Survival Plan

Your neighborhood needs to be more than just unified. It needs to be an organized community with a plan. That last word, in particular, is critical: “plan.” There are various reasons why your neighborhood needs to have a solid action plan in place for when a large scale disaster strikes, including the following:

- You won't attack one another for food and resources.
- You will be able to share resources.
- You can assign different tasks to everyone depending on their skill set.
- You can build a fortified neighborhood defense.
- You will always be safer in numbers.

We'll discuss how to put a survival plan in place for your neighborhood, but for now, just know that having a plan, to begin with, is essential to the defense of your neighborhood and its people in a disaster scenario. Now the main question comes: how can you get most if not all of your neighbors to come together and agree that having a survival plan for emergencies is necessary?

Tips for Getting Your Neighbors Involved

First and foremost, I want to establish something: DO NOT go to each home in your neighborhood, invite yourself in, and start ranting about the dangers of a natural disaster or an EMP attack and demand that they come up with a contingency plan with you. This gives the complexly wrong vibe about you to your neighbors and will lead absolutely nowhere. If anything, you've only succeeded in alerting your neighbors to the fact that you are a prepper and therefore likely well stocked with supplies...which means they'll be coming your way for those supplies when disaster strikes. Putting yourself in more danger like that is something you must avoid at all costs.

So instead, I would like to present some alternative solutions for how you can get your neighbors in agreement that a disaster plan is necessary:

What Disaster Preparedness Plans Already Exist?

It could be that your neighborhood or community already has a disaster preparedness plan. You can contact those on the board (if your neighborhood is part of an association) and ask about it purely out of curiosity.

Become a Part of the Citizen Corps

You can also contact the Citizen Corps in your area, which is a Department of Homeland Security program dedicated to helping communities and neighbors coordinate with one another in the event of a disaster, and see if you can get involved with them. Once your neighbors see that you are a part of the Citizen Corps (or, better yet, the unit manager in your area), they will be much more willing to listen to you.

What Disasters Are Most Likely to Affect Your Community?

I fully agree that disasters such as an economic collapse or an EMP attack are a very real possibility, but your neighbors might not think so. Therefore, ask yourself what disasters are most likely to affect your neighborhood. For example, if you live near the coast, it could be a hurricane. Or, if you live near a nuclear power plant, it could be the threat of an accident. Ultimately, your neighbors will feel much more motivated to prepare for disaster together if you zero in on a specific disaster that everyone recognizes is a very real possibility and affects your town or neighborhood specifically.

Avoid Certain Words and Phrases

There are certain words and phrases that I highly recommend you AVOID when discussing survival and disaster preparedness with your neighbors. As your neighbors might say, these words give off the idea that you are only crazy and ‘one of those doomsday preppers,’ as your neighbors might say.

Here are the specific words and phrases I am referring to SHTF, preparing for the end of the world, apocalypse, doomsday, bug out bag, without the rule of law (wrol), zombie, emp attack, societal collapse, terrorist attack, prepper, survivalist, and anything else along those lines.

Holding a Neighborhood Meeting

Eventually, you may get to the point where you feel the time is right to hold a formal meeting (or series of meetings) with your neighbors. I personally believe that a series of meetings is better than one meeting because you can tell who is truly dedicated to preparing your neighborhood for a disaster based on who comes back to a future meeting and who doesn't.

In fact, I recommend that you hold a minimum of four meetings in total, with the following things to be discussed at each one:

- •Have everyone introduce themselves to one another if they haven't already; create general awareness about threats or disasters your community faces; ask if others agree or disagree with you and why. P.S. Remember, you'll make yourself seem a lot more credible if you're a member or manager of a program such as the Citizen Corps.
- •Discuss the importance of stockpiling enough supplies in the categories of food, water, first aid gear, sanitation supplies, and ammunition; no one has to reveal what they have or don't have stockpiled, but everyone should agree to start stockpiling at least something.
- •Focus on the specific skill sets that everyone has and what roles people will be able to contribute; check up on the supplies people have stockpiled.

Based on the information you gained at the previous meeting, go as far as to assign specific roles to different people in the event of a disaster; discuss the importance of having a proper hygiene and sanitation system. You can hold more meetings than just those, obviously, but those are the topics you need to discuss at the first four.

Defending Your Neighborhood Against Attack

Setting up defensive fortifications for your neighborhood is great, but does simply setting up defenses guarantee that a defense of your community will be successful? Absolutely not. As always, you need to have a plan. Designate which neighborhood members are in the security team and tasked with defending the neighborhood as before. Set up a defensive strategy and make use of organization and tactics. Let's talk about how you can do so.

Communication

The most crucial element of the strategic defense of your neighborhood is solid communication between the defenders. In fact, simply communicating with one another via radio will do wonders for your defense. This is because each of you can stay in constant contact with

one another and update one another on the strength of the enemy force, how you're doing on ammunition, if anyone is wounded, and so on.

Something that should be noted about simple radios such as walkie-talkies is that they very rarely have the range capabilities that the manufacturer claims they have. Even though most will claim they can work for up to fifty miles, the truth is you be very lucky if they work beyond five miles.

Creating Obstacles for the Attackers

Chances are that your neighborhood is not a walled-in compound. Sure, you may have a basic fence that surrounds the premises, but this hardly counts as a defensive fortification. The point is that you will have to modify your neighborhood to make it more easily defensible. This means creating as many obstacles for the attackers as you possibly can so the fight is always kept outside of the neighborhood rather than within it. As we have already discussed in this guide, a layer of barbed wire fence followed by another layer of nail boards is a simple and yet excellent defensive fortification to make.

Another excellent defensive tactic is to control where the attackers will move. You can do this by creating fake cover at various points in your defense, such as bushes or logs. Anything that someone will perceive as being cover but that can easily be penetrated by a bullet counts as fake cover.

This way, you will know exactly where your attackers will go when the shooting starts. They're not going to dive for cover behind your barbed wire fencing. Rather, they're going to go for a ditch or a log to shield themselves from the gunfire... and since you know your bullets can easily penetrate through that, you know exactly where you need to concentrate your fire upon.

Another obstacle to creating is roadblocks. The last thing you want is for the attackers to climb inside a U-Haul truck and then barge their way through. The best kind of roadblock to creating will be fallen trees. They can block the entire width of the road (and a little more), and assuming the tree is wide enough, chances are good that most cars will not be able to drive over it. This strategy works well because it's very quick and efficient. You need to chop down a tree and then carry or roll it over. An alternative method would be to cut down three trees and create a maze that an approaching car would need to drive through before entering the neighborhood. Since the car would have to slow down first, it would become vulnerable to gunfire from the defenders. This method is also

practical because it means that you don't have to roll the tree back and forward every time should any of you need to leave the neighborhood.

Something to remember is that your attackers most likely will not be stupid. They're not going to launch a frontal assault against your neighborhood's most heavily fortified section. Instead, they're going to search for potential weaknesses and exploit them. A prime example would be a wooded area, where they know they can conceal themselves before announcing their presence. Your job will be to search everywhere for any weaknesses in your neighborhood's defense and always leave someone on watch wherever the point of weakness is. Keep in mind you can still create obstacles for attackers at any vulnerable points in your defense. For example, in an alleyway or a forest, you can set up trip wires. Attach cans with pebbles to these trip wires, and you will further be alerted to the presence of an attacking force.

A final kind of obstacle to make in the woods will be a pit. Simply dig a hole, make spears out of poles and sticks, and stab them into the earth. Cover the hole with a tarp, and then cover the tarp completely with foliage. Even though this kind of trap is unlikely to kill a victim, at the very least, it will incapacitate them and take them out of the fight. The more pits your neighbors and you manage to dig, the better.

Creating Cover and Defensive Positions for Yourself

While creating as many obstacles as possible for the attacking force is essential to your defense, remember that they will be shooting back. As a result, you have to pay equal attention to your own defensive positions and places of cover. As I have discussed in this guide already, sandbags represent the best defensive fortification you can make. They can effortlessly absorb bullets and, when stacked high enough, provide you with plenty of cover from incoming gunfire. You can also set up sandbags at strategic locations, such as on the side of the roads, at windows, and at doorways.

Another idea is to use a shovel to dig a foxhole and then surround it with sandbags. Dig the foxhole at a tactical location, such as on higher ground with a good view of the surrounding area. On all sides of the neighborhood, you will need to create as many defensive positions as possible. One of the cardinal rules of a gunfight is that you want to stay on the move, so your opponents don't zero in on your position.

What if the Enemy Breaks Through?

It's always important to be prepared for the worst, and in this case, the worst-case scenario is that the attacking force manages to breach your

defenses and swarm into your neighbors. At this point, your neighbors would likely fall back to defend their homes and families, and an all-out war would erupt on the neighborhood's streets.

Depending on the size and motivation of the attacking force, they may only target one or two specific homes to seize goods before retreating, or they may attempt to force everyone out of the neighborhood completely. Regardless, what you and your neighbors need to write up is a Plan B. If a superior force overruns your defense, what do you do? The answer is to have a location that you will fall back to and rally or where you can make your final stand. Again, communication is key here, as you can use radios to alert everybody that it's time to retreat. Your fallback location needs to be fortified with more sandbags and barbed wire fences so you can continue to mount a defense of your neighborhood from within it.

Defending Your Neighborhood

The good news is that if you and your neighbors make your neighborhood well fortified, to begin with, the chances that a simple raiding party will be able to break through and succeed in their mission is rather slim. The mere sight of a heavily fortified neighborhood may actually be enough to convince even the most desperate of people to turn away rather than risk their lives in a pitched battle. In summary, the four main elements of a successful neighborhood defense consist of the following:

- •Rock-solid communication between the defenders
- •Creating as many obstacles and roadblocks for the attackers
- •Creating as many defensive positions and places of cover for the defenders
- •Having a fortified fallback point within the neighborhood to make your final stand or to rally

If you and your neighbors can succeed in doing these four things (and you will), your neighborhood will be just about as well defended as it possibly can be.

Self-Defense Legalities. What Is Consider Self-Defense by Law?

To defend your home, you need to know why you need to fortify and defend it. So, if you're still not yet convinced that investing in the

fortification and defense of your home is something you need to be doing, this will be for you.

The average American house is not defense friendly. Yes, even though homes all come with locks on the doors and windows, they are still easily broken into by burglars who intend to get inside. This is why just under four million burglaries happen a year. If homes were not easy to break into, I guarantee you that number would be much smaller.

As we discussed in our introduction, desperate people will do desperate things to survive. With no food and water, people will start turning on and killing each other to get the things they need. If you have stockpiled your home with food and supplies (and we'll discuss stockpiling your home in greater detail later in this guide), then your home will immediately be a target to the looters and raiding parties who want what you have. Even if you don't have supplies, people may suspect that you do and launch an attack on your home anyway.

This fundamental rule that people will turn on each other in a catastrophe applies to every kind of a disaster: terrorist attack, enemy invasion, economic collapse, EMP attack, nuclear attack, nuclear power plant accident, and so on. So, let's say that a heavily armed and coordinated raiding party of four or five hungry people has launched an attack on your home. Be honest with yourself: do you believe you have the resources and skills to repel this raiding party if a disaster happens tomorrow? Remember that the average American home is not defense friendly. That raiding party can easily break through your home as it currently stands.

So, with this in mind, your answer will most likely be "no" or at least "probably not." And there's nothing wrong with admitting that. The vast majority of people in the country, or the world for that matter, would answer with "no." But the good news here is that by properly fortifying your home so that it is defensive friendly and learning basic defensive tactics, you will be much better prepared for disaster than 99% of other people. This alone should give you comfort.

Think of your home as your castle. It's your shelter, your place of refuge, your place of comfort, and it's where your possessions and stockpiles are located. Are you going to allow this castle to fall to an enemy force and let its inhabitants (AKA your family) be killed in the process, or are you going to fight back? The choice is yours, and if your answer is that you would rather let it fall, I advise you to stop reading this guide now

because you'll only be wasting your time. But if you answer with "fight back," then, by all means, read on.

Why am I asking you to think of your home as your castle? It's because castles are easily defensible. They are fortified, they are mighty, and they are well stocked. So can your home, but only if you modify it to be so, which is what this guide is about.

Why do you need to learn how to fortify and defend your home? It all comes down to one reason: to protect your family. Their safety and survival are your paramount concern in a disaster. If you don't know how to defend your home, then their chances of survival and your chances of survival drop significantly. As you continue reading this book, keep your family's survival in mind to serve as your primary motivation. Let that motivation fuel you to apply what you are about to learn in this book.

If you ever question why you are replacing your doors and windows, why you are learning defensive techniques, or why you are assembling resources to build a defensive perimeter around your home (and we will talk about how to do all of this and more shortly), just think of your family. By taking these defensive measures, they can and will survive whatever harm comes your way. Now that we've established why you need to learn how to fortify and defend your house let's learn how you can actually fortify it.

Chapter 5

Night Vision



Bug-Out

Bug-out power requirements are the easiest to prepare for as they have limited power requirements. They are the following:

- •Cellphones, walkie-talkies, CB mobile radios
- •Lighting
- •Radios, emergency, weather, AM/FM
- •Tablets, small laptops

The power requirements for these devices are fairly low and can be satisfied by solar and hand-crank generators. A combination of solar panels/battery packs is very popular for emergency power sources. These solutions work great as long as there is sunlight. But what if it is overcast or it is at night time? There are other two choices:

- •**Wind:** Combo wind/solar units
- •**Hand power:** Hand crank charger/radio units

Back-up power for bug-out events is critical as many services

such as communications, and the internet may still be operational. You may want to include more than one solution in your bug-out bag.

Emergency Events

Power requirements for the emergency events model encompass those for the bug-out model, but because of the possible extended event duration, some additional power sources may need to be added. This assumes that you have more cargo-carrying capacity than the bug-out model. The following are some choices:

Gas Power Generators

Small, quiet generators are readily available for good prices. These are useful for intermittently powering higher power appliances or charging battery banks when solar or wind is minimal. Naturally, a good supply of fuel is required.

Larger Solar Panels

Beyond the small portable style solar panels, larger panels provide enough power to charge a battery bank and provide adequate power to the needed electrical devices.

Battery Bank

Use larger batteries for making a bank that can retain a charge from your gas generator, solar and wind generation. While lead-acid batteries will work, they are heavy—NiCad or lithium is best. Battery banks are heavier and are definitely not for backpacking travel. But they do fit well in most vehicles and should be already in your car or truck as a given.

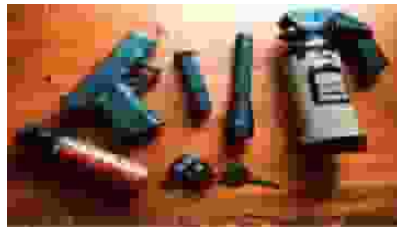
Prepper Hacks

The following are some beneficial “hacks” for power.

- •Have old car alternators around? They make workable power generators—wind, water, pedal-powered.
- •Lighting for important items can be done without power. Just paint them with glow-in-the-dark resin paint.
- •Want bright lights for temporary emergency needs? Hook one end of a 2-6’ fluorescent bulb to an antenna being fed by a CB radio. The RF energy will light the bulb.
- •Use a bicycle friction generator to charge USB devices. You just connect the right USB power wires to the output through a simple regulator.
- •If you are using lead-acid batteries and they become non-functional, open the cases and retrieve the lead plates. Use protective gear (masks and rubber gloves, etc.) as lead can be unhealthy. This lead can be used for ammo, air gun pellets, fish sinkers, and other items.

Chapter 6

Firearms and Tactical Accessories



Weapons for Defending Your Home

How can you expect to defend your home adequately if you don't have weapons (specifically, guns?). In this chapter, we'll dive into the specific types of guns you need to defend your home.

Storing Ammunition

A gun is nothing more than a metal, plastic, and/or wooden club without ammunition. Proper ammo storage is actually a subject that few people know much about. Contrary to what many think, ammo does have a finite shelf life and will go bad eventually. It won't last you forever. The good news here is that ammo can still last you a long time. Ammunition stored under optimum conditions should last you for fifteen years at least.

But notice the key phrase here: optimum conditions. If you store your ammo in poor conditions, it can corrode quickly and be unsafe for shooting. What good is it to you then? To make your ammo last as long as possible, always store it in an indoor location at normal room temperatures. Rather than store your ammo out in the open or even in the boxes it came in, store it in plastic or metal ammo cans and then place a desiccant pack in each can. It's also essential that you store common ammo as well. If you have guns that take standard ammunition, then you'll have a greater chance of finding more of that ammunition in a long-term disaster scenario.

These are simply the most common calibers and, therefore, the ones that you should focus on stockpiling. There are other great calibers (I'm a big fan of .357 SIG), but I can't recommend them as SHTF calibers because they are harder to find and higher-priced. And even if you don't have guns in these calibers, stockpile them anyway. Ammunition will be one of the most valuable trading/bartering commodities in a grid-down world there is.

It's also important to store enough ammunition as well. Okay, you can never truly store enough ammunition, so it's important to store a minimal amount of ammunition per caliber. My rule is one thousand rounds stored away per caliber. That's a lot of ammo, and ammo isn't cheap, so to make this possible make it a rule to buy just one to two boxes of ammo a week. Your stockpile will grow slowly but reliably this way.

Next, let's discuss the specific types of guns to have in your defensive arsenal.

Handgun

Next on the list is a handgun. Your handgun is another excellent home defense weapon. This is the gun that you keep strapped to your hip at all times so you can draw it at a moment's notice. Another way to think about a handgun is the weapon you use to fight your way to your rifle or as a backup weapon to your rifle.

When choosing a handgun, you can choose between a semi-auto pistol and a revolver. Revolvers are simpler, but semi-automatics hold far more bullets and are simpler to reload. For that reason, I would recommend a pistol over a revolver as it's a more suitable choice for defense against multiple attackers.

If you do choose a semi-automatic pistol, it should be a mid to full-sized model chambered in 9 mm, .40 S&W, or .45 ACP. These are the most common pistol rounds, and all are effective for self-defense with JHP ammunition.

Rifle

If there's one type of gun that belongs in any gun collection, it's a semi-automatic .22 rifle. The .22 is also very ubiquitous; even people who aren't into guns will often have a .22 collecting dust in their closet.

The .22 is an excellent survival weapon. Ammunition is very small and light, meaning you can store lots of it in a small amount of space. Recoil is low, making it a great round for introducing new people to shooting, and noise is also relatively low as well. The .22 is simply a great round for general plinking, target shooting, and small game hunting or vermin

control. It's certainly not the best round for defense, but it could be put into this situation if need be.

As far as specific makes and models are concerned, I would recommend the Marlin 60, Ruger 10/22, or the Smith & Wesson M&P15-22 for a general-purpose .22 semi-auto rifle. Each of these models is plentiful, available, inexpensive, very reliable, and easily customizable.

Pump Action Shotgun

Next on the list is a pump-action shotgun, chambered for either 20 gauge or 12 gauge. The shotgun is arguably the most versatile weapon currently available because it can be used for literally all shooting applications except concealed carry or long-distance shooting. When loaded with buckshot, the shotgun is a superb home defense weapon and will devastate the human body. A 20-gauge buckshot round has equal firepower to two .44 Magnum revolvers are going off at once, with lesser recoil than a 12. The shotgun becomes a magnificent bird or small game hunting weapon when loaded with birdshot. And when loaded with slugs, it transforms into an effective big game hunting weapon at reasonable distances.

You'll notice that I said to go with a pump-action shotgun. Why not a semi-auto? Because pump actions feed more reliable and are less expensive. It really is as simple as that. In terms of makes and models, go with a Mossberg 500 or Remington 870. These are the two most battle-proven and plentiful shotguns available on the market, and in my opinion, no other production shotgun of a similar price point is equal to these two models. I prefer Mossberg simply because the controls are more user-friendly to me, but both are extremely rugged and dependable.

Defensive Rifle

Next up is some kind of semi-automatic defensive rifle with a detachable box magazine. This is the best weapon for defending your home and property against multiple attackers. A semi-automatic rifle holds 20 to 30 rounds in the magazine, which means you don't need to reload as often as you do a shotgun or a pistol. Furthermore, a rifle gives you better velocity and stopping power than a pistol, lower recoil than a shotgun, and much more range than either.

If a semi-automatic rifle is out of your budget, your next best choice will be a lever action. Many people own lever actions already either because they bought or inherited them, or if you own one there's no reason why you can't press it into service if need be. Besides, a lever-action rifle honestly isn't a bad choice for defense. They don't hold very many

bullets (6 or 7), but you can shoot them faster than you can bolt actions, and you can also conduct reloads by firing 1 to 2 rounds and then loading 1 to 2 rounds.

The three lever-action rifles that I would recommend are:

- •Marlin 336
- •Mossberg 464
- •Winchester 1894

Long Range Rifle

Finally, to complete your survival arsenal, you're going to need a long-range rifle with a high-quality scope on it to tap targets at extended distances. While this rifle could be used for hunting, it could also be used for anti-personnel use as well.

Your long-range rifle should be chambered in .308 Winchester or .30-06 Springfield because these are the most common and popular options and will therefore be the easiest to find. Yes, there are many, many, many other great rifle calibers out there, but .308 or .30-06 will drop practically anything in North America, and both are battle-proven.

You have two primary choices for a long-range rifle: semi-automatic or bolt action. For a semi-automatic, here are my recommendations:

- •**AR-10**
- •Century Arms C308/HK G3
- •FN FAL
- •Springfield M1A

Honestly, any quality bolt action rifle will work well for you. Those are just the models that came to my mind.

More Weapons

Self-defense techniques are most effective when weapons are used. Although special weapons are created for such scenarios, it will not always be convenient to carry them outside, especially when there are many law enforcers around. For this reason, martial artists and self-defense instructors developed techniques using ordinary items as weapons.

Items ranging from shoestrings to scarfs are very useful in actual self-

protection scenarios. A simple pair of sneakers can become a “nunchaku” when used by a trained fighter. Here are some examples of ordinary tools that you can use as effective weapons:

Umbrella

Although there are foldable umbrellas sold today, many people still prefer carrying the longer version. You can use an umbrella to thrust an attacker’s eye or solar plexus. You can also use it to hit people who are trying to harm you.

Cane

A simple cane is useful as a weapon utilizing stick fighting techniques. Most canes are made from materials that are also used in making training sticks used in the martial art Kali. This makes the cane effective as a weapon to ward off attackers. Another advantage of the cane is that it is perfectly legal to carry even inside a plane, and anyone can own one without the fear of being arrested.

Car Keys

With proper hold, car keys can become weapons used to poke an attacker’s eye. Any sharp object such as a pen or a pencil can be used to jab the eyes or some sensitive parts of the body such as the neck.

Scarf

When held by a skilled person, a long scarf can strangle an aggressive attacker.

Environment

You can always use the environment to your advantage. If you are confronted in a dark alley, use the darkness to confuse your attacker and escape. You can use anything you can get a hold of as weapons, such as a rock or a piece of stick. Your surroundings will give you everything you need to survive a fight.

Pepper Spray

Pepper spray is one of the legal pocket-size weapons you can carry around. The good thing about pepper spray is that it can be used to neutralize an attacker from a distance of up to 20 feet. Secondly, this product does not cause any serious harm to your attacker. It only provides temporary blindness, allowing you to run away or call for help. If you will be using pepper spray, make sure your instincts are alert. To use pepper spray effectively, you should be able to spot danger before the attacker gets too close. You should also be swift in withdrawing it from

the hiding place and spraying it. Any delays may allow the attacker to get too close to the extent that the weapon may be useless.

For pepper spray to be helpful, it should always be carried in an easy-to-access pocket. For men, it should probably be in one of your side pockets. Since it comes in a small-sized bottle, most normal-sized pockets can hold it well; secondly, make sure you practice removing it from the pocket and press the spray. If you do not get it right, you might direct the spray toward your own eyes, making you a victim of your own weapon.

The recommended time for withdrawing and spraying the pepper is 3 seconds. If you take too long, it should be 5 seconds. However, experts can remove and spray the pepper in less than 2 minutes. Think of various scenarios when training to remove the pepper spray from your pocket and use it. Train to deal with a scenario where you are meeting with the attacker head-on. Think of a situation where you see the attacker coming and know that you are the target. Also, train using your pepper spray with a friend trying to struggle with you from the back; such exercises will help you know when to use pepper spray and how to use it.

Taser

The other pocket-sized weapon you may find helpful is a taser. This is an electronic gadget used to send electric waves into the attacker's body, paralyzing them. A taser is a small and easily affordable gadget. It is legal to carry a taser in the US and many other parts of the world. The taser, just like pepper spray, does not cause serious harm to the attack. It only immobilizes the attacker for a moment, giving you the freedom to flee or call for help.

The downside of the taser is that it can only be used when in close contact with the attacker. Lack of proper strength and techniques may lead to a failed attempt. Using the taser effectively should be kept in a pocket that allows easy access. The taser can even be held in your hand if you are anticipating an attack. Make sure the taser touches bare skin and not clothing. This ensures that the current is directed into the body of the attacker, making it difficult for them to attack. You should also maintain contact for a reasonable time of about 1 minute.

The results of the taser vary from person to person. Some people are strong enough to remain standing even when you are using a taser. However, they lose balance, and you get the chance to flee. Some people may lose their balance completely, fall down, and remain mobile for some time. The important factor to remember is that the taser gives you a

few minutes to flee. Do not remain standing there, even if your attacker falls down.

Whistle

The other important weapon is a whistle. This gadget might just be small, but it is worth a life. A whistle blow can help call for help, forcing the attackers to flee. It is, however, important to know when to use the whistle. You cannot use a whistle when you are already in the hands of the attacker. Use the whistle when fleeing or when you have a chance to scream for help.

Hornet

The hornet spray is just an alternative to pepper spray. It is cheaper than pepper spray and shoots well; it can be applied from a distance of up to 20 feet. The only issue with hornet spray is that it comes in a larger can than pepper spray. This makes it difficult to conceal it while walking on the streets

Penknife keyholder

The other key type of weapon you may use is a penknife. We also use pen knives for various purposes. We use them to peel fruits, make crafts, and as emergency knives. Most people do not know that these knives can also be used to protect them from potential threats. A penknife key chain allows you to carry the small pocket-sized knife everywhere you go. The beauty of a penknife is that it is small and can be carried everywhere you go. The downside of the knife is that it can be used against you if you are not careful. To ensure that the penknife is helpful, carry it in your pocket, or loop it on your waist. This makes it easily accessible. Practice how to hold the knife and how to flip it out of the casing in the shortest time possible. A penknife is just like the other weapons; it must be retracted quickly and applied quickly to put off the attacker.

Although penknives are legal, the way you use yours is key. A penknife can be used to cause pain, but it can be fatal if used to stab the attacker in critical areas. To avoid getting in trouble with the law, only apply a penknife when your life is in danger. Secondly, try using it to destabilize the attacker rather than murder them. For instance, a stab in the eye would stabilize the attacker and give you a chance to flee rather than stabbing in the hearing, which may lead to the attacker's death.

Pistol

The handgun is one of the most powerful but also the most dangerous weapons you can own. For this reason, it is highly discouraged to carry a pistol unless you are well trained in using it. Secondly, carrying a gun in

most states is illegal. It is, therefore, paramount to check your state's laws and carry a gun according to the laid down laws. With that said, it is possible to carry a gun as long as you are licensed.

If you are carrying a pocket-sized gun, keep it in a place where you can retract it very fast. Also, ensure that it is always loaded since having an empty gun might not be helpful when danger shows up. With that, you should be ready to protect yourself in case of danger. However, if you are not after the murder and you are afraid of such consequences, make sure your gun is always empty.

These two scenarios can be applied in self-defense. An empty gun is used to scare the attacker off. Most attackers will retract once they see a gun pointed at their face. As a matter of fact, you should never shoot your gun without giving the attacker a chance to surrender. Your first action should be drawing the gun, pointing at the attacker, and commanding them to surrender. If the attackers are not willing to surrender, it is advisable to shoot in the air in case our pistol is loaded. If the attacker still advances, shoot them in the leg to immobilize them.

It is also important to note that your actions should be based on the situation at hand. In an ideal situation, you may follow the above protocols. However, in a situation, your life is under direct threat, you may shoot to kill. For instance, if your attacker has a gun and is willing to kill, you should shoot first to kill.

Chapter 7

Evacuation



When Bugging in Needs to Become Bugging Out

In the prepping community, we tend to toss around the word bugout far too liberal that it becomes more of a Band-Aid than an actual resource. That is a problem. Whenever things get too real, there are some preppers out there who just default to the bugout. The bugout is a massive undertaking that requires investment, planning, and high-level execution to be most effective. It is not just a dot you put on a map and decide you will go there when everything gets squirrely. There are a lot of steps that go into bugging out, and if you are even remotely considering it, you should pay close attention to this chapter.

We will ask some fundamental questions about bugging out and set some very simple but necessary parameters for what you need to bug out effectively.

Can You Bug Out?

A question that many people do not ask themselves is, “Can I bug out?” Not everyone is capable of bugging out, and there are all kinds of reasons why that might be true for you too! There could be circumstances that keep you from bugging out that you have not even taken into consideration.

Your home is your greatest survival investment, remember? Simply emulating all of it at another location will be near impossible for most of us. So, you have to be very sure that bugging out is something you want to add to your bag of tricks. What if you are severely disabled? Is

bugging out something you want to deal with? Is it something you are capable of pulling off? There are some situations where you simply cannot bug out, or pulling it off will cause you tremendous pain or hardship.

What about the tens of thousands of Americans who care for elderly parents in their homes? Could you figure out how to get your elderly parents to the bugout location? What if you were tasked with getting there on foot? A wheelchair through the woods is as ugly as it gets.

Things like medications, injuries, and illness all affect your ability to bug out. You have to sit down with your family and ask the questions. You have to walk through this bugout process and recognize your weakest links. Obesity is another problem in our nation, and many people who are morbidly obese struggle to walk to the mailbox, let alone head 10 miles down the road with a backpack on.

The good news is that you can overcome a lot if you take the time to plan. There is more to you than you think as long as you can be honest about your shortcomings. There is an element of risk to bugging out and to everything we do in life. Even the most perfect bugout plan for two fit people, who are well-armed and prepared for success, can go bad. That said, there are some serious hindrances in people's way, and we have to be honest about what we are capable of because once you head out of the home, everything gets real!

Locations Before Bags

When considering the bugout, the biggest mistake is to buy the bag and the contents before considering the location. This is a big problem! Imagine packing your bags for a vacation that you hadn't booked yet. You do not know where you are going or for how long, but you have your suitcases packed and ready to go. Do you need a bathing suit? Do you need sunscreen? Do you need a sweater?

This is how silly it is to pack your bugout bag before knowing your bugout location. Now, do not get down on yourself. You have been tricked into buying that bag and filling it up with gear. You see, the bugout is not just about being prepared and keeping people safe. No. The bugout is also about marketing and making money. There are all kinds of companies out there that are making money off writing posts, making videos, and scaring people into buying things. It is sad, but it is true. This is how so many of us get conned into buying things we are not even sure we will need. For the most part, the things you buy will help in one aspect of preparedness or another. It is not a total waste. However, the

idea that you have packed up the perfect bag without knowing where you are headed is kind of crazy.

So, Where Do We Go?

The idea behind bugging out is that you must leave your home because you cannot live there anymore due to threats from the environment, people, or a lack of essential resources where your head should be the opposite. You should look for a place where you are safe, there are plenty of resources, and you can survive.

While many people like to believe they are going to bug out to the woods, that is a very tough way to live and unless you are versed in long-term camping, austere living or something along those lines, you will not be able to last very long in the woods. However, I understand that many people have no other option. Let's look at some locations to consider for a safe bug out:

- •Alternate home
- •Raw land you own
- •Cabin
- •RV
- •Family-owned land
- •State Park
- •National forest
- •Family members home (most people do not consider this an easy bug out!)

There are many options for bugout locations; just be sure you do not start trespassing, as that could go bad. Do the easy stuff first. Talk to family about staying with them if you need to bug out. Chances are you have someone who lives in the country, and as long as you are going to do some work and not just be a drain on resources, they would like to have you. Once you have secured a location or a few, you need to start thinking about how you get there.

How Do We Get There?

To get to your location, you will need to know the route. Everyone will need to know that route and how to get to the bugout location. This might be a route that travels highways or backroads. Once they have a route, they are good to go for many people. They will jump in the vehicle and hit the road in an emergency. So, what happens when the road is blocked? What happens when that route is no longer an option? Because

these situations could arise, you need to have more than one route to get to your BOL. You could argue that you should have more than one BOL! However, that gets expensive, fast!

At the very least, you should have several routes to get to your BOL. Some of these should be on the road, and others should be on foot. Maybe include some bike routes as even more options. If you cannot get to your bugout location, then it isn't your bugout location anymore!

Avoid major roads when planning bugout routes. Avoid routes that take you over water. There are many obstacles on roads you travel every day that you might not consider until there is a disaster and you have to get through in a hurry. You also need to consider what neighborhoods your bugout route will take you through. You want to avoid driving through or near rough neighborhoods in your city or town. You also need to understand that highly populated areas can suddenly turn into rough areas.

Craft yourself a few bugout routes that are going to get you where you need to be in times of emergency or disaster. Share these routes with your family, give them maps to carry in vehicles, and everyone will know where to go and how to get there if it all comes apart.

Be prepared to go by vehicle and on foot. The locations and the means of travel will tell you everything you need to know about what you should pack in your bugout bag. In this next section, we will delve deep into all the things you can store in your bugout bag and how to meet your survival needs while not putting hundreds of pounds on your back. The bugout bag can wear you down if you are not careful.

Refugees and Tent Camps

Even in an extreme disaster situation, there is a possibility that there is still some kind of law or government that will try to maintain rule and set up camps for the survivors. If you leave your home and go to one of these places, it will be rough. There will be thousands of people. You will be in horrible conditions sleeping shoulder to shoulder with people you don't know on makeshift beds. Fights will probably break out, and food will be in short supply. There will probably be sure people at these places who are willing to prey on others that can't defend themselves and take what little they have from them.

I would imagine these places will be a lot like being in prison. The officials will just see you as one of the inmates and will treat you like cattle. Just another one of the masses that they need to deal with. They

won't care about any personal issues you may be having as everyone else will be telling them about the same thing.

If you own or manage to find a weapon, it will be taken from you because they're not going to let you in with it. The same thing will more than likely go with knives and multitool. Any food supplies you have will be taken from you and distributed among everyone else. They will be perfectly entitled to do this as soon as martial law is declared.

So, not only will you be in a pretty dire situation, but you will also have no weaponry or supplies left if things go bad at the camp. The main thing that happens by going to one of these places is that you put your life completely in their hands. You have no say in your fate any longer. For the elderly or the weak, this may well be the best option for them as at least they will have some kind of protection due to the guards and security they have stationed there.

Another thing you need to keep in mind about refugee camps is that sickness can spread very quickly, seeing as so many people are crammed into a small space, and proper sanitation isn't possible. This becomes especially problematic if the disaster that caused this situation was some kind of pandemic, for example. By bugging in and staying at home, you know the people around you, and if they're sick, you can take the proper precautions to ensure it doesn't spread. You can have much better control over sanitation in general too.

I think a lot of people would head to a camp if a disaster were to occur because they're not prepared for a disaster, and also, we have a society that is over-reliant on a system that tells them what to do and think. It's not really their fault; they just became too safe in modern society and believed nothing could go wrong.

Chapter 8

Protecting Your Family



Protecting Your Family and Children

Protective Training

You should provide your family members with protective training so that they can protect themselves in case of any kind of danger. Here are some of the things that you can teach your family members:

- **Physical and verbal self-defense:** Every member of your family should be taught how to protect themselves in case an intruder attacks them. Physical self-defense techniques like punching or kicking will help your kids be prepared for any kind of situation.
- **Verbal confrontation:** This is the most important technique that you can teach your family members. Always remember that their safety is more important than anything else.
- **Use of cellphones:** Nowadays, even kids have cell phones and tablets, so it is very important to explain to them how to use these devices to alert the police in case of an emergency situation or a criminal attack. They should be taught how to call the police without drawing any attention towards themselves or their location. Also, they should be taught about calling for help while hiding in a safe place by using their cell phones.

Protective Equipment

Apart from teaching your family members how to protect themselves, it is also the parent's responsibility to protect their kids from any kinds of

danger by providing them with protective equipment. Protective equipment usually includes the following:

- *Safety helmet*: It is a very important piece of equipment that can help your children and other family members protect themselves from any unforeseen incident or an awkward situation.
- *Home security products*: These are various kinds of home security products that will help you keep your home safe from intruders and burglars. There are various kinds of security products available today that can be used for a number of purposes, but there are always some exceptions.

These are some of the most important factors that can help you protect your family and your children from any kind of danger. As a parent, it is very important to remember that you don't need to stress too much about protecting them because you need to ensure that you keep them busy with something positive so that they don't take things for granted and always remain relaxed to keep their guard up at all times.

Self-Defense for Kids

When you're young and you hear a story about someone who has been hurt or killed by someone else, your first thoughts are usually that it will never happen to you. And when it does happen, the shock and disbelief can cause more harm than the initial encounter. That's why self-defense training can be invaluable for children who have to interact with strangers regularly. Since their level of perception is still low and they tend to be impulsive, they are more likely than adults to make bad decisions on their own. The time to teach them how to defend themselves against an attacker or a violent criminal is when they're still in the early stages of development. Children nowadays are more likely to respond well to a simple self-defense session where they learn how to move, think and act faster so that if they ever have an encounter with a dangerous person, it will be over as quickly as possible.

A self-defense class for kids is not about teaching them how to hurt others. It's all about making sure that your child knows that there are steps towards protecting themselves. They might not be able to prevent an attack, but they can definitely learn how to make it end sooner than later. In this age of cell phones and television shows and movies that focus on violence, it's important to ensure that your child knows how to

protect themselves. And kids are the most vulnerable to copycat behavior as they're quick to learn from what they see around them. Their ability to learn is very high compared to adults because their brain has not yet completely developed, and they can store a lot of information before developing the capacity for rational thinking and complicated reasoning. It's best if you teach them self-defense before they even start school. The earliest sign of trouble is when a child feels threatened by another child or sees something that makes them feel unsafe in public or at home. But even if your child never faces an actual physical attack, it's important to encourage them to learn self-defense so they can be prepared if they ever encounter a violent criminal.

Building self-esteem is one of the essential things you can do as a parent because not only does it help your child feel better about themselves in the long run, but it also helps them to become more successful and able to defend themselves. It will also make them more confident about their actions and decisions, which will probably save them from the mistakes that so many other people end up making after experiencing a violent crime or two.

Preparedness Is the Key

Preparedness is the key; no one is safe from any kind of danger or any unforeseen incident. So, it is very important that you should remain prepared for all kinds of situations so you can easily deal with them when they arise. You should help your family members remain prepared as well so that they can react properly and safely in case of any kind of danger or emergency situation.

Always remember to keep your eyes open for any signs of trouble that could threaten your family and or property. If you ever spot something unusual, then be sure to take the right steps to make things normal again. If you are not aware of anything, then you can always involve the proper authorities so that they can take care of things for you.

The above-mentioned home defense plans are meant to help our homes stay secure, so we don't feel unsafe in them, but keeping all these procedures in place isn't enough. We must also practice this at all times. You should always remain alert even in your daily routine; there is no reason you should remain unaware of what is happening around you and around other people. Basically, you should always be prepared to react properly in case of any kind of danger.

Defending With a Family Protection Plan

When all the layers of discipline, deter and fortify have failed, and an intruder is in your home, you should never go out and search for a bad guy. If you go looking for trouble, you're going to find it. You need to fall back to a place where you know you can mount a substantial defense. Such a place is called a safe room.

Safe Room

A safe room is a place where your family needs to assemble in case of an invasion. If kids are old enough, they can get there on their own. Smaller children, elderly adults, and those with special needs should be assigned a responsible person to get them to the room as quickly as possible. Your safe room needs at minimum a telephone, windows facing the street, and a limited number of doors. It also needs to be accessible to every member of the family. If all family members sleep on the second floor, then the safe room needs to be on the second floor as well. This room also needs to be used in the event of a daytime break-in. Gathering in the safe room should be fast and simple.

Please note that getting to your safe room may not be possible. Discretion is necessary. For instance, your family is at the dinner table at the back of the home. An intruder enters through an open front window. He is between you and your safe room. At this point, it would be better for your family to exit the house and flee to a neighbor's home to call for help.

Assembling

When your family is assembling in the safe room, try to make an attempt to end the situation by commanding that the intruder leave. Who knows, they just might leave! Remember, we want to avoid a conflict. While this may sound odd, a police officer, or a lawyer, may ask you if you made any effort to notify the intruder to leave your home. If asked, it would be useful to say that you did.

If you have a self-defense tool like a firearm, make sure it is not a danger to your family. If you're not comfortable physically defending yourself or unable to do so, that is good to know. This will be a scary time, and you need to act in accordance with what you feel you can do. Otherwise, you might get yourself hurt. The door to your safe room needs to be barricaded as quickly as possible. Interior doors are often lightweight and hollow. They can be kicked in easier than exterior doors. You can

slow down and even deter an intruder by fortifying the door with a dresser, bookshelf, or mattress. Do not use your body to barricade the door. As stated before, interior doors are hollow and won't stop a bullet from penetrating them. Block the door with something heavy and then get away from it.

Calling for Help

A responsible person should be assigned to call 911 as soon as you enter the room and the door has been barricaded. This task should be assigned to an adult or teenager who can speak under pressure. If you own an alarm system, a representative may call to confirm the emergency. If you are assembled, and the call has not come, then go ahead and call 911. Do not wait for the alarm company.

When you answer the alarm company call, tell them that you need help and to send the police. At this point, they may ask you to stay on the line. Don't let this hinder you from executing the rest of your family protection plan. You can always put the phone down without hanging up.

Escaping

If you live in a single-story home, then your safe room needs to include functioning windows so that you can slip out in a hurry. Run to the neighbor's house or another pre-planned rally point. When you hear the police approaching, flag them down and tell them your situation. By escaping your home, police know that your family is safely outside. Now they know that anyone they encounter inside is a threat. This is an easier situation to deal with for first responders and a safer option for your family.

A quick escape may not be possible. If your safe room is on the second floor, use the window facing the street to call for help and communicate with first responders who are arriving after your emergency call. Make sure the police know where your family members are located so they can easily identify the intruder. Make it as easy as you can for the police to find the bad guy.

You can practice this with your family just like you would a fire drill. In the event of an emergency, everyone knows where to go. By having a plan and a safe room, you're telling everyone (the intruder and the police) that you are doing everything you can to protect your family.

Home Invasion Kit

A home invasion kit should be a bag or box located in your safe room. This kit should only be used if there is a home invasion emergency. The kit should include items you need to help you when seconds count. The

first item in your home invasion kit is a spare key. A great way to let police access your home during a break-in is to keep a spare key to the front door with a light-up keychain in your safe room. This way, someone inside can toss the key out the open window to the police so they can enter the house quickly. The light on the keychain should make it easy for an officer to spot it, saving precious time. If you have more than one front door, like a storm door, but that key on the ring as well. Then color code the keys with labels so the responding officer can quickly determine which key is for which door.

You also need a small folding knife. The knife can be used to cut any window screen that may prohibit someone from throwing the keys down to your lawn. It can also be used as a defensive tool if necessary. Use a folding knife instead of a fixed-bladed one so that when you're frantically reaching inside the kit, you won't cut yourself. If you have small children in the home, store the home invasion kit where little hands cannot access it.

A flashlight should also be in the kit. Consider getting an LED super bright light. This can temporarily blind an attacker if your safe room door is breached. You'll also be able to see more details of the attacker for identification later. Also, the flashlight can be used to flag down first responders from the window.

Your home invasion kit needs to include a signal horn. The horn can be sounded to attract the attention of neighbors and first responders. It may also scare off the intruders. When you need to use the horn, extend your arm out the window and sound it outside your home to preserve as much of your hearing as you can. You can find these small compressed air horns online or in boating stores.

When the Police Arrive

Just because the police have arrived doesn't mean the danger is immediately over. The key to staying safe once law enforcement has arrived is communication. Tell them you're throwing down a key. Tell them all of your family is in your safe room. Then listen for any further instructions. At this point, you may want to leave the safe room to assist the police by pointing out the intruders to the waiting officers. Do not leave the safe room until the police get you, even if there is an injury. Stay put and let the officers do their jobs. Your job is to protect your family in the safe room.

Once you are cleared to leave the safe room, continue that good communication; if someone is hurt, you may need an ambulance. If

you've used a self-defense tool to defend your home, secure it so that there isn't an accident. Don't walk toward a police officer with something that could be considered a weapon. Remember, they are just as jumpy as you are. You may discover that under the stress of the situation, you may not remember the events in order. If this is the case, ask for a few moments to be with your family and make sure they are physically and emotionally okay. Things should become more casual once the officers know the intruder is gone or hopefully handcuffed in a patrol car.

Physical Defense

The last thing you ever want to have to do in the event of a home invasion is to defend yourself physically. The layered home defense strategy is designed to deter criminals from targeting your home in the first place and then keeping them away from your family if they enter the home. The safe room is the final plan of protection. If the safe room is breached, you are left with a physical defense situation.

While I can't predict your exact home defense situation, you can reasonably assume that if an intruder breaches your safe room, they intend to hurt you. You may not know why, and you don't have time to figure it out. Now you have to fight for yourself and your family. This is when your decision you reached days, weeks, months, or years ago about what you're willing to do to keep your family safe comes into play. This is where everything you've trained for comes together. Your self-defense tool, training, and mental preparedness now have to stop the threat.

This is going to be ugly. It is going to be uncivil. It is going to be frightening. Give yourself permission to do what is necessary to save your life and protect your family. I don't think you can be fully ready for it, but you can be prepared. You'll be prepared because of your mindset, hands-on training, and internal desire to protect the ones you love most. When that threat comes through the safe room door, be ready to stop it. Let your attacker(s) know that the most dangerous place in the world is between them and your family.

Chapter 9

Most Common Mistakes That Can Cost Your Life



You Don't Fortify Your Doors and Windows

The first home security measure you will want to take is to fortify your doors and windows. This is because your doors and windows are the most obvious entry points into your home and therefore need to be bolstered first.

Windows

You don't just need to fortify your windows. You need to replace your windows. The standard glass windows in most American homes are terrible for defense and will do nothing to keep an intruder out. All it takes is one throw from a stone or a swing from a rifle stock to breakthrough.

Acrylic glass, such as Plexiglas, is far more durable than standard glass and will be, by far, your best option for replacing your windows. The best part of Plexiglas is that it looks just the same as normal glass, so no one will recognize the difference. Is Plexiglas indestructible? No, and an intruder could still

breakthrough if they wanted to, but it will take far more hits than normal glass. And by then, you should have already arrived on the scene to resist them or called law enforcement.

However, if this isn't good enough for you, you can still fortify your windows further. For example, you can install steel bars behind them like you commonly see at gun stores and pawn shops. The advantage to steel bars is that they are superb for keeping intruders out; there's a reason why guns or pawnshops will use them. But the disadvantage is that they are permanent and can give your home the look of a prison, which you may understandably not want.

A less effective option would be to install chicken wire behind your windows. Chicken wire can be set up or taken down as you see fit, meaning you can nail them behind your windows after disaster strikes. However, the disadvantage to chicken wire is that it doesn't provide near the level of resistance as steel bars do. That being said, it's still better than nothing, and Plexiglas windows fortified further with chicken wire will still be a formidable defense against the average intruder.

Doors

Again, as with your windows, you should consider replacing your doors (at least the ones that lead outside) rather than just fortifying them.

Conclusion

To survive an intrusion or invasion is one thing. However, to try and keep one from being invaded at all is another totally distinctive accomplishment. The topic of home defense is obviously subject to the type of property and environment you live in. But there are a few things we can all consider no matter where we live.

You may already have an alarm or a CCTV system installed, but they obviously won't be working without electricity. Also, even if they did work, there may be no one to respond in a disaster situation even if the alarm did go off. So, we need to rely on more basic methods of home security. The first thing I want to cover is the humble sign. You can do two things by signing up at your door or your gate. You can either deter potential robbers or you could make them think you're a more valuable target.

This book covers a realistic look at the types of threats we face and the tools and skillsets available for us to deal with those threats. Your ultimate goal in reading and digesting it should be to take a critical look at your personal situation and to fill the gaps in your own defenses. Consider the broad range of threats you might encounter and honestly assess your current skills and abilities to defend against all of them. If you do find a vulnerability, invest in the training you need to fill that gap.

Glossary

To fully understand the subject of self-defense, let's look at some of the terms commonly used in self-defense.

Assault: Assault is a term used to refer to a physical attack on another person. Any type of violent attack can be termed as a result of legal terms, except for a situation where the attack is done in self-defense.

Attack: Taking an aggressive military action against an individual. The attack is mostly physical and usually targeted at hurting the other person physically. The person who initiates the physical encounter is the one attacking. The other person may respond similarly, but it will not be seen as an attack but rather as self-defense.

Attacker: A person who starts an attack. The attacker takes the first action to harm or hurt another person physically. The attacker is the person who throws the first punch or takes the first physical action.

Burglary: This is a type of theft where the attacker breaks into a person's house or premises to steal properties of high value.

Child maltreatment: This refers to violence directed towards a child refers that occurs regularly rather than that which occurs on one occasion.

Defense: The term defense refers to the actions taken by a person under attack to protect their personal interests. If a person is under attack from a person that may lead to loss of life, they can take action to save their lives from the attacker.

Enemy: A person that has ill motives about you can be termed as your enemy. An enemy may hold a grudge or have a reason to want to hurt you in one way or another.

Family violence: This refers to violence targeted at one of the family members. Family violence can be targeted towards one of the tables or even the parents.

Gender-based violence: This refers to violence that is directed at a person of the opposite gender. In most cases, victims of gender-based violence are unable to defend themselves due to the factors surrounding the matter.

Group violence: This refers to a type of violence done by people

identifying themselves as members of a group. For instance, if a person is attacked by a group of thieves operating under an organized crime group.

Interpersonal violence: This refers to types of violence that occur between family members. Interpersonal violence is very common than most people think and often results in harm.

Kidnap: Take captive of someone without their consent for financial purposes. When a person has been kidnapped, the kidnapper uses either force or trickery to capture the victim and deny them their freedom.

Rape: A type of attack where the attacker intends to indulge in a sexual encounter with the victim forcefully. There are many types of rape, including those done by strangers and those carried out by sexual partners. Some rape encounters are forceful, while others result from lacking consent.

Roseberry: Type of attack that involves forcefully taking the property of value that belongs to another person. Robbery can happen at home or on the streets.

Self-directed violence: Refers to a situation where a person causes harm to their own body. Self-directed violence may include actions such as attempted suicide through physically painful processes.

Sexual violence: Any attack that is sexual in nature. Sexual violence could be physical or verbal. Sexual abuse actions such as rape, forceful marital sex, and others can be classified under sexual violence.

Street crime: This refers to criminal offenses that are likely to occur outside the home. Street crimes include theft, pickpocketing, kidnapping carjacking, among others. These crimes are very common.

Violence: The term violence means simply using force to cause physical harm to another person. Violence comes in different forms and degrees. A slap on the cheek can be termed a violent attack, while at the same time, murder can also be termed a violent attack.

Weapon: This refers to a tool that a person can use to inflict pain on another; weapons can be used to start an attack or in self-defense. There are all types of weapons, including small weapons that can be hidden.

BOOK 7

RV CAMPING

Introduction

RV camping is a popular pastime for RVers who enjoy the experience of being able to park on private property and stay for extended periods. With the increasing popularity of this practice, many owners are looking to convert their homes into let-able residences, thereby turning them into RV parking spaces as well. Benefits include a reduced need for paid overnight parking, lessened noise pollution created by cars near your home, and more exposure to natural surroundings.

Unfortunately, this has led to an increase in illegal parkers on public land that creates safety issues both with those trying to sleep at night and non-campers around the area. As such, some cities have passed ordinances restricting how long RVs can be parked in certain locations. For example, in the city of Oakley, CA, RVs may only be parked in a residential zone for 72 hours.

Benefits

- **Flexibility:** RV owners enjoy the flexibility that comes with being able to park on private property. Without the burden of ever having to leave, they can enjoy being close to everything they need while still feeling as if they are in the middle of nature.

With a large RV, you'll have an extra shower and toilet as well as a kitchen sink, making it easier than many campers who only have access to one of these amenities at a time when outside.

No more staying in crowded camping areas or parking lots where you might be exposed to loud noises and drunk people all night. You can also enjoy a more spacious sleeping area with air conditioning and heating, allowing for a more comfortable experience overall.

- **Safety:** With a large RV, there is more room for parking. That means fewer people and less traffic in the streets. The result: a more peaceful place to sleep.

Protects against false claims of ownership in case of theft. If you have

only a smaller RV, it will be easy to claim that you are camping on someone else's land without having to provide proof.

- Reduces traffic in congested areas by surrounding parking with an RV body or an RV park. Fewer people on the road allow less pollution and better visibility for everyone else out on the road.

Know your city's restrictions about where you can park your RV to avoid tickets and difficulties.

Concerns

As RV owners tend to keep a close eye on their property, they probably need not worry about those who may be attempting to trespass onto the land. However, this can be problematic if you have dogs that may run off and go through nearby yards or try and take over a neighboring yard. If you have cats, they are going to want to do their business outside too. While nature abhors a vacuum, your neighbors will understand if you expect any poop to occur. Keep in mind that any animals coming onto your property will need strict access control and some type of outdoor containment as well.

You can't be in control over what kind of security mechanisms your neighbors may have in place for keeping intruders out. Many may not even know about the security devices you have installed if you had to install them on your own. If you do meet an intruder and have to call the police, they will likely charge you with trespassing if they believe that you were aware of the lack of adequate security measures. This can be a costly mistake, so be sure that your security is sufficient so that others know their actions are not going to be looked down upon.

You may need to install extra fencing around your property to get a good night's sleep. If humans are investigating your home, chances are they will try and get through an open gate or window. If it is too late for your security measures to kick in and the intruder makes it into your home, you will want to make sure the intruder cannot make it out again. This may require additional fencing or other security measures such as an alarm.

Do not use a propane heater indoors unless there are adequate ventilation measures in place.

Make sure that any outdoor animals are not able to escape if they have an emergency and need to get inside quickly so they do not die of exposure

or abandonment issues. If anyone encounters an animal in distress, they will likely call the authorities as well.

Adding an RV to a small yard quickly becomes a hassle. The noise, fumes, and upkeep can quickly become overwhelming at times. Depending on where you live and your budget, this might not be practical for you at all. If there are no natural boundaries and you need to keep your pets and belongings away from others' property, making it larger or adding extra fences may be needed. If the ground does not work for that either, then it might make more sense to consider purchasing land or renting another space nearby.

As with any residential zoning restriction, there are two main ways to zone for RV parking. The first is to zone specifically for RV Parking (RV). The second is to zone for Car-Camping (CC), which is defined as any camping done in a vehicle that is not filled with water and used as housing indefinitely. It typically applies to recreational vehicles (RVs), motor homes, or trailers specific to camping.

Top Ten Things You Should Know If You Are a Beginner to RV Camping

RV camping is a great way to enjoy the benefits of camping without roughing it. As with any outdoor activity, planning and preparing are important to maximize the enjoyment and safety of your experience. If you're new to RV camping, check out this list of things that you should know:

1. An RV can be a very expensive purchase. If you have decided that an RV is for you, take your time when shopping for one and make sure that you get a good deal on it before signing on the dotted line. You can look for used RVs for sale at RV auctions or on Craigslist. If you do not have experience with buying an RV, make sure to speak with a professional to help you get the best deal on your purchase.
2. You do not need special insurance to drive an RV. The regular insurance policy that you have will cover your RV, so there is no need to purchase a separate "RV policy." That is, if you are driving an older vehicle, make sure that your policy has enough liability coverage in case of a serious accident.
3. Before choosing where you will be setting up camp, check with the

locals about camping regulations in that area. It is a good idea to check with the local municipality or county officials so that you can avoid getting in trouble with them.

4. Make sure that wherever you choose to park your RV has electricity and water. These two necessities will be very important if you are planning on cooking while camping out at night. Some campgrounds also have access to restrooms and shower facilities, so make sure that you know where they are before pulling up your RV into position.
5. Before unloading your vehicle, make sure that the gas tank is full. If you don't fill it before setting up camp, the odors from chemicals can attract unwanted attention from wild animals or other insects or spiders...on the other hand, if you do fill it up, be sure to keep it topped off until you are ready to leave camp.
6. Take a look at the RV's tires before leaving the dealership. Make sure that they aren't too worn down or bald and make sure that they have enough tread on them so as not to sink into soft ground or mud.
7. When camping in an RV park, take note of any rules and regulations that they place on your stay. If there are no rules, or very few rules (such as no fires allowed), then you may want to find another RV park that is more accommodating of your needs and wants.
8. Make sure that you have the right number of appliances, such as a refrigerator, to cook in your RV. You can usually find what you need at a local appliance store.
9. When checking out of the resort's campground, make sure that you still have access to your RV. It's important to note any charges that may be incurred by checking out early and having to return later. There are fees for leaving earlier and for leaving later than some certain time limit, so be sure to check on this before arriving at your RV.
10. Before heading out on your RV adventure, make sure that you have enough gas to get a long way. After setting up camp, it will often be a good idea to fill up the tank before going out to explore the area.

Chapter 1

How to Choose Your Rig

What Type of RV You Should Buy?

It's true; your maiden voyage will certainly be the most exciting and undoubtedly the most nerve-wracking. But while RVing may seem like a tall order for most amateurs, it doesn't have to be intimidating. All you need is a willingness to learn and a sense of adventure.

When I started the RV lifestyle, I didn't realize how versatile RVs are and how many classifications there are. I struggled to grasp all the different concepts and terminology used in RVing. You're probably in the same boat, especially if you are a beginner. But don't fret. The slight learning curve of an RV lifestyle shouldn't be too overwhelming. In this chapter, you will learn the different variations of RVs and what to expect from each of them. The term RVing describes a wide range of camping experiences, most of which have a minimal resemblance, so let's start from the very, very top. I would typically recommend a mid-sized motorhome with minimal driving skills and more feature comforts for beginners. But I must also admit that choosing the right kind of RV is a personal choice dependent on variables such as:

- •How many people are traveling with you?
- •Will you use the RV frequently?
- •What's your budget?
- •Will you be going on extended trips or short trips?
- •What features are you looking for?
- •The list is endless!

This chapter explores the basic features of recreational vehicles to help you narrow down your search.

There are three main types of RVs.

- •Motorhomes
- •Towable Trailers

- Campers

Motorhomes

You've probably seen these bus-like RVs in the movies. Motorhomes are designed with the same framing and artist's impression of mercenary buses and trucks. What does this mean for your adventure across the world? Lots of extra space to get comfortable, move around, and stretch. These units are part vehicle, part house, so they don't need towing. They get classified as either A, B, or C according to their sizes.

CLASS A MOTORHOMES



Class As are your classic motorhomes. They are the longest, largest, and heaviest RV option available on the market today. They are the most lavish RVs, and with that comes high costs. Class A motorhomes have state-of-the-art amenities and furnishings such as ample closets, luxe leather sofas, and luxury kitchen appliances such as microwaves, ovens, and refrigerators. You may even find bathtubs and washing machines in some of them.

They are perfect for full-time RVing, extended trips, family traveling, and people who want to live luxury on the road. Class A motorhomes are designed with an enormous panorama windshield and high seats, making them great for country viewing as you drive along. They are built on the chassis (a load-bearing framework that supports an object) of either commercial trucks, vehicles, or buses.

Features of Class A motorhomes:

- Average Length: 21-45 feet
- Average height: 11-14 feet
- Price range: 90k-500k
- They have 2 AC units
- They run on 50 AMP (AMPs are the base unit of electrical current)

Pros:

- •Lots of living and storage space
- •Can handle the most amenities
- •It can comfortably accommodate 4-8 people
- •Great driving visibility
- •It has bigger fuel tanks and water tanks
- •High towing capacity

Cons:

- •Low mobility
- •Very expensive
- •Low fuel economy, on average, they only get 7-13 miles per gallon

Class A motorhomes run on both gas and diesel

Class a Gas Motorhomes

Class A gas motorhomes are cheaper and easier to service when compared to diesel motorhomes. Gas engines offer more acceleration, and their performance is excellent in high altitudes and colder climates. Beware, with the engine in the front, gas motorhomes can be a little noisy while traveling.

Gas motorhomes are the perfect fit for occasional travelers because you will save a lot on upfront costs. Also, stick to gas motorhomes if you plan on staying in cold climates.

Class a Diesel Pushers Motorhomes

Diesel pushers are the definitive example of RV luxury. They offer more modern residential-grade and high-quality features when compared to gas motorhomes. The main difference between Class A diesel and Class A gas motorhomes is the price. Depending on the type, diesel pushers can have an additional cost of anywhere between \$50,000 and \$100,000. Diesel pushers offer more torque power, little to no noise, and smoother rides compared to their gas counterparts. They are built on a motor-vehicle chassis with the diesel engine located at the rear end. These engines are perfect for cross-country adventures and extended trips. Many RVers prefer diesel pushers for full-time travel. Not only is the diesel engine durable, but it also lasts longer than gas engines. For this reason, diesel pushers are pretty expensive.

I recommend Class As for full-time RVers because they are fully furnished homes. The big living area, extra amenities, and extensive

storage will benefit you greatly. These RVs are great for those who want to have a more comfortable and luxurious experience while out on the road.

CLASS C MOTORHOMES



Class C Motorhomes are the typical family-friendly motorhome that doesn't break the bank. They are also known as mini-motorhomes, but they provide the luxuries of sizeable RVs in a cheaper, scaled-down version. They are built on a trucked chassis and can be either gas or diesel-powered. Ford, Mercedes Benz, and Chevy are some well-known manufacturers of Class C engines. They are easy to recognize because they come with an exclusive loft over the cab that contains either a bed or storage space. They are the most diverse out of the motorhomes and can vary quite drastically in their designs.

Class Cs can be compact, full-size, or super-sized, with compact Cs being the most popular. They come with either a Mercedes cutaway chassis or Ford Transit. The big daddy of this group is the Super-C which uses a Freightliner or Ford F550. You will enjoy luxury home amenities such as roomy kitchens, large living spaces with plush leather seats, small dining room tables, queen-sized or fold-out beds, and private bathrooms. They can comfortably accommodate 4-6, but you can squeeze up to 8 people with a bit of creativity. They may not have all the luxury features of Class A motorhomes. Still, most people are usually comfortable with the options provided by Class C motorhomes.

Class Cs are usually easier to drive than Class A motorhomes. They are excellent towing machines, giving you plenty of flexibility when you are out on the road. They look like nothing else in the market; for this reason, Class Cs are very easy to pick out.

Because Class C Motorhomes run on 30 AMP power, they have more electric options during travel. Most RV parks are short of 50AMPs (I will go into the details of RV electrical in Chapter 4). With a shorter chassis, Class C Motorhomes can fit into more campsites than the larger

Class A. This makes them much more flexible when compared to their class A counterpart.

Features of Class C motorhomes:

- •Average Length 22-35 feet
- •Average height 10-12 feet
- •Price range 70k-200k
- •It runs on 30 AMP
- •Has one AC unit

Pros:

- •Smaller and more mobile than the Class A
- •Easy to drive (compared to most RVs)
- •Can handle lots of amenities
- •It can comfortably accommodate 4-6

Cons:

- •Not near as much space and storage as class A
- •High Price
- •Low fuel economy

Class Cs usually run anywhere from 8-15 miles per gallon, making them slightly more fuel-efficient than Class A motorhomes. Multiple Class C floorplans are available. This makes Class Cs great for weekend campers and part-time campers that want to get away with their families. They may not be as expensive as Class A Motorhomes. Still, the initial cost of Class C Motorhomes is very high compared to other models such as campers and trailers.

Class Cs are big and spacious, but they can be dim in the presence of other RVs such as Class A motorhomes or travel trailers. If you are interested in luxury camping, you may want to find alternative RVs that offer more options.

CLASS B MOTORHOMES



Class B motorhomes are fuel-efficient, small, agile, and ready to hit the ground running. The living space they offer is ideally suited for smaller groups. Picture them as Class C's little sister.

Every square inch of these sleek, modern design motorhomes packs lots of amenities in the compact space. They are also known as camper vans or B-Vans. Class B motorhomes are built on a van chassis and resemble large vans rather than a "houses on wheels." Class B motorhomes are limited to a certain degree. They can accommodate far fewer passengers than either Class A or Class C motorhomes. However, Class B motorhomes can go almost anywhere, just like standard vehicles. Class B Motorhomes are very flexible; and can make a smooth transition from a camping vehicle to an everyday city ride. They can and will often take up no more than a single parking space. You can easily store your Class B RV in places like your driveway or a big garage. Class Bs provide a flexible travel schedule because there are few places they can't go.

On average Class B motorhomes, you'll find features such as a Murphy bed/couch, small kitchen and dinette, bathroom or wet bath, and an awning. The Murphy bed or fold-out sofa provides you with extra space while you're not using it. Also, note that Class B kitchens are usually tiny. It is rare to find luxuries such as ovens, microwaves, and countertop kitchen space.

Due to lack of space, most Class Bs have one wet bath. A wet bath is a shower, bathroom, and sink combined (sounds fun). Most Class B's come with an automatic awning that helps you stay cool by protecting you from the sun. The awning allows you to extend your living space to the outdoors, creating more room at the campsite.

The features of a Class B motorhome do not compare to either Class A or C's; however, higher-end class B motorhomes have many of the same luxuries and amenities.

Class Bs are lighter and have a better fuel economy than other motorhomes on the road. They can cover anywhere from 15-25 miles per gallon.

Features of Class B Motorhomes:

- •Average length: 15-25 feet
- •Average height: 9-10 feet
- •Price range: 50-175k
- •Runs on 30 AMP

Pros:

- •Small and easier to maneuver
- •Easier to store
- •Better gas mileage
- •It can comfortably accommodate 2-4
- •Less pricey when compared to other motorhome options

Cons:

- •Expensive (for their size)
- •Limited space and storage
- •Few Amenities
- •Limited floor plan
- •Smaller holding tanks

Class B motorhomes are ideally suited for solo travelers or outgoing couples who love adventure. They are also great for people who enjoy the minimalist lifestyle and are willing to pack up and travel wherever they want. Just be prepared to let go of a few comforts.

Chapter 2

How to Choose Your RV

RV Trailers

Travel Trailers



Travel trailers are super-popular. This is your basic pull behind that uses a standard ball and coupler hitch. These rigs are also known as “bumper-pulls.” That’s because when they first gained popularity in the 50s, they would be attached to a tow car’s bumper. Of course, this has changed. Modern travel trailers are secured to the tow vehicle’s frame using a hitch.

They are the most widely sold and most varied type of towable RV. Travel trailers come in many forms, from simple models with chuckwagon kitchens and jelly-bean fashioned structures to fancy ones with sliding doors and picture windows. This rig is also versatile in weight; you can choose from an ultra-lite rig to a heavier half a ton version. No doubt you’ve seen one at a campsite or being pulled down the highway by a pickup truck.

Travel trailers are often cheaper than motorhomes and fifth-wheel trailers (which I will cover after this). With the low overhead clearance, travel trailers can fit perfectly into many places fifth-wheel trailers and Class A motorhomes wouldn’t.

Inside, you will find all comforts of a residential home. Like all non-motorized RVs, travel trailers have no driving area, which gives RV designers room to take advantage of a wider variety of available floor plans. The unlimited number of travel trailer variations and types makes this trailer ideal for many campers. Depending on the trailer’s layout,

expect to find features such as large dining rooms, residential kitchens, separate bedrooms, full-size bathrooms, showers, and more.

Travel trailers are typically not as luxurious as the fifth-wheel trailer or Class A motorhomes, even with their great amenities. Most travel trailer owners use a portable generator located outside the vehicle or nothing at all. Beware that the portable generator can be very noisy.

Due to their versatility, many travel trailers often have bunk beds and separate bedrooms to accommodate large families. A travel trailer's weight fluctuates and can vary anywhere from 4,000 lbs to 10,000 lbs. Travel trailers have varying mileage depending on the tow vehicle's capacity and the size of the trailer.

As an owner of a travel trailer, always know the towing capacity of the vehicle. Don't be deceived; a travel trailer takes just as much if not more skill to maneuver and drive than other towable. It is highly challenging to tow a travel trailer because of where the hitch point is. The turning radius isn't excellent either. Strong winds can easily throw you around. Fortunately, you can easily drop your travel trailer off and move along with your tow vehicle as you please. Most importantly, make sure you can back up the trailer before hitting the road. Backing up a travel trailer is very difficult and takes a lot and lots of practice.

Most states will not allow you to carry passengers in the trailer when traveling. So in most cases, you can only bring as many people as your car allows. This means you and your family will be crammed in your car all day as opposed to a motorhome on travel days. Please make sure to check the state laws on traveling with passengers in the trailer before you hit the road.

Features of Travel Trailers:

- •Average length: 12-35 feet
- •Average height: 10-12 feet
- •Price range: 10-100k

Pros:

- •Low cost
- •Can quickly drop off the trailer
- •Very versatile
- •It can comfortably accommodate 1-8 people
- •The travel trailer can work for many different types of RVers

Cons:

- •Need to have a large truck or SUV to tow a travel trailer
- •Difficult to maneuver and backup
- •You cannot travel inside of a trailer (in most states)

The travel trailer is an excellent fit for people looking to get away on the weekend with their families. I also recommend this rig to full-time RVers who don't want to spend a fortune on a big motorhome. Travel trailers are also great for boondockers; with travel trailers, you can get way off-grid, especially with the smaller travel trailers.

Travel trailers provide campers with the freedom of having a complete living unit while out on the road and a vehicle that lets them enjoy their travels.

Fifth Wheel Trailers



Yes, a fifth-wheel can imply something other than that single, unnecessary person always tagging along on dates. Among outdoor enthusiasts, it alludes to a type of rig that provides adventure lovers with the same benefits as that of bigger models without the stress of moving around with a full-blown house. The U-shaped coupling mounted above the tow truck's cargo bed led to its reference as a "fifth-wheel."

Fifth-wheel trailers are the largest towable RV on the market. Instead of the conventional hitch ball system found on travel trailers, fifth-wheel trailers use a fifth-wheel hitch to tow. The fifth-wheel hitch can only work when attached to the bed of a pickup truck. A fifth-wheel tow hitch centers the RV's weight, making it very stable and easy to tow compared to travel trailers. Owners of fifth-wheel often detach the trailer from their truck, allowing them to go where the trailer cannot.

The slide-outs and extended lengths make fifth wheels one of the most spacious RVs. Some fifth wheels have floor plans with up to six slide-outs.

The fifth wheel is quite an upgrade from the travel trailer and is great for people who do not want to commit to a motorhome. Fifth wheels are typically more luxurious than travel trailers. With a fifth-wheel, you can get the nicest amenities for the best price. A typical fifth wheel will include a residential kitchen, dinette, island, large living area, couches, a bedroom, and a full-size bathroom.

The fifth wheel gas mileage varies, but it is not very efficient. If your truck runs on diesel, the gas can be very costly, especially as you tow bigger fifth-wheels.

Features of Fifth-Wheel Trailers:

- •Average length: 25-40 feet
- •Average height: 12-13.5 feet
- •Price range: 40k-150k
- •It is designed with two AC units

Pros:

- •Plenty of living space and storage space
- •It has lots of amenities and luxuries
- •Variety of floor plans and layouts
- •Easier to tow (compared to travel trailers)
- •It can comfortably accommodate 4-8 people

Cons:

- •High price
- •You cannot legally travel inside the trailer
- •Bad fuel economy
- •Due to their large sizes, fifth-wheels may not fit into all campsites
- •Fifth-wheels are not nearly as versatile compared to the travel trailer
- •Unhinging and backing up can be a real challenge

The fifth wheel is great for RVers who stay at campgrounds for an extended time and people who like to live a lavish and spacious lifestyle. A fifth wheel is also a great solution if you already own a pickup truck capable of towing it.

Like any other type of RV, it is vital to ensure that the towing vehicle is

strong enough to handle the weight of the RV and all the camping gear inside of it.

Hybrid Trailers



Hybrid trailers are a blend of travel trailers and pop-up campers. If you have been looking for a lightweight, small RV with a decent amount of space, look no further than the hybrid trailer. These trailers have pop-outs in addition to traditional slide-outs. Both the pop-out and slide-outs provide additional living space. The interior of hybrid trailers is similar to that of conventional travel trailers, except the pop-outs on the sides are made of canvas. You can expect a dinette, bathroom, shower, stove, and a fridge. Larger rigs may even have couches in the living area. Hybrid trailers also have excellent bed spaces. The beds fold out of the camper's sides, opening up the floor area for other people to sleep.

Features of Hybrid Trailers:

- Average length: 13-15 feet
- Average weight: 3,000-7000 lbs
- Price range: \$15,000-\$40,000

Pros:

- It can be easily towed around with either small trucks or SUVs
- It can easily fit in most campsite locations
- They have more space than meets the eye

Cons:

- The fabric walls are thin, and nights can get noisy
- They are expensive for their size
- The fabric sides don't offer protection from harsh weather conditions

RV Campers

Truck Campers



Looking for a tow anything, go anywhere and camp anywhere type of rig? Look no further than truck campers. Forget fifth-wheels and Class As. If you want ultimate freedom and adventure, you want a truck camper. Truck campers are designed to glide into a pickup truck's bed and automatically turn the pickup truck into a motorized recreational vehicle.

They can be mounted and demounted from trucks very easily. These campers are called demountable campers in Europe and tray campers in Australia. Truck campers are pretty small, and 42 states don't even recognize them as RVs. They don't take up much space and will only occupy two parking spaces at most. They are versatile and can fit anywhere, from driveways at a friend's house, sandy beaches, unpaved logging roads, and standard parking lots. You are basically able to go everywhere a pickup truck can.

Just like the trailers in many states, it is illegal to ride in the camper while driving so you can enjoy your travel days crammed in your truck. Make sure to check the laws for each state because they vary when it comes to traveling in truck campers. You can expect to get 10-15 mpg, but gas mileage varies depending on the size.

Features of Truck Campers:

- Average floor-length: 8-12 feet
- Average height: 10-12 feet
- Price: 10-100k
- Most come with rooftop air conditioners

Pros:

- Easy to maneuver

- •Can go almost anywhere
- •Easy to boondock
- •Can comfortably accommodate 2-4 people
- •A truck camper has great depreciation value

Cons:

- •Limited space and storage
- •Have to have a truck
- •Difficult to load and unload the truck
- •Over time, the camping trips will take a toll on the truck
- •Not all trucks can house truck campers

The truck camper is great for solo RVers and couples who want to boondock off-grid and visit more remote locations. As long as you do not mind the limited space, a truck camper should work just fine.

Pop-Up Campers



While so many choices exist in the rabbit hole of RV options, many RVers prefer lightweight, more affordable pop-up campers. They have ultralight maneuverability, smooth-riding axles, and extra space for all your treasured belongings. In simple terms, a pop-up camper is an RV that can be collapsed down into a large box on a trailer. They slump into light trailers for transportation and pop up during camping.

Pop-ups look like small trailers or fancy tents at the campground and are short and flat when collapsed. Not only do pop-up campers cost significantly less compared to other options, but they are also cheaper to maintain. They are easy to tow because of their lightweight nature and can be towed by most modern cars.

Pop-up campers can go just about anywhere, which makes them perfect for boondocking and over-landing. Their compact nature makes them easy to haul through more rugged terrain, and their size adds to the ease of fitting them into tight spaces. Pop-ups fold down into a smaller size

allowing for easy storage and travel. This rig is family-friendly, and many families choose this option over other RVs because they are very affordable.

With pop-up campers, you can expect two queen-sized beds, a small kitchen sink, stove, a small dinette (that folds into a bed), and built-in storage. They have a hard base extension with canvas sides that provide extra sleeping space. Many are surprised to learn that some pop-up campers have air conditioning. Some also have rooftop units, window-mounted units, and portable AC units. Even when popped, space and amenities are limited compared to larger RVs.

Gas mileage depends on your vehicle, but on average, expect to lose around 7 mpg while towing a pop-up camper. Thankfully the aerodynamic structure saves gas mileage significantly.

These campers have very thin walls, so loud noises will easily penetrate and cause disturbances. If your generator is running, the noise will be on full blast all night. If you are sensitive to noise, a pop-up camper may not be the best fit for you.

Pop-ups can be susceptible to harsh weather, especially the smaller models. Storms and winds can cause severe damage if you are out camping in a pop-up. I would recommend checking the weather before setting up a pop-up camp.

Features of a Pop-Up Camper:

- •Length: 8-16 feet (packed) 16-30 feet (popped)
- •Height: 8-12 feet (popped)
- •Price Range: 5-40k

Pros:

- •Low price
- •Compact and lightweight
- •Great mobility
- •Easy to store
- •It can comfortably accommodate 2-4 people

Cons:

- •Few amenities
- •Can be noisy
- •Fragile

- •Having air conditioning is certainly not a guarantee
- •Setting up and breaking down your pop-up camper can be very time-consuming

Pop-up campers are a great and inexpensive choice for solos or small families that want to get away and experience nature for a weekend. This rig is also great for those who want to test out the RV life without total commitment.

Teardrop Campers



Teardrop trailers are small, towable RVs. They are bold, striking, and easily recognizable due to their distinct shape—round on one end and tapered on the other. They are shaped like teardrops, hints, and names.

Teardrop campers are the cheapest trailer option available on the market today. The simplest ones are nothing more than a bedroom on wheels. The clever design and vintage look of teardrop campers make them a favorite among many campers. Many RVers customize their teardrops with retro paint, exciting color schemes, wooden exteriors, or a simple color to match the tow vehicle.

With a teardrop camper, you can enjoy the outdoors without having to worry about generators, electronics holding tanks, and all the amenities that come with large RVs. One huge benefit of teardrop campers is that they can be towed by most cars, so you can take this rig virtually anywhere you want. You don't even need vehicle storage facilities. It's very easy to fit your teardrop in the driveway or squeeze it into the garage.

In a teardrop, you can expect a galley, queen-sized bed, and storage units. A teardrop galley is an outdoor kitchen consisting of cabinets, cooking space, and some kind of cooking device. Like the pop-up, many teardrop campers do not come with an AC unit; however, many install their own later on.

Teardrops can get pretty cramped because there isn't enough space to accommodate people standing up. The limited storage and space

compartments limit the amount of gear you can bring. Most teardrops lack fully equipped bathrooms, so you will need to get creative to take a shower. Hygiene facilities at the campground and national parks will come in handy when you are out on a teardrop trailer.

Features of Teardrop Campers:

- •Length: 8-13 feet
- •Height: less than 6 feet
- •Price: 5-20k

Pros:

- •Price
- •Mobile
- •Lightweight

Cons:

- •Lack of space
- •Few amenities
- •No indoor kitchen
- •No bathroom

The teardrop is a great trailer for newbies or people who are just learning to tow and maneuver a trailer. It works for those who don't want to spend a fortune and be free from the worries of large recreational vehicles. As long as you adore nature, you'll love this rig.

Chapter 3

Towing and Carrying

RV Towing

White knuckles. You might be familiar with them; I mean, every RVer has gone through the pain while learning how to tow. When you're new to it, towing an RV can feel pretty intimidating. It takes lots of time and energy to get comfortable with towing a rig. Here's everything you need to know to build your confidence, so you can relax and loosen your grip as you set your foot on the pedal.

Towing a Vehicle

Travel Trailers and Fifth Wheels

If possible, buy your trailer or fifth wheel before you buy your tow vehicle. This way, you will have more freedom to choose the right house for you instead of finding a rig that works with your truck.

Terms GVW (gross vehicle weight): is how much the trailer and its payload weigh together.

GVWR (gross vehicle weight rating): is the highest weight the trailer can safely and comfortably hold and transport.

Depending on your rig, you'll need to determine which type of hitch you'll need. A hitch is a point that connects to a vehicle's chassis for towing.

There are four main types of hitches:

WEIGHT-CARRYING

This is the most basic hitch and is used for small- and medium-sized trailers. It uniformly distributes your trailer tongue loads through the bumper and frame of the tow vehicle.

You can quickly load and unload this hitch and comfortably tow medium to small-sized trailers. Always make sure the ball mount is rated to handle the weight of your trailer.

WEIGHT-DISTRIBUTING

This hitch is designed for heavier travel trailers, as it evenly distributes the weight of your payload. It works by using adjustable spring bars and tension to distribute the trailer's weight to the tow truck's axles.

There are many benefits to a weight distribution hitches such as;

- •Even weight distribution
- •More trailer tow capacity
- •Better control over your vehicle
- •Less wear and tear on the vehicle
- •Improved steering and brake control

However, they are more complicated and take longer to connect and disconnect from the truck.

I generally recommend a weight-distribution hitch for larger RVs, but you will need one if;

- •The trailer's weight is equal to or exceeds 50% of the tow vehicle's GVWR
- •Sagging occurs at the rear end of your tow vehicle when it is attached to the trailer
- •Trailer sway is a common occurrence
- •Steering or stopping your rig is a challenging task

You can choose to add sway bars to your weight distribution hitch to help reduce sway and to feel safer; however, they are not needed for every trailer.

GOOSENECK

A gooseneck hitch uses a hitch ball that mounts under the truck bed and bolts onto the truck frame using brackets to connect the trailer. It allows for a tight turn radius and is mounted in the bed of a tow truck. Gooseneck hitches can pull loads as heavy as 30,000 lbs or more. The biggest advantage of using gooseneck hitches is that their mechanism is less invasive. For this reason, a complete truck bed is available for use when towing your trailer. They are well structured to tow huge loads such as flatbeds, large trailers, toy haulers, or livestock. The weight capacity of gooseneck hitches is usually higher compared to other hitches.

I would not recommend using a gooseneck for towing your 5th wheel,

but it is possible.

FIFTH WHEEL

Fifth wheel hitches are big hitches with hinged plates that sit in the bed of your tow truck. Long-bed trucks are best suited for the fifth wheel hitch. Slider fifth wheel hitches will also work perfectly with short-bed trucks.

They consist of many components and have a bulky and heavy design. A fifth-wheel towing is generally more stable, smoother, and quieter than a gooseneck hitch. It is worth noting that fifth-wheel hitches can be used on pickup trucks only. If you have a fifth-wheel travel trailer, I highly recommend this hitch over the gooseneck hitch.

Motorhome Towing

Many RVers decided to tow their car behind the motorhome because it allows them to be more mobile.

There are three main types of motorhome towing.

Flat Towing

Flat towing means that all four tires and wheels will be on the ground at all times. Unlike the much equipment needed for dolly and trailer towing, flat towing gets the job done with a small tow bar.

The flexibility of a flat tow allows you to go exploring, shopping, and sightseeing at a moment's notice with no need to drag the RV all over the city.

What you will need;

- •Tow Bar
- •Base plate kit installed on the tow vehicle
- •Wiring kit (for lights and breaking)
- •Safety cables
- •Supplemental braking system

It's worth noting that you cannot back up your motorhome while the vehicle is attached. However, unhooking the toad and backing up doesn't require much time.

Ensure the manufacturer approves your vehicle before towing on all fours because many vehicle transmissions do not allow this option. You

have to be extra cautious; otherwise, you will cause severe damage to your tow vehicle

Installing all of this equipment is very challenging and expensive. If you are not a good mechanic, I highly recommend getting this done by a professional.

If your vehicle allows you to flat tow, I recommend this option over the others.

Tow Dolly

A tow dolly is also a type of trailer that attaches using a ball hitch. After attaching the hitch, you drive your vehicle up onto the tow dolly. The front 2 wheels of a car are loaded while the car's rear wheels are on the ground rolling.

A significant advantage of using a tow dolly is that you can tow a wide variety of vehicles on a tow dolly.

With a tow dolly, you will need;

- Straps (to anchor the vehicle down)
- Safety chains

A tow dolly is used specifically for vehicles with front-wheel drive transmissions. However, rear-wheel-drive cars can use a tow dolly if their transmissions are disconnected (I would not recommend this). Tow dollies are pretty big and take up a lot of storage, but you can easily store your dolly somewhere on the campsite.

Tow dollies are heavy and can add approximately 500-1,000 lbs to the existing tow weight. Also, note you can't back up the motorhome while the dolly is attached. I highly recommend getting a tow dolly with brakes installed because not all of them come with brakes.

Car Trailer

A car trailer is a four-wheel car carrier that lifts and holds your entire vehicle from the ground. It also allows you to haul the car while it's entirely on top of the trailer.

If you have an all-wheel-drive or 4-wheel drive vehicle, chances are you'll have to put it on a trailer to tow it behind your motorhome. Like the tow dolly, you can pull a wide variety of vehicles on a trailer compared to flat towing.

When using a car trailer hinge, you'll save significant wear and tear on your toad's engine and transmission while you haul it.

You will need;

- •Ramps (if the trailer does not include them)
- •Ratchet straps for tie-down
- •Brake controller (if the trailer has electric brakes)

Due to the large size of the trailer, it can be challenging to maneuver around parking lots, gas stations, and campgrounds. Unlike the other hinges, with talented driver skills, you can back up your motorhome while the trailer/toad is attached.

The only disadvantage of using a car trailer compared to a tow dolly is the equipment's cost. It is usually more expensive than owning/renting a tow dolly. But if you are serious about driving, I recommend a car trailer over a tow dolly.

Do's and don'ts of towing

- •Always use the right tools for your specific towing style
- •Do lots of practice
- •Never exceed the recommended weight limit
- •Make sure all your towing equipment gets installed correctly

Chapter 4

Set-Up

RV Electrical System

From the overhead lighting and vent fans to your HVAC system and refrigerator, your RV electrical system is what allows you to use many of the contemporary amenities you've grown accustomed to. And, as great as it is to have access to all of that stuff while on the road, it helps to have a basic grasp of how your RV's electrical systems work if you want it to stay running properly.

A basic grasp of RV wiring and power sources will help you make educated decisions about where to draw electricity and troubleshoot if something goes wrong if you want to use your RV regularly (and especially if you want to live in one full time).

We understand that most RVers aren't electrical engineers, so we won't go too technical (i.e., you won't learn how to rewire your entire RV—this isn't RV wiring for idiots!). We will, however, provide you with some basic RV wiring knowledge and jargon so that you can comprehend what's going on with all of your batteries, panels, wires, and connections.

How Does Electricity Work in an RV?

You'll never have a limitless supply of electrical power, whether you're in an RV or at home. As a result, it's a good idea to go over a formula you learned in high school but have likely forgotten about. Watts, or total power, is a function of current (amps) and voltage (volts). $\text{Watts} = \text{amps} \times \text{volts}$, or $W = A \times V$, is the equation for this. This formula will tell you how many different electrical devices you can have on at the same time in your RV (or your home, for that matter). Your circuits will work well as long as you remain beneath the quantity of available power. Excessive power will trip the circuit in your RV electrical system, as you may have seen firsthand if you've ever tried to use your microwave and hairdryer at the same time!

Because your RV has both AC and DC electrical systems, we need to go

through the differences briefly. The power in a DC system only flows in one direction, which is why it's termed a Direct Current system. The current in AC power, on the other hand, alternates directions regularly, which is why it's named Alternating Current.

One RV, Two Electrical Systems

There are two different electrical systems in an RV: a 12-volt DC system and a 120-volt AC system. The 12-volt system is well powered by a battery (or numerous batteries in some situations), and it powers things like your water heater, furnace, and refrigerator, as well as most of the lights in your RV's living space, your water pump, your carbon monoxide detector, and a variety of other things. The 120-volt system is also powered by an RV electrical hookup connector or a generator, and it runs your kitchen appliances, television, and other large electrical equipment.

RV Power Sources: the Low-Down on Batteries

The overall voltage of your RV's 12-volt system must be—you guessed it—12 volts. A single 12-volt battery or numerous 12-volt batteries linked together in a parallel circuit can accomplish this. However, utilizing two 6-volt batteries in series (to generate a 12-volt battery effectively) is usually preferable to utilizing a single 12-volt battery. This setting will usually result in a substantially longer battery life, often known as a deeper discharge time. Utilizing two 6-volt batteries has the disadvantage of taking up more space than using one. However, if your camping needs the extra battery life, that trade-off can be worth it.

Your 12-volt battery (or batteries) automatically charges when you plug into a campground RV electrical pedestal (or any other power source). You can make use of your batteries to power anything that operates on 12-volt if you're boondocking or dry camping and aren't plugged in. Adding an inverter to the mix will help convert the direct current from the 12-volt battery to a 120-volt alternating current, allowing you to power 120-volt appliances and use your vehicle's electrical outlets. Because your RV's 12-volt system, like all batteries, will eventually run out of juice and need to be recharged, it's important to know how much discharge time you have.

30 Amp or 50 Amp?

Almost all the RVs come with a power cord that may be plugged into a campground's electrical pedestal (developed campgrounds with available hookups, anyway). A "shore power" connection is another name for this type of connection. There are two amperages available for these power

cords: 30-amp and 50-amp. There are three prongs on a 30-amp cord and four on a 50-amp line. Obviously, if you have a 50-amp connection, you can use a lot more electricity at once than if you only have a 30-amp connection. * Remember to use the electricity formula at the start of this piece to figure out how much extra power you have.

While many parks have RV electrical hookups for both 50-amp and 30-amp cords, some only provide 30-amp hookups. As a result, investing \$20 or more in a 50 amp to 30-amp adaptor is an excellent idea. Keep in mind that if you lower your amperage to 30, you won't be able to consume as much power as you would if you were plugged in at 50. To avoid a voltage drop, you should utilize the smallest adaptor and extension cords possible. Finally, while a 50-amp RV can be converted to use a 30-amp cord, a 30-amp RV can never be converted to use a 50-amp cord.

Before You Plug Your RV Electrical Hookup

It's tempting to plug in and switch everything on as soon as you arrive at your campsite. However, safety should always be a priority, especially while working with electricity. To begin, use a polarity tester to check the hookup to ensure the campground's wiring is in good working order. If it isn't, your polarity tester will warn you before you fry any or all of your RV's electrical components. This is a common and inexpensive gadget that can be obtained for \$40 or less, and it's an excellent way to protect your RV's electrical wiring from unintended damage.

Next, take a few measures and turn off everything—both your RV's electrical system and the RV electrical pedestal—before plugging in. Check that everything attached to any interior RV electrical outlet is also turned off. Switch them on once your power cord is securely plugged in. Installing a surge guard to safeguard your RV's electrical system from potentially destructive surges is also a good idea. These will help set you back a few hundred dollars, but they are insurance against a larger, more destructive problem.

Know Your RV's Electricity Hogs

Not all of the devices you connect to will use the same amount of power. Some devices run on relatively little power, while others consume a significant amount of your available power. In general, anything that generates heat or cools down consumes a lot of energy, and you can't have too many of them running at the same time. This is specifically true if you have a 30-amp power cord.

The majority of your kitchen appliances consume a significant amount of

electricity. Microwaves, coffee makers, and toasters all use a lot of electricity. Air conditioners consume a lot of energy as well. Hairdryers and curling irons, for example, consume a lot of electricity. TVs and stereos, on the other hand, utilize a lot less energy.

RV Generators

You can still create the power you need to enjoy your electrical gadgets if you don't have access to shore power like you would at an established campground... if you have a generator, that is. Many big motorhomes come equipped with a propane-powered generator, but smaller RVs and travel trailers may require an aftermarket purchase.

The generator will provide AC electricity, which will power your 120-volt system and allow you to use larger, everyday equipment like your refrigerator and HVAC system. However, many boondockers prefer not to use a generator due to the high expense of propane as well as the noise and odor of its exhaust, so we must consider another solution.

RV Solar and Wind Options

You may use solar panels to power your RV and charge your batteries if you're an RVer who enjoys camping off the grid or visiting public sites that don't have power hookups. Because there's never a need for the plugin, this is a terrific alternative for RVers who like boondocking or dry camping. Solar panels for RVs come in a variety of sizes and are rated according to how much energy they produce in watts. More panels are required for larger RVs, and they have the necessary roof area. The battery and inverter/charger device are connected directly to the solar panels. While there is some initial effort involved in getting them up and running, the great advantage is that you may be virtually completely self-sufficient in terms of your electrical demands.

Keep in mind that an inverter will be required to convert the power generated by your solar panels into the electrical current required by your RV's equipment. And, while solar power can help you generate enough electricity for most small appliances, it's difficult to run your air conditioning on solar alone—and, aside, isn't it more fun to go somewhere where the weather is already great if you're boondocking?

RV Electrical Maintenance and Troubleshooting

The most efficient method for detecting a minor issue before it becomes a large problem is to do routine maintenance and inspections. Regularly, inspect your batteries and all of their connections. Right before you depart on a trip is an excellent time to do so. Check that all of the connections are secure, that nothing is damaged or frayed, and that

everything is clean and corrosion-free. If you notice something that doesn't look right, it's a good idea to have it checked out.

If you're using lead-acid batteries, keep an eye on the electrolyte levels and replenish them as needed. Deep-cycle and lithium batteries, as well as modern deep-cycle batteries, can help you avoid this need for maintenance while also prolonging the life of your batteries.

Also, be aware of where your RV's electrical panels are located. Check to see if a circuit has been tripped or a fuse has blown if something isn't operating properly. If a fuse has blown, you should be able to see it, although this isn't always the case. A little test light that lights if a fuse is good can be utilized in this situation. If you replace a fuse and it blows right away, it's a sign that there's a bigger problem. You can also try following electricity wires to see whether the connection is broken, though this is difficult to perform without professional help.

Always Use Extreme Caution with Electricity

If you're used to doing electrical work, you're already aware of the safety precautions to take, such as turning off the power at the source before working, treating all wires as if they're alive, and using tools with non-conducting handles. However, if you're unsure about your abilities to operate with electricity, don't put your RV or your life in jeopardy. Only have your vehicle serviced by people that are familiar with and experienced in RV electrical repair.

In an ideal world, you'd be able to put anything you wanted into your RV's outlets and have it function. You wouldn't have to worry about current or voltage, and your batteries would constantly be charged. While we don't live in a perfect world, your RV electrical system can, for the most part, keep out of your way and let you power whatever you want without causing you any problems. However, understanding the fundamentals of how electricity flows and how your RV's electrical system operates is still beneficial.

We can't say this enough: don't gamble with your RV's electrical. It's a powerful force, and in the wrong hands, it can be deadly. If you're not sure how to conduct a repair, if an RV electrical connection appears to be defective, or if you're worried about your batteries or wiring, have an experienced professional examine it. It has the potential to save your RV, your finances, and, in the worst-case scenario, your life.

How to Use Water in Your RV?

One of the many advantages of camping in an RV is the availability of running water. You can use your RV water tank to rinse vegetables, boil a pot of water, shower, and flush the toilet, all without having to leave the comfort of your camper.

You might think that getting water in an RV is as simple as turning on the tap if you've never done so before. However, hooking up your RV's plumbing requires a little more effort behind the scenes. Continue reading to learn more about how to use water in an RV.

RV Tanks

Before we begin, it's critical to understand the differences between each of your camper's water tanks. In most RVs, there are three different types of tanks:

- The freshwater tank is where the clean, drinkable water from your RV sink and shower is stored.
- The semi-dirty water that runs down the drain filters into the gray water tank of the RV.
- The RV septic tank, commonly known as the black water tank, is the final component. The waste from your toilet is stored in this RV holding tank.

Using the Water Hookup

If you're staying at a campsite with full or partial hookups, getting water is as simple as plugging into the water connection. The procedure is simple and just requires a few steps:

- Locate the freshwater drinking hose on your camper. Attach a water filter or a water pressure regulator to the hose now if you'll be using one.
- Connect the loose end of your hose to the water supply connector at the campground.
- Instead of using your RV water tank, connect your RV water system to city water.
- If you intend on camping without hookups (commonly known as "boondocking"), you'll need to fill up your RV's freshwater tank with a hose or several gallons of water before arriving at your campground.

RV Plumbing

An RV water pump is required to ensure that enough water pressure is

delivered from your sinks and RV shower. Make sure you know where the pump's switch is so you can turn it on for the duration of your journey.

An RV water heater, on the other hand, will ensure that you have hot water for showering and cooking. Make sure to turn on the switch for your water heater, which should be found near the water pump.

Emptying Your RV Water Tank

Finally, you'll need to empty your tanks at the end of your journey. Most campgrounds and RV parks have a dumping station where you may dispose of any garbage or wastewater. There are only a few steps to emptying your tanks:

- •Put on a pair of rubber gloves and grab your sewer hose.
- •Connect the hose to the sewer hookup.
- •Secure the other end to the black water tank.
- •Open the valve and let the contents of the tank drain.
- •Close the valve completely.
- •Empty the grey water tank and let the wastewater drain.
- •Close the grey tank valve.
- •Flush and rinse the tanks to clean.

Chapter 5

Planning the Trip

Now that you have all the knowledge you need to rent your RV, next is the actual planning stage. In this section, you'll learn how to go about your trip and how to save money while you're at it—because who doesn't want to do that? Let's get on with it!

As discussed in the previous chapter, renting an RV will take up a large chunk of your travel expenses. It is not cheap. But by cutting corners here and there, you can make your wallet and bank account thank you later. Here are a few ways to avoid extra charges and save money on your first RV trip.

Financial Planning Considerations

When renting an RV, summer is, of course, the peak season, when everyone is out to enjoy the sun and the weather, so RV rental fees and campsite fees also jack up their prices. Even gas prices go sky high during the summer months, so our advice is to rent an RV off-season. Get out there during spring, fall, winter, or even during shoulder season—this means it's the area's off-season during which it gets the lowest number of tourists during the year.

By doing this, you can avoid the summer crowds—you might not enjoy RVing that much if your campsite and parks are filled to the brim with summer vacationers dragging their screaming kids along. We already have a pair of kids along with us; we don't need to see more, thank you very much! Also, have you seen the autumn foliage in the national parks? It's absolutely breathtaking! Hues of reds, oranges, and yellows abound. Winter is also a nice time to go out and explore. And if you know where to go and plan your trip, you can actually spend your winter in warmer weather!

Plan ahead, even if a lot of things are unpredictable. Map out where you're going and where you plan to stay, especially if you want to stay at a campsite. Also, take into consideration other things like food and gas,

etc. If you are well prepared, you can minimize any unexpected expenses.

Rent from local small-time RV dealerships—they might offer you better prices—or stick to those peer-to-peer rental sites. Another thing to do to avoid hefty charges with mileage fees is to actually rent an RV nearer to your destination. You can also calculate whether it's cheaper to let the renter drive the RV to the campsite and set it up for you—it's usually not, though—or pick it up and drive to the campsite yourself while you rack up those mileage fees and the gas you'll be feeding your rented RV.

Take pictures of the condition of the rented RV before you start. This piece of advice is especially relevant if you do choose to rent with peer-to-peer rental platforms, but also a good practice for anything you rent, really. Go around and see whether something seems wrong with the chassis, engine, or interior. From scratches to anything broken or off, take a picture and keep it. It might sound like a bit much, but this way, you have photographic evidence in case you receive a complaint. It's a good way to avoid getting slapped with a hefty bill and losing your deposit in the end.

Some renters will offer you “unlimited mileage” for a motorized RV. This just means you're paying more for the rental. Here's a tip: if you plan to stay in one place or state for your whole trip, better rent from someone or from a company that's already nearer to your destination. You'll be spending less time on the road racking up the mileage fees.

If you already have a perfect truck for towing a towable, then get a towable. If you hook your truck up in a smallish towable, you can skip paying the mileage fees as most of them will offer you “free unlimited use.” There's no engine in there, so what mileage can you count? Just be sure to also take into account the amount of gas your towing vehicle consumes. Also, remember not to overfill the RV, as a heavier rig will eat up more gas. Another benefit to renting a towable is that you won't need to shell out cash to rent a car or ride the campsite's shuttle buses to explore or go somewhere. You can just unhitch, set up, and drive out again.

Since the RV will already be drinking fuel by the gallons, don't get charged more because you forgot to refill the tanks when it's time for you to return the RV. Some will charge you an extra \$20 to \$50 if you forget to fill it back up.

Eating out will take a huge chunk of money out of your travel expenses, so since most RVs that you can rent already have a kitchen, take

advantage of it and cook your own meals. And if you don't know how to cook, well, this is the perfect time to master the craft! Go make a meal plan and go grocery shopping before your trip—pick simple, easy-to-do recipes that don't need too much prep. If you've already scoped out the RV you intend to rent, find out the amenities and see what you are going to be working with in advance. If the rig has a microwave and a freezer, you can opt for those frozen microwavable meals, or better yet, go through YouTube and search out easy microwave recipes. You'd be making brownies in a cup in no time!

There's also no shame in couponing, so bring along a few coupons you think you'll need on the road to save up on those quick grocery runs.

RV campsites can get very expensive because of the extra amenities they offer, so if you want to save money on campsites, why not avoid them altogether and try to go off-grid or go boondocking? And if you are only going to be taking a couple of days out in the RV, then why not try dry camping? Dry camping is camping without hookups. You'll be totally relying on the RV's store of water and electricity, but depending on how well you can conserve these resources, this can be easy for a trip of two or three days.

If you're planning to just park at a campsite for the convenience of hookups and use the space as a base while you explore the surrounding area, you're not really using much of the extra amenities, are you? So it's best to pick a campsite in the middle ground. This means a site that doesn't have too many fancy amenities—just the basic hookups with no golf courses and such. It's also much better to book months and months in advance. Not only will it make sure that you have a slot in the campsites, but it will also ensure that the rates are going to be cheaper. Most sites will also give you a discount during the off-season, as well as cheaper rates for longer stays.

However, if you are planning a long road trip visiting various destinations and dropping by a lot of campsites, you'd better get the passes. From the national parks and federal recreational lands, you can avail of several free and paid passes under the "America the Beautiful" passes. There's also the Passport America Membership. With \$44 a year, you can save 50% off on various campsites all across the country.

Drive safely, and don't go speeding. First off, the RV is not yours, so don't crash it even if you have insurance. Second, since an RV is again basically a home, you have more objects inside that are rattling around while you go speeding down the highway. A sharp turn might make all

the contents spill from the drawers and cabinets. It's not uncommon for drivers to find themselves greeted with chaos when they open the door to the living quarters after going through a particularly rough patch of road. That said, secure everything when you're moving.

Clean the RV before you return it. As stated above, companies and other renters will charge a fee for cleaning service if you leave your mess inside their RVs. To prevent getting charged extra, clean up afterward.

Look for offers on one-way rentals or relocation deals. Rental companies like Cruise America, with franchises across the country, offer deals like this regularly. Because RVs tend to cluster on more popular spots or states, especially during RV season, large rental companies will need to transport the rig back regularly. On these one-way offers, the type of vehicle, your route, and the number of days will be set. For example, for 50% off, you might be told to pick up the RV in Seattle on a certain date and return it in Sacramento 20 days later. If your plans are not set in stone, you can take advantage of these deals easily.

Bring your own amenities if you have them—no need to pay \$60 for towels and pillows or \$100+ for a kitchen kit if you have a way to bring it yourself. Think of the things you'll be needing like towels, bedsheets, pillowcases, kitchen utensils, etc. It might seem like a chore to provide for everything yourself, but it can save you money.

Navigation and Tech

In today's technology-driven age, apps are now an everyday part of our human experience. Whether or not you wish to get back to the great outdoors, there's frankly no escaping cell phones. Besides, there are lots of apps out there designed for RV owners, so plow ahead and download everything on this list! You'll thank us later.

Google Maps (Free)

It's the best mapping app out there. The new Google Maps might seem the same as the old one, but it has a few changes. It can find gas stations, so you won't have to completely rely on your car's gauge. It also gives you a step-by-step walkthrough of how to get somewhere so that you can't get lost. The thing about google maps is that it's not just a map anymore—it has many functions and uses.

Google Trips (Free)

This app can collate all the emails (reservations, booking, etc.) regarding

your trip in one app and can provide automated day plans marked on the map.

Roadtrippers (Free/Paid)

This app can pinpoint parks, roadside attractions, and scenic points as you go along your merry way. It can even save the places you've already visited. The free version will only provide 7 waypoints, though, but that won't be a problem for short trips.

Roadside America (Paid)

Because the country is filled with quirky roadside attractions, this app will introduce them all to you. It provides maps and photos regarding the country's favorite roadside attractions.

Copilot RV (Free)

Since this is designed with RVers in mind, this app provides offline maps and navigation—reliable when your Wi-Fi isn't reliable. It can also calculate your route when you input the class of the RV you're driving, its size, weight, and height. Yes, height is important, and this app will warn you of dangerously low bridges and propane-restricted tunnels.

Waze (Free)

Get real-time updates on the traffic around the area you're in. This app will also give you ETAs on your destination. It does work best near bigger cities, though, where a lot of its users are. So if you want to try boondocking in the city, this one's for you.

Gas Buddy (Free)

It might sound silly that we RVers have a map for cheap gas, but when your RV eats gas for breakfast—an RV can carry 150 gallons of fuel—every cent that you can save goes a very long way. This app not only tells you where the nearest gas station is, but it also lets you know where gas is the cheapest.

Wi-Fi Finder (Free)

Having the internet can keep the tensions down in your RV. You can download maps from this app to browse offline as they list out where in the country you can find Wi-Fi. It shows you verified hotspots as well as their speeds and type of venue.

Togo (Free)

Download this app, and you can stalk service centers and maintenance. It also lets you set up notifications and help you create checklists when you're packing for your trip.

Coverage (IOS) (Paid)

This app collates all the cellular coverage maps of popular carriers across the country so you know whether that camp you're about to stay in at the last minute has great coverage for your network or not.

Oh Ranger (IOS) (Free)

This one is a comprehensive database of all the state, local, and national parks across the country, letting you know about the activities you can do in a given park, such as water sports, hiking, or horseback riding.

MTB Project (Free)

Perfect for bikers everywhere, with this app, you can download offline maps, photos, topographical trail maps, etc.—everything you need if you're planning to go on mountain biking trails.

The Outbound Collective (Free)

If you like fun and adventurous activities, then this one's for you. This Outbound Collective will give you information not only about off-grid hikes but also about where to find local hot springs.

All Trails (Free)

This app will introduce you to more than 75,000 different trails, not only in the United States but all over the world. You can use it to find backpacking trails, hiking trails, running trails, etc., near your campsite.

REI Co-op National Parks Guide (Free)

We love this app for providing lots of trail data and hike descriptions across the most popular National Parks in the United States, e.g., Grand Canyon, Yellowstone, etc. You don't even need the internet to access the app; the data is available offline.

Lonely Planet (Free)

Along with Waze, this is a useful tool if you're planning to do boondocking in the city. It gives you recommendations on places to see, visit or eat. You can even download the maps and recommendations and browse them offline.

A Survival Guide (Paid)

For when you need to go live like Bear Grylls, this app teaches you how to build a shelter in case of an emergency or find out whether a certain plant is poisonous or not.

First Aid by American Red Cross (Free)

A useful little app that tells you step-by-step how to clean and dress wounds in case of an emergency. It features videos and animations that can help you along the way.

Chapter 6

Daily Activities in an RV

Cooking Equipment

- •Dishes and cutleries: Disposable or non-disposable, your pick.
- •Pots and pans: Don't bring a lot; two to three pieces are more than enough. If they're nesting pots and pans, all the better.
- •Cups/mugs
- •Kitchen knives
- •Cutting boards
- •Cooking oil
- •Cooking utensils: spatula, ladle, and tongs
- •Can and bottle opener
- •Condiments: salt, pepper, sugar, soy sauce, etc.
- •Ziploc bags
- •Potholders or oven mitts
- •Mixing bowls and colander
- •Kettle
- •Tablecloth or placemats (optional)
- •A small cooler or ice chest (optional)
- •Coffee maker, French press, dripper, etc. (optional)
- •Toaster (optional)
- •BBQ equipment (optional): If you plan on having BBQs, bring your own grill (electric or charcoal). Some campsites

do offer grilling stations, but most of them are dirty, so it's better to bring your grill.

Recreational Gear

- •Outdoor activities: Sports equipment like football, basketball, soccer ball, etc., and other sports that can be played outside, like a frisbee.
- •Indoor activities: Useful when the weather is bad and you're stuck inside. Bring along cards, board games, books (paperbacks), magazines, DVDs, speakers, puzzles, and coloring books for the kids—just remember to bring washable crayons to avoid getting charged for cleaning if the RV is rented.
- •Swimming gear: inflatable rafts, floaters, swimwear, goggles, snorkel, etc.
- •Rain gear: raincoats, umbrella, ponchos, rain boots, etc.
- •Sunglasses, hats, and visors

Personal Hygiene Supplies

- •Toiletry kit: shampoo, conditioner, soap/body wash, toothpaste, toothbrush, deodorants, razor, etc.
- •Medicines and prescriptions: Bring any drug prescription you need, stocking up from your pharmacy before you go. Bring cold and cough medicine, throat lozenges, fever medicine, allergy medicine, etc.; basically anything you regularly take from your medicine cabinet. Pack this all together in a small pouch.
- •First aid kit: You can just pick a small one up in your local pharmacy.
- •Sunscreen and lotion

- •Insect repellent
- •Hand sanitizer and hand wipes

Bedding and Closet

- •Bedsheet
- •Sleeping bags and/or blanket
- •Pillows
- •Towels
- •Clothesline and clothespin—or you can just bring a rope.
- •Clothes hangers
- •Laundry bags and nets

Clothing

How much clothing you will require depends on the places you plan to travel to. Most full-time RVers tend to carve their route based on the weather, implying that during the summers, they head to the north or the west, and during winters, to the south. Living in mild climates would require you to have a few heavy and thick clothes. The following checklist of clothing should suffice your needs as a full-time RVer.

- •1 denim jacket
- •1 raincoat
- •1 pair of pajamas
- •1 wool sweater
- •1 button-up denim shirt
- •3 pairs of shorts
- •6 t-shirts
- •1 long-sleeved thermal

- 2 pairs of jeans
- 1 sweatshirt

As minimal as this may seem, you will realize that you do not need more than this.

Kitchen Items

While you are in your current home, take a close look at all the tools and utensils that make up your kitchen. Which of these can you not live without? Which one of these is actually eligible to make to the room you will have available for them in your RV?

Also, remember that having an RV means that there is a lot of shaking involved as mentioned earlier too. This shaking is equivalent to almost a 3.4 magnitude constant earthquake. So having glass plates and crockery is not really going to be a good idea for your RV life.

Minimal Decorations

A few campers, if not all, do tend to have a spot for decorating their RVs while others like to keep their RVs elegantly sterile looking. You would definitely like to take a few things that would like to make your new mobile home appealing and inviting. For the interiors, small printouts of your favorite bands or movies make do for a good-looking wall. Your outdoor space will also need to be looked at. Whenever you move into a new location, the patio will become your favorite space. Would you like a hammock? Foldable chairs? A portable grill? Solar lights for the patio? These are some of the things that will help you lie down peacefully and stay calm whenever you have settled in a

beautiful location and plan to be there for a couple of days or more.

Essential Items to Have

Your RV will need maintenance from time to time. Most of the small fixes can be dealt with if you have the proper tools and some amount of expertise or a data connection to Google or Youtube. The following equipment will come in handy to keep a check on your RV's health.

- •Flashlights: It's always good to have portable lights on you when there is no constant supply of electricity.
- •Batteries: Even people who do not live the RV life keep batteries for backup. So, extra batteries will always be gold for your RV life.
- •Scissors: Because never has anyone felt that they did not need scissors. Scissors are always handy.
- •Fire extinguisher: You will be dealing with the fire in a small closed space and even around while camping. Things can go wrong in a split second, and a fire extinguisher is a must.
- •Ropes: For times when your RV gets stuck in marshy terrains, and you need to pull it out or for any other general purpose.
- •Shovel: Always good to have. Multiple purposes while you are on the open road.
- •Water hose: It can be used to wash and clean your RV. It can be used for other purposes too.
- •Tool kit: A basic multifunction toolkit for the everyday American handyman to fix things.
- •Road flares: To be used in emergencies when you have a

breakdown and need to draw the attention of passing vehicles for help.

- •Recycling bags: You are not just living in nature, but you are one with nature. It will become your responsibility to keep it as clean as possible.
- •Leveling blocks: You're not going to be always parking at a campground. You will have forest days, mountain days and valley days, etc. These will come in handy with the parking.
- •Propane: This makes for an important fuel to have at all times during your RV life. It serves multiple needs from cooking to cooling and heating your RV.
- •Duct tape: Well, duct tape never goes to waste.
- •Gloves: To help while you use most of the other essentials mentioned above.
- •Jumper cables: To jump-start your RV in case the RV battery goes too low.
- •Tire pressure gauge: To check the air pressure of your tires from time to time.
- •Light bulbs: Having a pair is always handy in case the regular lights inside the RV switch off in the middle of a journey.
- •Extension cord: To have a power plug available even a few feet from your RV. Good for those outdoor camping days.
- •Tarp: To cover your RV if you're taking a hike or are keeping away from it for a long period.

Sticks n Bricks to Full-Timers Transition Checklist

RVing offers a whole new world with unlimited possibilities for living a truly fulfilling life. Having all that extra space in the open, however, also means that you need to pack your stuff wisely for all the limited space within your RV. The essentials for a full-time RV life are listed below.

Eating

For most of us, this would be the most important part of the essentials. Meals are an important part of the RV life, and you need to ensure that you have all the required materials to suit your RV lifestyle. With sufficient storage for food items and ample space for cooking and cleaning, you could become a connoisseur of good food while on the move. Preparation helps too. Just be sure that everything is in place when it's time to put that meal together.

This list will help you with most of your eating needs:

- •Cups: These will help you serve beverages when you have any visitors coming in.
- •Mugs: Mugs can be used for any personal use when you deal with liquid items or personal beverages.
- •Plates: Plates can be reserved again for guests mostly to serve them meals.
- •Bowls: Campers usually have their meals in bowls as it makes washing them easier.
- •Small Utensils: These can be generic utensils such as a cheese shredder or a strainer.
- •Knives: These will help with the cutting and slicing and even as a defensive weapon against animals or break-ins.
- •Spoons: These can be kept in a limited quantity based on the types of spoons you may need.
- •Pan: If you want to pan-fry any meals.
- •Cleaning equipment: To clean up after cooking or eating.
- •Napkins/Paper towels: To be used to wipe your hands and

face.

- •Soap for dishes: To wash those dishes sparkling clean every time.
- •Sponges and rags: To help with the washing of dishes and other utensils.
- •Tupperware: To store extra food from lunch or dinner for the next serving.
- •Can opener: To open any can in case you buy preserved food cans.
- •Bottle opener: To have that pint of beer or open any other bottle while you are camping.
- •Oil for cooking: Essential to help you cook most of the meals during your RV life
- •Condiments: To add flavor to your food. Again, you can decide whether you want an elaborate set of condiments or whether simple salt and pepper will do.

Sleeping

One of the most important things to a camping life is to ensure that you sleep well to have a fresh day ahead of you when you wake up. Keeping the RV windows open can let you breathe in the fresh night air, and you can also set the air conditioning to enjoy a comfortable sleep in any given weather. The following essentials will help with your sleeping needs.

- •Pillows and pillowcases
- •Sheets for all the beds
- •Extra blankets and/or sleeping bags

Relaxing

It would just be a regular apartment life if there were no room for relaxation and recreation in your RV life. Therefore, you owe

it to yourself to carry the following items to keep you relaxed while you are on the road.

- •Comfortable chairs: For when you spend your evenings outside the RV around a bonfire
- •Novels: Novels and other books to read in your free time
- •Card games: For when you have friends over
- •Puzzles: To kill time every now and then
- •Stationery: For making notes and to help with all the games
- •Some outdoor games: A football or a soccer ball or some sports equipment for activities outside the RV

Bathing

While you can enjoy bathing in lakes and streams from time to time while on the road, your RV will come equipped with its own bathroom and you will need to carry the following essentials along with you.

- •Shower gel
- •Shampoo
- •Conditioner
- •Toothbrush with toothpaste
- •Towels
- •Toilet paper
- •Other toiletries

Outdoor Activities

You chose this life because you love living in the open world without any fences. You will be going on hikes, camping outdoors in forests, and truly living a life of adventure. Consider the following checklist for all your outdoor activities.

- •Water bottles: To keep yourself hydrated while you are

away from the RV.

- •Sunscreen: Since the sun can be painful in the summers.
- •First Aid Kit: Because you need to be ready for the smallest of accidents.
- •Neck warmer: To be used on those cold days when the weather is cold but still beautiful for you to go for a stroll.
- •Hat: To save you from the harsh sun rays.
- •Sunglasses: Again, to protect those precious eyes from the harmful rays of the sun.
- •Shoes: Appropriate footwear for runs or hikes and other such activities.
- •Insect repellent. Because out there in the open, the world belongs to everyone and not just you. So, you will have other friends visiting you from time to time depending upon the area you are in.
- •Backpack: To carry everything while you set off for any outdoor activity. To store your water bottles and light meals, your money and keys, and other important things.
- •Gear for outdoor activities: Hiking stick, binoculars, camera, perhaps a tripod, a compass, an adventure watch, etc. Everything you term essential for the kind of hiker you are.

This is a basic checklist for every full-time RVer, and it may vary from person to person. When you actually set off into the open, you will get more comfortable with making your own list of essentials eventually.

Chapter 7

RV Maintenance and Repairs

RV Washing

If you use your RV frequently, then regular washes are your best bet. Washing your RV often helps prevent rust, corrosion, and decay. RVs are more like tiny houses, so washing the dirt and grime off them is more complex than cleaning a regular car. Due to the high amount of water required to clean an RV, most campgrounds rarely let RVers clean their rigs on the grounds. The most practical and effective way to wash your RV would be at home or anywhere you have a steady water supply.

Materials:

- •Foam Cannon
- •Pressure washer
- •Mop/soft bristle brush
- •Soap
- •Ladder
- •Bucket of water
- •2-3 Microfiber towels
- •Wax

Here are two game-changing tips when washing your RV;

Extra help will come in handy when cleaning your RV, especially if you work in direct sunlight (which you should avoid at all costs). The whole process becomes easy and more efficient when multiple people join hands in the cleaning process. I recommend working as a team with one person rinsing and the other drying. While washing your RV in direct sunlight may be unavoidable, you can try working in the morning or right before sunset when temperatures are much cooler. This way, fewer spots and streaks will be left in the rig from quick drying, and you won't get burnt to a crisp from exposure.

You can use a foam cannon and a pressure washer to make the cleaning

process faster. You attach the foam cannon to the pressure washer, and it sprays the soapy water all over the RV. Foam cannons, like everything else, can be found on Amazon for 35 dollars. This item is a game-changer and will save you countless hours cleaning your RV.

Split the RV into these five parts when washing so that you improve efficiency and you don't miss water and soap spots:

- The RV's top section
- The driver's section
- Front of the RV
- Passengers side
- Back of the RV

Always start with the roof. Some roofs are walkable, others not so much. For this reason, rooftops can either be easy or very difficult to clean. Always read the manual before you set foot on the roof. Handle the rooftop carefully, especially around any miscellaneous objects such as antennas, vents, and skylights. Slipping from this height could be a disaster, so be cautious with that too.

Steps:

1. Using a pressure washer, wet a section of the RV. A pressure washer ranging from 1300-1700 PSI should be appropriate. Make sure that you never use the pressure washer's most robust tip (don't attach any angle below 25 degrees). Always keep a safe distance (neither too close nor too long in a single spot) while cleaning. Otherwise, necessary seals and vinyl decals may come off.
2. Spray the side of the RV you are cleaning using a foam cannon. There are many excellent foam cannon soap options available online. Mix the foam cannon soap with water in a ratio of 1:1.
3. Dip your mop/brush into the water bucket and apply it firmly to the RV.
4. Dip your microfiber towel in the water and clean the tires.
5. Rinse everything off using the pressure washer.
6. Repeat until the whole RV is clean.
7. Dry off the RV with microfiber towels. Microfiber towels have up to 200,000 fibers per inch of fabric, so they will efficiently and effectively dry off the RV.
8. Polish off the RV using wax. Waxing your rig may be time-

consuming, but doing it at least twice every year adds an extra layer of protection against the elements.

RV waxing is one of the most overlooked parts of RV maintenance. Not only does this wax make your RV look way better, but it leaves a protective layer on the RV. This layer wears away as the months go by, so you should be waxing every few months. Regular waxing ensures your RV is on its A-game, and who doesn't want the best-looking RV in the campground.

Always use special RV wax to avoid oxidation of the fiberglass. You can use paste, liquid, or spray on wax to get the job done. The process takes 1-2.5 hours, depending on the size of your rig. That's because your RV probably has more surface area compared to the average sedan. Test the wax on a small area of the RV first to see how that turns out. Don't forget to have extra caution when applying the wax on decals and seals.

If you are fully committed to high levels of RV cleanliness or if you clean your rig frequently, I recommend looking into water deionizers. Water deionizers enable you to clean your RV without drying it by taking the minerals that cause oxidation out of the water. They cost around \$400, but they will save you so much time in the long run because you don't have to dry off your RV anymore.

Waterless Wash

Cleaning your RV the traditional way takes a tremendous amount of work and time. But you'd be intrigued to learn that there is a product called Wash Wax All that encapsulates the dirt on your RV so that you can clean it without water while waxing it simultaneously. Wash Wax All has polymers that give your RV a glossy sheen even if you don't polish it after washing. It is a high-performance product that is very simple to use. Besides, with Wash Wax All, you will need neither a hose nor a pressure washer. For this reason, you won't have to worry if you are in an area where water is restricted, and you don't need lots of space either.

Wash Wax All is an exceptional 5-star product on Amazon with over 2,000 reviews. If that doesn't make you a believer in WWA, I don't know what will.

Materials:

- Microfiber Mop

- Wash Wax All
- Spray Bottle
- Ladder (to get to the top of the RV)

Steps:

1. Mix the Wash Wax All with water in the spray bottle in a ratio of 1:1. Feel free to make adjustments depending on how strong you want the mixture to be.
2. Using the spray bottle, wet one side of the microfiber mop with the Wash Wax All mixture and start scrubbing the RV. The mophead should be moist but not wet. Let the mixture sit on the RV for about 1 minute so that all the dirt gets encapsulated. Always use a quality microfiber mophead because without it, the Wash Wax All may not work efficiently.
3. Go back over the side you cleaned using the dry side of the mophead. The Wash Wax All will clean the RV and act as a wax that protects it from the elements.
4. Repeat the process until the RV is clean

This method takes anywhere between 45 minutes-1.5 hours.

Tires

Distribution of Weight

When it comes to weight and handling, driving an RV feels more like a truck. Fifth-wheel trailers, travel trailers, and motorhomes can all be quite hefty. The wide and heavy load makes them susceptible to harsh weather and high winds. For this reason, RV weight distribution, especially around the tires, is crucial.

Sadly, most RVers neglect their tires. For example, when did you last check the tire pressure? If you own a motorhome, when did you check the inner duals? Better yet, when was the last time you got your rig weighed? Be prepared for sky-high repair costs and unexpected downtimes if you have either inflated tires or an overweight RV because both are unsafe. Most RVers neglect their tires because they don't understand the requirements for proper maintenance.

You'd be intrigued to learn that a study done by Recreation Vehicle Safety Education Foundation reported that more than 25% of RVers

overloaded the maximum tire capacity of their rigs. Based on manufacturer specifications, the RVs were overloaded with more than 900 extra pounds. Another survey done by Firestone showed that out of every 5 RVs, at least 4 had an inflated tire. 1/3 of all the inflated tires were dangerous and could fail at any moment. If that is not bad enough, the extra weight weighed down 40% of all rear tires. All these make sense because RVers are obsessed with filling every nook and cranny of all available space. Today, my goal is to ensure that you don't become another statistic in either overloaded RVs or under-inflated tires.

All tires have a maximum weight capacity for safety reasons. The load shouldn't go past the maximum cargo capacity recommended by the manufacturer. Most, if not all manufacturers, come up with weight ratings based on the chain's weakest link. The RV itself, the suspension system, axles, tires, and brakes all have a weak link, and in most cases, the tires are the weakest link.

The weight distribution throughout the RV should be uniform so that no single tire bears most of the load. If you are concerned about your RV's weight distribution, find a vehicle scale and weigh each tire separately to check the load distribution on each tire. Finding a scale shouldn't be a challenge. Just look up truck scales near me on google maps, and a million options will pop up.

The permissible tire load depends on the specific load range and size of a tire. If you want to increase your load capacity, you can change to a tire with a higher load rate but always keep the gross axle weight in mind.

Tire Pressure

Never drive your RV with a tire pressure less than that recommended for the load. If the tire pressure is too little, the sidewalls might flex too much and overheat. Underinflated tires have increased friction which makes them susceptible to overheating and tire blowouts. If the pressure is too much, the traction reduces together with the stopping distance. Overinflated tires are prone to punctures, cuts, and breaks.

Your tires' performance is dependent on the correct PSI (pounds per square inch). Finding a suitable PSI doesn't have to be a challenging task. There are multiple ways to figure out the correct tire pressure and specifications. One method is to find the manufacturers' data plates that are usually available for all RVs. The data plates will give correct PSI recommendations depending on the RV's maximum weight load.

Take into account that the scale will recommend the PSI at the maximum weight capacity the RV can handle. So, if you load your RV lightly, you

will be overinflated if you use the plate's recommendation. To make sure you have the correct tire pressure, you need to get a tire pressure gauge. Gauges cost \$5-10 and are worth every penny. Tire gauges allow you to measure the PSI (Pound Per Square Inch) of a tire. Before every trip, you need to check your tire pressure with the gauge.

If you don't maintain the correct tire pressure, the tires may suffer from excess heat build-up, poor handling, and fast tread wear. A tire may lose up to two pounds of air pressure every month. You should therefore check your tire pressure regularly to make necessary adjustments and improvements that are required. Two tires that look the same might have a very different pressure. That's why an accurate pressure gauge is a necessity for your RV. Try to avoid checking the pressure when tires are still hot; you will get a higher pressure reading.

Age and Types of Tires

Old age is tough on anyone, and tires are no exception. Most drivers usually replace tires when the treads wear out, but tire life is more than just tread wear. RVs spend a fair amount of their life parked and exposed to damaging UV rays. Sun rays accelerate tire aging, especially on the sidewalls. When the RV is parked on concrete or asphalt, the lubricants in the treads slowly wither away over time.

Long hours of parking will also flat spot and harden your rig's tires. As you can see, parking your RV long-term isn't a good idea. I typically try not to let my RV sit for more than three months without driving it.

Most RV tires have an efficient working life of about five years. However, you can double that period to 10 years with proper maintenance and protection from certain factors such as exposure to UV, rough weather, poor storage, speed, and low inflation.

I would recommend that you get an inspection done on your tires annually after the first five years.

Fortunately, the Department of Transportation designed a method that all RV drivers can use to determine how old a tire is. The uniform tire identification code developed by DOT quickly identifies the manufacture date of the tires. It's worth noting that a tire on a new vehicle may be much older than you think. Maybe the tires had been sitting in the warehouse for a long time before they got installed.

The DOT number is usually located on the inside sidewall of the tire near the rim.

Check the last four digits of the DOT number to understand when a tire was manufactured. The first two numbers of the last four digits will tell

you the week the tires were manufactured. The last two numbers show the year the tires were manufactured. For example, if the last four digits of a DOT read 0821, the tires were manufactured in the 8th week of 2021.

Tire Covers

Tire covers are vital. They protect your RV tires from elements such as UV exposure, snow, rain, and wind which impact their lifespan. Covering your tires when they are not in use significantly increases their durability.

Tire covers cost approximately \$20-50 dollars and are well worth it in the long run.

Tire Maintenance

The most important aspect of proper tire care and maintenance is cleanliness. Dirt and oil on the road suck the life out of your tires when you don't maintain them. The soil acts as a sponge that holds the contaminants while the oils degenerate the rubber. If the tires are dry and clean, the natural lubricants that protect them won't erode near as quickly.

You can wash your tires with soap and water occasionally, but don't go beyond that. Excessive washing will eliminate antioxidants and anti-ozone found on the sidewalls because they are meant to protect the tires. I recommend using tire dressing once every few months to protect your tires. Tire dressing cost around 15 dollars and can easily be found on Amazon or any local maintenance and repair shop.

Be careful and avoid tire dressing that contains alcohol, silicone, or petroleum products. These three ingredients can fasten the aging process by causing your tire to crack. As long as your tire dressing doesn't have these harsh chemicals, it should be protected from harmful UV rays.

Conclusion

Thank you for reading this book. If you want greater independence on the road while keeping many of your comforts, try bringing along another automobile—what we call a dinghy to tow behind your class A motorhome—or just getting a towable. The extra vehicle will provide you a lot more freedom to drive wherever you want without having to worry about finding parking for your really big rig or whether or not it will fit where you want to go.

You can have your prescription medications delivered to campgrounds if you're concerned about them. Simply locate and inquire as to whether or not the campsites will take packages for you. You can also plan your trips to the cities so that you can pick up your prescriptions from stores like Walgreens or CVS, which have locations all over the country.

People will condemn you for living in a style that is different from what society mandates, especially if you live in a smaller rig and want to go to a lot of places. You'll have to refill your jugs or tanks from drinking fountains on occasion. You'll have to learn to care less about what other people think of you. You don't have to be ashamed. Other than the amazing adventures on offer, there could be a variety of reasons why someone would choose to live this life, but as long as you're not doing anything wrong, you're fine.

Some campgrounds have a 10-year restriction, which means RVs older than 10 years may be turned away. This is more or less the case in the higher-end parks, for reasons such as reducing vehicle failures, limiting electrical surges, and even maintaining the park's appearance. So, if you're looking to rent or buy an older RV, add this to the list of things you should ask the campground before making a deposit.

The weather will govern your life if you have an RV that relies heavily on solar power for electricity. If it's going to be cloudy for a few days, go somewhere sunny or go without electricity for a few days.

Look for an RV that allows you to stand comfortably inside. If you're on the shorter side, this shouldn't be a problem. Many people underestimate the importance of being able to stand up and walk around in a rig without bending any parts of your body or striking your head whenever you go to

the restroom, especially if you plan to travel for lengthy periods. After a wonderful vacation, no one wants to acquire chronic back discomfort.

If you suffer from back problems and are planning a long vacation, whether you're renting or not, you should definitely consider investing in a nice mattress for your RV. Soon after, your back will shout praises to thank you.

Us Park Locator Chart

State Parks RV Camping Alabama



Alabama is a state found in the Southeast USA. This state is bordered by Georgia to the east, Tennessee to the north, Mississippi to the west, and the Gulf of Mexico to the south. Alabama is the 24th most populated state and ranked 30th in size. Birmingham, which is among the most industrialized cities in the country, is the largest city in Alabama. This state is diversified when it comes to geography. The northern region is dominated by Tennessee Valley (mountainous), while the south has Mobile Bay, one of the most historical ports. Alabama is generally an exciting state with plenty of captivating locations. When it comes to state parks, Alabama has plenty of them. Discussed below are some of the state parks in Alabama.

Blakeley State Park-Harper-Spanish Fort, Alabama

Located within the famous Mobile-Tensaw Delta, Blakeley State Park is one of the most diverse and largest state parks in the Gulf Coast region. Sitting on over 2,000 acres of land, this park has the most biodiversity setting in the Northern USA. It contains historical sites of the state's largest Civil War battle and Native American settlements that date back many years. The park also contains Blakely, an important and historical early town of Alabama. Generally, this is an exciting park with plenty of

fun activities. There are over 20 miles of biking, nature trails, and horseback riding, among others. You can also enjoy the exciting boat cruises into the Delta River. You surely won't run out of fun activities at this park. Furthermore, the park has RV and primitive camping facilities, cabins, as well as restrooms.

OTHER ATTRACTIONS CLOSE TO THE PARK

This park is located close to Spanish Fort, a major town where you can explore and enjoy the numerous joints.

CONTACT INFORMATION

Phone Number: +1251-626-0798

ADDRESS AND DIRECTIONS

Address: 34745 AL-225, Spanish Fort, AL 36527, United States

GPS Coordinates: 251.626.0798

HOW TO MAKE RESERVATIONS

You can make early reservations for this state park. You can do so by calling or using their website. It will cost you \$99 to make a reservation. Furthermore, there is a \$30 fee for RV camping sites. The best time to visit this state park is in the summer when the climate is stable.

MAIN ACTIVITIES AND ATTRACTIONS

- •RV camping
- •Horseback riding
- •Nature trails
- •Kayaking

Wind Creek State Park

Located on Alabama Highway 128 and south of Alexander City, Wind Creek state park is one of the largest campgrounds in the country. Many other things make this state park special. It also acts as the public access to Lake Martin, one of the largest water bodies in the state. This park sits on a massive 1,445 acres of land that stretches to the beautiful shoreline of Lake Martin. These captivating features make the park an exciting place to be.

Bluegill, crappie, and striped bass are some of the rare and beautiful species the lake has to offer. If you love water sports, this park is a great place to camp. There are also fishing tournaments that are organized at the park annually. If you are skilled enough to test the rocky waters, you can try the "Chimney Rock" area of Lake Martin. This is one of the most

coveted areas of the lake. After enjoying the lake, you can take a calming visit to the North Picnic Area and enjoy some fishing and swimming. There are plenty of fun activities at this park, and it's never a dull day!

OTHER ATTRACTIONS CLOSE TO THE PARK

There are several attractions located close to this state park. Some of them include areas like the Smith Mountain Observation Tower, Cherokee Ridge Alpine Trail, Forever Wild Coos, Coosa Wildlife Management Area, Coon Creek Forever Wild Tract, and the Yates Lake Wildlife Management Area.

CONTACT INFORMATION

Phone Number: 256-329-0845

Website: alapark.com

ADDRESS AND DIRECTIONS

Address: 4325 AL-128, Alexander City, AL 35010, USA, South of Alexander City on Alabama Highway 128

HOW TO MAKE RESERVATIONS

This state park has an online reservation system that works efficiently. You can use it to make reservations or call the park office. If you live nearby, you can simply walk in and make a reservation. This park strongly recommends reservations. There is a \$5 reservation fee for people aged 12-61 years. There is also a \$4 parking fee for visiting campers. The best time to visit this campground is in the summer and early months of winter. Activities during this time are many, and rates are subsidized.

MAIN ACTIVITIES AND ATTRACTIONS

- Dining
- Equipment Rentals
- Fishing
- Geocaching
- Mountain Biking
- Golfing
- Trails
- Zip Lines

Bucks Pocket State Park

After 5 years of renovations, this state park was officially reopened in January 2021. The new Bucks Pocket State Park now has an attractive

camping area and reconstructed ORV trail. Several amenities create a lucrative environment for off-road enthusiasts, campers, and vacationers. The improved state park has become an instant attraction in Alabama thanks to extensive renovations. The construction of numerous picnic tables and fire rings creates an environment for overnight camping.

Buck Pocket State Park has a total of 23 campsites, with 13 of them being hook-up sites. 4 of those campsites are pull-through sites. All the 23 campsites are connected to water and electricity. Furthermore, each campsite has a picnic table, camper pad, fire ring, and grill. You will also have access to 11 primitive campgrounds located in the southern part of the campground.

OTHER ATTRACTIONS CLOSE TO THE PARK

Some of the nearby attractions include the Walls of Jericho Forever Wild Tract, High Falls Park, DeSoto State Park, Lake Guntersville State Park, and Mentone Camping Area.

CONTACT INFORMATION

Phone: 256-659-6288

ADDRESS AND DIRECTIONS

Address: 393 County Road 174 Grove Oak, AL 35975

GPS Coordinates: 34.47083145

HOW TO MAKE RESERVATIONS

You can make reservations by calling the park office or using their online platform. This state park requires you to make a reservation with payment for the total stay, plus taxes. The total amount is paid when the reservations are made. If you want to make a reservation for tent camping, call directly because this reservation is not yet available online. Similarly, primitive camping is only reserved through calling. The best time to visit this state park is in December.

MAIN ACTIVITIES AND ATTRACTIONS

- •Dining
- •Equipment Rentals
- •Fishing
- •Geocaching
- •Mountain Biking
- •Golfing
- •Trails
- •Zip Lines

Gulf State Park (Near the Town of Gulf Shores)

This is another exciting state park in Alabama. The Gulf State Park has around 6 kilometers of beaches, a brand new Lodge and Conference Center, and a spacious campground. The park has attractions like surfing, white sand, seagulls, and plenty of fun activities you can engage in. This destination is a place you will definitely want to visit more than once. There is too much to explore in just a few days. After having a great time hiking, you can start biking.

If that is not your fun activity, there is paddling and swimming in the Gulf. Furthermore, you will have the luxury of choosing whether you want to camp under the stars or take advantage of the excellent indoor lodging facilities. Furthermore, you can have an educational adventure at the park's Nature Center. There is also the Learning Campus and Interpretive Center which can be a great source of educational insights. Boredom is the last thing you will find here!

OTHER ATTRACTIONS CLOSE TO THE PARK

This park is located close to Foley, Orange Beach, Gulf Shores, Mobile, and Fairhope. This gives you several restaurants and retail options to consider. Some of the other nearby attractions include The USS Alabama and Meaher State Park, Weeks Bay Reserve, and The Five Rivers Delta Resource Center.

CONTACT INFORMATION

General Park Info: 251-948-7275

The Lodge: 251-540-4000

Camping: 251-948-7275

Cabins & Cottages: 251-923-3900

ADDRESS AND DIRECTIONS

20115 State Park Road, Gulf Shores, AL 36542

HOW TO MAKE RESERVATIONS

You can make reservations either by calling or using the online platform. Keep in mind that this park requires a \$200 deposit at the time of booking and a \$5 reservation fee. There is also a \$4.5 fee for parking. During peak seasons, this park offers discounts on its services.

MAIN ACTIVITIES AND ATTRACTIONS

- •Camping
- •Swimming
- •Zip Lines

- •Golfing
- •Mountain Biking

Meaher State Park

This state park seats 1,327 acres of land. It is located in the northern region of Mobile Bay. The Meaher State Park is a day-use, scenic and picnicking park that has modern camping hook-ups for overnight stays. This park's fishing pier and boat ramp are a great attraction for those that love fishing. There is also a self-guided walk on the boardwalk that will give you a unique and up-close view of the Delta.

OTHER ATTRACTIONS CLOSE TO THE PARK

After having a good time at the park, you can also explore the various attractions nearby. Thanks to the park's close location to Mobile Bay City, you will have abundant dining and shopping options. The beautiful white sands of the Gulf Coast are also a few minutes away. If you still thirst for outdoor adventures, the nearby Upper Delta Wildlife Management Area will offer wildlife viewing and hunting opportunities.

CONTACT INFORMATION

Phone Number: (251) 626-5529

ADDRESS AND DIRECTIONS

5200 Battleship Parkway East Spanish Fort, AL 36527

HOW TO MAKE RESERVATIONS

You can make reservations by calling the park office or using online platforms. There is a \$2 entrance fee for day use only. This will allow you to participate in activities like birding, taking pictures, fishing, and hiking, among others. However, if you want to go boating, you will pay a \$4 boat entry fee. Parking is free thanks to the large parking area.

MAIN ACTIVITIES AND ATTRACTIONS

- •Fishing
- •Boating
- •Nature Trails
- •Swimming
- •Hiking
- •Bird Watching

Rickwood Caverns State Park

This is a lucrative state park found in Alabama. What makes this park

unique is the historical cave that contains 260-million-year-old formations created by water. These formations reveal evidence that the cave was carved from the nearby ocean bed. The Rickwood Caverns Park has every trait of an exciting location. If you are looking to warm up during the cold months of winter or cool off from the hot summer temperatures, this underground gem maintains a constant temperature year-round. There are many captivating wonders around this state park. Perhaps, the main attraction is the guided cave tour. This park is also a great place for activities like picnicking, camping, gemstone mining, hiking, and bird watching.

OTHER ATTRACTIONS CLOSE TO THE PARK

Some of the attractions located nearby include the Tannehill Ironworks Historical State Park and The Bankhead National Forest. You will have plenty of dining and shopping options in downtown Birmingham. You can also enjoy biking at the Coldwater Mountain Forever Wild Tract found near Anniston. Other attractions include the Birmingham Civil Rights Institute, the Cahaba River National Wildlife Refuge, Sloss Furnace National Historic Landmark, Forever Wild Turkey Creek Nature Preserve, and Ruffner Mountain Nature Center, among others.

CONTACT INFORMATION

Office: 205-647-9692

Campground: 205-590-0832

ADDRESS AND DIRECTIONS

370 Rickwood Park Road Warrior, AL 35180

HOW TO MAKE RESERVATIONS

To make reservations, you can either call the park office or use their online platform. If you live nearby, you can also walk in and physically make a reservation. The best time to visit this park is during the months of summer.

MAIN ACTIVITIES AND ATTRACTIONS

- Guided Cave Tour
- Picnicking
- Camping
- Hiking

State Park Campgrounds Arizona



Arizona is a state found in the western region of the United States. It is often grouped in the southeastern states and sometimes the mountain sub-regions. It is the 14th most populated and the 6th largest state in the country. Phoenix is the capital and largest city in Arizona. This state shares the Four Corners Region with Colorado to the northwest, Utah to the north, and New Mexico to the east. Some of the neighboring states include California and Nevada to the west and the Mexican states of Baja California and Sonora to the south.

The southern region of Arizona is known for its desert-like climate, with very mild winters and hot summers. On the other hand, the northern region of the state features forests of Douglas fir, pine, and spruce trees. It also has mountain ranges such as the popular San Francisco Mountains and Colorado Plateau. This region also contains deep, large canyons with significant winter snowfalls and moderate summer temperatures.

There is also access to world-class resorts in the areas of Tucson, Alpine, and Flagstaff. Apart from the globally recognized Grand Canyon National Park, one of the world's seven wonders, there are plenty of other monuments, national forests, and state parks. Discussed below are some of the state parks in Arizona.

Lake Havasu State Park

This is an exciting state park located on the shores of Lake Havasu. It features a large grassy area and beautiful white-sand beaches. This state park gives you an outstanding view of the lake and mountains around. Shade covers, grills, and picnic tables make Lake Havasu State Park an excellent place to stay and relax on the beach. There is also a camping option.

Furthermore, this state park has picnic areas for special occasions or family reunions. If you love nature walks and hiking, there is the Mohave Sunset Trail, located a mile away. There is also the Arroyo-Camino Interpretive Garden that is within the park. This garden is home to a wide range of wildlife and rare species of plants.

Those that love bird watching will love the Great Horned Owl and Anna's Hummingbird that are within the park. Pets are allowed here but

must remain on a leash. Besides, boating is also a popular activity here. There are around five boat ramps that are available to campers.

OTHER ATTRACTIONS CLOSE TO THE PARK

There are several attractions near this state park. You have the option to explore other nearby attractions like River Island Unit which is 25 miles away, Buckskin Mountain State Park around 27 miles away, and Cattail Cove State Park, that's only 15 miles away. There are also other places like the Lake Havasu Museum of History where you can stop by and learn more about the region's history. You also have a great opportunity to tour and explore the desert interface at the nearby Bill Williams National Wildlife Refuge.

CONTACT INFORMATION

Phone Number: (928) 855-2784

Email: ljuers@azstateparks.gov.

ADDRESS AND DIRECTIONS

Address: 699 London Bridge Road, Lake Havasu City, AZ 86403

HOW TO MAKE RESERVATIONS

You can make reservations by calling the park office or using the online method. The charges are \$90 for a family of up to 4 members. Additional members will pay \$5 each. The best time to visit this state park is during the early months of summer.

MAIN ACTIVITIES AND ATTRACTIONS

- Hiking
- Camping
- Birdwatching
- Swimming
- Fishing
- Boating
- Picnicking

Cattail Cove State Park

Cattail Cove State Park has a total of 61 RV and camping sites. The maximum number of days you are allowed to stay here is 14. There are several campsites, with each holding a maximum capacity of 10 people. A maximum of six adults are allowed on one campsite. Furthermore, a maximum of two vehicles are allowed per campsite. Sites that haven't been reserved are sold out on a first-come, first-serve basis. Keep in

mind that you are not allowed to save sites. All the campsites are connected to water and electricity.

Besides, they also have a BBQ fire grill and picnic tables. In most cases, fires are allowed at fire rings at every site except when there are fire restrictions. Out of the 61 campsites, 57 have 30-amp service. The remaining four offer 50-amp service. This state park has primitive camping sites with stand-up BBQ grills, picnic tables, and access to washrooms. There are also waste bins. However, there are no campfires and fire pits all year round. Keep in mind that all boat-in campsites operate on a first-come-first-serve basis.

OTHER ATTRACTIONS CLOSE TO THE PARK

There are plenty of attractions close to Cattail Cove State Park. You can explore other nearby parks like Lake Havasu State Park which is located 17 miles away, Buckskin Mountain State Park, located 15 miles away; and the River Island Unit which is only 14 miles away. You will also have plenty of dining and shopping options in Lake Havasu City, located 10 miles north of the park. Those that like wildlife viewing will love the River National Wildlife Refuge, that's eight miles south of the park.

CONTACT INFORMATION

Phone Number: (928) 855-1223

ADDRESS AND DIRECTIONS

Address: Lake Havasu City, AZ 86405

Directions: To access this campground, drive 15 miles south of Hwy 96

HOW TO MAKE RESERVATIONS

The most common way of making reservations at this state park is through phone calls. Get in touch with the park office and let them know when and for how long you intend to stay at the park. Keep in mind that the maximum number of days you can stay here is 14. The best time to visit this park is towards the end of winter.

MAIN ACTIVITIES AND ATTRACTIONS

- •Camping
- •Boating
- •Hiking
- •Swimming
- •Fishing

Buckskin Mountain State Park

From boating to swimming to camping and hiking, there is so much you can do at Buckskin Mountain State Park. You will also have exquisite views of the area and an 18-mile stretch that runs along the Parker Dam and Colorado River. Parker Dam is the world's deepest dam, making it an attraction on its own. This area's warm weather and a combination of land and water activities make the park one of the best places to be.

You can enjoy mild winter temperatures, relax at your campsite, or cool off in the river during the hot summer seasons. Boating is one of the popular activities at this state park. If you don't have a boat, the strip has many rental options you can use. There are also several campsites to make sure your stay is comfortable. Some of the other common activities at this state park include fishing, swimming, and hiking. There is also access to water and electricity.

OTHER ATTRACTIONS CLOSE TO THE PARK

While staying here, there are plenty of nearby attractions. For instance, you can explore the London Bridge, one of the world's largest antiques. There is also the Lake Havasu Museum of History, where you can stop by and learn more about the area's history. Furthermore, the Bill Williams National Wildlife Refuge located nearby gives you a great opportunity to explore the desert interface. This refuge is also an excellent place for hiking and bird watching. Those that like wildlife viewing will love the Havasu National Wildlife Refuge located nearby.

CONTACT INFORMATION

Phone Number: (928) 667-3231

ADDRESS AND DIRECTIONS

Address: 5476 North US Hwy 95 Parker, AZ 85344

HOW TO MAKE RESERVATIONS

You can make reservations by calling the park office or using the online method. If you live nearby, you can simply walk in and make a reservation. The park charges \$10/day per vehicle and \$3/day for bicycles. The best time to stay here is during the months of summer.

MAIN ACTIVITIES AND ATTRACTIONS

- Camping
- Hiking
- Horseback Riding
- Boating
- Fishing

- •Swimming

BOOK 8
DIY SOLAR POWER

THE COMPLETE GUIDE TO
BUILD
YOUR OWN SOLAR POWER
SYSTEM

Introduction

When solar energy systems were first introduced to the public, it was believed that they were only for the wealthy as they were incredibly expensive, even with the subsidies provided by many governments. However, as with all new technology, purchasing either the original equipment or the latest version is now much cheaper. The result has been the possibility of creating your solar energy system and removing your RV from the grid. This will provide an enormous sense of financial freedom and release you from any uncertainty regarding electricity prices in the future.

In a world where a limited quantity of carbon fuels is left, many scientists and even individuals are looking to devise new ways of creating energy. Of course, many countries operate nuclear power stations that provide them with all the electricity they need with surprisingly few environmental effects. However, a nuclear power station is inherently dangerous. If something were to happen at the power plant, it is possible to have a disastrous fallout, affecting thousands of people.

As such, there has been a massive increase in interest in more passive, environmentally friendly approaches to creating energy. Wind and water power are two avenues that have been explored thoroughly within the last few years. Solar power is another potential solution to the energy crisis around the world. Many companies and even individuals have invested in their solar panels to generate electricity, assist the planet and save funds.

Solar power is the future of energy consumption as all the big corporations invest in gaining better technologies in this direction. When you choose to move to solar energy, you can get the latest technology for power generation. Having the latest technology means that you have the best chances of utilizing power and energy.

Moving from grid to solar power has unique benefits, and now you know all about them. Understanding these benefits will help you make your final decision. Focus immensely on the quality of lifestyle and cost-saving opportunities. You can have your energy supply and save throughout the year.

Benefits for People, Environment, and Money Saving

Solar power is significantly beneficial when you look at it from a scaled perspective—meaning it has overreaching benefits for all of humanity and the rest of nature because the conventional sources of electricity generation hurt the health of living organisms and the environment as a whole. Solar energy can generate electricity in a way that does not have any of these effects, making clean energy a significant reason for its shift.

But more importantly, there is one economic reason that most individuals and societies fail to realize. Non-renewable resources are coming to a point where supply certainty is coming into question. Mining costs and exploration costs are increasing to the point that other forms of energy extraction are becoming comparatively less economical and more expensive. That increased cost affects everyone. It translates to higher input costs for manufacturing, thereby higher costs of goods ranging from food to clothing and transportation to housing. Indeed, it touches all layers of the economy.

Aside from rising costs, the annoying instability of costs affects households. The cost of power can fluctuate as time goes by, and as average temperatures start to rise, the cost of cooling homes and offices is starting to demand the power grid. There are cases where you observe rolling brownouts in neighborhoods with sweltering heat in the summer. A house fitted with supplemental solar power will not be a victim of those brownouts or out-and-out power disruption.

Often, we limit ourselves to what we want to use in the RV which may strain the costs of power. With a solar system in the house, we no longer have to limit our electricity use because the electricity we demand is not derived from a non-renewable source. The increased demand we place has no adverse effects on the planet, our neighbors, and our future generations.

Chapter 1

DIY Solar Power System

Types of Solar Power Systems

Grid-Tied Solar Power System

A grid-tied system requires a connection to a network or a utility power grid to generate and supply solar energy. There are no batteries connected to the system, and any excess energy that is generated is sent back to the network.

If the energy generated into your switchboard is more than your power consumption, then the excess electricity is directed to the grid through the meter. This specific meter records the amount of kilowatt-hour (KWh) sent to the grid. Your utility company will record this figure in every billing cycle and pay you accordingly.

Off-Grid Solar Power System

An off-grid system doesn't require a connection to the electricity grid. You only need to connect to the battery to store the excess electricity. The battery capacity will enable you to store enough electricity to be used at night and on cloudy days. The power generated can meet residential, industrial, and commercial user needs, even during the winter months.

Hybrid Solar Power System

A hybrid system is a mix of both grid-tied and off-grid systems. When the grid is available, they work as on-grid solar systems; otherwise, they perform like the off-grid system. They generate electricity similar to a conventional grid-tied solar system. The lithium or lead-acid battery connected acts as a backup power

supply. If you want to have a continuous power supply in case of a power outage, you should consider a hybrid PV system.

How to DIY Installing a Solar Power System, Step by Step

1. Design and size your solar power system based on your power needs.
2. Buy solar power equipment.
3. Mount your solar panels either on the rooftop or in your garden.
4. Connect your solar panels to the charge controller and then to the battery (in battery-backed systems).
5. Install solar inverters and set up stands for your inverter and battery.
6. Install a smart meter/net metering (for grid-tied and hybrid systems).
7. Complete your power system by connecting it to the main electrical board.
8. Request your local utility company to permit you to Operate (PTO) on the net metering system and connect to the grid (if applicable).

Following these steps will help you set up your solar power unit. The financial return can be reaped later since solar energy is a green energy source and cost-effective.

How to Evaluate Solar Potential

Solar power is more effective if you live in a place that gets a lot of sunlight. Not all places are the same when it comes to this. If

you don't get enough direct sunlight in your area, solar will not work as well. In other words, the farther away we get from Earth, the more difficult this process will be. Many people live in places like Canada, Russia, Alaska, or Northern Europe who are at a big disadvantage. On the other hand, places like Hawaii, Ecuador, and Tahiti have a big advantage because they get a lot of sunlight.

The different seasons also affect how well solar power works. This means that a lot more energy will be made during the summer months than during the winter months. Even though solar panels need direct sunlight to work at their best, they can still work even if it's cloudy outside because they can still make electricity from direct sunlight. Clouds can still block some or all of the sun's rays, but solar power can still be used.

How to Aim for Maximum Energy Efficiency

- The efficiency of a solar panel is how well it can turn sunlight into energy that can be used. Most of the time, people use photovoltaic panels in their homes. They can have anywhere from 150 to 370 watts of power per panel. It also helps that solar cells with no grid lines on the front are better at absorbing sunlight than other types of solar cells. Having a microinverter on each panel can also be better than having a single inverter on the side of your house.
- The most important thing to remember here is that the more efficient the panels are, the more wattage they can make. In turn, the fewer panels you need means that you will need less of them. In this case, quality is more important than how many things you have. The cheaper the

panels, the more likely it is that you will need to buy more of them to get the same amount of power.

- To figure out how many solar panels you need, divide the wattage of the solar panels by the wattage of your home.

How to Calculate Payback of Your Investment

When you switch to solar energy, you may expect to see a reduction in your monthly power bill from the utility provider. Suppose you have a solar system connected to the grid. You may export surplus solar energy to the utility company and earn quarterly money depending on the amount of power you ship to the utility company. It is possible to import more fuel from the utility company when your solar panels are not producing enough electricity. When compared to when you are exclusively reliant on the utility provider, this will result in a reduction in your power price. The choice to invest in solar energy is good to make if you want to minimize your expenses while also protecting the environment. Even though the initial cost of installing a solar system is significant, the system will eventually pay for itself over time. The state and federal tax breaks shorten the time to pay down the debt.

In most cases, if you build a grid-connected solar system yourself, it will pay for itself within three to six years; if you employ a professional contractor, it will pay for itself in around five to nine years. Aside from that, solar panels are covered by a 25-year guarantee, and any energy produced beyond the first payback period is considered a return on your investment (ROI). In the case of a solar energy system, the payback period is the amount of time it will take you to repay your original investment. Calculating your payback time using a solar ROI

calculator online is simple. As an alternative, you may use the solar payback method to figure out how long it will take to pay off your investment in solar energy. You might begin by estimating the overall cost of installing a solar system after subtracting any subsidies that may be available. Once you have this amount, you may compare it to the cost of power from your local utility provider.

*Payback Period = (Total Installation Cost - Value of Incentives) / (Cost of Electricity per Unit * Annual Electricity Consumption)*

You should budget for the cost of solar equipment, a permit, installation expenses, contractor salaries, and any other expenditures related to the project as part of your overall installation costs. Incentives have a monetary value that rewards, such as the tax credits you get for installing solar electricity. In most cases, the solar investment tax credit is worth 26 percent of your federal taxes, and you are eligible to claim this credit. When determining the repayment time, consider any additional municipal or state incentives available in your nation. The cost of power is calculated as the billing rate per kilowatt-hour of energy used. Your utility company should supply you with information on the cost of fuel. Your electricity bill often displays the amount of power used or used. Annual electricity consumption is calculated by multiplying the monthly use by twelve to get the yearly consumption. Alternatively, you may collect monthly utility bills from the utility provider for the whole year and calculate an appropriate figure.

Chapter 2

How Solar Panels Work

Hybrid AC & DC Solar Electricity (Off-Grid)

Components of a Hybrid System

Solar Panels

Depending on your energy requirements and the efficiency of your system, you can choose panels that help meet your specific demands. You have to determine the right size for your system to meet your energy needs. As with any PV system, a specific racking system is required to install panels.

Hybrid Inverter

As mentioned above, a hybrid inverter combines two separate devices in one unit: a battery charger to charge the storage and a solar inverter to convert the panels' generated power to AC electricity. Due to having more complicated functions than conventional inverters, hybrid inverters are more expensive but slightly less efficient than grid-tied inverters.

If you are anticipating adding batteries to your existing grid-tied system in the future, it is wise to consider a hybrid inverter when planning your system. A hybrid inverter, in this case, works similarly to the traditional grid-tied inverter.

Once your budget lets you add batteries, your hybrid inverter acts as a battery charger/inverter and a solar inverter. Alternatively, you can add a battery charger/inverter separately to your grid-tied inverter in case you want to add a backup to the existing, totally grid-tied setup.

Battery Bank

Depending on the size of the batteries, they can store power for use, ranging from several hours to several days. If you often experience interruptions of grid power supply, especially during bad weather conditions, batteries will be of great benefit.

Tesla Powerwall is one of the most popular home battery systems because of its battery capacity of 14kW, which can store half the average daily energy consumption for homes in the US. It allows you to keep

lights on 24/7. Additionally, Powerwall's unique technology allows you to use all the stored energy in the battery without damaging it.

Charge Controller

The basic function of all charge controllers is to prevent battery overcharging and block reverse current from batteries. Some charge controllers on the market provide extra functions, such as controlling proper voltage in relation to temperature and battery type as well as protecting the battery against over-discharging.

Solar charge controllers are required in DC-coupled hybrid systems, where the solar panels' generated DC power is used to charge the batteries directly.

Wiring

The cables transport the power from the panels to the charger controller, the inverter, your home, battery, and the net metering. Wire configuration depends on your solar array configuration (series and parallel) and whether the AC or DC coupling battery configuration is used.

In AC-coupled wiring, the generated DC power from panels is converted to AC power for household use and/or sent to the grid. Then another inverter/charger converts the AC power to DC again to charge the batteries. This device converts the battery's DC power to usable AC power.

In DC-coupled wiring, however, the DC-generated power passes through a charge controller to charge the battery, and then an inverter discharges the battery to generate AC power for household uses. Both types of battery coupling have their advantages and disadvantages and will be covered in detail in chapter eight.

Net Metering

This type of meter records the amount of power sent to and received from the electrical grid company for credit.

Grid-Tied Solar Power System

A grid-tied (on-grid) solar power setup is a system that connects to an electrical power grid. This type of system first satisfies all your power needs before delivering the excess power to the electrical grid. When the solar system cannot satisfy your power demands, especially at night or on days without sunlight, you can draw power from the grid.

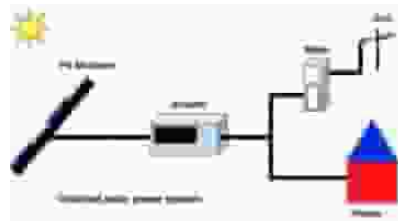
It is the least expensive system of generating energy since no battery

backup is required. The excess energy produced is directly sent to the power grid utility company. In this case, the electrical grid acts as the battery backup for your system.

The amount of power fed to the electrical grid slows the electric meter's rate and measures the power usage. It causes the meter to spin backward. In other words, if the meter spins backward, it is an indication that solar power is being fed into the grid.

When unused power is delivered to the grid, the utility company uses "net metering" to credit homeowners with the per kWh price they pay for energy consumption when drawing power from the grid.

A grid-tied system is the preferred solar power system on the market because it is the least expensive and least complicated PV setup. Homeowners can enjoy more than fifteen years of profits after the break-even on solar system investment.



The panels should be installed in a place with maximum sunlight exposure. This can either be a roof or ground mount. Proper wiring is required to transport power between the connected solar equipment, your home, and the local electrical grid.

Chapter 3

Electricity Basics

Electricity uses are everywhere, hence the need to have basic knowledge of laws that govern how electricity operates. To understand these laws, you need to understand the key foundation of basic electrical concepts such as voltage, resistance, current, Ohm's law, circuit theory, and others.

Let's start by defining what electricity is.

Electricity is the flow of an electric charge. An electric charge can either be positive or negative, and its movement creates an electric field. The charge is generated from primary sources (natural sources of energy such as sunlight) and secondary sources.

No matter how the charge is created, the flow of this charge results in an electric current. This tutorial will teach you the basic electrical concepts that help you better utilize them while designing and installing your PV system.

Primary Factors of Electricity

Voltage

The unit of electrical potential, the difference in potential between two points in a conductor carrying one-ampere current, and the force created by one ampere flowing under one volt of electrical potential, is known as the volt and is equal to the difference in electrical potential between two points of a conductor carrying one ampere of current when one watt of energy is dissipated between the points. It would be like having a voltage of one volt over a one-ohm resistor with one ampere flowing through it. Volta was honored in 8th and 9th-century Italy when he was given credit for discovering voltage, and his name appears in the unit's name. The unit of ohm is used for electrical values. To evaluate electrical energy power consumption, we must know how many hours it uses and whether it is in kilowatt-hours or kilowatt-hours.

Current

The flow of electrical charge results in an electric current. The current

flow rate is measured in *amperes (A)*, and it is represented by the letter “I”. The scientific definition of the current is the flow of $6.25 * 10^{23}$ electrons per second.

Considering the same water hose analogy, just as voltage resembles the water pressure, current can be compared to the amount of water passing through the hose pipe. And just like the rate of flow of water through the pipe, current represents the rate of flow of electrons through the conductor. For example, the number of electrons flowing through a circuit with a 12A current will be three times as those flowing through a circuit with a current of 4A.

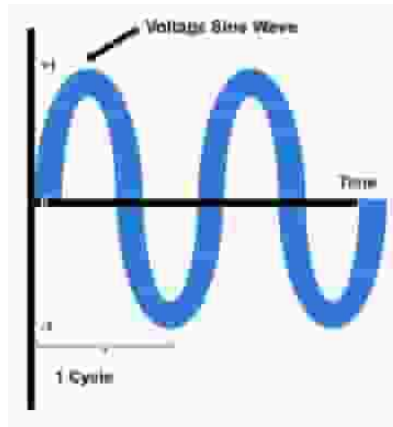
The current flowing through a circuit can either be direct current (DC) or alternating current (AC). DC has a constant voltage polarity that allows it to flow in only one direction. By contrast, AC flows in both directions along with its voltage polarity. The diagram below shows the difference between the two types of electric power.



AC Power

Alternating current (AC) power is the standard electricity emitted from the power outlets. The flow of electric charge periodically changes from either positive (upward) to negative (downward) direction. The movement of electrons results in the formation of sinusoidal AC waves.

AC power produced by an alternator switches its polarity due to the stationary coil's movement about magnetic flux. Both AC and voltage follow a particular sinusoidal pattern, as depicted below. Depending on the type of load of the electrical device used, these waveforms may be in phase or out of phase with each other.



Sinusoidal AC waves vary from -1 (located under the horizontal line) to +1 (located above the line). For example, a sine of 90 degrees is considered 1, while a sine of 0 degrees is equal to 0. The voltage and current waveforms flowing on an oscilloscope have sine waves that overlap each other. The oscilloscope is the device used to measure the AC sine waves.

Each complete sine wave is called a cycle, consisting of two negative and positive peaks (-1 and +1), each located between two zero points (illustrated in the AC diagram above). Frequency is the measure used to describe the alternating voltage and current rate. The unit used to measure the wave's frequency is called hertz. The standard power frequency in the US is 60 hertz, which is equal to 60 complete sine waves (cycles) in one second.

DC Power

Direct current (DC) power is a linear electrical current that moves in a straight line. DC power is drawn from batteries, fuel cells, and solar cells. You can also obtain DC from AC power by using an inverter or a rectifier that converts AC to DC power.

Most electronic devices use DC power from batteries because batteries offer consistent voltage. Other devices have a built-in rectifier in the power supply unit to enable them to convert AC from the power outlet to DC power. Not all electronic devices use DC power; some use AC power sourced directly from the power grid.

Resistance/Impedance

Resistance measures the voltage ratio across an object to the current flowing through it. In fact, it measures the opposition of the current as it flows through the circuit.



Resistance is measured in **ohms**, as denoted by the omega symbol (Ω). When current passes through a material, it experiences some resistance to a certain degree.

Conductor materials offer less resistance, and electrons can move freely through the material. For example, aluminum, copper, gold, and silver materials offer less resistance, while insulator materials have high resistance and restrict the flow of electrons through the material. Examples of insulator materials include glass, paper, plastic, rubber, and wood. The higher the resistance is, the lower the flow of current would be. If the resistance of the circuit is constant, then you can use Ohm's law to determine the behavior of the material.

Ohm's Law

One ohm of resistance is equivalent to the circuit's resistance when one volt generates one ampere of current or the dissipation of one watt of electricity when one ampere flows through it. Ohm's law gives the relationship between resistance and voltage/current: resistance equals the ratio of potential difference to current, with the associated units being the ohm, volt, and ampere. Resistance, the portion of impedance caused by capacitance and inductance, is measured in ohms, while in circuit analysis, impedance, defined as the sum of resistance and reactance, is measured in ohms. Acoustic and mechanical ohms are often used to compare systems that deal with sound and machines, respectively.

$$V = I * R, I = V / R, \text{ or } R = V / I$$

Watt's Law

Watt's law states that the power dissipated in a circuit is a product of its voltage and the current flowing through the circuit. It describes the relationship between the power, current, and voltage drop in a circuit.

$$\text{Power} = \text{Voltage} * \text{Current}$$

Or

$$P = I * V$$

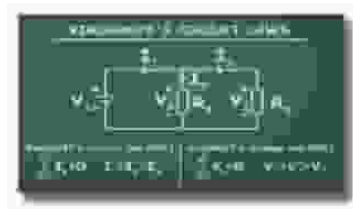
For instance, if you have several 500-watt electrical devices, you probably want to know how many of them you can plug into your circuit without blowing a fuse. To determine how many devices you can plug in, you need to first determine the total amount of current you can draw from the circuit. If the circuit has a 15A circuit breaker and if the voltage required is 110 V, then the power dissipated in the circuit will be:

$$110 \text{ V} * 15 \text{ A} = 1650 \text{ W}$$

This is the available power for your circuit, so whatever device you plug into your circuit should be less than this. In our case, we can plug a maximum of $1650 \text{ W} / 500 \text{ W} = 3.3$ (rounded down to 3) 500-watt electrical devices into the electrical circuit.

Kirchhoff's Law

The concept of Kirchhoff's law is ideal for dealing with complex circuits. This law describes a relationship between the current flowing in a node and the voltage across a loop.



Kirchhoff's Current Law (KCL)

Since all electrical components are connected together by nodes, the total current going through the node should be equal to the total current leaving that node. In other words, the *current in* is equal to the *current out*.

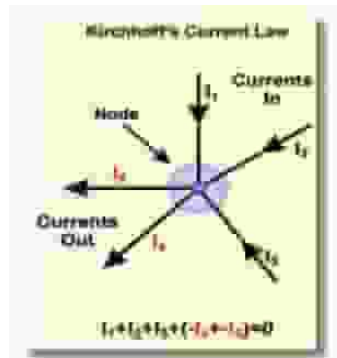
$$\sum I_{in} = \sum I_{out}$$

The sum of current entering into and out of the node must be equal to zero.

$$I_{in} + I_{out} = 0$$

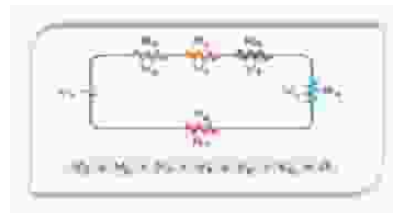
In this case, the node acts as a connector, or junction, between two or more elements or current paths. A *closed-circuit* path must exist for the current to flow in and out of the node.

The current coming to a node is measured positive, while the one exiting is measured negative; thus, their sum is zero.



Kirchhoff's Voltage Law (KVL)

This law states that the algebraic sum of all the potential differences (voltages) of all the elements connected in series in a loop is equal to zero. It also ensures there is the same voltage (potential difference) across each branch in the circuit. In other words, all the electrical components in the circuit have the same current flowing through them.



$$V_1 = IR_1 + IR_2 + IR_3 + IR_4 + IR_5$$

$$V_1 + (-IR_1) + (-IR_2) + (-IR_3) + (-IR_4) + (-IR_5) = 0$$

Or

$$\sum V_{\text{total}} = 0$$

As illustrated above, the voltage of the source (V_1) is considered positive, while in the resistors (R_1 , R_2 , R_3 , R_4 and R_5), it is dropping (negative), and that is why the law states that the algebraic sum of voltage drops must be equal to zero.

Electrical Circuits

An electrical circuit consists of components that allow transmission, storage, and conversion of energy. The energy transmitted through the

circuit flows through one or more sources and exits via one or more outlets.

Every circuit has three basic elements: *voltage source*, *load*, and *conductive path*.

A voltage source consists of a battery that enables the current to flow through the circuit, while the conductive path allows the current to flow through the conductive material. The load is an electrical device that consumes the power in the circuit.

The conductive circuit establishes a relationship between the voltage source and the load. Circuits have a switch that you can turn on or off and a fuse connected between the source and the load.

Therefore, before you build your own solar system, you have to know about the circuits and how to create one successfully.

Components of a Simple Electrical Circuit

A circuit is made up of many electrical components. Knowing these components will help you design your own system.

Switch

Whether pushbutton, momentary, or rocker, a switch blocks electrical current when the circuit is closed.

Resistor

A resistor regulates voltage and current flow in a circuit. The resistor size must be known before creating the course. The resistance in a circuit may be calculated using Ohm's law. That is, the battery and the LED provide the voltage and amperage.

Capacitor

A capacitor is another fundamental electrical component that stores electricity and releases it when the voltage dips. It works like a rechargeable battery.

Diode

This restricts the flow of produced power. The diode's principal function is to route and stop undesired electrical discharge in the circuit.

Light-Emitting Diode (LED)

The LED is a conventional diode that only enables one-way electrical flow. The LED component's anode (+) and cathode (-) generate light when an electrical current flows. Electricity always flows from positive (anode) to negative (cathode).

Transistor

A transistor acts as a tiny switch, and, when triggered by an electrical signal, it turns the current on or off. It can also amplify signals.

Types of Circuits

Knowing the circuit's current and voltage is crucial when connecting two or more electrical components. Resistors are two-terminal electrical components (a course with two endpoints).

Closed-Circuit

A closed-circuit is a circular that permits electricity to flow from one end. The capacitor's positive and negative terminals are connected in series. A closed circuit, as seen below, offers a low resistance channel for electrical current.

Open Circuit

The current stops flowing when you turn off the circuit or a wire breaks, resulting in an open course. A damaged wire interrupts the passage of electricity, as seen below. Toggling a light switch opens or shuts a circuit that links lights to power. Disconnecting the battery opens a course. Open circuit voltage is essential for sizing primary PV equipment.

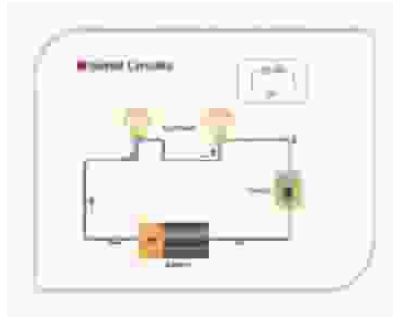
Short Circuit

A short circuit occurs when two unconnected terminals are directly linked. The electricity will flow down the minor resistance channel if you connect two power supply end terminals. This might shut off your power supply due to your fuse function. Due to the high energy voltage, the circuit's high current may generate a lot of heat. The course has minimal or no resistance to current flow. As you will see throughout this book, a short circuit current is critical for sizing PV equipment and wiring.

Connections: Series and Parallel

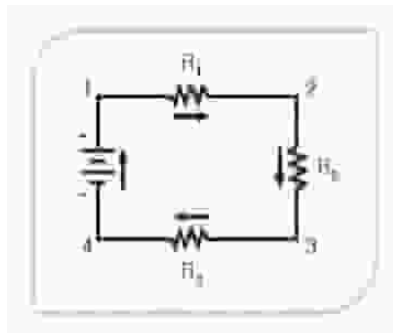
Series Connection

In a series connection, the electrical components follow a single electrical path, and the same current flows through each of the connected components. The voltage across the circuit is equivalent to the sum of the voltages across each of the connected components (as mentioned in Kirchhoff's voltage law).



Components of a series circuit are connected in line with the power source, and the current is constant throughout the circuit. If you open or break a series circuit, the entire circuit will stop operating. For example, if one of the light bulbs connected to a string of lights in a Christmas tree burns out, the entire series of Christmas tree lights will not work until you replace the broken one.

A series circuit consists of several resistances that are connected one after the other, forming an end-to-end connection.



In this configuration, as depicted above, the current flows in a clockwise direction from points 1 to 2, 3, 4, and back to point 1. The resistors (R_1 , R_2 , and R_3) are connected in series and a single chain to the battery:

$$R_{\text{total}} = R_1 + R_2 + R_3 + \dots + R_n$$

The voltage supplied in the circuit is the sum of individual voltage drops across the resistors, while the current passing through all elements is equal.

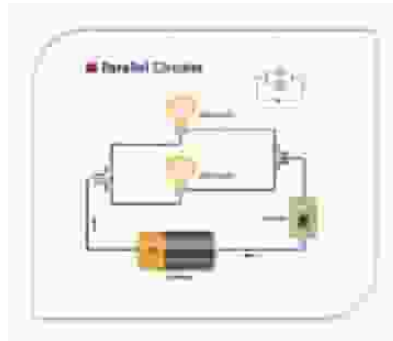
$$V_{\text{total}} = V_1 + V_2 + V_3 + \dots + V_n$$

$$I_{\text{total}} = V_{\text{total}} / R_{\text{total}}$$

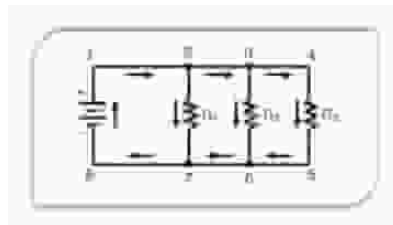
Parallel Connection

In a parallel connection, electrical components connect along multiple paths, and the voltage across each of the components is the same.

Components connected in parallel have a constant voltage and branch off from the battery.

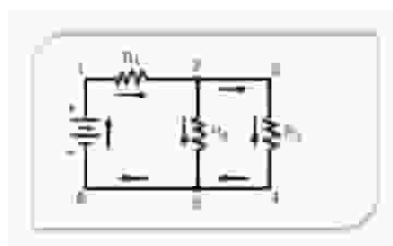


The current that flows through the circuit is equal to the sum of currents across each of the components (resistors).



Again, the circuit above has three resistors, but the current has to flow through multiple paths. The first path flows from points 1 to 2, 7, 8, and back to point 1. The second path flows from points 1, 2, 3, 6, 7, 8, and back to 1. And the third path flows from 1, 2, 3, 4, 5, 6, 7, 8, and back to 1. Each path flowing through R_1 , R_2 , and R_3 is called a “loop.”

$$1/R_{\text{total}} = 1/R_1 + 1/R_2 + 1/R_3$$



Series-Parallel Configuration

The above series-parallel configuration consists of two loops to allow the flow of current. The first loop allows the current to flow from points 1, 2, 5, 6, and back to point 1. And other flows from 1, 2, 3, 4, 5, 6, and back to 1. Both currents flow through R_1 (from point 1 to 2), while R_2 and R_3

are configured in parallel to each other; therefore, while the total voltage of this circuit is equal to the sum of voltage in R_1 and either voltage of R_2 or R_3 , the current passing through R_1 is equal to the sum of the currents of R_2 and R_3 .

Chapter 4

Tools and Equipment, Local Permits

Safety Tools

The installation of solar panels requires heavy lifting, climbing on the roof, and electrical wiring; thus, your safety is of utmost importance. Some of the protective equipment you need to consider include the following.

Gloves and Boots

Always wear gloves and closed-toe boots to avoid cuts, scrapes, and other injuries when installing panels. Boots with flat soles give you the grip required when working with shingle roofs, tiles, or metals.

You can also wear long-sleeved clothes to prevent the burning of your skin when working outside or on the roof.

Goggles

Wear eye-protection glasses and other protective gear to prevent eye injuries when working. Since you will be exposed to direct sunlight while working on the roof, some sunscreen lotion is also a good idea.

Roof Anchors

Roof anchors protect you from falling when installing a roof-mount system. Always attach a safety harness to the anchor when working on the roof to provide yourself with an extra layer of protection.



Scaffolding

A scaffold helps you climb to the roof and can act as a boom-lift for getting the equipment to high places. You can make a temporary scaffold structure that aids in installing panels at higher places. Regular ladders can also be used in simpler projects.



Multimeter

Use a multimeter to check whether there is voltage before you work on the system. Ensure the conductors and terminators have zero voltage before starting any installation—that way, you’ll avoid an electric shock.

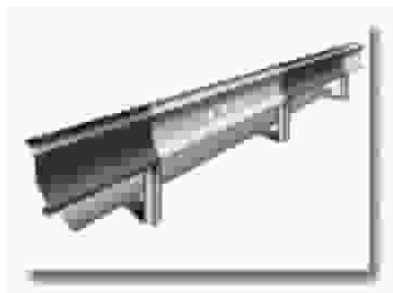


Guardrails

When installing solar panels on a roof, especially in more extensive projects, you are at risk of falls. Thus, there’s a need for solar safety hacks like temporary guardrails. A roof safety harness tool also protects you from falling.

Ladder

You need a sturdy ladder to help you climb up and down with ease. The ladder should extend at least three feet above the edges of your roof.



Power Tools

Pitched and sloped rooftops require different mounting systems and, consequently, different tools. Additionally, you will need a majority of these tools for other solar components installation. Below are some of the common solar installation tools you should consider.

Cordless Drill

A cordless drill is a powerful tool that simplifies your DIY work. It helps you drill pilot holes, drive in lag screws, and tightly fasten them into the roof. A cordless drill has a variety of functions, and every homeowner should have one. A general-purpose drill with a 12V or 18V battery is suitable for most solar purposes.

Impact Driver

Just like the cordless drill, impact drivers are efficient in driving long deck screws, tightening module clamps, and fastening racking bolts on surfaces. An impact driver is built for driving screws but cannot drill. It is suitable when dealing with large screws and bolts because it exerts an extra rotational force on hard material.

Drill Bits and Sockets

Drill bits act as cutting tools that create holes of different sizes and shapes on different types of materials. Always choose a drill bit larger than the hole size you want to create.



The twist bits are the common drilling bits for plastic, timber, and metal materials, and you can drill them with your hand or use an electric drill. If you want to drill into concrete, stone, or brick material, you should use masonry bits.

A drill bit socket is a tool that adapts sockets for use in a drill. They have an adapter fitted on a tapered shank drill to a tapered hole that is larger than the created hole size. The sockets fit on the nuts or bolts to tighten the drill bits, as depicted below:



Caulking Gun

This tube filled with cartridge material (roof sealant) seals up any gaps or holes left after fastening screws on your rooftop. The cartridge material used may be either silicon or latex, and you can use it to bond together a range of materials such as glass, metal, or ceramic.



A caulking gun regulates how much caulk gets out of the tube when you squeeze it. The roof sealant prevents any leaks due to drilling installation holes. When buying a roof sealant, go for the appropriate one for your roof sealing purposes.

Jigsaw

This is a powerful tool that allows you to cut rails after installing the solar modules. It enables you to have more control when cutting complicated patterns or shapes to avoid damaging your roof.

Reciprocating Saw

A reciprocating saw is a handheld tool that allows you to quickly cut through a number of materials. The saw has a large blade just like a jigsaw blade and an oriented handle that allows you to comfortably cut materials on vertical surfaces. A chargeable saw is preferred on the roof.



Hole Saw/Hole Cutter

A hole saw is a ring-shaped blade that makes holes on a surface without cutting the core material. It is suitable for drilling, and the hole creator has a pilot drill bit at the center to prevent the saw teeth from moving. You can use this tool to cut through thin metal plates and roof material.

Screwdriver

A screwdriver allows you to tighten or loosen different types of screws. Although impact drivers have dominated most screwdriving applications, manual drivers might come handier in certain situations.

Pliers

Crimping pliers have jaws that allow you to grip objects when you squeeze the two handles together. Though most pliers are designed to perform general-purpose work, there are those designed specifically for certain purposes.

If you have long nose pliers, they can bend wires or squeeze out tight spaces. Pliers with sharp edges can shear through thick electrical wires. You can also use pliers to grip objects when doing the installation. Holding wires with pliers helps prevent electrocution.

Measuring Tape/String Line/Chalk Line

A measuring tape is obviously needed for your project. For instance, you can measure the distance between the drilled holes on your panels and mark corresponding areas on your rooftop to know where to drill the holes.

A chalk line tool marks straight lines on a flat surface. You can use it to lay straight lines between two points and ensure the panels are mounted on the chalk lines.

A string line ensures that your solar panels are installed in perfectly leveled squares. Everyone appreciates well-organized solar panels on the roof.

Roof Sealant

A roof sealant helps prevent leaks from the drilled holes. Always make sure to buy a sealant suitable for your roof material.

Wiring Tools and Equipment

You will need to know how to use several tools and equipment specifically used for wiring.

Junction Boxes and Splices

A junction box is an electrical box that encloses electrical wires and cables. If you cut electrical cables or splice the wires together, you need a junction box to protect against short-circuiting of the wires.

These safety measures prevent electrical shock from live wires in your home. All wires connected to your switches and lights should be enclosed in a junction box, which will serve as an enclosure for all spliced wires. Each box consists of a connection splice that accommodates two or more circuit cables. Either conduit connectors or cable clamps secure cables entering the box.



When buying junction boxes and splices, ensure they meet your circuit's voltage and current requirements. Always use approved splicing devices or insulated lugs.

AC Breakers

An AC circuit breaker prevents damage to your appliances by cutting off the power supply when it detects an overload. It functions by interrupting current flow when it detects a fault. The circuit breakers can also import and export power from your equipment. Below, you can see a sub-panel containing a few circuit breakers:



Subpanels

This is an essential component that helps you add additional circuits in your home when the main panel circuit breaker slots are full. It extends the distribution of power to specific areas in your home. A subpanel has its own breakers, making it easy to extend your wiring using multiple branch circuits to your home or buildings if they're far away from the main panel.

PV Meters

If you're installing a grid-tied or a hybrid solar system, you have to install a dedicated PV meter that measures your solar array's energy. In most cases, you have to install the meter socket base, and once your solar system is approved, the utility company will install the meter face and activate your PV system.



Conduits

A conduit is a tube used to protect your electric wiring from moisture, impact, and chemicals in exposed areas. The plastic sheath enclosing the wires is prone to damage. To avoid this, you can pull single strands of wires into a metal conduit to protect sensitive electrical circuits.

Electrical metallic tubing (EMT) conduit is a rigid steel raceway that protects the wires and grounds the panels. Always make sure you have the right conduit size before starting the installation process. Once you

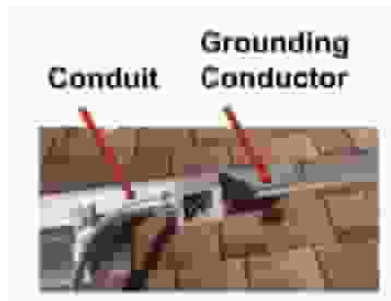
place the conduit correctly, you can tighten the joints using a set of channel locks.

Channel Locks

Channel locks look like pliers that you can use to grab, hold, and turn nuts or bolts. The tool is also great for crimping metal objects or the end of pipes. They come in a set of 6.5, 9.5, and 12-inch pliers.

Equipment Grounding Conductor (EGC)

This is a bare copper wire used to ground the solar components. It connects solar panels, EMT conduits, and other metal enclosures together. EGC provides a path for connecting electrical components to the ground to avoid ground faults.



Wire Cutters

A wire cutter allows you to cut wires made of aluminum, brass, copper, iron, and steel material. The insulated handles help prevent electrocution from the wires while working, and they provide a comfortable grip. If you have a diagonal flush cutter, they enable you to cut wires at an angle close to the base.

Wire Strippers

The wire stripper is another must-have tool, as they allow you to remove insulation from an electrical wire when you want to make contact. There are different types of wire strippers with varying notch sizes.

Wire Crimpers

A crimping tool fixes connectors at the end of the cable. Though it looks like a pair of pliers, it joins together two pieces of a metal plate. There are three types of crimping tools: ratcheting, hydraulic, and hammer.

A ratcheting crimping tool allows you to secure insulated wire connectors, terminals, and heat shrink butt splices. You have to apply a threshold pressure to join the connectors on the two pieces of the wire. Ratcheting crimpers come in various sizes, and you can interchange

them to crimp connectors of different widths. Before buying the crimping tool, confirm the type of wire or cable it can crimp.

A hydraulic cable crimping tool is a special crimping tool that crimps terminals of wire ropes and conjoins two pieces of metal together. A hammer crimping tool can crimp connectors, terminals, and splicers together. A hammer is needed to apply force to the crimping tool.



Fish Tape

This useful tool allows electricians to route a wire through the wall or pull it through an electrical conduit. The fish tape has a flat, long, thin steel wire wound up inside a round-shaped wheel. The fish part allows you to attach the wire, and then pull the wire through the conduit. A conduit is a pipe similar to a plumbing pipe that protects your electrical wiring.

Torque Wrench

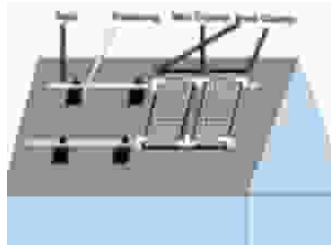
A torque wrench is a unique T-shaped tool that allows you to use a specific torque to fasten bolts, nuts, and lag screws on solar panel rails. It is ideal in situations where the tightness of screws and bolts is very important. A high-quality torque wrench helps you tighten bolts and nuts on the rails. Though this may consume a lot of time, it ensures that your setup components are in place and tightly fixed.

Solar Racking Equipment

Roof Rafters

A roof rafter is a structure that forms part of the roof design and runs from the hip of your roof (ridge) to the wall plate. In fact, it is not really a solar tool or piece of equipment; however, it provides base support for mounting solar panels.

Your decision on where and how many panels to install is significantly influenced by the position of the rafters on your roof.



Rails

Rails are mounted on the roof to support solar panel rows.

For installing the solar panels, you need to place each of the panels vertically or in a portrait position, then use two rails with clamps to secure the panels on the roof or the ground. The rails are secured to your roof using screws or bolts.

Roof-Mount Flashings

Roof flashing is a thin metal material in the form of galvanized steel, aluminum, or copper. Its main function is to avoid any water leakage around the holes drilled in the roof to secure the rails. Below, you can see a schematic of a racking system and the relationship between flashings, rails, and clamps:

End Clamp, Mid Clamp

Clamps allow you to hold or position the panels on the rail. While end-clamps secure the panels at the rail end, mid-clamps are located between two panels and keep them attached to the rails.

Solmetric Sun Eye/Pathfinder

These are solar assessment or shade analysis tools that provide accurate measurements of the amount of solar energy generated per day, month, or on an annual basis. These tools can also measure shading patterns within a particular area.

Battery and Maintenance Tools

Hydrometer

This measures the relative density of electrolytes in a flooded lead-acid battery to determine the state of charge of your battery. If there is a higher concentration of sulfuric acid in the battery, that means there is a higher level of electrolytes. A higher density results in a higher state of charge.

Distilled Water

Distilled water refills the level of electrolytes in your flooded lead-acid battery. The amount of distilled water added to the battery depends on your battery condition. If you have a new battery, you should add distilled water up to the bottom of the filler tube. An old battery requires distilled water up to the level of the electrode. You can use a small flashlight to view the electrolyte level in the battery.

Baking Soda

If sulfuric acid from the battery leaks on the surface, you can pour baking soda on the spot to neutralize acid spills.

Funnel

This is used to guide liquids through the small opening of the lead-acid battery case for refilling distilled water into the battery.

Rubber Apron

Before handling any dangerous chemicals and toxic materials, you have to wear a rubber apron to protect your body and clothes against any spills. Even a drop of sulphuric acid or any other powerful chemical could cause serious injury to your skin.

Rubber Gloves

If you work with toxic chemicals and other harmful detergents, you have to wear gloves to protect your hands.

Local Permits

Obtaining the necessary permits before installing solar panels in your house includes obtaining electrical permission, securing a structural or construction permit, and obtaining a specific solar PV permit. Consult with a local specialist to ensure that you know any legal concerns and zoning regulations in your nation. You should also get appropriate information on building permits to prevent the possibility of having to re-do the whole system installation or being punished for failure to do so. This is particularly true in the case of solar panels that are installed on the ground. Building permits are often provided at the local level. Thus it is essential to adhere to all state laws and regulations that apply to your municipality while applying for one.

Chapter 5

Charge Controllers

Charge controllers are an essential component of battery-backed PV systems. In fact, off-grid systems, as well as DC-coupled hybrid PV systems, should utilize a controller to regulate the process of charging the batteries. The DC power generated by your solar array flows to the charge controller to charge the batteries. This chapter will walk you through the essential features of charge controllers and guide you on how to select, install, and program your device properly.

What Is a Solar Charge Controller?

Basically, a solar charge controller's main task is to regulate voltage and current from the solar array to protect batteries from overcharging and over-discharging.

Charge controllers are critical components used in off-grid and DC-coupled hybrid PV systems to regulate the PV output for battery charging. As explained before, grid-tied and AC-coupled hybrid PV systems do not require a charge controller. And that is because no battery is used in the former one, and an inverter/charger regulates the battery charging in the latter one.

Why Do We Need a Charge Controller?

Charge controllers carry numerous functions in PV systems; however, they play two critical roles concerning batteries:

1. A solar array with a nominal voltage of 24, for instance, is often supposed to store its excess power in a matching nominal (24-volt) battery; however, this setup will generate a V_{mpp} (maximum power point voltage) of around 36 V, which will definitely damage the battery bank if directly connected to it. Here is where the solar charge controllers come in handy. Most 24-volt batteries need a voltage of around 27 to 28 volts (larger than their nominal voltage)

to get fully charged. The same rule applies to 12- and 48-volt batteries.

2. Additionally, when solar panels generate no power at nighttime, and therefore, no voltage, the higher voltage of batteries, compared to the array, can drain the batteries and push the current toward solar panels. Charge controllers prevent this.

Other than the main tasks mentioned above, most charge controllers provide a range of functions, like load control and lighting. Below are some of the optional features you may find helpful in some controllers:

- *LED* or *LCDs* are available in some controllers. Additionally, some controllers like Victron can be monitored remotely by connecting to your phone or other devices by Bluetooth.
- An alternative to a display is a *MT 50 screen*, which is included in some models and can be connected to some other models, such as the Epever charge controller, for programming the device as well as displaying the charging data.
- *Temperature compensation*: most modern controllers can adjust the battery input according to the battery's temperature and temperature correction voltage to improve the battery-charging process.
- *Low voltage disconnect*: When your DC loads are connected to these charge controllers, this feature will protect the battery by disconnecting the current while the voltage is too low.
- *Lighting*: some controllers can turn the lights on and off at dawn and dusk.

Charge Controllers and Stages of Charging

Charge controllers help batteries undergo the stages of charging properly. There are three to four stages of charging, depending on the type of battery. These stages are important for all batteries to perform properly and last for a long time:

- *Stage 1, bulk charging*. The charge controllers will send all the available current to charge the battery when the sun is out.
- *Stage 2, absorption*. As the battery reaches the regulation voltage, the controller keeps the voltage constant. Therefore, the battery is

protected from overheating and over-gassing (in lead-acid batteries).

- *Stage 3, equalization.* Only flooded lead-acid batteries undergo this stage. The periodic boost charge in this stage can lead to a better stirring of the electrolytes, completing the reactions, and leveling the battery's voltage.
- *Stage 4, float charge.* This is the stage where the battery is fully charged, so the controller reduces the voltage to avoid battery over-gassing and overheating.

The Graph Below Illustrates the Above-Mentioned Stages of Charge:

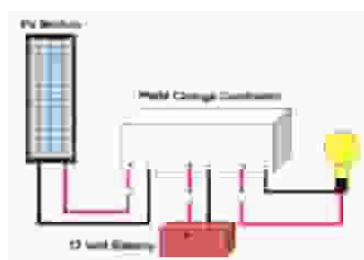


Charge Controller Technologies

Charge controllers are available in two different technologies, PWM and MPPT.

PWM Solar Charge Controllers

A Pulse Width Modulation or PWM, solar controller directly connects the solar array to the battery. During bulk charging of the batteries in the daytime, the continuous connection between the array and the battery will pull the array's voltage to the battery's voltage. As the battery is getting charged, its voltage will rise, and so does the array's voltage. That is the reason you can only use a matching nominal voltage of battery and array when using a PWM charge controller.



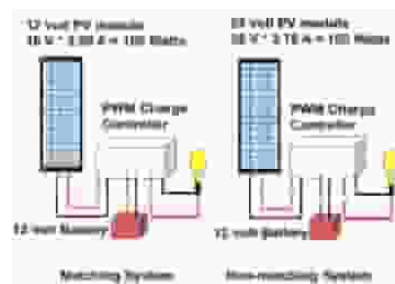
To explain the essence of matching nominal voltage when using a PWM

charge controller, we can connect a PWM controller to two matching and non-matching PV systems and observe the results.

But first, we need to identify the Voc and Vmp of the two PV systems. The table below shows the approximate open-circuit voltage and maximum power voltage of three different panel types. Manufacturers include the exact figures in the datasheet for each nominal voltage of the solar panel.

Nominal Voltage	Number of Cells	Open Circuit Voltage (Voc)	Maximum Power Voltage (Vmp)
12	36	22	18
20	60	38	30
24	72	44	36

Now, we can compare a 12-volt and a 24-volt solar panel charging a 12-volt battery being connected to a PWM controller:



100-watt, 12-volt solar panel to 12-volt battery:

As you can observe in the left-hand diagram, the 12-volt battery output power will be as calculated below:

$$P = I * V$$

$$P = 5.56 \text{ amps} * 13 \text{ volts} = 72.28 \text{ watts}$$

Therefore, the system's efficiency would be:

$$72.28 \text{ watts} / 100 \text{ watts} = 72.28\%$$

The efficiency rate of PWM controllers is less than the premium (80-90%) efficiency of MPPT controllers, which is due to the direct connection and not benefiting from the maximum power tracking in MPPT controllers. Note that a 12-volt nominal battery would have a voltage of around 13–14 V when fully charged. And that is the reason we used 13 V as the battery's voltage here.

100-watt, 24-volt solar panel to a 12-volt battery:

In the right-hand diagram above, the 12-volt battery output would be as

follows:

$$P = 2.78 \text{ A} * 13 \text{ V} = 36.14 \text{ watts}$$

The system efficiency would be 36.14%.

As simply calculated above, the PWM controller only performs fairly well when the PV module and battery nominal voltage are the same. This example is intended to explain the way PWM controllers work. They should always be connected to matching voltages of the solar array and the battery.

As explained above, even when PWM controllers are connected to matching panels and batteries, they perform at an efficiency rate of around 75%, which would be lower than the decent MPPT controllers.

PWM controllers are the least expensive controllers on the market. Some PWM controllers are available in multiple nominal voltages, meaning that they can charge a 12-volt battery using a 12-volt array and 24-volt battery storage using a 24-volt nominal array. Note that PWM should not be used with a 24-volt array to charge a 12-volt battery because it will result in energy loss.

How to Size a PWM Controller

Sizing a PWM charge controller is pretty straightforward. They are rated in amps as well as the previously mentioned nominal voltage.

By looking into your solar panel specification sheet, you can find the panels' short circuit current (Isc). By multiplying the Isc of the panel by the number of parallel strings, you can find the maximum total current of your solar array.

According to the National Electrical Code, you should also consider two safety factors.

1. 25% for over irradiance conditions when sun exposure is more than Standard Test Condition (STC).
2. 25% for more than three hours of continuous use, which is often the case with PV systems.

Total amperage = number of strings in parallel * panel's Isc * 1.25 (over irradiance) * 1.25 (continuous use)

To better explain the process of sizing, let's try an example:

Assume that we have two strings, each composed of two Renogy solar panels rated at 100 watts and 12 volts, to set up a 24-volt nominal solar

array. The panel's specification sheet indicates an I_{sc} of 5.86 amp and 22.3-volt V_{oc} . The maximum current is calculated as below:

$$2 \text{ strings} * 5.86 \text{ amps (Isc)} * 1.25 * 1.25 = 18.28 \text{ amps}$$

So, the 20-amp Renogy charge controller can easily handle our off-grid setup. Do not forget to check if the selected controller can handle our PV system's voltage.

MPPT Charge Controllers

As their name implies, Maximum Power Point Tracker, or MPPT controllers, can track the V_{mp} (maximum power voltage) of the solar array to regulate it into a usable voltage to charge the battery. By using an MPPT, you can have a 20- or 24-volt nominal solar array charge a 12-volt battery bank.

These controllers are more common and also more expensive; however, they can increase the system's efficiency by 20% to 30%. As explained under Kirchhoff's law, the power that enters the MPPT equals the power that comes out of it; therefore, when charging a 12-volt battery via a 24-volt nominal voltage array, the MPPT reduces the voltage to around 14–15 volts and increases the current so that the power output remains equal:

$$\text{Power (Watts)} = I \text{ (Amps)} * V \text{ (Volts)}$$

MPPT controllers can let you be more flexible while choosing your system's voltage. For instance, you can use a 20-volt nominal voltage array to charge a 12-volt battery or two of those panels connected in series to charge a 24-volt battery, or even three 20-volt panels in series to charge a 48-volt battery.

The most significant advantage of increasing your array's voltage is the fact that higher voltages mean lower current, hence the smaller wire size and lower cost. Additionally, you need lower battery voltage, which can significantly decrease your upfront costs.

Size an MPPT Charge Controller

To select an MPPT controller, you need to consider three separate features of your PV system, including current (amps), voltage, as well as temperature.

Size The Amp Rating

MPPT charge controllers often reduce the array's voltage to the charging voltage of the battery. Since the power into the MPPT is equal to power

out of it, this will result in a rise in the output current. So, by dividing the array's power by the battery's voltage, we can estimate the amperage.

Don't forget to multiply the number by 1.25 (NEC safety factor).

So:

Amp rating = total power output/battery voltage * 1.25 (NEC safety factor)

Size The Voltage

Although the MPPT controller can handle higher nominal voltages than the batteries, the Voc (short circuit voltage) is the limiting factor. For instance, a 24-volt solar panel has a Voc of around 44 volts; therefore, we need to select a controller that can handle the string's open-circuit voltage (Voc). As a reminder, the Voc of the string is calculated as below:

Voc of the string = Voc of panel * number of panels in series

Temperature Compensation

Solar panels generate voltages higher than the open-circuit voltage (Voc) measured under Standard Test Condition (STC) when exposed to low temperatures.

Lower temperatures can increase the Voc of each string of panels by approximately 0.03% per degree Celsius below 25°C. This feature is referred to as the Voc temperature coefficient of the solar panel, usually mentioned in the specification sheet.

For instance, if a solar panel has a Voc temperature coefficient of -0.03% per degree Celsius, it means that we need to add 0.030% to the Voc for each degree Celsius below 25°C and decrease the Voc by 0.030% for each degree Celsius above 25°C.

Higher temperatures than 25°C have no effect on sizing the controller; however, it must be considered when programming the controller.

An alternative way to find the highest Voc on cold winter days is to check the NEC, table 690.7 A, to find the temperature correction factor for each temperature range below 25°C. For instance, for the ambient temperature range of - 6°C to -10°C, the factor is 1.16. Simply multiply your array's Voc by this number to calculate the highest Voc possible.

We can formulate the sizing procedure as below:

Maximum volts = number of panels in series * Voc of the solar panel + [solar panel's Voc temperature coefficient * (difference between 25°C and the lowest ambient temperature)]

The example below better explains how to size MPPT for your off-grid

setup:

Assume that we want to connect two 12-volt, 190-watt HQST solar panels with Voc of 24.3 volts and Voc temperature coefficient of -0.33%/°C in parallel to a 12-volt battery bank.

As explained above:

MPPT amp rating = total power output / battery voltage * 1.25 (NEC safety factor)

So:

MPPT amp rating = $2 * 190 \text{ watt} / 12 \text{ volts} * 1.25 = 39.58 \text{ amps}$

Therefore, the controller should at least handle 39.58 amps. If the lowest ambient temperature in the area is -10°C, then:

Maximum voltage = number of panels in series * Voc of solar panel + [solar panel's Voc temperature coefficient * (difference between 25°C and the lowest ambient temperature)]

So:

MPPT Volt rating = $2 * 24.3 \text{ volts} + [0.33\% * (25^\circ\text{C} - (-10^\circ\text{C}))] = 48.6 + 11.55\% = 54.21 \text{ volts}$

In this case, the 60-amp Renogy MPPT, with its maximum voltage input of 150 volts, can easily regulate the charging of batteries.

How to Choose the Right Solar Controller

The PWM is an inexpensive option for smaller systems and is perfect for PV modules with a nominal voltage of 12, 24, and 48 volts to charge 12, 24, and 48-volt battery banks.

The MPPT controller, on the other hand, is more suitable for larger systems where additional percentages of efficiency will lead to generating tens or hundreds of more watts per hour. Additionally, only MPPT charge controllers can efficiently charge a 12-volt battery bank, for instance, using a residential 20-volt nominal PV module.

Other than considering the battery voltage, some important considerations must be taken into account to selecting the controller. The most important one is your battery type.

Most charged controllers handle most flooded and sealed lead-acid batteries easily; however, if you are charging a custom (DIY) lithium-ion battery, you will need a charge controller like the Epever charge

controller, which can be programmed using an MT 50 screen connected to it.

An MT 50 screen is a useful monitor with the ability to be connected to the controller via a cable. This will enable you to monitor and program your controller. Charge controllers, like the Victron MPPT, make the programming of lithium batteries even easier. In addition, you can connect your phone to the MPPT via Bluetooth and adjust the features accordingly.

Other available solar charge controllers that do not come with an MT 50 screen or Bluetooth connection options are not recommended to be used with custom batteries because they are hard to program accordingly.

How to Program Solar Charge Controllers

Different battery manufacturers recommend various voltages for their products. Added to that, batteries may need compensation as the temperature goes higher or lower than 25°C; therefore, the charge controller must be programmed accordingly. You need to get familiar with the different features of controllers and batteries to program. These features are as follows:

Charge Profile

The different stages of charging each battery undergoes are referred to as the charge profile and include: bulk, absorption, equalization, and float charging. Batteries need different voltages depending on their charging profile. By looking inside your battery specification sheet, you can easily find the appropriate charging voltage for each stage.

Temperature Compensation Voltage:

The chemical nature of lead-acid batteries indicates less activity in cold weather and higher chemical reactions when it is hot; therefore, the input voltage of lead-acid batteries needs to be increased and decreased in lower and higher temperatures than 25°C accordingly.

The temperature compensation voltage is the amount of voltage (in volts) needed to be adjusted for the charging voltage of lead-acid batteries in temperatures higher or lower than 25°C. This is usually mentioned in the battery's specification sheet. Most lead-acid batteries are typically around -3 millivolt per °C per cell. This means that a 2-volt (1-cell) battery at 24°C needs 3 millivolts more than the recommended voltage of the manufacturer to be properly charged.

So, first, you need to divide the battery's voltage by two to see how many cells your battery contains. For instance, a 12-volt battery has $12/2 = 6$ cells. In our case, and under 24°C , the 12-volt battery needs $(12 / 2 \text{ volts} * 3 \text{ millivolts}) = 18$ millivolts more than recommended to be charged at 24°C .

As emphasized above, only lead-acid batteries need the voltage to be compensated in ambient temperatures higher and lower than 25°C . The example below explains the process of adjusting the battery's charging voltage:

Assume you are using a lead-acid battery in an area where, in the summertime, the battery experiences a high of 45°C ; so, you need to program your controller as follows:

The lead-acid battery specification sheet shows that the recommended float charging voltage should be 13.3 volts, while the temperature compensation voltage is $-20\text{mV}/^{\circ}\text{C}/\text{cell}$. It means that for each degree Celsius above 25°C , -20 millivolts should be added to the voltage of each cell, so:

$45 - 25 = 20^{\circ}\text{C}$ temperature difference.

$20^{\circ}\text{C} * -20 \text{ millivolts} = -400 \text{ millivolt} = -0.4 \text{ volts per battery cell}$.

Each battery cell equals 2 volts, so a 12-volt battery has $12 / 2 = 6$ cells.

$-0.4 \text{ volts} * 6 \text{ cells} = -2.4 \text{ volts}$ should be added to the recommended charging voltage;

$13.3 \text{ volts} + (-2.4) = 10.9 \text{ volts}$.

Therefore, you need to program the controller to charge your battery with this voltage in the summertime. Similarly, in colder climates, the voltage should be compensated. In fact, the voltage will be increased to improve the chemical reactions of lead-acid batteries.

Important Hint:

Do not confuse the battery's temperature compensation voltage with the solar panel's V_{oc} temperature coefficient. The temperature compensation voltage consideration for lead-acid batteries is due to their chemical nature, making them more active in hotter climates while less active in colder weather conditions, whereas the V_{oc} temperature coefficient refers to the solar panel's V_{oc} changes in different climatic circumstances.

1. **Charging Rate:** we need to set the controller in order not to charge our battery at a faster rate than it can handle. For instance, a 100-amp-hour battery should not be charged faster than $100/2 = 50$

amps, meaning that if you use a controller bigger than 50 amp, you need to change the charging rate.

Smaller controllers do not need to be programmed for charging rates. Each battery has its specific charging voltages. For instance, the following charging specification can be extracted from a 12 volt 100 Amp-hour Battleborn battery.

Absorption Voltage: 14.2 V to 14.6 V

Float Voltage: 13.4 V to 13.8 V

Equalization Voltage: 14.4 V (if applicable)

Absorption Time: 30 minutes per 100Ah battery bank

How to Connect the Charge Controller

Once you have learned enough about the different features and functions of solar controllers and selected the one that fits your solar setup, it is now time to connect it.

Charge Controller Installation Tools:

- Wire stripper
- Wire crimping tool
- Heat shrink gun
- Appropriate screwdriver
- Impact driver
- Ratchet
- Ammeter
- Wattmeter

First of all, connect the ground wire from your controller to the ground terminal of your load center. Using a wire stripper and crimper, connect the negative, then the positive terminals to the corresponding terminals of the battery.

Take safety measures, especially if you are working with a 48-volt battery. Do not forget that DC voltages of 40 or greater can cause death if they come into contact with your body.

Turn off the DC disconnect switch before connecting the negative, then the positive terminals of the array to the controller. Use an ammeter and wattmeter to check the current of the battery and the wattage of the array.

You can turn on the DC disconnect switch if they are within your nominal range. You are good to go now.

Chapter 6

Solar Inverters

A solar inverter is considered the brain of PV systems. As the generated power by the PV module is in the form of DC, an inverter is an inevitable part of any PV system. This chapter is dedicated to inverters to explain the essential features of all types of inverters. If you want to learn more about a PV system, keep reading.

Inverter's Function

The main function of an inverter is to convert the DC load to AC load. There are several different types of inverters available; a grid-tied inverter is connected to the solar array and delivers AC load to the house, while a hybrid inverter is connected to the battery on one side and the grid as well as the AC appliances on the other side to deliver AC load to the house and the grid. Inverters may also provide DC power to the battery.

An inverter/charger can charge your battery using either grid or a generator. It can really be useful in off-grid systems where fewer peak sun hours are available.

Common Features of Inverters

DC and AC Terminals

All inverters should have a DC terminal to connect to the battery and one or a few AC terminals to be connected to the loads.

As the DC terminals should be connected to a large size wire (due to the battery's high current), it is preferred to be made of fairly high-quality material. Loose connections can lead to significant issues. Therefore, copper wires and wire logs are used to connect the battery to the DC terminal.

The AC terminals may be in the form of a regular receptacle, a GFCI receptacle, or a terminal block in smaller inverters, while it is only

offered as a terminal block in larger inverters. AC terminals in most inverters have an overcurrent protection device to protect against high amps.

AC terminal blocks are useful for connecting panels and subpanels to the inverter, while power outlets will let your appliances be directly plugged into the inverter. Regardless of the inverter size, the power should not exceed 1500 watts per power outlet.

High Voltage Disconnect Switch

Most inverters have a switch to protect against higher voltages than recommended. A 24-volt inverter should only be connected to a 24-volt battery bank; however, if the battery voltage goes high—for instance, 33 volts—the switch will disconnect the inverter. Keep in mind that the switch does not guard this inverter if it is connected inadvertently to a nominal 48-volt battery.

Low Voltage Disconnect Switch

This feature comes in handy, especially if a lead-acid battery is used. This will protect the battery from over-discharging and, consequently, irreversible damage.

A programmable low-voltage disconnect switch is another feature that only some inverters offer. Using a BMS and lithium-ion battery, this feature allows you to turn on the inverter again once the battery voltage rises to the preset voltage.

Voltage and Power Ratings (Wattage)

Inverters are rated according to their voltage. They can be connected to 12-, 24-, 36-, or 48-volt systems. Inverters must match the nominal voltage of the corresponding PV system; otherwise, they will get damaged in the long run.

Inverters are generally available in different power ratings. You may find inverters as small as 50 watts and those as big as 50000 watts; however, most residential inverters utilized in common PV systems are rated between 3000 and 12000 watts.

Inverters are selected to handle your specific power requirements depending on the system's battery size and amount of power generated. These components are rated for two different power requirements:

Continuous (Typical) Power

Continuous power refers to the amount of electricity needed to keep all

your appliances working, such as the TV, laptop, fridge, etc.

In fact, continuous power is defined as the amount of power an inverter constantly provides and is usually much lower than the peak power. This is the amount of power, for instance, a microwave or refrigerator constantly consumes after the motor has started up.

Peak (Surge) Power

Other than continuous rating, inverters are rated for peak power. Peak power is defined as the maximum power that should be supplied for only a short period—a few seconds to minutes. Some appliances, especially those with electrical motors—such as refrigerators, pumps, and compressors—need a large amount of power to start up. This amount of power is much higher than what they consume continuously.

The rate of this surging power can range from 30% to 300% of the inverter's previously-mentioned continuous power. The inverter's datasheet mentions this rating and the time (in seconds) available. Typically, 5 to 15 seconds of peak power rating suffices for the power needed to start most appliances. Many household appliances and water pumps might actually need this surge for less than a second.

The example below explains the two different power ratings of an inverter:

If you are running two 100-amp hours, 12-volt batteries, you need an inverter to handle 2400 watts:

$$2 * 12 \text{ volts} * 100 \text{ amp} = 2400 \text{ watts}$$

So, a 3000-watt growatt inverter can handle your system. This inverter can handle 3000 continuous watts as well as 9000 surge watts. Purchasing a larger inverter size than your existing consumption is a good idea. You may need to add more appliances to your house in the future.

Off-Grid Inverters

These inverters use battery storage to convert power. They are battery-powered and can be used in off-grid systems. Also, these inverters can be used in grid-tied and grid-interactive systems. This type of inverter will need to go off the grid or reduce dependence on a utility company.

Off-grid inverters can't sell produced power to the grid.

On the market is available inverters with a built-in AC charger that can charge batteries from the grid if solar panels don't charge batteries fully.

But for off-grid inverters, AC connection is one-directional; they can only take power from the grid and can't send it back.

Also, you can connect a power generator to the AC input of these inverters, and you will be able to charge batteries this way. So, you can use them in the winter or on very cloudy days when your panels can't produce enough power.

It is great to have these options available, and it makes your system more flexible.

Grid-Tied Inverters

Grid-tied PV systems need inverters. The inverter is regarded as the brain of the system by managing the flow of power. The main role of the inverter is to convert the DC power generated by the solar panels into usable AC power for AC appliances in your home.

As its name implies, DC power flows in one direction; AC power, however, alternates due to changing the direction of the power. More efficient inverters generate more AC power out of the PV system's generated DC power.

In the US, grid-tied inverters are required and mandated by the National Electrical Code (NEC) to be installed in grid-tied PV systems. With net metering, the local utility company pays or charges for the net electricity transferred into and from the grid by a grid-tied inverter. This is recorded by the specific meter on the customer's premises.

For instance, if you consume five kilowatt-hours per month and your PV system generates and transfers four kilowatt-hours to the grid per month, you will be charged by your local utility company just for the one-kilowatt-hour balance of the electricity transferred to and from the grid. In the US, net metering policies may be different state by state.

The grid-tied inverter should be able to match the phase of the local grid and keep its power output voltage higher than the grid's voltage. This higher voltage would help to transfer the generated power to the grid.

Most modern grid-tied inverters provide a fixed unity power factor. This means that the inverter's output voltage and current's sine waves are perfectly in phase, and the phase angle may differ only one degree from the grid's AC power.

The most significant drawback of these inverters is that the NEC requires them to switch the whole AC and DC circuits off in the event of a power

outage. This is for the safety of electricians who are fixing an issue following the blackout.

Hybrid Inverters

Hybrid inverters are considered the headquarters of battery-backed PV systems; they are, in fact, a combination of a regular grid-tied solar inverter and a battery inverter/charger in one unit. These inverters use meters to measure electricity consumption and smart software that is programmed to determine an efficient way of using and converting solar energy.

As the description above implies, hybrid inverters perform multiple functions; therefore, they have some limitations when compared to off-grid inverters. The main limitations are as follows:

Limited peak (surge) power output when a blackout happens; therefore, appliances that need peak power to start are not usually connected to them.

Most hybrid inverters have limited backup power; therefore, only small (essential) loads such as lighting or some other low-consumption devices can be backed up when the grid is down.

Unlike grid-tied inverters, hybrid ones let you still use the power for essential appliances in the event of a blackout.

AC-Coupled and DC-Coupled Configurations

AC- and DC-coupled configurations are battery-related topics; however, the inverter's integration in the two configurations is highly different, and you need to understand the main differences to choose the proper one for your house.

Having two wiring configuration options is a specific feature of battery-backed systems, and you need to select the suitable configuration and the corresponding inverter type accordingly.

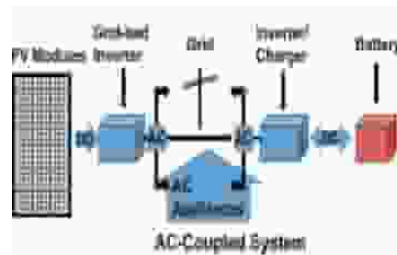
As you know, a solar array produces DC electricity, while most household appliances utilize AC power; however, the battery bank stores the power in DC form. The main difference between the two systems is the path that the generated DC power should take to be stored in a

battery, converted by an inverter, consumed at home, and transferred to the grid. Let's dive into more details of each system.

AC-Coupled System

In this system, the solar array's generated electricity flows to a regular solar grid-tied inverter to be converted to AC electricity. Depending on the time of the day and your energy consumption, the AC power can be used for your home appliances, sent to the grid, or go to an inverter/charger to be converted back to DC to charge the battery bank. The same inverter/charger should convert the battery's DC power to AC for use during night or blackouts.

In this type of configuration, the stored power in the battery should be converted three separate times to be ready to use. This configuration will eventually result in a lower efficiency rate when compared to a DC-coupled system.



As you can observe in the diagram above, no charge controller is installed, while two inverters are needed in the AC-coupled configuration. The inverters carry out the following tasks in this configuration:

1. The grid-tied inverter converts the DC power from PV modules to AC power to be usable by the AC appliances and the utility grid.

Based on your power consumption and its preset program, this inverter then decides to direct the power toward the grid, your house, or the second inverter. Note that the grid-tied inverter cannot feed your battery bank. When the PV system's generated power surpasses the daily consumption, this inverter will redirect the electricity toward the second inverter or the grid, depending on how it has been programmed.

2. An inverter/charger: this smart device is simultaneously connected

to the grid-tied inverter, the grid, your house, and the battery system. Once the batteries are fully charged, this inverter sends a signal to the grid-tied inverter, meaning that all the converted AC power can either go to the grid or to the house, based on your consumption. This inverter can even use the grid to charge the battery if your array's generated power does not fulfill your battery capacity.

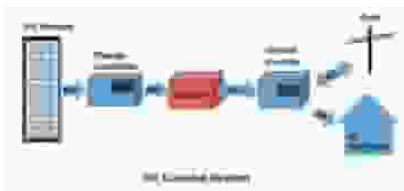
3. This type of configuration is the most desired one for those homeowners with an existing grid-tied PV system who decide to add a backup to their system.

DC-Coupled System

In this type of configuration, the generated DC power flows to a charge controller to charge the battery bank, similar to a totally off-grid system; therefore, the power is not converted to AC and then back again to DC to be stored in the batteries.

A hybrid inverter performs all the tasks that two inverters do in an AC-coupled system. This inverter converts the battery's DC power to usable AC power for your home and the grid. It can also use the grid to charge your battery bank.

There are two main paths that the array's generated power will pass through, and in both ways, the electricity will be converted only once from DC to AC. These paths include:



1.

The power flows from the battery bank to your home.

2. The power directed from the battery bank toward the grid.

Historically, AC-coupled configurations were more common for residential and commercial solar installations since most homeowners started with a conventional grid-tied system and then added a battery bank to the system; however, as more DC options are available now, DC-coupling is getting more and more popular.

How to Size an Inverter

One of the most important steps in selecting the appropriate inverter for your PV system is to figure out the correct inverter size needed. Since certain PV systems and inverter types have specific sizing requirements, we will discuss the sizing for each type of inverter separately.

Size an Off-Grid Inverter

An off-grid inverter is sized according to your daily continuous and surge power consumption (wattage). Unlike sizing the battery bank, where you need to figure out your total energy consumption (watt-hours), sizing an off-grid inverter is merely based on your consumed power (wattage) per day. In other words, your off-grid inverter should be able to provide power so that all your AC appliances can run smoothly regardless of their duration of usage per day.

This example will help you learn how to size your own inverter. The chart below represents a list of loads, including the continuous and surge power consumption of several appliances used in an off-grid house. A simple alternative way of sizing is using an online calculator.

AC Appliance	Quantity	AC Continuous Power (Watts)	AC Surge Power (Watts)
Light bulbs	10	100	0
Fridge	1	250	2200
Microwave	1	1000	0
Well pump	1	425	2350
LED TV	1	175	0
Coffee maker	1	950	0
Total		2900	4550

As the table implies, we need an inverter that can handle at least 2900 continuous watts and 4550 surge watts for some appliances to kick-start. Additionally, the voltage should match our nominal battery voltage.

Other than the maximum power, the inverter must match AC appliances' voltage. Inverters are available in 12, 24, and 48 DC volts. The DC input voltage of an off-grid inverter must comply with the battery's nominal voltage; otherwise, it may not work or may be damaged. The AC output of inverters may be 120 or 240 volts, depending on the inverter type and the output wiring.

Size a Grid-Tied Inverter

To size your required grid-tied inverter, you need to look for two important features:

- Power (wattage)
- Array's voltage

A grid-tied inverter's main function is to receive and convert the generated DC power. The inverter must be big enough to handle your solar array's maximum amount of power.

Assuming you have installed two strings—each composed of four solar panels rated at 175 watts, or 12 volts—let's figure out the required inverter's maximum power:

Maximum power = 2 (parallel strings) * 4 (panels in every string) * 175
= 1400-watt, total solar array's generated power

Therefore, a 2000-watt inverter can easily handle the generated power.

Since you may need to add more panels to cover a greater portion of your electricity bill in the future, it is wise to oversize your inverter. It avoids re-doing and the need to replace your inverter with a larger one in the future.

Chapter 7

Batteries

Deep Cycle Battery: What Is It?

Like all the solar options, a deep-cycle battery is designed to provide steady output for a significant period until discharging to its recommended limit. This type of battery is different from car batteries, which should always be ready to generate a burst of high-power output to start the car engine. As this definition implies, off-grid and hybrid PV systems can just utilize deep cycle ones. Different types of deep cycle battery technologies can be paired with solar systems, such as lead-acid, lithium-ion, nickel-based, and flow batteries.

Types of Batteries

Lithium-ion and lead-acid batteries are the two most popular chemistries available for off-grid systems. They are, indeed, not only different in chemistry but also in many other aspects, such as the cost, lifespan, and capacity.

Lithium-ion technology is newer and superior to lead-acid in almost all areas apart from the price. While they offer higher efficiency, capacity, depth of discharge, and lifespan, they, unfortunately, cost a lot more than their old-fashioned competitors.

Nickel-cadmium and flow batteries are other solar battery types. They're seldom used for residential or recreational purposes, and they won't be covered here.

Lead-Acid Deep-Cycle Batteries

This technology has been utilized for storing energy for more than a century. Due to their reliability and low cost, these batteries are still extremely suitable choices for small and medium-sized PV systems.

The main downside of these batteries is their maintenance, especially in flooded types, which need ventilation and frequent refilling. Ventilation considerations will lead to installation issues as well. Their shorter

lifespan (seven to ten years) and depth of discharge are other disadvantages. These batteries should only be discharged up to 50% of their capacity to prevent them from being permanently damaged. Deka or Crown Battery may be among your best options to select as a lead-acid battery.

Mechanics of Lead-Acid Batteries

A lead-acid battery consists of the following compartments:

1. Lead plates
2. Diluted sulfuric acid solution, known as electrolyte
3. Negative electrode (anode)
4. Positive electrode (cathode)

The lead plates work as a separator blocking a direct link between two opposite electrodes. During the charging period, lead oxide is produced at the cathode, while during discharging, sulfate ions leave the electrolyte, and water is produced. The inflammable gas, hydrogen, may be formed if the battery is overcharged. This increases the risk of an explosion, hence the importance of proper monitoring and ventilating the batteries.

Types of Lead-Acid Batteries. Features and Terminologies

1. ***Flooded batteries*** are the traditional type used for starting engines in motorcycles, golf carts, as well as deep cycle solar power systems. The user can open the lid to add distilled water as the battery dries up.
2. ***Sealed*** batteries utilize the very same mechanics as flooded ones; however, a sufficient amount of liquid has been added before sealing the battery. You cannot add distilled water to this type as the name implies.
3. ***Valve regulated lead-acid (VRLA)*** batteries are sealed lead-acid batteries equipped with a regulating mechanism to let oxygen and hydrogen gasses escape safely from the battery.
4. ***Absorbed gel matt (AGM)*** is a variant of VRLA lead-acid batteries, constructed with more advanced technology for keeping electrolytes suspended around active plates to provide a decent depth of charge and discharge. Solar and storage purposes are among the uses of this type.
5. ***Gel lead-acid*** batteries utilize the same electrolyte suspension mechanism, although due to the addition of silica to the

ingredients, they are not considered a wet cell. While they offer a slightly longer lifespan in hotter weather conditions, there is more chance that they'll have a shorter lifespan if charged with the wrong voltage.

Monitoring a Flooded Lead-Acid Battery

The two above-mentioned parameters should always be monitored, especially in a flooded lead-acid battery. The following tools are required for monitoring and refilling a flooded lead-acid battery:

1. Distilled water.
2. Voltmeter, to figure out the voltage of the battery.
3. Temperature compensating hydrometer to determine the specific gravity of the battery.
4. Proper safety gloves and goggles.

Frequent maintenance and refilling are required to maintain the electrolyte level and the charge level of the flooded lead-acid batteries; however, in AGM lead-acid batteries, these two factors cannot be modified, meaning that AGM lead-acid batteries are less prone to damage.

As mentioned above, two factors significantly impact a battery's health: fluid level and state of charge.

- **Fluid level**

You can check the mineralized (distilled) water level by opening the flooded lead-acid battery lid. While most batteries have a fill level, you can make sure to have enough water if no metal lead surface is visible. Make sure you never overfill the battery; the maximum amount should usually be half an inch below the cap. Always consider the safety measures mentioned above.

- **State of charge and level of discharge**

By checking the voltage and specific gravity, we can quite simply figure out the depth of discharge and the state of charge of a lead-acid battery.

The table below contains the figures for depth of discharge to voltage and specific gravity for a 12-volt battery. You can easily double the figures and use them for a 24-volt battery as well.

State of	Specific	Voltage (12
-----------------	-----------------	--------------------

Charge	Gravity	V)
100%	1.26	12.7
75%	1.22	12.4
50%	1.19	12.2
25%	1.15	12.0
0%	1.12	11.9

Temperature Effect on Lead-Acid Batteries

Lead-acid batteries provide their optimal performance if stored under optimal temperature (25°C, or 77°F). In general, lead-acid batteries get charged faster and so, unfortunately, discharge faster in higher temperatures, while in lower-than-optimal temperatures, the battery has a decreased capacity, although with an increased lifespan. Generally speaking, an 8°C (15°F) rise in temperature will halve a lead-acid battery's lifespan.

To charge a lead-acid battery in higher and lower temperatures than are optimal, special considerations must be taken into account, the most important of which is the voltage adjustment. These batteries need to be charged with a higher voltage in colder weather and a lower voltage in hotter weather.

Additionally, when lead-acid batteries get colder, their capacity decreases, while load and charge rate is also affected. These factors can seriously affect your storage capacity. There would also be a risk of higher currents and, consequently, a fire hazard in higher temperatures; therefore, certain considerations must be taken into account to size your battery bank and your system.

VRLA Vs. FLA Battery Charging and Maintenance

Flooded, unsealed lead-acid batteries need the most maintenance of all lead-acid battery types. They need to be frequently filled. In regards to ventilation, they need a properly ventilated space, and it's a good idea to connect the battery box to an outdoor space. In larger systems, ventilating fans are needed to be installed. As explained before, this is due to the hydrogen-releasing nature of these kinds of batteries, especially when overcharged.

VRLA batteries can never be refilled because the manufacturer seals them. Since they only release gas if overcharged, ventilation consideration is still needed, although not as strictly as for FLA batteries. The FLA batteries' discharge level should be determined by measuring

their specific gravity via a hydrometer; however, this is impossible due to their sealed nature in the VRLA type (and AGM and GEL). FLA batteries accept the widest range of voltage tolerance among lead-acid batteries. Accordingly, an appropriate charge controller must be connected to them with a proper charging program.

VRLA batteries are much more voltage-sensitive when compared to FLA batteries. To have a fairly long lifespan, they require proper charging. At higher voltages than recommended, the battery heats up, and gas is released, which leads to permanent harm to the battery. Hydrogen release in this situation poses a risk of irreversible damage to the battery, while in FLA, it is much less risky. Selecting a proper charge controller is the key to having a well-maintained VRLA battery.

As their name implies, flooded (both sealed and unsealed) lead-acid batteries cannot be placed on their side due to the risk of leakage. VRLA batteries can be oriented on their sides, thus allowing battery placement and installation flexibility.

Lithium-Ion Battery

Lithium-ion technology has been incredibly helpful and reliable in storing electrical energy with the growing popularity of electric vehicles. These batteries are also now being commonly used in almost any cordless electrical device, such as laptops, cell phones, etc.

Tesla Powerwall and LG Chem are the pioneers of the lithium-ion battery technology utilized in residential solar storage systems.

While lead-acid batteries are more suitable for small, infrequently used off-grid systems, lithium-ion batteries best suit larger systems. A longer lifespan and depth of discharge, higher efficiency, and capacity make this newcomer an ideal option for residential purposes.

Lithium-ion batteries are considerably more expensive than lead-acid. Lithium-ion batteries' higher cost and the heat-releasing chemistry are their only downsides. The heat-releasing feature of these batteries, called thermal runaway, can highly increase the chance of fire initiation, especially if installed improperly.

DIY Lithium Batteries, Choosing the Proper Lithium-Ion Cells

Lithium-Ion Vs Lead-Acid Battery

- **Cost:** While you can purchase a Lithium-ion 100-Amp-hour 12-Volt battery for around one thousand US dollars, the same capacity

VMAX lead-acid battery is worth around one-fourth of the lithium-ion battery. Considering the 50% discharge limit of lead-acid batteries when compared to 100% in the lithium-ion type, you will need two lead-acid batteries to store the same as one lithium-ion, which would still cost you half the price of a lithium-ion battery.

- **Efficiency:** lithium-ion batteries are proven to be more efficient than lead-acid ones. While an overall 95% efficiency is considered for lithium-ion batteries, the lead-acid type has a range of efficiency between 80 to 85%. Higher efficiency means that a greater amount of stored energy can be provided as usable.
- **Capacity and depth of discharge:** because of their modern technology as well as their chemistry, lithium-ion batteries store more energy than their older competitor with the same amount of space. Overall, this means less space is needed. This will be a decent feature, especially in larger off-grid systems where batteries occupy substantial space.

As explained above, depth of discharge is defined as the percentage of battery storage being safely utilized before harming the battery. While lead-acid batteries can be seriously damaged if drained by more than 50% of their total capacity, lithium-ion batteries provide 85% and even more of their capacity ready to be used. *Effective capacity* is the term used to describe the depth of discharge joined with the capacity of the battery.

- **Lifespan:** lifespan of batteries is defined as the number of cycles they can be charged and discharged before becoming seriously damaged. Lithium-ion batteries last several times longer, leading to a more effective lifespan than lead-acid ones.

Chapter 8

Solar Panels

The photovoltaic (PV) system utilizes a sustainable energy source and is more affordable than ever before. PV effects cause solar panels to convert the light energy from the sun into electrical energy. When sun rays shine on the surface of the panels, they are absorbed, reflected, or even passed through the cells to generate electricity.

What Are Solar Panels Made of

Since solar panels utilize photovoltaic (PV) technology, they're referred to as PV modules. PV modules are composed of a certain number of PV cells, depending on their power-generating capacity.

PV modules are made of PV cell circuits enclosed in an environmentally protective laminate; they act as the building blocks for the PV solar system. PV cells act as a semiconductor material (silicon) that converts light energy into DC electricity.

A group of PV modules is wired together to form a PV array. PV modules may be wired in parallel, series, or both to deliver enough current and voltage required to run appliances.

The front surface of the PV modules is covered with a transparent material, such as tempered glass, and a waterproof material at the back. Also, a weatherproof material covers the edges of the module, while the aluminum frame holds all the components together to form a mountable unit. Each PV module

has a junction box or a wire lead at the back to allow you to connect the modules to other solar system components.

Types of Solar Panels

There are three common manufacturing techniques for PV modules. These technologies result in the production of solar panels that vary in terms of appearance, cost, performance, and method of installation.

Single-Crystalline/Monocrystalline Silicon

This is a form of crystalline silicon (C-Si) PV module with a high energy efficiency of 17% to 20%. It is the most efficient solar energy production technology on the market. These PV modules are space-efficient, expensive, and have a high energy-bearing capacity. Due to the high lifetime value of these panels, they're optimized for commercial and residential purposes. The panels have rounded edges, a uniformly darker blue color when compared to multi-crystalline modules, and are less affected by high-temperature changes.

Multi-Crystalline/Polycrystalline Silicon

This works similarly to the single crystalline but has a lower conversion efficiency of between 13% and 16%. The cells of these modules are made of several silicon crystals, making them cost-effective. They are easy to identify due to the square shape of the panels, and they have a blue speckled look. However, the panels have a slightly shorter lifespan and are more affected by high temperatures.

Amorphous Silicon (A-Si)/Thin-Film PV Module

This thin-film PV module has a lower light absorption rate than the crystalline silicon modules. These modules have the lowest efficiency of 10% but are more installation-friendly. These modules have a thickness of a few nanometers to micrometers,

hence the name “thin-film”. They are the most portable, flexible, easy-to-install, and lightweight panels on the market.

If you’re on a low budget, you may want to select this option. Many people prefer these panels because of their flexibility and the fact that they’re less affected by high temperatures. The lightweight nature of thin-film panels makes them easy to install on any surface, such as glass, metal, and plastic. They occupy the least possible space, making them suitable for an RV or van installation.

Solar Panel Specification Sheet

Solar panel specifications sheets provide detailed information about how to operate the panels and how to configure the PV system. You will also know the power production capacity and the efficiency, how temperature changes affect the operation of the panels, and information on the dimensions of the panels. This information allows you to analyze the performance of the panels accurately. You can review this information at the back of the panels or review what your installer recommends so that you know what you’re buying. You can find the datasheet information in PDF format under the product, from the support, or download it from the manufacturer’s website.

There are a number of terms and ratings you need to understand to avoid confusion when reading your solar panel’s datasheet. The main ratings are reflected in the datasheet below:

Specifications	
Electrical performance at STC	
Maximum power	125 W
Maximum power current (Impp)	7.18 A
Maximum power voltage (Vmpp)	17.4 V

Short circuit current (Isc)	7.14 A
Open circuit voltage (Voc)	20.92 V
Maximum system voltage	600 V
Temperature coefficient of Isc	0.0045 A / °C
Temperature coefficient of Voc	-0.085 V / °C
Efficiency	19.8%
Electrical performance at NOCT	
Maximum power	90 W
Maximum power current (Impp)	5.96 A
Maximum power voltage (Vmpp)	15.1 V
Short circuit current (Isc)	6.124 A
Open circuit voltage (Voc)	19.5 V
Efficiency	18.4%

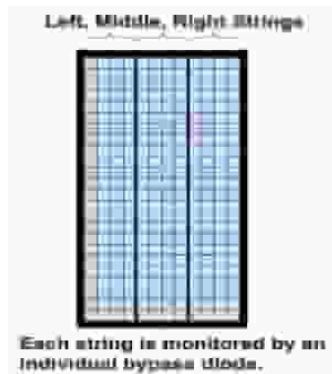
You need to learn these terms to understand and utilize the above-mentioned specifications for your system applications.

Solar Panel and Shading Effects

To prevent hot spot problems and improve power output from shaded cells, PV modules are equipped with bypass diodes. A bypass, or internal, the diode will block the shaded cells so that no current will pass through them.

The diode is either integrated into the module itself or installed in the module junction box. Each module has three strings of series cells: left, middle, and right strings, each of which has one diode. For example, if one or two rows of cells are shaded, their

diode blocks them and bypasses the current, so the unshaded cells are not affected.

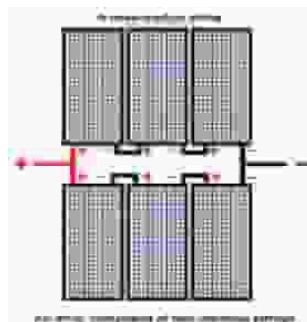


Assuming you have a 60-cell module, you will have three strings of twenty cells wired in series, each protected with a single diode. The three strings are connected in parallel with each other.

Shading of The PV Array/String

A PV string consists of one or several modules connected in series. Do not confuse PV string with the strings inside each solar module (panel). Wiring the modules in series increases the voltage output while the current will remain the same.

However, a solar array is usually composed of one or several strings containing the same number of panels. These PV strings are connected in parallel, so the current will be scaled based on the number of strings while the voltage will be the same as that of the individual string's voltage.



The intensity of sunlight in a particular area rarely affects the voltage output of your system; however, the current generated by the PV module is dependent on the amount of sunlight the modules are receiving.

Shading of individual modules affects the performance of your PV array. A reduced generated power by one shaded module will reduce the rest of the modules connected in series in the same string.

The most efficient method to avoid the shading effect in PV string is the use of Module Level Power Electronics (MLPEs). These include power (DC) optimizers and micro-inverters, which can be connected to an individual PV module to increase its performance under shading conditions. By using MLPEs, maximum power point tracking is done at the module level.

Tilt and Orientation of The PV Array

When mounting solar panels, you should ask yourself the following questions:

At what tilt you should mount the modules.

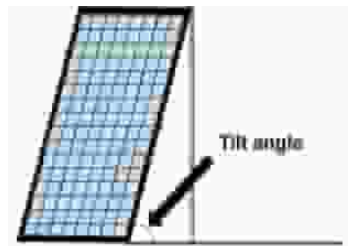
Whether to use portrait or landscape orientation.

Tilt Angle

Tilt angle is defined as the vertical elevation angle at which modules are mounted on the roof. You can set the tilt's orientation or direction to optimize the panel's performance when installing the modules. If you have a pitched roof, however, the preferred module's tilt angle will be the same as the tilt of the roof.

In a flat roof, the tilt is 0 degrees, while for a vertical wall-mount

module, the tilt angle is 90 degrees. The amount of energy generated depends on the tilt angle.



Tilt Angle and Latitude

At noon, the sun is not always above us. You can maximize the annual output by tilting the panels slightly in the south if you live within the Northern Hemisphere. The tilt angle depends on the latitude; the further you move from the equator, the higher the tilt angle.

Electricity generation will be at its peak in the afternoon and the early evening if the panels are facing toward the west. In this case, panels can give the maximum yields over panels facing toward the south because they tilt toward the setting sun.

If the PV array has exactly vertical exposure to sunlight throughout the day, the output from the array will be at its highest; however, the sun moves throughout the day, making it impossible to face direct sunlight unless you use a dual tracking system, such as (2-axis solar tracker). This tracker ensures the array tilts at an optimal angle throughout the day and in different seasons to maximize the output.

Alternatively, you can install a single-axis tracking system on the tilted arrays to enable the panels to rotate to face the sun as it moves from east to west. This increases the output during the early and late daylight hours.

A one-axis-solar tracker will increase your initial cost by around 40% to 50% while raising your power output by 30% to 35%. Since adding solar trackers will significantly increase your

upfront costs, most homeowners ignore this option and prefer a fixed mounting.

Chapter 9

Sizing a Solar Panel

Solar Panel Sizing for Grid-Tied Systems

Method 1:

1. Estimate Your Energy (Calculate Your kWh Usage)

The first step to sizing your solar system is to determine your average daily power consumption (kWh). This will help you in knowing how many panels you need to install in your home.

Start by gathering your electricity usage (kilowatt-hours) based on your electricity bills from the utility company to determine your consumption for the last twelve months. From this, you can identify your peaks in electricity usage throughout the year. Mostly, your energy usage spikes during the winter and summer months because of the heavy use of the heating and cooling systems. Your grid-tied system tends to produce more electricity in the summer months due to peak sun exposure. Below is an example of an electricity usage history.

Electricity Consumption History	KW H
June 14	850
July 13	1123
Aug 13	1148
Sept 13	1058
Oct 13	1127
Nov 13	834
Dec 13	945
Jan 14	869
Feb 15	705
Mar 14	682

Apr 14	679
May 14	680

You can get your average daily electricity usage from your annual power consumption bill. Add up your power consumption for twelve months. In the example above, the annual consumption is 10700 kWh. Then divide the total number by 365 days to get the average daily power consumption:

$$(10700 / 365) = 29.31 \text{ kWh, average daily consumption}$$

2. Determine Peak Sun Hours

Your local peak sun hours depend on your location and climate in the area. You have to determine the peak hours of sunlight per day to get the most of your solar power.

Identify peak sun hours in your geographical area to estimate how much energy the panels produce during the peak hours. You can use the sun hours map chart to get the average peak hours for your city. Assuming you live in Arizona, your array will experience 5.5 sun hours per day.

Using annual average daily sun hours will help you roughly estimate your average daily power generation; however, it does not reflect your system's actual power generation potential on sunny, summer days and cloudy winter days. Instead, you can consider the winter daily average sun hour to be more conservative.

3. Calculate the Panels' Output

To obtain the power output of your PV system, take your daily power consumption and divide it by peak sun hours. Let's calculate how much energy your panels generate each hour in this case.

Start by multiplying your hourly power usage by 1000 to convert your power consumption into watts. Then divide it by the number of daily peak hours.

$$29.72 \text{ kWh} * 1000 = 29720 \text{ watts}$$

Solar panels output = daily power consumption (kWh) / average peak sun hours

Assuming you live in Arizona, which experiences 5.5 peak sun hours per day, your array's output per hour is:

$$29720 \text{ watts} / 5.5 \text{ sun hours} = 5403.6 \text{ (rounded to 5404 watts)}$$

PV setups make experience system losses from the solar inverter,

connected cables, and others that amount to 25% of the system's total power; therefore, the actual size of the system is derived by adding 25% to the solar array's output:

$$5404 \text{ watts} * 1.25 = 6755 \text{ watts}$$

Based on your roof size, location, peak sun hours, and grid reliability, you can decide what percent of power consumption to cover by your panels. We decided to cover 75% of the daily consumption; however, most homeowners consider 50% to 60% when they first install a PV system.

$$5404 \text{ watts} * 75\% = 4053 \text{ watts (desired output)}$$

4. Calculate the Size of Your PV System

Lastly, divide the solar array's output by the energy rating for each individual panel. Since panels are rated based on individual consumption, most of the panels are in the range of between 275 and 380 watts.

If you choose a 360W High-Efficiency LG Solar Panel, we can refer to the datasheet and figure out that the Pmax under NOCT is 325W; therefore, the number of panels needed for your system will be:

$$4053 \text{ watts} / 325 \text{ watts} = 12.47 \text{ panels}$$

Since there are no partial panels, you can round up this number. So, you need fourteen 360-watt panels to meet 75% of your energy needs. As you observed here, using the power output under NOCT provides more realistic results than when considering STC.

Method 2

Once you know you have enough roofing space to mount the panels, identify the tilt angle and the direction the panels should face. You can use the PVWatts Calculator to determine your monthly power output from the panels.

The PVWatts Calculator works as follows:

- Enter the address and click on the orange button on the right.
- On the open system info page, enter your previously-calculated DC size of the system.
- Pick a standard module.
- On array type, choose "fixed (roof)" if you have roof mounts or "fixed (open)" if you're dealing with ground mounts.
- Leave an allowance for system losses of around 15%.

- Enter the azimuth angle of 180 for southern-facing roofs along with the solar panels' tilt angle, which would almost always be your roof's tilt angle.
- Once you enter all the details, you can click the orange arrow on your right to obtain your monthly solar system output.

The PVWatts Calculator provides an accurate breakdown of your energy output based on your location and the characteristics of your building.

How to Size Hybrid Solar Systems

The hybrid solar system is a grid-tied system connected to a battery bank; therefore, it possesses grid-tied and off-grid systems characteristics. Since you are connected to the grid, you cannot worry much about your daily consumption. Additionally, in the event of an outage, you can take advantage of your backup.

In most hybrid systems, a subpanel, or essential load panel, is designed so that you can supply your essential electrical devices. Below, you can see the steps needed to design a hybrid system:

Estimating Your Energy Needs (As Shown Above)

By using the example below, we can better explain the different steps:

Assume you live in a house in California with 5.2 peak sun hours, where you consume 1100 kWh per month. Your system is supposed to be supported by a 12 V battery and 200-Watt Renogy solar panels with a power output of 170 under NOCT.

To determine the power consumption per day, we divide monthly usage by 30, or, if yearly consumption is available, divide by 365:

$$1100 \text{ kWh} / 30 \text{ days} = 36.66 \text{ kWh per day}$$

$$36.66 \text{ kWh} * 1000 = 36660 \text{ Wh}$$

Determine Peak Sun Hours (As Shown Above)

Determine the peak sun hours based on your location. This will help you know how much energy the panels generate during peak sun hours.

Wh per day/peak sun hours = required power output

$$36660\text{-watt hour} / 5.2 = 7050 \text{ watts}$$

Number of panels needed = power output/PV module rate

7050 watts / 170 = 41.47 (rounded up to 42) panels required to provide the whole daily consumption. Depending on your essential loads and

available roof space, you might just cover 60% to 70% of your daily consumption and install fewer panels than mentioned above.

Sizing Your Battery

Unlike off-grid systems, in hybrid power systems, you just need to cover your essential loads by the battery bank; therefore, you need to collect and list the consuming load of all your essential (desired) appliances to figure out how big your battery should be. Here is the list of most preferred appliances as the essential loads.

Loads	Power (Watts)	Duration (Hour)	Daily Energy Usage (Watt Hour)
(8)* 10-watt LED lights	80	6	480
(1)* 110-watt laptop	110	3	330
(1) *90-watt TV	90	3	270
(1) *300-watt fridge	300	12	3600
(1) *70-watt fan	70	2	140
(1) *320-watt washing machine	320	1.5	480
			5300 Watt Hours

Since the battery cannot be 100% efficient, you have to account for an estimated battery loss of 15%. Divide watt-hours per day by 0.85 battery efficiency:

$$5300 \text{ Wh} / 85\% = 6235 \text{ Wh total battery capacity}$$

Since batteries are rated in amp-hours, not in watt-hours, convert the Wh to Ah by dividing the battery's capacity by the battery voltage (12 V, 24 V, or 48 V). As you're using a 12V battery, then:

$$\text{Battery capacity} = 6235 \text{ watt-hour} / 12 \text{ V} = 519.5\text{-amp hour}$$

Once you get the battery capacity, you can divide it by the battery's rating to know how many batteries you should use in your system. For instance, you need six 100-Amp Hour Lithium-Ion batteries that can store 600-amp hour (> 519 Ah), and consequently, you need an array that produces at least 7200 watt-hours (600 *12 volt = 7200 watt-hours).

You should keep in mind that this amount of power is the minimum amount required to be supplied by the array. You can either go with this or scale it up to your entire daily consumption (36660 watt-hours).

How to Size an Off-Grid PV System

Calculating your power needs for an off-grid system is different from a grid-tied system. Since you live off-grid, you have to focus on the daily power usage (kWh) instead of the monthly or annual electricity bills.

An off-grid system makes you energy-independent since it can cover your day-to-day energy needs. For this reason, your system should offset 100% of your energy consumption demands and store more energy to run your home smoothly.

Without an electricity bill to guide you, you have to start by listing all the major appliances in your home and how much electricity you use daily. This will help you determine your load.

You can use a load evaluation calculator to determine the size of your off-grid system. Alternatively, you can check how much electricity each appliance consumes from the appliance electrical consumption guide or the energy guide sticker and determine their usage duration. Let's look at the step-by-step procedure regarding how to size your system based on your location and your energy needs.

: Determine Your Energy Needs

You need to evaluate the energy needs for each piece of equipment you have in your home. Have a look at the user manual to confirm the device power consumption rate or confirm the rate from the manufacturer's website. Once you obtain the power consumption rate, you can multiply this figure by the number of hours you run the item every day.

For example, if we have a 300-watt fridge that runs for 14 hours a day, an oven rated at 2 kW (2000 W) that we intend to use for half an hour each day, and we need two 10-watt light bulbs that run 24 hours per day, the total load list will be as follows:

Load (Watt)	Duration (Hours)	Power (Watt-Hours)
300-watt fridge	14	4200
2000-watt oven	0.5	1000
10-watt light bulbs * 2	24	480
		Total power: 5680

Add Inverter Load

If you're using an inverter to convert DC to AC power for your

consumption, you have to account for inverter and system efficiency losses. Inverters consume a fraction of generated power when running.

Therefore, you have to add the consumption rate of the inverter to your daily total. Different types of inverters have different consumption ranges. So, have a look at your inverter spec sheet to determine how much your inverter consumes. If your inverter consumes 30 watts and runs for eight hours a day, you need to add that to your power load.

Inverter load = 40 W

Watts * 8 hours = 320 Wh

Total load = 5680 Wh + 320 Wh = 6000 Wh

You also have to account for inefficiencies in your system. Efficiency losses range from 5% to 15%, depending on the specific type of inverter and how much load is connected. This is important when sizing the battery—hence the reason you should buy a quality, efficient inverter.

Calculate Battery Size

Batteries store the collected solar energy for later use. The size of the battery depends on the required backup power to effectively run your appliances. When there is not enough sunlight to power the panels during the winter months, you can rely on a backup generator since battery storage might not be enough.

When choosing your battery size, you have to consider system inefficiencies and temperature coefficients associated with your off-grid system. These inefficiencies have an impact on solar output, and the rate of inefficiency depends on the solar equipment and the system design. You have to compensate for these inefficiencies by oversizing your solar panels appropriately.

Typically, the battery's voltage output is 12 V, 24 V, 48 V, or 120 V; therefore, the first step is to select the battery voltage. Lower voltages, like 12 V, work perfectly for smaller systems, while 24 V and 48 V better suit a medium and large system, respectively. Another consideration is the inverter and charge controller capacity, solar array configuration, and wire sizes.

Assuming your total daily power consumption equals 6000 Wh, you then have to account for inverter inefficiencies. You can look at your inverter spec sheet to determine its efficiency. For example, if your inverter's efficiency rate is 90%, you should add 10% to your daily power consumption. So, the amount of energy drawn from the battery to run your inverter will be:

$6000 \text{ Wh} * 1.1 \text{ inefficiency} = 6600 \text{ watt-hours}$

Next, you have to account for temperature changes in your battery's capacity to deliver power. If you're using a lead-acid battery, you should expect a loss in battery capacity in lower temperatures. For example, if the battery temperature is around 20°F during the winter months, you can multiply your battery capacity by 1.59.

$6600 \text{ Wh} * 1.59 = 10494 \text{ watt-hours}$

You also have to factor in the efficiency loss that occurs when charging and discharging the battery. For lead-acid batteries, the efficiency loss is 20%, while lithium-ion batteries have an efficiency loss of 5%; therefore, if you decide to add a lead-acid battery to this system:

Minimum energy storage capacity of battery = $10494 * 1.2 = 12592.8$
Wh

Conclusion

Now you can install solar panels on your property and enjoy uninterrupted electricity to go about your everyday life.

The best way for you to get the most out of your solar system is to keep the panels clean and to make sure that the wirings are always snug. Every week, do a walk-around and inspect your equipment to look for degradation, rust, snug fit, cuts, tears, and anything that shouldn't be there. Make it a point to inspect your battery compartment and ensure there are no critters nesting in there or any fluids leaking. If you have a gasoline generator and hardly use it, run the generator during your inspection days. Don't let fuel stay in there and degrade. Also, make sure that all the wiring to the generators is in good order.

Above and beyond that, you should send your RV to a maintenance shop to inspect and fix things, or you can do it yourself once a year. Replace wiring that you think needs it, change housing and protective covers, and grease the hinges to panels and frames.

The right way to live in this world is to ensure continuity in our everyday activities, many of which are connected with electricity. But for electricity to reach the rural areas, you now have the power and knowledge to build one.

BOOK 9
OFF-GRID SOLAR POWER
THE ULTIMATE GUIDE TO GET
STARTED
WITH SOLAR POWER SYSTEM
FOR RVs, BOATS,
CABINS, AND HOMES

Introduction

To fully understand Off-Grid Solar Power and how to install a system for your home, RV, or cabin, we have to begin from the obvious, which is the basics of solar energy. Off-grid solar relies on the abundance of free solar energy, which can meet energy demands with minimal impacts on the environment.

Information on the United States Department of Energy Website reveals that the increased deployment of solar energy systems offers a wide range of benefits for the country. Solar energy is the cleanest source of energy available worldwide. This makes it useful not just for domestic use but even for other broader applications as a contributor to economic growth, job creation, and climate change mitigation which is its major selling point.

The solar potential throughout the United States is quite impressive. Installing PV panels in as little as 0.6% of the country's total land area could potentially power the entire nation. More locally, it is possible to install a system in your home, RV, cabin, and other small structures either as a supplement to power from the grid or as a standalone power source that is off the grid. These factors make solar energy an attractive choice not just for its environmental prospects but also for its economic potential.

One of the factors that account for the growing popularity of solar energy is the cost of the installation which continues to drop as solar technology further improves. Solar power is becoming rapidly popular as a renewable energy source in various nations of the world. The reduced costs are part of why solar panels are visible almost everywhere you go. You'd spot PV panels as you drive by homes, businesses, and other structures. The growth of the industry is expected to boom further as the years roll by. At this rate, International Energy projects that solar power would become the world's major source of electricity by 2050.

Chapter 1

Pros of Off-Grid Solar Power

This is because solar power has a lot of benefits that make it a good source of energy. Many people are slowly switching to renewable energy sources, and using the sun's rays to power their homes can certainly help this process along as well. It's important for all living things on Earth to get power from the sun at some point in their lives. There is still a lot more that can be done to use its power. Some of the things that solar power can do for you are on the list below.

Clean and Green

Clean and renewable: It's 100% safe and clean. It cuts down on the use of fossil fuels that are bad for the health and the environment. Our air, water, and soil will be harmed if we keep using oil and coal at the rate we are now. This will lead to the loss of many species over many years. Between the years 2000 and 2065, it is thought that more species will die out because of fossil fuels than in all the years that humans have been alive.

Solar, on the other hand, doesn't make any pollution, and the sun's power is an unlimited source of energy. It doesn't hurt the ozone layer or the Earth's surface. When the sun doesn't come out, solar power will be here to stay until the sun does.

You Have the Right to Decide How It Works

Many homes have power outages regularly. This includes rich countries, especially when there are natural disasters. U.S. electricity grids are over 100 years old and can't keep up with more people and extreme weather. Each state will have to spend billions of dollars to make the electric grids better. The customers will have to pay for the costs.

With more and more technology, we need to improve our infrastructure. In the beginning, when you use solar power, you become energy independent. You don't have to worry about the grid going down and stopping work. The fact that you won't be left in the dark, literally, without electricity gives you a lot of comfort. That next storm or disaster will not be able to get through to you.

You Can Save a Lot of Money

The cost of energy for your home is always going up and won't be slowing down any time soon. Solar is efficient and saves money all year long. It doesn't matter if it's cloudy outside. The sun still shines. So, don't think that you'll lose power when you can't see the sun. There is a chance that this could cut your monthly energy bill down to zero. This investment is worth it just because you won't have to pay so much for electricity anymore.

Besides saving money, you can get a lot of other things as well. There are a lot of big tax credits being offered all the time, so check to see which ones you qualify for. The cost of the equipment is also going down, which is good news for people.

Because Solar Is the Best Source of Renewable Energy

What makes solar power better than all of the other renewable energy sources that are out there today? Solar is a good option for renewable energy, but I like all of them. It's easy for everyone to get to because the sun is always there. In this video, we'll look at some ways solar power is better than other renewable options and see why it's better for you.

Chapter 2

Cons of Off-Grid Solar Power

Even the best things in life have flaws. Sometimes, the things we care about will let us down. There is no such thing as a perfect thing in life, no matter how much we love it. At least, not in every case. The same thing is true of solar power too. Even though this energy source has a lot of good things going for it, there are some things we need to be aware of. When it comes to solar power, I don't think it's a good idea to use it all the time, even though I think this will change in the future with more progress. There are some drawbacks to going solar, but I don't think they'll be enough to keep us from going. I want everyone to be aware so that they can make the best decision for themselves.

There Is a High Price for Solar Panels

In the beginning, solar panels cost a lot of money. This can scare people away from getting them. When it comes to the price, it varies a lot from state to state and from manufacturer to manufacturer, but the average can be between \$15,000 and \$25,000. In fact, this is what the Center for Sustainable Energy says. Many people aren't sure if it's worth it to spend so much money at the start. Many people don't have this much money sitting around, and if they do, they don't want to spend it all at once.

You'll have to spend a lot of money upfront, but you'll save a lot in the long run. You could save a few hundred dollars a month on your electric bill, which would make the investment worth it in a few years. Let's say, for a moment, that your electric bill is usually \$200 a month or so. You spend \$2,400 in one year alone. In 10 years, that's already \$24,000. The solar panels will last much longer than ten years if you take care of them the right way I have good news for you. If you choose to go the traditional route, your bill will only get bigger from here on out. If you do this, you will save money and help the environment in a big way. Check out these tips to see if you'll save money in the long run with solar panels.

Evaluate How Much Sunlight You Get

While solar panels can work anywhere, the sun must shine for them to work. The more sun exposure you have, the more energy you will get from your solar panels. Some places in the world are better at getting solar power because of this. A solar system's output is also affected by the orientation of your home, the type of roof, and the amount of shade it makes. The more sun your home gets, the more money you could save on your energy bills. Some of this can be fixed, like cutting down on the amount of shade from trees or moving the panels. As for the sun, it likes to do its own thing.

Reliability

The sun isn't out, and a lot of people don't know how solar power works when it is. Even though electricity can't be made during the night, this doesn't mean that all of your lights and appliances will go out as soon as it gets dark. At night, all the energy that was made during the day and stored will be used up.

Use less power during the day so more of it can be stored. During the day, you can use more natural light and never leave more lights on than you need. At this time of day, many people are out of their homes. This means that they use very little energy while they are away.

With solar power, you have to be careful about how reliable it is. There are ways to get around this, though. At night, if you really need electricity, you can still connect to the main power grid. Then you'll have to pay another energy bill.

Chapter 3

Electricity Basics

Voltage

When that electron is pulled away and travels along a path, it has to move in a certain direction. An electric field determines that direction. The details of this are beyond the scope of this book, but the point that you must take with you is that the electron will move from the area of high concentration to an area of low concentration. The greater the difference between the higher and the lower, the greater the potential. The greater the potential between the two ends, the stronger the push of electrons in the circuit from the high to the low. That potential is described by volts. You hear it often that something is 12V, 24V, or 110V. This is often described by analogies using water pressure to illustrate volts. Take a tank that has two chambers separated by a valve. On one side there is no water, and on the other side, there are about three feet of water in the chamber. The pressure exerted by the three-foot column will make the water push into the empty chamber. It will start with more pressure, and as the column gets lower, it pushes less until the two chambers have the same height of water. At that point, there is no more push. There is no longer any difference in the pressure between the two.

In almost the same way (but not exactly), when a circuit is closed, the electron is pushed from the start to move and that knocks out the electron in the atom closest to it. That electron then goes to the neighboring atom and knocks out the electron in

its outermost shell. That keeps happening along the length of the entire circuit. The easier it is to knock an electron off its atom, the more conductive the material is. The more difficult it is to knock an electron off its outer shell, the less conductive it is.

When you have a battery, the voltage of that battery tells you how much push it has. Imagine a trolley is carrying a couple of robots. That trolley moves through hurdles and traffic to get to different city areas to deliver the robots to do mechanical work. The trolley is pushed past obstacles and friction, then gets to its destination. The robots get down and do the work, then get back in the trolley and go home. If you have a huge bodybuilder, say Arnold Schwarzenegger in his prime, you will be able to push that car easily. If instead, you get someone like Pee-Wee Herman to do it, he wouldn't be able to push much of a load. If you get a toddler, then the possibility that the kid can move the trolley even a little is an issue. The force is what voltage is. It tells you how much of a load it can push through. Arnold would have much greater voltage than the toddler.

Current

The second thing in electricity that you hear all the time is amps. Amps is short for ampere. This is the measurement of current. So the next question is then, what is current? Simply put, the current is the rate of charge flow.

If you recall, electricity is the movement of charge. Charges are either positive or negative. Protons are positively charged, and electrons are negatively charged. When we speak of electricity, we speak of the movement of electrons carrying that negative charge. Amps measure how many of those charged particles are moving through the circuit or, more specifically, across the point that is being measured. That could change in different parts of the circuit.

Volts, amperes, and ohms are the measurement units of voltage, current, and resistance respectively. They have a specific and unalterable relationship. Voltage is the product of current and resistance. In other words, $V = I \times R$. V is voltage in volts, I is current in amps, and R is resistance in ohms. In this relationship, if you have high resistance, you need to increase the voltage to keep the current constant. If you want to keep the voltage constant, then you will have to reduce the current.

In the same way, $I = V / R$. It is the same thing just rearranged concerning I . In this case, to keep I constant, any changes in voltage must have an inverse change in resistance. So to keep amps constant, a higher resistance requires a higher voltage.

Resistance

In the same way $R = I / V$. In this case, to keep resistance constant, any increase in current must be accompanied by an increase in voltage. You just need to keep this relationship in mind. But there is one aspect of all this that can confuse many people. Voltage is typically fixed. You either live in a country that gets 110V or 220V out of the wall. You can't change the voltage, so that is typically fixed. What you can change are amps and ohms. Amps are more about what is pulled rather than what is pushed. It's better to think of amps being pulled, volts doing the pushing, and resistance being stationary. Using these three states gives you an idea of how to control them. If you need more voltage, then change the number of batteries in a battery-driven system. In terms of amps, if you get a motor to go faster, it will pull the amps it needs to run the motor. That increased amp requires lower resistance when the voltage remains the same. But since the wall outlet still has the same voltage, when you increase the amps what you realize is that the wires start to heat up. That is why fuses melt. The increased heat melts the

filament and the circuit breaks. To reduce the resistance, you will have to increase the cable's size, which would reduce the resistance.

The greater the diameter of the cable, the less the resistance, and the more current will be able to pass through it without it increasing in temperature.

Power

Power usually means something else when we use it in everyday conversations. In electricity, power has a specific meaning. Power is about the force that voltage and current create. Remember, the current is the number of charged particles that flow per unit of time, and the volt is the force that pushes the electrons. Power is the force and the quantity that results from certain volts and certain amps. 12 amps at 110 volts result in 1,320 watts. Power is voltage times current or volts times amps. A 110-watt light bulb on the 110-volt system means that it is drawing 1 amp. A 5-amp appliance on a 12-volt source will give you 60 watts. It's not that difficult to calculate wattage. Volts—amps—watts.

Chapter 4

Solar Power Fundamentals



What Is a Solar Panel?

We hear about solar power with increasing frequency these days and that is because of two core reasons. The first is the environmental impact of non-renewable energy production. The fear of depleting that source of energy has expedited the development of alternative power generation technologies. This leads to the second reason: the precipitous fall in costs associated with the deployment of distributed solar-generated power.

The key factor that we must distinguish when it comes to understanding any kind of power generation technology is that power is not just influenced by its generation but also its distribution. The power ecosystem is characterized by centralized generation (regardless of the method of generation) that is then fed to a nationwide grid and transported over long distances. This has a two-pronged effect. The first is that it needs a huge capital investment to expand or maintain this grid. The

second is that there are significant inefficiencies at play here. You have to generate a significantly higher amount of electricity to support the needs of a community when you need to transport that energy over wires because a large amount is wasted in transmission. Look at it this way, if water pipes were naturally porous (this is hypothetical to drive a point), then you would lose more water the longer the pipe distance (traveling from the source to use). So, you would lose less water if the source of water were two doors away compared to how much you would lose if the source were two towns away. Because at each length of pipe the water travels, part of it seeps out of the pipe. Thus, the water plant has to process more water to overcome the loss of this water. Processing water is expensive.

Now think about this same thing in electricity terms. The power generation company has to generate more electricity than is being used because it has to transmit that electricity over inefficient cables over long distances.

Since there are two factors at play here, there are two ways to reduce the burgeoning power generation cost and the old way's environmental cost. The first is to convert the methods of generating electricity. This is the kind of thing that Elon Musk has invested in (SolarCity—a company owned by Musk's cousins).

The idea behind this is to have a farm of solar panels and then connect that power generation ability to the existing grid so that the power can be transmitted to the end-user.

What Is It Made of?

Since solar panels utilize photovoltaic (PV) technology, they're referred to as PV modules. PV modules are composed of a certain number of PV cells, depending on their power-generating capacity.

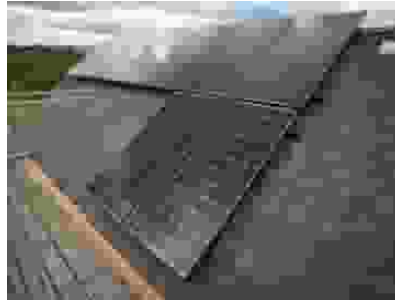
PV modules are made of PV cell circuits enclosed in an environmentally protective laminate; they act as the building blocks for the PV solar system. PV cells act as a semiconductor material (silicon) that converts light energy into DC electricity.

A group of PV modules is wired together to form a PV array. PV modules may be wired in parallel, series, or both to deliver enough current and voltage required to run appliances.

The front surface of the PV modules is covered with a transparent material, such as tempered glass, and a waterproof material at the back. Also, a weatherproof material covers the edges of the module, while the aluminum frame holds all the components together to form a mountable unit. Each PV module has a junction box or a wire lead at the back to allow you to connect the modules to other solar system components.

Chapter 5

How Solar Panels Work



How Do They Work?

Solar panels convert solar energy into electricity because the energy makes electrons within the material move, generating electricity with varying efficiency rates.

On average, a single panel will produce somewhere between 250 and 400 watts. A domestic system for a house might have between four and ten solar panels, giving it a capacity between a kW and 4 kW. Over a single year, a 4kW solar panel system could produce almost 3000 kWh of electricity if operating in good conditions.¹ Of course, off-grid systems are often smaller due to space constraints and reduced consumption needs.

Understanding this allows people to calculate how many solar panels are needed for any given application to power it properly. However, it is essential to note that many domestic solar panels are surprisingly inefficient, although they can still produce plenty of energy in homes.

Even the best residential panels generally only operate at around 20% efficiency. Solar panels can be made far more efficient than

this, achieving efficiency rates of up to around 50%, but unfortunately, this technology is still prohibitively expensive. In the future, it is likely to become cheaper, and we may be able to make better use of the sunlight that is available to us.

Overall, therefore, the process of converting solar energy into electricity is pretty inefficient at present but still valuable, especially in off-grid settings where other sources of power may not be applicable. While solar panels are far from perfection, they are certainly a viable option.

Components of an Off-Grid Solar Power System

For your system to function efficiently, you must select components that meet your energy demands. The main equipment required includes:

Solar Panels

Solar panels are the key element in your installation process. When buying solar panels, you should evaluate them in terms of cost, efficiency, technology type, and warranty. The most commonly used solar panels for residential uses include monocrystalline panels and polycrystalline panels. Monocrystalline panels are the most expensive, yet efficient panels on the market.

The number and size of solar panels you buy depend on:

- Your energy requirements.
- Efficiency ratings.
- Size of your roof area.
- Peak sunlight exposure in your location.

Solar Charge Controller

The charge controller allows you to use DC power directly as well as regulate the DC power generated by solar panels to charge the batteries.

It is connected between the panels and the battery to maintain proper charging of the battery. It regulates the voltage and current flowing to the battery to prevent overcharging of the battery.

Solar Inverter

An off-grid inverter converts the DC power generated by panels to the AC power that's required to run appliances in your home.

Battery Bank

A backup battery stores the excess energy for later use. The battery bank enables your PV system to continue operating with minimum sun exposure.

Mounting/Racking System

A racking system's function is to secure the panel(s) on the roof since you can't directly mount the panels on your house's roof.

Types of Solar Panels

The theory explained before applies to all solar panels. Some differences are worth noticing among PV modules. Thus, we can classify solar panels by technology.

Crystalline Silicon Panels

SINGLE-CRYSTALLINE/MONOCRYSTALLINE SILICON

This is a form of crystalline silicon (C-Si) PV module with a high energy efficiency of 17% to 20%. It is the most efficient solar energy production technology on the market. These PV modules are space-efficient, expensive, and have a high energy-bearing capacity.



Due to the high lifetime value of these panels, they're optimized for commercial and residential purposes. The panels have rounded edges, a uniformly darker blue color when compared to multi-crystalline modules, and are less affected by high-temperature changes.

Multi-Crystalline/Polycrystalline Silicon

This works similarly to the single crystalline but has a lower conversion efficiency of between 13% and 16%. The cells of these modules are made of several silicon crystals, making them cost-effective. They are easy to identify due to the square shape of the panels, and they have a blue speckled look. The panels have a slightly shorter lifespan and are more affected by high temperatures.

Thin Film Panels



AMORPHOUS SILICON (A-SI)/THIN-FILM PV MODULE

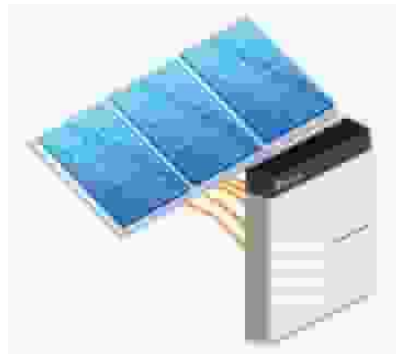
This thin-film PV module has a lower light absorption rate than the crystalline silicon modules. These modules have the lowest efficiency of 10% but are more installation-friendly. These modules have a thickness of a few nanometers to micrometers,

hence the name “thin-film.” They are the most portable, flexible, easy-to-install, and lightweight panels on the market.

If you’re on a low budget, you may want to select this option. Many people prefer these panels because of their flexibility and the fact that they’re less affected by high temperatures. The lightweight nature of thin-film panels makes them easy to install on any surface, such as glass, metal, and plastic. They occupy the least possible space, making them suitable for installation on an RV or van.

Chapter 6

Batteries



You are bound to be aware of batteries' impact on our daily lives. Every portable electronic device depends upon them, and many of us find that our lives also—to a degree—depend upon them. *How often have you felt a jolt of horror upon realizing that your cell phone's battery is almost dead and you can't do the important thing that you depended upon it for?* This can leave you unable to navigate, make an emergency call, submit documents, coordinate with group members, help out a friend, or a whole host of other things. It is a major inconvenience and is becoming more so that we become more dependent on our cell phones every year.

This extends to every area of life that includes batteries. A flat battery on your car, your laptop, your tablet, or even just your remote control can range from devastating to inconvenient, but there's no doubt that when batteries fail, it is never a good time, and it is always frustrating. More than anything, batteries are a technology that we depend upon heavily, and very often, they let us down.

However, in each of these scenarios, you are only dealing with one item that has gone flat and become unavailable for use. It might be very important in that instant, but it is still just one thing. However, the batteries in your solar panel system are supporting everything—and that's why it's so crucial to choose as well as you possibly can within your budget.

Getting the right battery will make a massive difference to your experience with solar panels. Batteries are notoriously inefficient and

suffer from many other problems, such as how much space they require, the maintenance that is needed, and the end-of-life disposal issues.

The battery is the store you depend upon most of the time, and it is therefore extremely important to choose correctly, so, in this chapter, we're going to look at:

- Lithium-ion batteries
- Flooded Lead-Acid batteries
- Sealed Lead-Acid batteries
- Nickel-Cadmium batteries

For each, we will explore the advantages and disadvantages associated with them and the setups they are most appropriate for. This should put you in a great position to choose the most viable for your off-grid solar power system.

We'll then cover choosing the best battery and which specs matter the most.

Lithium-Ion Batteries

This is one of the newest kinds of battery technology. It has been climbing in popularity recently, especially with the increasing uptake of electric vehicles—which require good energy storage in a very limited space.

They are an excellent option in many applications, and if you can afford them, you may find them good for an off-grid setup. Of course, no battery is perfect, but many people are turning to these as a solution for their power storage. They are currently one of the most widely used solar battery banks because of the advantages they offer.

Don't be deterred just because they are new technology. As evidenced by their popularity, they are a particularly attractive option at present, and they often outstrip the other batteries for many reasons.

Pros:

There are a few major advantages to these batteries, including:

- They are low maintenance
- They do not require as much space as other batteries tend to
- They last for considerably longer than most other batteries (generally at least ten years, usually longer)

Cons:

There are also a few disadvantages associated with these batteries, despite their popularity, including:

- They cost significantly more than other batteries
- They are more of a fire risk

Overview:

In general, lithium-ion is the most promising and useful battery for at-home use, especially in off-grid setups where space is very limited. If you don't have room for large battery banks and you are looking to minimize the weight of your home (in a mobile setup, for example), then lithium-ion batteries are certainly the best option in almost every given scenario. This is true despite the cost.

Flooded Lead-Acid Batteries

Also, in common use, lead-acid batteries have been the standard for many years, and although they suffer from quite a few disadvantages, they are a reliable storage solution that has stood the test of time. We'll look at flooded and sealed lead-acid batteries, starting with flooded.

Suppose you cannot afford lithium-ion batteries and you have a stationary off-grid home. In that case, these are certainly a reasonable alternative, and they remain popular in solar panel systems despite their disadvantages. Let's explore the benefits and drawbacks.

Pros:

- They are a reliable and much-tested solution
- They are pretty easy to recycle
- They tend to cost less

Cons:

- They are bulky
- They need to be stored upright in a ventilated, temperature-controlled area
- Their depth of discharge is poor
- They don't last as long as other batteries
- They need maintaining

Overview:

There are some scenarios in which a flooded lead-acid battery is the best option, but in general, you will find other solutions better unless you are on an extremely tight budget and you have a suitable space for them—in which case they become attractive.

Sealed Lead-Acid Batteries

In a low-maintenance version, the sealed lead-acid batteries don't require you to top up the water and do not have a high risk of toxic gasses escaping while the battery is recharged. Otherwise, these share similar advantages and disadvantages to the flooded lead-acid batteries, although they may be somewhat more expensive and have a reduced lifespan overall.

These batteries are similar to car batteries, although they are usually considerably larger.

Nickel-Cadmium Batteries

Another battery that has stood the test of time and improved significantly in recent years, nickel-cadmium batteries (Ni-Cd batteries), are also an option. Still, they are not allowed in some countries due to high toxicity levels.

They are still available in the USA, but you should consider the environmental impact of selecting one of these batteries; they are generally considered a poor option.

Pros:

- •Reliable storage solution
- •A very durable battery that should last long
- •Not affected by temperature extremes

Cons:

- •The toxicity levels are high
- •The battery is tough to recycle
- •The battery must be discharged before it can be recharged, affecting the storage space

Overview:

In general, you will find that other options are far more appealing than nickel-cadmium unless your battery bank cannot be protected from the elements by any means. In these scenarios, nickel-cadmium batteries may remain a viable option.

Which Specs Should You Look at?

Even once you have chosen the type of battery for your off-grid home, you will need to look at the various batteries within that category and the specs they can offer you. It is important to narrow down the category first. The comparison is simply too huge to deal with, but now that we've looked at categories, let's explore the specs and which ones are particularly important when you're shopping for a battery.

Capacity

Potentially the most important element in choosing a battery is its capacity. This means the maximum amount of energy stored in that battery. When the battery is full, your solar panels will not be able to store up any more energy.

It is imperative to look at this number and measure it against your needs. Suppose your battery cannot hold enough power to be helpful. In that case, it will constantly cause problems within the system, and you will find you perpetually run out of power when your solar panels aren't operating (e.g. overnight).

Make sure that your battery can manage for at least one night, or consider the minimum power storage acceptable for you. This calculation should be reasonably easy to do when you know approximately how much power you will use during 24 hours.

Stackability

If you buy a battery, it is always worth thinking about the future and what you may need then. It is beneficial to expand your energy storage system later, so it is important to look at whether your solar batteries are stackable.

This may not be a deciding factor, but if you want to build a large power bank, it is worth exploring stackability and ensuring that your battery can be expanded when necessary.

Cycles warranted

All batteries have a set number of times to recharge and be fully

powered. This number varies according to other stats, but it's imperative to consider the number of recharges guaranteed by the manufacturer.

You will constantly be draining and recharging your solar battery, and over time, the amount of power it will hold (and how long it will keep it for) will decrease as the battery becomes less efficient. Usually, manufacturers provide a warranty that tells you how the battery will perform after several charging and discharging cycles.

Looking at this number will give you a good idea of how long the battery should last, which will help you to choose a high-quality product that suits your needs. Remember, batteries with better guarantees are likely to cost more upfront but should not need replacing as quickly and will usually offer protection if something goes wrong with them.

Power rating

You need to know how much power your battery can supply to your system all at once. A battery may have a significant amount of energy stored in it, but if it only outputs this at a trickle speed, it will not supply all your appliances at once. This is particularly true if you have devices that demand a lot of energy, such as vacuum cleaners or fridges.

You should look at the kilowatts that the battery you consider can provide. Often, you will find two different power ratings: one is an "instantaneous power rating," and the other is a "continuous power rating." As you might expect, the continuous power rating tells you how much the battery can supply if it is steadily drained. The instant power rating tells you how much power the battery can give in one short burst. This is useful if you have appliances that require a lot of power to start up but little while running.

Familiarize yourself with both of these stats and factor them into your equation to know what power rating you need to get the most from your system.

Battery size

This will matter a lot more in some setups than others, but it is important to bear the size of the battery in mind when you're weighing up your options, especially if space is limited in your home. You need to minimize how much you dedicate to your battery bank, as this will be a permanent feature of the system.

Even if you can tuck it out of the way, it's a good idea to look for small, compact, lightweight batteries, especially if you are operating a mobile home rather than a fixed off-grid setup. Of course, this does cost more,

but it's generally worth the extra expense to give yourself long-term convenience.

Chapter 7

Charge Controllers



You need to use a solar charge controller to prevent your batteries from overcharging or over-discharging. There are times that your solar panels may charge the batteries more than you had planned for (like when you drive on a sunny day in snow-covered areas), and that extra current from the panels will degrade the batteries. To prevent that, you need to get a solar charge controller.

There are only two things you need to know to be able to make a selection. First, you need to know what voltage your system is designed for, is it 12, 24, or 48 volts? In this book, we have been looking at 12-volt systems. So, if you followed everything here, it would be a 12-volt charge controller. Some controllers auto-detect the voltage and adjust accordingly.

The second is the current that you will be looking at during peak charging. For this, you need to look at the solar panels you are purchasing. They will list peak charging in their manual. Look for what is called “short circuit current.” Once you get that number, add a buffer to it. Let’s say your panel’s short circuit current is 8 amps; if you add a 25% buffer, that means you need to get a 10-amp solar charge controller.

PWM

PWM. (Pulse Width Modulations), efficiency is about 70%, which is another type of charge controller. This type of controller essentially is about 20 to 30% less efficient than the MPPT controller, which means that when we will use a cheap PWM controller on every 10 panels, we will have to add another 3 panels to get the power that we would get by using an MPPT controller (additional few hundreds of dollars). This type of controller is affordable and a good solution for small solar systems—solar panels of which are producing power under high temperatures—between 45 and 75°C. The controller doesn't work efficiently if solar panels are shaded. A 20 amp controller costs about 20 to 30\$ but is less efficient than an MPPT controller.

To use this charge controller—the nominal voltage of solar panels and battery bank should be the same. A 12 volts panel should charge the 12-volt battery.

This charge controller simply reduces the voltage output of solar panels to the voltage of the battery bank without changing amps, and because of that, there are some power losses and lower performance.

MPPT

MPPT. The Maximum Power Point Tracking, or MPPT is the most efficient solar charge controller. It tracks the output of the panels in such a way that it can regulate the voltage and amperage and provide the best charging capability without losing power on the output of the solar charge controller. On average, this type of controller can deliver between 10% to 30% higher performance as compared to the other controllers.

Efficiency is 95% to 98%. Furthermore, the MPPT controller can compensate for low irradiance levels (less sunlight) or cap the system when there is a spike in voltage due to high irradiance levels. As such, it is the most sophisticated type of controller and, therefore, the costliest. Nevertheless, it is certainly worth the investment and the type of controller you can set and forget about.

It can be used when the nominal voltage of panels is higher than the battery bank nominal voltage. For example, 60 volts (20 volts x 3 = 60 volts) solar array can be charging 48 volts battery bank. Or you can use this charge controller to connect a 20 volts solar panel to 12 volts battery bank.

Which Type of Charge Controller to Choose?

The ultimate decision on which type of controller boils down to the following criteria:

- Solar array size:
- Cost
- Efficiency

If you are looking for the most cost-effective option, you can choose to use a simple 1 or 2 stages, solar charge controller. You need to keep in mind that it is the least efficient controller and almost no one uses it these days, so I don't recommend using them.

In the case of efficiency, the best choice is the MPPT. These outperform the other two types of controllers hands down. As stated earlier, it can increase efficiency anywhere from 10% to 30% which means that the time needed to charge the batteries will be less. This is ideal for climates where sunlight isn't as

abundant or for larger systems, or if you have limited space for mounting solar panels.

As far as sophistication, you would have to decide how much technology you need in your system. A good, middle-of-the-road approach would be to install a PWM controller. This is a solid controller for mid-sized systems or in climates where there is abundant sunlight. PWM controllers also offer the best efficiency-cost ratio. While MPPT controllers are the most efficient, they are also the most expensive. So, it's up to you to determine whether your budget allows for it.

One other consideration is if you are incrementally building your system, you can spring for a PWM controller while your solar power system is smaller and then upgrade to an MPPT as your system grows. You might not think that it would make sense to invest in two controllers. But it is better to look at it in terms of upgrading your system as opposed to spending on the same item twice.

Chapter 8

Inverters

Off-Grid or Stand-Alone Inverter

Off-grid inverters are available in 12, 24, 36, and 48 volts and should match your solar array and your battery. Although some inverters possess a protection voltage system, there is no way to use a lower voltage inverter with a higher voltage battery if you don't want your inverter to be permanently damaged. Other than voltage, inverters are rated in watts. The bigger your battery bank, the bigger the inverter needed.



On-Grid or Grid-Tie Inverter

Grid-tied PV systems need inverters. The inverter is regarded as the brain of the system by managing the flow of power. The main role of the inverter is to convert the DC power generated by the solar panels into usable AC power for AC appliances in your home.

As its name implies, DC power flows in one direction; AC power, however, alternates due to changing the direction of the

power. More efficient inverters generate more AC power out of the PV system's generated DC power.

In the US, grid-tied inverters are required and mandated by the National Electrical Code (NEC) to be installed in grid-tied PV systems. With net metering, the local utility company pays or charges for the net electricity transferred into and from the grid by a grid-tied inverter. This is recorded by the specific meter on the customer's premises.

For instance, if you consume five kilowatt-hours per month and your PV system generates and transfers four kilowatt-hours to the grid per month, you will be charged by your local utility company just for the one-kilowatt-hour balance of the electricity transferred to and from the grid. In the US, net metering policies may be different state by state.

The grid-tied inverter should be able to match the phase of the local grid and keep its power output voltage higher than the grid's voltage. This higher voltage would help to transfer the generated power to the grid.

Most modern grid-tied inverters provide a fixed unity power factor. This means that the inverter's output voltage and current's sine waves are perfectly in phase, and the phase angle may differ only one degree from the grid's AC power.

The most significant drawback of these inverters is that they are required by the NEC to switch the whole AC and DC circuits off in the event of a power outage. This is for the safety of electricians who are fixing an issue following the blackout.

Hybrid Inverter

Hybrid inverters are considered the headquarters of battery-backed PV systems; they are, in fact, a combination of a regular grid-tied solar inverter and a battery inverter/charger in one unit.

These inverters use meters to measure electricity consumption and smart software that is programmed to determine an efficient way of using and converting solar energy.

As the description above implies, hybrid inverters perform multiple functions; therefore, they have some limitations when compared to off-grid inverters. The main limitations are as follows:

1. Limited peak (surge) power output when a blackout happens; therefore, appliances that need peak power to start are not usually connected to them.
2. Most hybrid inverters have limited backup power; therefore, only small (essential) loads such as lighting or some other low-consumption devices can be backed up when the grid is down.

Unlike grid-tied inverters, hybrid ones let you still use the power for essential appliances in the event of a blackout.

Chapter 9

Wiring

The efficiency of the system largely depends on the wires (material that the conductor is made from and thickness) you have used in the system; the copper conductor has high conductivity.

Gage size is the overall thickness of the wire. Wire gage size for solar power systems ranges from the thinnest 14 gauge to the thickest 0/4 gauge wire.

The thickness of the wire is dependent on the length of the wire and the amp load that the wire should carry;

If you choose smaller wires required, you can cause overheating, which can lead to fire and huge power losses in the system. If you chose the wrong wire even a fuse will not save you.

Recommendations:

- Always choose a little bit thicker wire than required if it is possible;
- For wiring solar panels, use a solar hook up wire (UV (ultraviolet) resistant);
- For long distances, use thicker wire to conduct current efficiently;

If you don't want to use thick wires (copper) because they are very expensive or you can't find one, you can increase the voltage for that wire just by connecting elements of the system (batteries or solar panels) in series.

Wire size recommendations:

- If you wire 12-volt panels:
- 10 gauge wire if the length is less than 25 feet;
- 8 gauge wire if the length is more than 25 feet;

If you connect 2 12 volt solar panels in series, you will have 24 volts total, now you can use 12 or 10-gauge wires.

Wiring a solar charge controller (amps) and battery bank:

- •20 amps—12 gauge
- •30 amps—10 gauge
- •40 amps—8 gauge
- •60 amps—6 gauge
- •80 amps—4 gauge

Choosing wire for wiring an inverter and battery bank:

Inverter carries a big current and requires very thick wire. If you don't want to look for wires and install fuse and connectors. You can buy an inverter wiring kit online with an already installed fuse.

- •1000-watt inverter—4 gauge wire
- •2000-watt inverter—0 gauge wire
- •2500-watt inverter—2/0 gauge wire
- •3000-watt inverter—4/0 gauge wire

For running appliances, you can use 12 gauge or 10 gauge wire *safely*.

Chapter 10

Safety Protection Devices

Fuses

Why do you need fuses for your PV system in your RV or your boat? The simple answer is that there are rare periods when there is a chance that the wires heat up due to spikes in current, a malfunction in the appliance, or even a short in the wiring due to rodents, perhaps. But when there is a spike and the wires get too hot, they act as a heating filament and a source of ignition. They may be the smallest component of the entire system, but they are undoubtedly the most important when it comes to a mishap.

The first thing you need to remember is that it is not just the amperage of the solar panels but also how you tie them together. If you tie them in parallel, your voltage may be the same but your amps are additive. So if you have 5 amps coming from the first panel, by the time you get to the third panel, the wiring is carrying 15 amps. You need to take this into account when you wire the panels and select the right gauge and the right fuse. If you place a 12-amp fuse on the first segment, that will work, but if you place a 12-amp fuse in the second segment, then that fuse is going to break. One way to do this is to place 12-amp fuses on the solar panel before the combiner, and then use a thicker wire to tie them together. If you place them in series, then you will not have this issue.

In the same way, place a fuse after the combiner, after the controller, and after the inverter. Use a 25% rule of thumb above

the short circuit current, and fuse each junction. This keeps the entire system safe.

Circuit Breakers

When a circuit breaker senses an overload, it shuts out the electricity to your appliances. When it identifies a defect, it interrupts the current flow. Your circuit breakers may also import and export electricity.

Grounding

All PV solar power systems require the equipment to be grounded so as not to move or shift from their location. Ground the equipment with wire cutters, using a flat-head screwdriver, using a drill for installing lugs, and a flat-head screwdriver for tightening the installed ground lugs (inserted on the back of roof-mounted systems).

Chapter 11

Busbars

In electrical power distribution, an element that is crucial to consider in any installation is the busbar. You need to use a busbar when you use three or more connectors or lugs on any terminal (for example, the battery terminal).

These are copper or aluminum strips that can be seen inside switchgear or panel boards that carry the currents in the electrical system. They act as the collection or distribution of electrical currents up to the loads from the source. They are also called central wiring terminals. There are several uses for busbars:

- Positive busbar
- Neutral busbar
- Ground busbar

Small busbars are intended for small, off-grid PV applications with just a few pins for interconnection between components (inverter, charge controller, and batteries).



Small 250A busbar

Check the amp rating of a busbar before you buy it.

Chapter 12

Mounting Systems

Mounting Solar Panels On an RV



Step One: Measure Up. As mentioned, you will start by checking that all your components fit. It is best to begin by measuring the roof, as this will let you know how many panels you have space for. Try to avoid mixing and matching solar panels of different sizes, and make sure you take into account vents and aerials, as these will need to be worked around.

Step Two: Consider Key Questions. A few of the crucial elements you need to cover are:

Will I fix the solar panels permanently, or do I want removable panels?

Do I want to wire the panels in series or parallel?

Do I need roof space for anything else, or can I dedicate all areas to solar panels?

What tools do I need, and do I need to buy or borrow any?

How am I going to get access from inside the RV?

Step Three: Purchase Your Components. Ideally, you want to have as many necessary components as possible before you start. This will let you layout a skeleton design and check that everything is compatible and working before you start fixing parts of the system together. Any errors can be corrected, and you can ensure you're satisfied with the layout and compatibility before you start fitting the system. This will also allow you to return any components that are not compatible and have been purchased in error and replace them if necessary.

Step Four: Assess Inevitable Damage. When installing solar panels,

you will inevitably do some damage to your RV unless you have not yet kitted it out. If you are building the whole system from scratch, you should fit solar panels before you fit insulation and linings because then you can fit these around your cables. However, if you are retrofitting solar panels (as many people will be doing), you will need to assess how you can minimize the damage and cost up any repairs that need to be done after you have finished the fitting.

Step Five: Assemble Components and Purchase Extras. As well as all of the components discussed in the previous chapters, you will need some other bits and pieces for fitting everything together. You should have:

Solar panels

A solar charge controller

A battery bank

Solar mounting brackets (for fitting the panels to the roof without drilling holes in it)

MC4 connectors (for extending solar cables safely)

Solar cables (for carrying the current from solar panel to charge converter)

A solar panel gland (for sealing the hole around the cables that run from the panels into the RV)

Fuse holders and fuses

Battery cutoff switches (so you can isolate the battery if necessary)

Battery terminal eyes (for connecting the solar panel cable to the battery)

Heat shrink (for joining bare wires)

Step Six: Test Your Equipment. Before you spend time putting everything together, it's a good idea to test that everything you have bought is in working order so you can return any faulty units without having to spend hours undoing your work; This can make a huge difference if you are unlucky enough to end up with something faulty.

Step Seven: Install Your Battery. Start by installing your battery, isolator switches, and fuse holders. Your battery should be fitting in a secure area and firmly fixed down so that there is no risk of it moving or falling while you are traveling or in the event of an accident. You should attach it to the hull of the RV, rather than any movable internal components, and then make sure that you ground it promptly.

Next, fit the isolator switches and the fuse holders, but do not put the

fuses in place yet. Test that everything is secure. Flip all isolator switches to the “off” position.

Step Eight: Fit The Solar Panels. It is best to do as much work as possible from ground level, but you will undoubtedly need to access the roof for this step. If possible, use cardboard templates to mark where your panels will fit and where the mounts should be attached, as this is easier than working with the panels directly and reduces the risk of damaging them.

Cables should be installed to be accessed when the panels are in place, especially when mounting fixed panels. You don't want to have to remove everything to change a cable.

Test each of your solar panels works well by placing them in the sun and using a multimeter; this is important to do before mounting them, as it could save you a lot of work if one of the panels is faulty.

Once you have done this, attach the mounts to your solar panels using the instruction manual. Usually, you will be using Z brackets, which will be fitted to pre-existing holes in the panel's frame using the supplied bolts.

Some people also use VHB tape and butyl tape on the bottom of the Z brackets to increase adherence to the roof.

This gives a better attachment because it adds thickness to the screw hole, and the butyl tape also waterproofs the hole that has been made, reducing the risk of rust and water buildup. You may want to fit the panels without this tape, to begin with, to test that they fit well, and then add the tape once you are satisfied with the positioning.

Note that your brackets need to be mounted with maximum contact with the surface below, so work around any ridges or lumps on your RV roof. Don't put mounts in positions that reduce the contact, or the mounts may come off, and the panels will fall.

Once you are ready, lift the panels to the roof and make sure that the cables are pulled free so they don't get trapped underneath. Use a power drill to drive the self-tapping screws into the roof and check that each is secure. Your panels should be fitted tightly, with no wobbliness. You can add a further coat of sealant over the screws if you like.

Next, mark the holes for the cables, and then drill them. Fit the cable glands, prime and paint the hole edges to seal them. The cables will be added later.

Fit your solar panels to the mounts and check that they have firmly

bonded in position. It is best to have at least two people for this job to pass tools and equipment up onto the roof while the other works.

Step Nine: Wire Up Your Panels. You may find that it helps to draw yourself a diagram to show how the panels should be wired before you start. Your panels will usually have a meter of positive and negative cable fitted to them, ready to use. If you need to extend this, make sure you use the correct connectors of a suitable voltage.

Attach the gland collars to the cables and double-check that all of your connections are correct and secure. Use the multimeter to ensure everything is working correctly, and then feed the cables through the cable gland and get the collars in position. Tidy up all of the wirings so that nothing is loose or trailing.

Step Ten: Install The Charge Controller and Inverter. This will be done inside the RV, and again, the charge controller and the inverter must both be securely fixed to a solid wall. Use the manufacturer's directions to wire up the controller and the inverter, as the directions may vary from unit to unit. Note that you may not need an inverter in an RV, as your RV's battery may already have one of these.

Finally, add your fuses, turn the isolator switches to "on," and test the system. If there are any issues, immediately cut the switch to the battery again, take out the fuses, and start inspecting the system until you can locate the issue. Once you have done so, rectify it and test again. Always test your system before a long trip to ensure nothing has come loose or been damaged.

Mounting Solar Panels on a Boat



Some of the early steps for mounting solar panels on a boat will overlap with those for mounting on an RV—so check out the full instructions in the above section if you need more information. A few aspects mentioned there may not apply to boats, but most will.

Step One: Measure Up. As with mounting panels on an RV, you first

need to measure up, but in this case, you need to first think about where you will be positioning the panels. This will depend heavily on the kind of boat that you have. Many people will mount their panels on the roof of the boat as this overcomes issues with shading and maximizes space, but there are some situations in which this may not be suitable.

If you have a sailboat, you might want to look at mounting the panels on the cockpit dodger, although you will usually need flexible panels to achieve this. Some people mount a panel on the stern rail, while others may even mount them on the deck.

Of course, there are some disadvantages to mounting the panels on your deck; you will encounter more shade, and you need to buy expensive, robust solar panels that will tolerate constant foot traffic. You also need to think about allowing for a little airflow beneath the panels.

Once you have decided which space is the most suitable for adding solar panels, make sure that you measure it accurately, taking into account any bars, poles, or other interruptions that will eat into the space available for the panels. You should also pay attention to the curve because you must deal with this when mounting the solar panels.

Step Two: Consider Key Questions. See the RV section for some of the most important questions.

Step Three: Purchase Your Components. The components will be similar to those of other systems, but you should always look for marine-suitable options. Your solar equipment will be perpetually exposed to dampness and possibly splashing, as well as salt (if you ever set sail on the ocean), and that means you need to ensure everything will hold up properly. Do not use ordinary wire; you will need tinned marine-grade, or the wire will likely lose its conductivity after a few months.

Step Four: Assess Inevitable Damage.

Step Five: Assemble Components and Purchase Extras.

Step Six: Test Your Equipment.

Step Seven: Mount Your Panels. There are many ways to mount solar panels on a boat, and it will depend a bit on the solar panels you want to use. If you intend to go for a simple setup, you may find that mounting the panels on the boat's roof is the best option—and this will be similar to mounting them on an RV.

Again, it's a good idea to use cardboard templates to see how the panels will fit, and this will also help you to determine whether the curve of the boat is going to cause issues. Any interruptions, like aerials, will be easy

to spot if you lay the full solar panel system out in cardboard before adding the real panels.

Remember that if the solar panels will charge your boat's battery, they will need to be connected to it, often involving drilling through the deck. You will still need a charge controller.

Again, you can use Z brackets or mounts that come with your solar panel if applicable. You will need to ensure that they are suitable for the surface you plan to attach them to. If the surface is curved, you may have to purchase mounts specifically designed to mount curves. Using mounts intended for straight surfaces will result in poor adhesion between the panels and the boat, which could cause an accident.

Again, thoroughly seal holes with waterproof sealants, and make sure that the cable hole is fitted with a gland to prevent water from getting into the boat.

If you would rather not mount fixed solar panels on the roof of your boat, consider any of the following options:

Purchasing marine solar panels with zips can be sewn to any fabric components of the boat (e.g. roofing). This keeps the panels out of the way and makes mounting them relatively easy. Remove the roof's fabric, measure up the panels, and sew them into place. They should be stretched taut once the fabric is reinstalled, but this is a great way to get panels out of the way and ensure they get plenty of sunlight.

Mounting solar panels on a frame near the back of the boat. You will need to purchase a strong metal frame for your panels and ensure that this is very securely attached to the back of the boat. All cables must be protected from splashing.

Mounting solar panels using Velcro. This method may sound unsafe, but Velcro's proper strength is viable for mounting flexible solar panels. You must maximize the security and always build in a margin for error when considering the strength of the Velcro, but this is another great way to attach flexible solar panels to fabric or another curved surface. Many boats are not flat, so this may prove preferable to mounting on a frame or using Z brackets. Velcro also makes the panels easy to remove or replace when necessary.

Mounting with a strong adhesive. Many adhesives suitable for use on boats should be sufficient to hold flexible solar panels in place, although you should be aware that some airflow is needed beneath the panels. If you are going to stick them down, ensure there is a little sealant or something in the corners to lift the panels just slightly off the surface that

they are stuck to. You should check on the adhesive frequently to ensure it has not become brittle. Replace it if it is showing signs of wear.

Any of these mounting methods should be suitable for use on a boat. It is always a good idea to test and then stress test your solar panels once they are in place to ensure that they will not come loose on a proper boating expedition. Try them out in rougher weather, and then check the adhesion in your next dock. If it is pulling away in any areas, look for alternatives. Many forms of sealant and tape will hold flexible solar panels in place on a boat.

Step Eight: Wire Up Remaining Components. Once your panels are in place, wire them up according to the manufacturer's instructions (and the RV guide above if necessary). You will still need a charge controller, but again, you may not need a battery inverter if you already have one on your boat.

Connection Methods for Mounting Solar Panels

As you have already noticed, there are many different ways solar panels can be mounted. I have explored quite a few above to offer you as many options as possible, but here are some of the commonest methods you might want to try. Because there are so many different circumstances in which solar panels can be installed, it's a good idea to understand as many mounting systems as possible so that you can choose the one that is the most suitable for your setup.

Above Roof for Tile/Slate Roofs: This is often inexpensive if your tiny home has a tile or slate roof, and it is also efficient because it allows for airflow (which helps keep the panels cool); This is the method described above, in which tiles are removed to allow brackets and rails to be attached to the roof. The panels are then clamped to the rails, and the tiles are put back. This method is great for traditional housing on pitched rooftops.

In Roof Solar Panels: This system is usually only suitable if you are redoing the roof from scratch; if you are, it is possible to build the panels directly into the roof; This has some cost savings because it reduces the amount of roofing material that you will need. However, it does not allow the panels to cool as efficiently, and it may mean you struggle

when the panels need replacing unless you can get some with identical dimensions.

Solar PV Roofs: You can turn your entire roof into a giant solar panel if you purchase panels that have been designed for this. These are flat and can look attractive, but you will probably only find them useful if you build a cabin or tiny home from scratch. They are unlikely to work well on boats or RVs, as the roofs tend to be part of the vehicle's fabric already. You can also buy tiles/slates that will allow you to tile your roof with solar panels.

Z Brackets: If you want just to install a few panels, you may find that the rail system is overkill, and in that case, you could consider using Z Brackets. These are often suitable for boats, RVs, and tiny homes, and they can be effortless to fit. However, they will need the holes to be sealed, or they may compromise your roof.

Adhesive/Velcro: In some situations, Velcro and/or a strong adhesive will be sufficient for attaching small panels. This is usually only the case for systems that are lower down, as, on a house, solar panels will experience significantly more uplift (where the wind rushes under the panel and attempts to lift it away from the roof). It is not advisable to glue down solar panels (huge ones) to the roof of a house; you should mount them properly with metal brackets. If you use adhesive or Velcro, you need to stress test the system and ensure it is sufficiently strong, even in poor weather, and keep your panels securely attached.

Standing Seam for Metal Roofs: This generally involves clamping a U-clamp onto the raised seam and then attaching solar racking to it to mount the panels on. The advantage of this is that there is no need to drill into the roof. If you have a corrugated metal roof, you can similarly avoid much drilling by installing specially designed brackets over the corrugations.

Chapter 13

Tools You Need

Basic Tools

Your safety is paramount because solar panel installation involves heavy lifting, roof climbing, and electrical wiring. You might consider the following precautionary equipment.

Gloves, Boots

Always wear gloves and closed-toe boots to prevent cuts and scratches when installing panels. Flat-soled boots give the grip needed for working with shingle, tile, or metal roofs. Wear long sleeves to avoid skin burns while working outdoors or on a top.

Goggles

When working, use eye protection glasses and other safety gear. Working on the roof exposes you to direct sunlight, so bring some sunscreen lotion.

Roof Anchors

Anchors prevent falls while installing roof-mount systems. When working on the roof, always use a safety harness to provide an added layer of protection.

Scaffolding

A scaffold lets you ascend to the roof and may be used to move heavy equipment. You may build a temporary platform to help you install panels higher up. More straightforward projects may utilize regular ladders.

Multimeter

Before working on the system, check for voltage using a multimeter. Before installing, make sure the conductors and terminators are entirely neutral.

Guardrails

Falls may occur while installing solar panels on roofs, particularly on

larger installations. Solar safety hacks like temporary guardrails are needed. A roof safety harness equipment prevents falls.

Ladder

You need a solid ladder to easily climb up and down. The ladder should reach three feet over the roof's edge.

Power Tools

Roofing systems that are pitched or sloping need whole separate mounting techniques, and hence entirely different equipment. Additionally, you will need the majority of these tools to install additional solar-related components. The following are some of the most often used solar installation equipment that you should consider.

Cordless Drill

A cordless drill is a vital instrument that makes home improvement projects much more accessible. It aids in drilling pilot holes, driving lag screws, and tightening the screws into the roof. A cordless drill can do a wide range of tasks, and every homeowner should have one on hand. A general-purpose exercise equipped with a 12V or 18V battery is ideal for most solar-powered applications.

Impact Driver

Impact drivers, like the cordless drill, are effective for driving lengthy deck screws, tightening module clamps, and securing racking bolts to a variety of different surfaces and materials. An impact driver is designed to drive screws, however, it is not capable of drilling. It is beneficial when dealing with big screws and nuts since it produces an additional rotating force on hard materials, making it an excellent choice.

Drill Bits and Sockets

Drill bits function as cutting tools, allowing for the creation of holes in various sizes and forms in a variety of materials. Always choose a drill bit that is one size bigger than the hole size you want to generate. Twist bits are the most popular drilling bits for plastic, wood, and metal materials, and you can drill them with your hands or with an electric drill. You may drill them with your hands or with an electric drill. The usage of masonry bits is recommended if you want to dig into concrete or stone or brick materials. A drill bit socket is a tool that allows sockets to be used in a drill by adapting them to the drill's specifications. They have an adaptor attached to a tapered shank drill that will enable them to

drill a tapered hole more significant than the size of the hole they have made. The sockets are designed to fit over the nuts or bolts to tighten the drill bits, as seen in the illustration below:

Caulking Gun

This tube filled with roof sealant fills up any gaps or holes left after installing screws. The cartridge material might be silicon or latex, and it can bind materials like glass, metal, or ceramic. When you press a caulking gun, it controls how much caulk comes out. The roof sealant eliminates leaks caused by drilling holes. Choose a roof sealant that is suitable for your needs.

Jigsaw

This vital tool may cut rails after installing solar panels, for example. It gives you greater control when carving intricate patterns or designs on your roof.

Reciprocating Saw

A reciprocating saw is a hand-held instrument that can cut through several materials. The saw features a broad blade, like a jigsaw, and an angled grip for cutting materials on vertical surfaces.

Hole Saw/Hole Cutter

This ring-shaped blade produces holes in a surface without harming the core. A pilot drill bit in the middle prevents the saw teeth from sliding. This tool may be used to cut thin metal plates and roofing material.

Screwdriver

A screwdriver is used to tighten or loosen screws. Manual drivers may be more convenient in certain instances than impact drivers.

Pliers

When you press the two handles together, crimping pliers have jaws that grab items. While most pliers are general-purpose, others are tailored for particular tasks. Longnose pliers can bend wires and squeeze out small places. Sharp-edged pliers may shear through thick cables. During installation, pliers may be used to grab things. Plier wires help avoid electrocution.

Measuring Tape/String Line/Chalk Line

Your project requires a measuring tape. Determining where to drill holes on your panels may be as simple as measuring the distance between the drilled holes on your boards. Straight lines are drawn using a chalk line tool. It may be used to draw straight lines between two places and align

the panels. A string line maintains exactly level solar panels. Everyone values well-organized solar panels.

Roof Sealant

This prevents leakage from the drilled holes. Always purchase a sealant that matches your roof's material.

Wiring Tools and Equipment

You will need to know how to utilize various wiring tools and equipment.

Boxes and Splices

A junction box encloses electrical lines and cables. A junction box is required when cutting or splicing electrical cords to prevent short-circuiting. These safety precautions protect you from electrical shock. All cables related to your switches and lights should be housed in a junction box. Each box has a splice for two or more circuit cables. Conduit connections or cable clamps secure cables entering the box. Verify the voltage and current requirements before purchasing junction boxes and splices. Be sure to use certified splicing devices.

AC Breakers

When an AC circuit breaker senses an overload, it shuts out the electricity to your appliances. When it identifies a defect, it interrupts the current flow. Your circuit breakers may also import and export electricity. A sub-panel with a few circuit breakers is shown below:

Subpanels

When the main panel circuit breaker slots are filled, this component lets you add extra circuits. It distributes electricity to specified sections of your house. A subpanel has its breakers, making it simple to expand wiring to distant homes or businesses.

PV Meters

You'll need a specialized PV meter to track your solar output if you're building a grid-tied or hybrid solar system. You install the meter socket base in most situations, and the utility provider installs the meter face and activates your PV system.

Conduits

A conduit protects exposed electrical wire from moisture, damage, and chemicals. The wires' plastic covering is fragile. To safeguard sensitive electrical circuits, draw single wire strands into a metal tube. EMT

conduit is a substantial steel raceway that protects the wires and grounds the panels. Always check the conduit size before commencing the installation. Once the conduit is in place, channel locks may be used to secure the joints.

Channel Locks

To spin nuts or bolts, channel locks look like pliers. It's also fantastic for crimping metal or pipe ends. 6.5, 9.5, and 12-inch pliers.

Equipment Grounding Conductor (EGC)

Unpainted copper wire for grounding solar components. A solar panel, EMT conduits, or other metal enclosures. To prevent ground faults, EGC connects electrical components to the ground.

Wire Cutters

A wire cutter may cut aluminum, brass, copper, iron, and steel wires. The insulated handles help avoid wire electrocution and give a secure grip. A diagonal flush cutter allows you to cut cables at an angle near the base.

Wire Strippers

A wire stripper is another essential piece of equipment for removing insulation from an electrical wire to form a contact. Wire strippers come in a variety of notch sizes.

Wire Crimpers

A crimping tool secures cable connections. It looks like pliers, but it attaches two metal plates. Ratcheting, hydraulic, and hammer crimping tools are available. This tool fastens insulated wire connectors, terminals, and heat shrink butt connections. To link the wire connections, use a threshold pressure. Ratcheting crimpers exist in various diameters and can crimp contacts of multiple widths. Confirm the crimping tool's wire or cable compatibility before ordering. A hydraulic cable crimping tool crimps wire rope terminals and attaches two pieces of metal. A hammer crimping tool can crimp connections and terminals. A hammer is required to crimp the tool.

Fish Tape

This handy gadget enables electricians to run wires through walls or pull them through conduits. A flat, long, thin steel wire is twisted within a round-shaped wheel. The fish enables you to connect and pull wire through the conduit. A conduit is a pipe that protects your electrical cables.

Torque Wrench

A torque wrench is a unique T-shaped tool for tightening bolts, nuts, and

lag screws on solar panel rails. It is perfect for tightening screws and nuts. A good torque wrench helps tighten rail bolts and nuts. While this may take a long time, it guarantees that all components are securely in place.

Solar Racking Equipment

Roof Rafters

A roof rafter is a roof design element that goes from the ridge to the wall plate. It is not a solar tool or equipment, but it offers foundation support for solar panel installation. The location of the rafters on your roof influences where and how many panels you put.

Rails

Rails support solar panel rows on the roof. Install the solar panels vertically or in portrait orientation, then fasten them to the ceiling or the ground with two rails with clamps. The rails are screwed or bolted to your roof.

Roof-Mount Flashings

Roof flashing is made of galvanized steel, aluminum, or copper. Its primary purpose is to keep water out of the holes bored in the ceiling to fasten the rails. The schematic below shows a racking system's flashings, fences, and clamps.

End Clamp, Mid Clamp

It holds the panels on the rail. While end-clamps secure the boards at the rail end, mid-clamps retain them fastened between two panels.

Solmetric Sun Eye/Pathfinder

These tools quantify the quantity of solar energy produced each day, month, or year. These technologies can also measure shading patterns.

Battery & Maintenance Tools

Hydrometer

The relative density of electrolytes in a flooded lead-acid battery determines its charge state. A greater concentration of sulfuric acid in the battery equals more electrolytes. A greater density equals a more significant charge.

Distilled Water

Distilled water recharges your flooded lead-acid battery's electrolytes. The quantity of distilled water depends on the battery's state. If your battery is fresh, fill the filler tube with pure water. An aged battery needs purified water for the electrode. Use a tiny flashlight to check the battery's electrolyte level.

Baking Soda

If sulfuric acid from the battery leaks on the surface, you can pour baking soda on the spot to neutralize acid spills.

Funnel

This is used to guide liquids through the small opening of the lead-acid battery case for refilling distilled water into the battery.

Rubber Apron

Wearing a rubber apron protects your body and clothing from harmful chemicals and poisonous materials. A drop of sulphuric acid or any other strong chemical may cause significant skin damage.

Rubber Gloves

If you work with toxic chemicals and other harmful detergents, you must wear gloves to protect your hands.

Chapter 14

How to Avoid Most Common Mistakes

Main Challenges

Solar power might be one of the “cool kid” things to do, and there are certainly very major benefits that you are probably aware of—but it is not without its faults, especially when you are building your system from scratch. In this chapter, I will run through some of the challenges you may encounter and how you can troubleshoot these issues to optimize your system.

Technical faults with solar panels are surprisingly rare if installed correctly, but many people experience both major and minor issues with their panels. Quick resolutions—or prevention—should get you back up and running as soon as possible, ensuring you get the most from your panels.

Nobody wants to be without their solar panels. Still, those who depend upon them in an off-grid setup are hit even harder by issues, so it’s important to spend a bit of time familiarizing yourself with what can go wrong and how to avoid it or fix it swiftly.

Issue One: Animal Invasions

A surprising but common issue is animals taking up residence in your solar panel setup. This usually occurs in solar panel setups on fixed abodes, not mobile ones, but it is not unheard of for animals to nest among solar panels even when they have only been in place for a short period. This is particularly true if you have parked in an area with a lot of wildlife accustomed to human presence.

The commonest creature to find making a home for itself among your solar panels is birds. Because solar panels need to be slightly spaced out to allow heat dissipation, birds often build nests between the panels, where a narrow channel is perfect for nesting. While this might sound

cute, it can cause quite a few issues, and it isn't something that you should encourage.

Firstly, it often creates a lot of noise, especially if the birds successfully hatch and rear chicks. In a tiny home, you may sleep close to the roof, and this can be very frustrating if it prevents you from getting proper rest. Since many birds take weeks to hatch and fledge, it's also not a short-term issue.

Furthermore, the nest and/or the birds could cause damage to the panels, especially if they climb on them or try to get underneath them. They may scratch the panels and get them dirty, which will reduce their efficiency, especially over a long time.

Additionally, if you are in a mobile home, you may not want to disturb the birds when the time comes to move again, and this presents a moral dilemma that is best avoided if possible. You don't want to be stuck on a campsite for longer than planned because you have a nest full of baby birds on your roof, and you feel responsible for their well-being.

Birds aren't the only issue, either. Other animals such as rodents could also use the panels for nesting, presenting even more serious problems. They might damage the wiring or chew their way into your home—both of which need to be avoided if possible. Squirrels and rats are unwelcome in most houses because they can be so destructive and may spread disease, so it's important to take action to protect your panels, your home, and your health.

The solution: Fortunately, there are a few things that you can do to prevent this. Installing coiled wire or mesh between the panels or blocking off access to the channels with plastic strips should stop the birds from building nests there and prevent access for all but the most determined rodents. Some rodents may still chew their way into the space if they can smell food or are desperate, but the wire, in particular, should deter them.

If you end up with animals among your solar panels, it's a good idea to call a company to deal with them. This may not be an urgent issue, as most animals are unlikely to do severe damage in a short time, but you should still get professional help to remove them if possible. Acting promptly, especially for birds, may help the wildlife out because they will put less energy into building nests and laying eggs if they are removed quickly, rather than being allowed to start on a home before being disturbed.

If you have nesting birds on your roof, make sure you look into the

legalities of moving them. Many species are protected by law, so prevention is much better than cure in this scenario.

Issue Two: The Solar Inverter

According to this, more than one in ten solar panel owners experience issues with their inverters. Of course, this is a UK stat, but it's likely to apply similarly in the United States, and it highlights just how tricky this particular bit of equipment can be to make the most of.

Unfortunately, the solar inverter is also crucial for keeping your system operating correctly. Without it, you won't be able to use your solar panels for anything but direct current. Quite a few things can go wrong with a solar inverter, but it's important to note that some solar inverters don't last very well.

Because most solar panels have such long lifespans (20+ years), many people automatically assume that a solar inverter will do the same—but in fact, most solar inverters only manage between 5-15 years. That is a pretty significant difference.

A high-quality solar inverter should last for longer than a cheap one, but even so, it is unlikely that an inverter will last for as long as a solar panel will. Although inverters can be expensive to replace, you should recognize this likely cost and prepare for it. Check what warranty the manufacturer offers before purchasing anything, and always make sure that it isn't still covered before you purchase a new unit. It's a good idea to set funds aside for replacing your inverter.

If your inverter is still working but is displaying an error message, refer to the manual for guidance on what's wrong and how to fix it. You should check the fuses and ensure that breakers are not getting tripped. If they are, you will need to start testing various parts of the system to try and detect any faults that may have developed.

The solution: If your inverter needs replacing, you will have to buy a new one and wire it in. It is worth investing in a good inverter despite the upfront costs because this increases its chances of lasting well.

However, if your inverter displays an error, you will need to check the manual for information about what is going wrong. If the fuses keep blowing or other errors occur, make sure you test the system or get an engineer to inspect the system and diagnose the fault. Although this will cost you, it could also save you a lot of time, because it won't always be easy to tell what's going wrong.

Issue Three: Corroded Wiring

Like all parts of your system, the wiring is subject to failure. You should regularly check on your wiring, especially outside the home, because this is more likely to corrode. It's essential to look out for loose connections when you do this general maintenance check, too. Try to do this every few months, or more frequently if you live in a very wet environment.

If you live on a boat, make sure that you increase your wiring checks' frequency and build this into your general "boat maintenance" routine. Any exposed wiring will corrode much more quickly than in a dry environment with constantly damp air.

Any corrosion issues should be dealt with promptly, as they could break your system, cause fire hazards, and reduce the conductivity. This decreases the efficiency of the solar panel, meaning that you are generating less energy overall, even if the panels are still working. A lot of corrosion could have a significant impact on the system.

The solution: Make sure that wires are sealed in a waterproof casing. This is particularly important for wires outside of the home, but it should be done for all wiring. If you live on a boat, you need to be even more careful to look out for corrosion, both on wires and contacts. This will ensure that you can fix issues promptly and keep your solar panels at maximum efficiency. It is also important for maintaining safety.

Promptly replace any wires that have corroded, and turn the system off until you have done so, especially if the corrosion is bad. While it is unlikely to cause safety issues, it's still better not to use corroded wiring.

Issue Four: Corroded Solar Panels

Solar panels can get corroded, too, although this will usually only occur if the panel gets damaged in some way. If something falls onto a panel, breaking the seal, water can start to seep in and corrode the components inside.

As with other corrosion, this can reduce the efficiency and may, in some cases, be dangerous. It is, unfortunately, also very difficult to fix.

The solution: This problem can usually be solved by replacing the solar panel. If you notice that your solar panels have been damaged by a falling branch or something similar, it is important to do a thorough inspection and take action if you find any sign of damage. If you have an off-grid system, you may depend on a constant flow of power, and a corroded panel could leave you in a difficult situation.

Some people claim that you can repair solar panels by sealing the crack, but this is not likely to work very well in most instances and will still result in reduced performance. A PV solar panel needs to be completely

sealed to operate efficiently, so be cautious of attempting this. Most sealants will turn foggy or discolor in the sunlight that solar panels are constantly exposed to, which will reduce the panel's effectiveness over time.

If you are going to try to repair a solar panel, make sure you get the inside of it as dry as possible before sealing over the crack with your chosen material. This will reduce the risk of corrosion, but if it has already begun, it may not solve the problem.

A broken panel will need to be replaced. You may be able to patch it up temporarily, but at-home repairs are not likely to work for long. At present, there is no dedicated material for mending a damaged solar panel—especially once it has begun to rust internally.

Issue Five: Dirty Solar Panels

This might not sound like a very serious problem, but it can be a surprisingly big issue. Dirt and debris getting built up on the panel can dramatically reduce how much sunlight hits the solar cells, and this will reduce how much energy they generate for you every day.

If you live somewhere near a tree and the leaves blow onto the panel, or there is a lot of air pollution, or birds commonly perch on the panels, you may find that they quite quickly accumulate a film of dirt and leaves. A little dirt should not noticeably affect your panels, but if a panel gets very dirty (for example, from bird droppings or leaf litter), you will need to address this issue.

Similarly, if you are operating a boat with solar panels and are frequently out at sea, the panels will likely collect a misting of salt over a few months. This will also decrease the efficiency and reduce the amount of electricity your panels produce each day.

The solution: Cleaning the solar panels is usually fairly straightforward, although it can be more challenging to do safely if you have a two-story home. You may need to hire a company or at least some scaffolding to get the panels clean successfully.

Otherwise, simply get to the same height as the panels and clean them using soap, water, and a soft cloth. Do not use harsh chemicals or heavily abrasive materials on your panels, as you may scratch them or damage their coating; soap and water should do the trick in most cases. Use an eco-friendly soap if possible to reduce the risk of damage to the environment.

If you are struggling to remove dried-on bird droppings or something similar, try leaving a wet cloth on the mess to help it soften, and then

have another go at cleaning it later. I've found that being allowed to "soak" in this way helps to loosen almost all the dirt that might get onto solar panels.

Regularly cleaning your solar panels should make them easier to clean, whereas if you allow a thick coat of dirt to build upon them, they are likely to prove more challenging. It's a good idea to clean them with soap and water at least once a year, or more often if you live in a heavily polluted area. Remove debris such as leaf litter with a long brush as necessary.

Issue Six: Cracked Solar Panels

Sometimes, your solar panels will develop cracks after they have been installed. Interestingly, this is often due to micro-cracks, which would have been present before you installed the panels but are not visible. These tend to occur during transportation, so choose a reputable shipping company for transporting your panels to you—or consider collecting them in person if you can use them so that you can minimize the risk of knocks occurring. Solar panels are unfortunately quite delicate, and it's effortless for them to get damaged in transit.

You may occasionally be able to see these cracks if you inspect the panels very closely before installation, but unfortunately, they are usually invisible. As time passes, they are likely to grow larger, and eventually, they will start to impact your solar panels' ability to generate power. When they are tiny, the impact will be exceedingly small, but as they get bigger, you might start to notice a drop in the efficiency of your panels.

It is somewhat unusual for panels to get damaged once installed as they are, in general, safe from sharp impacts that could harm them. However, falling branches, a thrown stone, balls, and other flying objects might cause a crack that was not there before installation.

The solution: Unfortunately, there is not much you can do about this sort of thing. You will simply have to replace the panel. The one upside to this is that the impact from most cracks will not be huge, so you do not need to rush to replace a panel before you can afford it.

Issue Six: Hot Spots

I mentioned earlier how heat can be problematic for solar panels and lose efficiency when kept in warm environments. That's why hot spots are another important thing to look out for when it comes to maintaining your solar panels properly. A hot spot is an area on a solar panel overloaded. It becomes much warmer than the other parts of the panel while operating.

There are a variety of causes of hot spots, but you must do your best to mitigate all of them, both when installing and when maintaining your solar panels. Hot spots could reduce the lifespan of a solar panel and may also reduce its performance day today. They can cause short circuits and damage and need to be prevented or fixed if they occur.

Some of the common causes for hot spots include connections that have been badly soldered, debris buildup in areas of the panel, or structural defects. Partial shading can also be a problem to watch out for.

The solution: Sometimes, you will need a professional to work out that a hot spot even exists, but there are a few things that you can do yourself to reduce the risk of them occurring and fix them quickly if they do appear. The first of these is to make sure that you have soldered all connections thoroughly. Routinely check on connections and ensure that all are still firmly attached.

Secondly, keep your panels clean and free from debris, and where possible, remove items that shade the panels. This may not always be viable, but if not, consider repositioning a panel that gets heavy shade in one area consistently. This will help ensure that all solar cells within the panel generate electricity and spread evenly throughout the panel.

If you have fixed a hot spot, but the panel is still not performing as it should, you may need to consider replacing it. Hot spots can do severe damage to solar panels, and once this has happened, there is little that you can do to solve the issue.

Issue Seven: Incorrectly Estimating the Amount of Power Needed

This is a much bigger issue if you operate in an off-grid setup because it matters how much power you generate. If you have the grid's security behind you, it might be annoying not to generate sufficient power from your solar panels. Still, it is unlikely to have a considerable impact on your daily life—although you will have higher power bills as a result.

However, if you are operating off the grid, you have no backup if you need more power than you are generating. You are entirely dependent on your equipment and what it can create, and if you end up draining your batteries, you could find yourself without heat, light, and your cell phone at a very inopportune moment. If you are a long way from civilization, this becomes even more of an issue.

This is a common problem for people who rush into creating a solar setup experience, and it's usually a result of not factoring in all the equipment you will be using. If you don't count your fridge, laptop, air

conditioning, or other major power drains, you may find your system is seriously under-equipped to meet your needs.

The solution: Fortunately, there are a couple of things that you can do about this problem, and these are best done in advance before you set the system up. It is sometimes possible to rectify issues with underpowered systems later, but it's much better to plan first, even if you have calculated your power consumption accurately.

Before you decide what you need for your solar panel system, take some time to think about and list all of the equipment you use. You may find that it helps to do this over a few days or even weeks, writing down every electronic device you utilize in that timespan. Think about different times of the year, too. *Do you have a plug-in heater for the winter? Will you have air conditioning running in the summer?* Get input from family or friends, and list everything that you can.

Once you have this list, add up all the power consumption and a safety margin. This covers devices you haven't thought of, instances in which you may use more power, etc. If a friend wants to charge their cell phone at your house, you don't want to find this throws your whole calculation out, so create a good safety margin of 25% or more.

Given your space and budget, this should give you a good idea of how much power you need to generate and how viable this is.

Secondly, think about making your system scalable. Wherever possible, purchase components that will allow you to upgrade and expand when necessary. Many solar systems are modular, meaning that you can add extra batteries, panels, etc., as you need to in the future. If you build a system with scaling it up in mind, you could save yourself considerable costs if you need to expand later.

Remember, it is always better to have a little more than a little less. You don't want to end up fumbling around in the dark in the middle of winter because you have miscalculated, and there are likely to be a few things you have not thought of during your calculation. Over-build and ensure there is scope to expand, and your system will hold up well.

Issue Eight: PID

You may have come across the term Potential Induced Degradation while looking at information about solar panels. This is an issue that can occur over the lifetime of your solar panel system.

Although you will have earthed your solar panels, you can run into this issue if there is a mismatch between your earthing and the amount of

voltage generated by the solar panels. You may encounter some partial voltage discharge in the main circuit when this occurs.

This can lead to a loss in performance, and it can also damage the lifespan of your solar panels—obviously something that owners want to avoid. In some cases, the stray currents will damage your solar panels so much that you see a power loss as high as 30%. This will have a massive impact on your system.

It is worth noting that this issue is even more likely to occur in systems that are not earthed, so it provides another good incentive for properly earthing your solar system. It is both safer and protects your equipment.

Heat and humidity can also cause PID, and it is widespread, although not every solar module will encounter this issue. PID is not something that you will be able to detect visually, and it's quite a big issue for many solar systems. Because unavoidable environmental factors can cause it, it's challenging to prevent it.

The solution: In some cases, PID can be reduced if you can ground the negative DC pole in your inverter. Not all inverters allow for this, and you may need to get a specialist to do it, but it is one option for reducing or negating PID.

Another solution is to buy an “anti-PID box.” This will need to be built into your system between the strings and the inverter, and it reverses the effects of PID (although if the effects have been long-term, the damage will remain).

Alternatively, if you wish to prevent PID from occurring at all, you may wish to purchase solar panels that have been specifically designed to minimize the risk. These are available but are likely to cost more. Some frameless PV modules are at less risk of PID, but they cost extra and are heavier than standard panels.

High-quality panels are more likely to resist PID, so if you can budget for a more expensive panel, you may find it worth doing so. It is also worth discussing the PID resistance with the manufacturers and asking how their panels fare and what they do about this. Unfortunately, PID is a pretty complicated issue, and as yet, there are no simple solutions—although improvements are being made.

Chapter 15

Maintenance

For some reason, it has entered the public's cumulative consciousness that most people can easily undertake solar power installation. This is certainly not true, and more importantly, this is dangerous. But as far as maintenance is concerned, there are a few things that one can do, but the rest of it should be undertaken by a professional, as well.

Typically, you should check with the installer if they have a service contract that you can sign up for. It typically involves a monthly fee that may be waived for the initial months if they performed the installation. It also makes it extremely unlikely that there will be any fuss in the event of a warranty claim since they are the ones doing the maintenance.

So the first best bet that you can make is to sign on with your installer for a service contract. When you are choosing your installer, this is one of the things you should check on and negotiate.

If you want to get in and get your hands dirty, you can either get a kit with detailed instructions and as long as you are handy with the necessary tools, then you should be fine. Just make sure you get a licensed electrician to at least do the wiring and give it a once-over before you turn things on—especially if you are connecting it to the grid.

You should still get a professional to maintain it, but there are things that you can do to keep it in tip-top condition above and beyond what the service guy does. Make sure that the panels are always clean and the glass is in good condition. Wipe them clean

and if possible, when you have them installed on your roof, install necessary walking up paths between the panels to give yourself room to clean the glass and perform upkeep maintenance.

Make sure there are no rodents in the areas where wiring runs and, if possible, run the wired in conduits and keep them out of exposure to the elements and pests. Run the self-diagnostic tools if you have an automated system. Test all circuit breakers as well. Check the manual for your particular system and keep a checklist based on the items that they recommend as user maintenance.

Conclusion

Solar energy is becoming an increasingly popular form of alternative energy source around the world, bringing numerous benefits to its users. Capturing the sun's power is free, and with a small investment into the necessary equipment, anyone can set up a solar power system. As soon as the panels are installed and connected to the other necessary elements, they will start producing energy. The efficiency of modern solar systems makes it possible for owners to see a significant return on investment within the first year of installation. If not in energy bills, they will notice the payback when selling their property. Solar panels can significantly increase the market value of the property and have become sought after by buyers.

With an off-grid system, you can do even more. These autonomous power generators produce electricity the same way as their grid counterparts. They do that by harnessing the sun's energy and converting it into alternating current. However, because they have no connection to the utility grid, they allow for complete self-sufficiency. The system stores any energy it produces in a series of batteries, which you can use during the night and whenever the system isn't able to generate power due to weather or any other reason. Despite this system requiring a few more components than the grid-tied version, you will never depend on our utility company for energy again.

Due to the high level of independence, off-grid solar systems have a lot more room for customization. Whether you want to use a solar system for indoor or outdoor living, you can set up an efficient system that will suit your needs with the right strategy. With the rapid depletion of the world's fossil fuel supplies, an array that allows you to produce all your energy provides solutions to some essential problems. Since it relies on a pure energy source, an off-grid system is significantly eco-friendlier than relying on greenhouse gasses.

If you aren't familiar with solar power setups, understanding how they work can prove rather challenging. This book will help you understand how an appropriately set up off-grid system can make your home self-reliant energy-wise. In addition to reducing or even eliminating your utility bills, solar energy provides you with an opportunity to build a more sustainable future. But before you plan your dream setup, you must

familiarize yourself with the main components of an off-grid solar system. Furthermore, you will need to learn how to calculate your needs to build an array that will effectively cut down on energy waste and provide you with the amount you need.

This book also contains several advanced methods and strategies to help you build the most efficient solar systems for your needs. You will learn about the different structural components of an off-grid solar system and its functions. After learning these functions, it will be much easier to determine what kind of adjustments you may need. Also, to build an effective and safe off-grid power system, you need to keep the structural and safety issues of installing solar systems in mind. Remember, these systems gather, produce, and conduct electricity, so they should be handled with extreme precaution.

Glossary

Cell

Cells are the fundamental components of every solar module and can be found in almost all designs, regardless of the manufacturer. It is akin to a battery cell in that it is the smallest structural unit of the battery.

CO₂

See Oh Two—we all know what that is—it is the chemical abbreviation for Carbon Dioxide, a gas that is a product of respiration in all living tissue and it is the byproduct of combustion. In the context of energy, Carbon Dioxide will typically refer to the emissions created by the combusive processes of a system.

Conversion Efficiency

Conversion Efficiency is the term used to determine the efficacy of the equipment. It measures the number of light photons that are converted to electricity. Both are theoretical values based on what we have observed. We can calculate how many photons are entering the system based on the exposed area and the intensity of the light (and the frequency of the light). We then measure how many electrons are generated by the setup. The number of electrons is calculated by measuring the amps generated. The resulting ratio is then expressed as a percentage of one to the other. The more efficient a system is, the more electricity you can generate for the cost of the system.

Energy Payback

This is an interesting term because it is rather convoluted if you don't stop to think about it. Panels require energy to construct. Manufacturers calculate the amount of energy it takes to make these panels. Then they calculate the amount of electricity the panel can generate and divide how much electricity is used to manufacture it by the amount of electricity it can generate in a year. The resulting number is the number of years it will take to break even in terms of the electricity used and the electricity generated.

Grid Connected

When the solar generator generates excess capacity, the excess energy can be sold back to the utility company via the grid. If you are off the grid, you can't sell the electricity back to the utility company and your

excess will be wasted. But if you are grid-connected, you can direct the system to push it back to the grid. For instance, this is truly beneficial when you are away on vacation and your consumption is minimal. The bulk of the electricity generated can be sent back into the grid.

Inverter

If you are grid-connected, you need an inverter to convert the DC that the solar system generates into AC (Alternating Current).

Micro-Inverter

There are also such things as Micro-Inverters. These are for smaller loads and are typically installed in individual panels to execute the conversion after electron generation immediately.

String Inverter

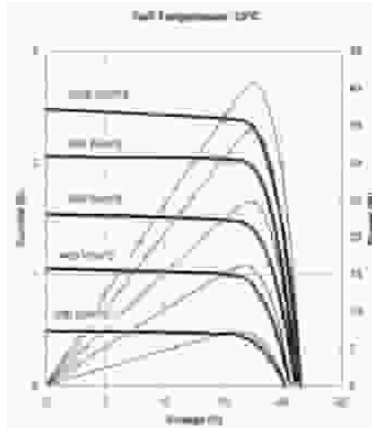
These are the most common of the inverter family and are typically used in residential systems to convert DC to AC.

Central Inverters

As we have described, these do the same thing but are typically used in much larger commercial photovoltaic systems.

Insolation

Insolation (not to be confused with insulation) measures the amount of energy radiated by the sun in a certain geographical location. You see, one of the things that affect the density of photons to hit the surface of the earth is the angle at which it hits—that angle depends on the latitudinal position that is being measured. It also makes a difference if the light is direct or diffused. Strong insolation refers to the higher density of photons, and as such, it is better for photovoltaic systems. For example, Alaska and parts of Canada have some of the lowest insolation, as opposed to say, Florida or Texas, which have higher insolation. Insolation also changes during the year, as the sun makes an apparent move into the north during summer and south during winter.



kWh

kWh stands for kilo, meaning thousand; Watt, the measure of power; and hour, the period it is measured. It is the unit of energy that most current and power consumption is measured by. A kilowatt-hour is the use of 1000 Watts of energy in an hour. You know the measure of a light's wattage—let's say 100 watts. Imagine using ten of those 100-watt bulbs for an hour—that is a consumption of one kWh. When you pay your utility bill, the amount of power you consume is measured in kWh and charged at cents per kWh.

Micron

This is a measurement in the metric system. Like the American measurement of the millionth of an inch, a micron is a millionth of a meter. In cell production, manufacturing steps occur in dimensions measured in microns.

Module

A PV module, or Photovoltaic module, is a group of PV cells that have been electrically tied together. These modules are what is usually referred to as solar panels. Each module is covered to protect it from weather, typically with tempered glass.

MW

MW stands for megawatt, or 1000 kilowatts, or one million watts.

Net-Metering

This is more of an accounting term than it is an electrical or photovoltaic term. But it does nonetheless become relevant if you are pushing electricity back into the grid through your utility. As the term suggests, it nets out what you take versus what you send back. You could use a certain quantity of electricity during the month (let's call that X), and you could also be producing power that you send back to the grid (let's

call that Y). The net would be X minus Y. Your meter will turn one way when you use the power company's electricity in one way, and it will turn in reverse when you send electricity back. You will turn back the meter by doing this, and what happens is that your monthly bill gets reduced by that amount. Most utility companies will carry forwards the difference if there is an overhang rather than send you a check for it.

Photovoltaics (PV)

Photovoltaics refers to the generation of electricity by light. The term photo means light, and volt refers to the electric potential.

Polycrystalline

Poly indicates many. Crystalline refers to the silicon crystals that are used in the cells of the PV panels.

Silicon

Silicon is a Periodic Table element that is the fundamental ingredient in the construction of PV cells. In essence, it is what makes sand and is the main ingredient in glass and computer chips.

Silicon Carbide

Silicon carbide (SiC) is a compound made using Silicon and Carbon (also another member of the Periodic Table). It is an abrasive used extensively in the manufacturing of panels in the PV industry.

Stand-Alone System

This is a solar system that is not feeding excess back to the grid. It is not even connected to the grid. These are what we usually refer to as off-grid systems and are self-sufficient. They store the electricity generated in batteries and are used when the photovoltaic panels do not get enough sunlight to generate the required power.

Wafer

A wafer is a slice of silicon disc that forms the start of the cell's manufacturing process.

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BOOK 10
WATER BATH CANNING AND
PRESERVING COOKBOOK

THE ESSENTIAL GUIDEBOOK
TO WATER BATH AND
PRESSURE CANNING WITH
200+ DELICIOUS RECIPES TO
CAN MEATS, FRUITS,
VEGETABLES AND
DIFFERENT MEALS IN A JAR

Introduction

Canning is a shelf-stable food preservation technique in which foods are sealed in airtight containers and boiled for a certain amount of time. It used to be the only way to preserve leftovers from summer picnics or holiday feasts since refrigeration wasn't commonplace until relatively recently.

Most commercially canned foods are heated inside the container in a water bath, which means they aren't sealed inside an airtight container before they're processed under pressure with steam. Pressure canners work differently—they seal foods in airtight containers with the lid locked in place before placing them inside a sealed vessel. The air pressure surrounding the food is increased to at least 10 pounds per square inch (psi), which destroys any microorganisms that might cause foodborne illness. Each type of food requires a different amount of processing pressure.

Two types of canners are available: water-bath canners and pressure canners. They both allow you to safely process foods in the oven or on the stovetop, but they do it differently. The instructions that come with your particular kind of canner will explain Directions: the food and how long to process it for.

In general, when canning low-acid foods in a water bath canner, you need to add a small amount of acid to the food. This helps prevent microorganisms from growing and producing toxins in canned foods. Likewise, commercially canned goods typically contain more salt, sugar or vinegar than what you would add at home. These additives help preserve food in a way that's similar to canning but is actually more like pickling. Preservatives aren't just used in commercially canned foods—salt is the most common preservative used for home-canned fruits and vegetables, while sugar or honey are commonly added to home-canned jams and fruit butter.

Canning jars are made of tempered glass and are available in several different sizes, the most common being either 6 or 8 oz jars. The standard canner can hold 7-quart jars or 9-pint jars. You should never fill a jar more than half full since it needs room to expand when boiling. The lids are reusable, but only if they're not bent or rusted. Either way, they

should be replaced after you use them once for any food that isn't commercially canned.

The most important thing to remember about canning is that you shouldn't skip any steps during the process, especially the ones related to food safety. That's why every jar of canned food that you buy comes with a "use by" or "sell by" date, which is a reminder to consumers that the food is safe to eat long after it's been processed. The "sell by" date also lets stores know when they should remove the product from their shelves since perishable foods tend to degrade quickly at room temperature. The "use by" date is used as an indicator as to whether the canned goods are still safe for consumption after this expiration date.

History and Development of Canning

The need to preserve food dates as far back as the first years of the Napoleonic Wars. The French government offered the hefty reward of 12,000 francs to the inventor that could produce an effective way of preserving large quantities of food for a prolonged period of time. The requirement resulted from the need to support Napoleon's military campaigns. The winner of the contest was Nicolas Appert in 1809.

He noticed that unless the seals leaked, the food cooked inside a jar did not spoil. Acting on this observation he developed a method to seal food in glass jars. The reason that the food did not spoil, was discovered 50 years later by none other than Louis Pasteur who noticed and recorded how microbes affected the food spoilage.

Glass jars presented a challenge, as there were a lot of problems involved in their transportation. The solution was given by Peter Durand in 1810 who devised the familiar cylindrical wrought-iron canisters (the root of the modern term cans). Durand's cans solved the fragility problem of the glass jars and they were also cheaper and faster to manufacture. However, glass jars still remain as a good option for canning high-value products at home.

Durand's cans may have solved the glass jars' inadequacies, but they presented another problem. Not everyone could use a bayonet to open a can up. Sometimes it was necessary to smash the cans with rocks to open them up. This necessitated the development of a can opener which didn't happen until 1840, largely due to the fact that the factory and the know-how of Nicolas Appert were all but destroyed in 1814 by the coalition soldiers invading France.

The next step was the development of the famous tin can. It would seem that the entire canning concept was something that the French could be

identified with (in a similar fashion that the Fins were identified with driving and the Brazilians identified with soccer), as another Frenchman, Philippe de Girard was the one who thought of the method and developed it with the assistance of Bryan Donkin and John Hall. The product was dubbed a tin can because the material used was tinned wrought iron.

Tin cans became a massive success. Initially amongst the military forces of the British Army and the Royal Navy and then commercially. It is indicative of this success that by the mid-19th century, canned food became a status symbol for the middle class.

This success was mitigated heavily after the Franklin expedition disaster in 1845, which vividly demonstrated that canned food may entail serious health hazards. In this case, it was the lead solder that was used for sealing the cans and that was proved to be extremely poisonous to humans. The situation was remedied through various improvements and side inventions, and by 1860 the increase in urban populations demanded increasing quantities of canned food. At that point, the time required to cook food in a sealed can was reduced from six hours to thirty minutes.

The next major advancement in canning technology occurred during World War I. In the beginning, the food contained was cheap and of low quality. The majority of the cans contained the then famous 'Bully Beef' which was actually very cheap corned beef. To improve the morale of their soldiers the British began purchasing food of higher quality and then created the staple of all military forces even to this date: the complete meals.

As incredible as it may seem, the last major development that occurred around the 1900s remains the same until today. And this is the double seeming technique that completely sealed the cans and made them totally airtight and allowed for the food inside to remain uncompromised for a period of at least five years, even under the worst storing conditions.

The only change that has happened during the manufacturing stage of a can recently, is the substitution of steel and wrought iron with aluminum compounds, which made the can production faster and cheaper.

While it is possible to make metal cans at home, it is preferable to buy the ones that are easily made that have observed the safety precautions or use glass jars if you want to prepare and can your own food and keep it stored to be used in case of an emergency.

Chapter 1

Canning

Canning and preserving foods at home has emerged as a trend because you get to store your food longer and kill any microbes that may spoil food. Even with all the industrial preserving methods at their all-time best, maybe we want more natural products, and most of us like the idea of canning and preserving our own foods in the comfort of our homes.

Canning is one of the easiest and most reliable methods of preserving all types of foods. It is a way to preserve food when there is no fridge and requires only a few readily available items that aren't too expensive.

With home canning, you can just simply prepare your canned foods instead of buying canned foods that contain preservatives and other ingredients it's safe, natural, and can easily be done at home and stored in your pantry for months or even years.

Advantages of Canning and Preserving Foods at Home

While there are so many canned and preserved food products you can buy from department stores nowadays like jams, etc. it is still a better option for you to try canning and preserving your own food at home. Here are several reasons why:

- *Convenience.* When you can and preserve your own foods at home, you give yourself access to portable food items when you need them and you no longer have to shop for these foods from department stores because you already made what you need in your own cupboard. For instance, if you need something to pair your bread with, you can easily make your own jam that you can use not only at present but for future use as well. It saves you time, money, and effort in running to the store to buy them.
- *Longer shelf life.* If you have a lot of fruits at home or if you are growing your own food in your backyard, they will all be wasted if you do not consume them at once before their expiration date but

when you can and preserve your own food at home, you are saving these food items from demise by extending their shelf life. This is because you are turning them into something that is useful for you but won't easily expire. This will help you avoid wasting resources and be wise in thinking of new ways to make use of the food resources you have.

- *Nutritional value preserved.* When you can and preserve your own food, you are not only maintaining their condition and their state or locking in their freshness but you are also actually preserving their nutritional value. So, even if chemical reactions may have changed the way the food items taste and their texture in your mouth, you can be assured that their nutritional value is still intact and that even if you are not eating the food in its original form, you are not depriving yourself of the nutrients from these foods.
- *Safety and Control.* When you can and preserve your own food at home, you know what you are putting in it or the ingredients that you are using as preservatives and you know that you won't be putting synthetic and chemical ingredients into your preserved foods just to preserve them well. In other words, you have control over the foods you are canning and preserving. This way, you are also in control of your safety when it comes to consuming canned and preserve foods. Some of the canned and preserved foods out there may use preservatives that could be toxic to the body and health but when you can and preserve your own foods at home; there is no threat to your safety.
- *Cost-Efficient.* Canning and preserving your own foods at home could mean a hefty initial cost but it can still be considered cost-efficient because you will not be paying for labor and expensive cost of operation unlike when you buy canned and preserved foods from companies. This is also cost-efficient in the long run because you no longer need to buy these food items from stores as you have access to your own canned goods already. Therefore, it can indeed save you money too.
- *More rewarding.* Aside from the fact that canning and preserving your food at home can benefit your safety, your budget, your convenience, etc. this process also proves to be more rewarding than when you simply buy canned goods and products out there. This is because after you have gone through the effort of preserving and canning your own foods, there is a feeling of satisfaction you

would feel knowing that you are the one who made the food you are using and that despite the time and effort you have invested, you still managed to succeed.

Safety Tips

There are a few safety tips that you should follow when you start canning and preserving foods from home. Canning is a great way to store and preserve foods, but it can be risky if not done correctly. However, if you follow these tips, you will be able to can foods in a safe manner.

Choose the Right Canner

The first step to safe home canning is choosing the right canner. First off, know when to use a pressure canner or a water bath canner.

Use a pressure canner that is specifically designed for canning and preserving foods. There are several types of canner out there and some are just for cooking food, not for preserving food and processing jars. Be sure that you have the right type of equipment.

Make sure your pressure canner is the right size. If your canner is too small, the jars may be undercooked. Always opt for a larger canner as the pressure on the bigger pots tends to be more accurate, and you will be able to take advantage of the larger size and can more foods at once!

Before you begin canning, check that your pressure canner is in good condition. If your canner has a rubber gasket, it should be flexible and soft. If the rubber is dry or cracked, it should be replaced before you start canning. Be sure your canner is clean and the small vents in the lid are free of debris. Adjust your canner for high-altitude processing if needed.

Once you are sure your canner is ready to go and meets all these guidelines, it is time to start canning!

Opt for a Screw Top Lid System

There are many kinds of canning jars that you can choose to purchase. However, the only type of jar that is approved by the USDA is a mason jar with a screw-top lid. These are designated “preserving jars” and are considered the safest and most effective option for home preserving uses.

Some jars are not thought to be safe for home preservation despite being marketed as canning jars. Bail jars, for example, have a two-part wire clasp lid with a rubber ring in between the lid and jar. While these were popular in the past, it is now thought that the thick rubber and tightly closed lid do not provide a sufficient seal, leading to a higher potential

for botulism. Lightening jars should not be used for canning as they are simply glass jars with glass lids, with no rubber at all. That will not create a good seal!

Reusing jars from store-bought products is another poor idea. They may look like they're in good condition, but they are typically designed to be processed in a commercial facility. Most store-bought products do not have the two-part band and lid system which is best for home canning. Also, the rubber seal on a store-bought product is likely not reusable once you open the original jar. You can reuse store-bought jars at home for storage but not for canning and preserving.

Check Your Jars, Lids, and Bands

As you wash your jars with soapy water, check for any imperfections. Even new jars may have a small chip or crack and need to be discarded. You can reuse jars again and again as long as they are in good condition.

The metal jar rings are also reusable; however, you should only reuse them if they are rust-free and undented. If your bands begin to show signs of wear, consider investing in some new ones.

Jar lids need to be new as the sealing compound on the lid can disintegrate over time. When you store your jars in damp places (like in a basement or canning cellar) the lids are even more likely to disintegrate. Always use new lids to ensure that your canning is successful.

Check for Recent Canning Updates

Canning equipment has changed over the years, becoming more high-tech and therefore more efficient at processing foods. In addition to the equipment becoming more advanced, there have also been many scientific improvements, making canning safer when the proper steps are taken. For example, many people used to sterilize their jars before pressure canning. While this is still okay to do, it is not necessary as science has shown that any bacteria in the jars will die when heated to such a high temperature in a pressure canner. Sterilization is an extra step that you just don't need!

Make sure that your food preservation information is all up to date and uses current canning guidelines. Avoid outdated cookbooks and reassess "trusted family methods" to make sure they fit into the most recent criteria for safe canning. When in doubt, check with the US Department of Agriculture's Complete Guide to Home Canning which contains the most recent, up-to-date canning tips.

Pick the Best Ingredients

When choosing food to can, always get the best food possible. You want to use high-quality, perfectly ripe produce for canning. You will never end up with a jar of food better than the product itself, so picking good ingredients is important to the taste of your final product. Also, products that pass their prime can affect the ability to be canned. If strawberries are overripe, your jam may come out too runny. If your tomatoes are past their prime, they may not have a high enough pH level to be processed in a water bath. Pick your ingredients well and you will make successfully preserved foods.

Clean Everything

While you may know that your jars and lids need to be washed and sanitized, don't forget about the rest of your tools. Cleaning out your canner before using it is essential, even if you put it away clean. Make sure to wipe your countertop well, making sure there are no crumbs or residue. Wash your produce with clean, cold water and don't forget to wash your hands! The cleaner everything is, the less likely you are to spread bacteria onto your jarred foods

Follow Your Recipe

Use recipes from trusted sources and be sure to follow them to the letter. Changing the amount of one or two ingredients may alter the balance of acidity and could result in unsafe canning (especially when using a water bath canner). Use the ingredients as directed and make very few changes—none if possible.

Adhere to the processing times specified by your recipe. Sometimes the times may seem a little long, but the long processing time is what makes these products safe to store on the shelf. The processing time is the correct amount of time needed to destroy spoilage organisms, mold spores, yeast, and pathogens in the jar. So, as you may have guessed, it is extremely important to use the times that are written in your recipe as a hard rule.

Cool the Jars

Be sure that you give your jars 12 hours to cool before testing the seal. If you test the seal too early, it may break as the jar is still warm, making the rubber pliable. Be sure to cool the jars away from a window or fan as even a slight breeze may cause the hot jars to crack. Once cool, remove the metal band, clean it and save it for your next canning project.

Don't Risk It

If you suspect that the food you have canned is bad, don't try to eat it,

just toss it! Each time you open a jar of canned food, inspect it and check for the following:

Is the lid bulging, swollen, or leaking at all?

Is the jar cracked or damaged?

Does the jar foam when opened?

Is the food inside discolored or moldy?

Does the food smell bad?

If you notice any of these warning signs in a food that you have canned, throw it away. Do not taste it to check if it is good. It is not worth risking your health to try the food after seeing one of the above signs.

Luckily, it is fairly easy to spot a jar of food that has gone bad. Home-canned food can spoil for many reasons. A dent in the lid, a small crack in the jar, an improper seal, or not enough processing time are all common errors that may cause canned foods to go bad. Follow the exact canning directions and hopefully, you will never get a bad jar of food!

Chapter 2

Pressure Canning

Pressure canning is a method of food preservation that involves the use of pressure canners, which are heavy-duty equipment specially designed in such a way that allows steam to be trapped inside the container and thereby increase the pressure in it. The pressure is needed, especially in low acidic foods, to destroy the bacterium *Clostridium botulinum* since the boiling temperature does not affect the spores of this bacterium.

The pressure canner has a vent port, a pressure gauge (weighted gauge or dial gauge), and screw clamps. It is important to note that pressure canners are not the same as pressure cookers, although the operation of both involves trapping heat inside and increasing the pressure in the pot or container.

A pressure cooker is used mainly to cook foods rapidly, while adequate pressure in the cooker is not necessarily maintained. Some cookers cook foods at regulated pressure, but others come with no pressure regulation settings. In pressure cookers, heat is gained and lost too quickly, and this makes them unsafe for food canning processing. The recent modifications in the pressure canner have reduced the heaviness and improved the safety measures in case the pressure in the canner becomes too much. Whichever type of pressure canner you have chosen to use, it is crucial to follow the manufacturer's direction of use strictly.

When using pressure canning, the food could either be hot packed or raw packed. Hot packing is said to be the best practice for removing air and maintaining the original color and flavor of the food. Hot packing simply involves boiling the food (simmering) for a few minutes and swiftly filling the jars with it.

The food jars should be filled loosely in hot packing while in raw packing; the jars should be tightly filled with the food (although unheated unlike in hot packing). Air is usually entrapped in the jar environment when using the raw packing method and this affects the color of the food after a while. However, some foods such as vegetables are best processed raw in pressure canning.

Necessary Tools and Equipment for Pressure Canning

Vent Port

A vent port is a hollow pipe, usually short, that stretches from inside the container above the lid. Its function in a pressure canner is to enable the entrance or exit of air and steam in the container. When it is opened, steam and air escape, but close it means trapping air and steam inside. The vent will usually have a pressure gauge, which could be a weighted pressure measuring gauge or dial pressure measuring gauge to measure the total internal pressure when carrying out the process.

- **Weighted gauge:** This type of pressure measuring gauge fits over the vent port and can be used to control the internal pressure. It allows the pressure in the canner to rise, and when the proper pressure level has been reached; it jiggles or rocks to release excess steam. Unlike dial gauge, weighted pressure measuring gauge does not require frequent check-ups for accuracy because it really cannot go out of calibration.
- **Dial gauge:** A dial pressure measuring gauge uses a needle that moves in a circular graduated indicator to indicate or show what the pressure in the canner is. It is necessary to check this device frequently in order to avoid processing errors such as under-processing, which results in spoilage or over-processing, which affects the quality of the food. The dial gauge is more flexible when making altitude adjustments but should be replaced when cracked or when the gauge is off by more than two pounds.

Safety Valve

A safety valve is made available as an escape route for the pressure in the canner in case the vent fails to let out the excess pressure and the inner pressure gets way too high. The safety valve is a safety mechanism put in place to prevent an occurrence of explosion. It ensures that the pressure in the canner does not rise to an unacceptable level and therefore comes into play when the vent fails to release the excess pressure as it should.

Sealing Devices

These devices include gaskets, sealing rings, etc., and are necessary for pressure canning. Sealing devices help to guarantee the food jars are

airtight enough to protect the food from getting spoiled. Failure to seal correctly does not occur so frequently, but the reasons the jars will not seal well may include;

Bad jars (e.g., jars with uneven or chipped rims). Ensure you use a standard jar to start with.

Insufficient heat during processing (i.e., the air is still present in the jar), and also inadequate processing of raw packed pressure canning. Ensure that air is completely removed, and no residual air is left in the jar for proper sealing.

Forcefully cooling a pressure canner will result in particle stains on the sealing rim and therefore prevents adequate sealing of the jar. Avoid this by simply not cooling the pressure canner forcefully.

Maintaining an incorrect amount of headspace.

Rack

This device is needed to raise the food jars and prevent them from touching the surface of the canner. It prevents the jars from colliding and avoids breakage as well as ensures that steam is evenly circulated during the pressure canning process.

Jars

The suitable jars to use in pressure canning are tempered jars to avoid breakage when being heated. Quart jars are advisable as most recipes are designed to fit such. Ensure to choose a standard jar to prevent issues like improper sealing.

Other tools in pressure canning may include a jar funnel through which the food is poured into the jars, a jar lifter, which is used to remove hot jars from the canner, a timer to keep an eye on processing time, bubble freer, and also lid wand. These tools make the pressure canning process more straightforward, although they may be tagged as not compulsory.

Getting Ready for Pressure Canning

Here are what you need to do before the pressure canning process.

- **Heat the jars:** Wash the jars with soap and water and then rinse well. Next, pour 2–3 inches of water into the canner. Cover it loosely (do not lock), and allow the water to boil to 180°F. Place the jars with a little amount of water inside (to submerge the jars) into the pressure canner. Cover the canner loosely again and let the

jars be steamy hot for a few minutes. For the filling, take out a hot jar, fill it with food, and return it to the canner before taking out another jar. Don't fill a cool jar with food and don't fill two jars at a time.

- **Prepare the lids:** Use new lids for each jar. This is because while screw bands may be used again, lids should only be used once. Also, ensure to check the lids for any form of defects and follow the manufacturer's guide when preparing them.
- **Fill the jars with food:** Pack the food inside the jar with a funnel (if necessary) and do not crush it. Next, add hot liquid according to the direction of your recipe. Measure the headspace and adjust as necessary.

Whichever type of packing process you are using, raw packing or hot packing; ensure to pack the food tightly or loosely as the case may be. That is, pack the food tightly when you are packing it raw, because of shrinkage, and when using hot packing, the food should be packed loosely.

After filling the jar and adding hot liquid or water, the headspace to leave will be determined by the recipes. Foods that tend to swell will invariably require more headspace. It is essential not to leave too much headspace or too little headspace because both situations will affect the canning process.

The air bubbles left in the food will come up when heated, and they can be removed using a bubble freer such as a plastic spatula. Carefully insert the plastic spatula into the jar as the air is allowed to escape. You should also be careful not to use metal as it may affect the glass jar and cause more damage later on. After the bubbles are removed, wipe the rims of the jars with a clean, damp cloth and properly seal the jars for processing in the pressure canner.

Pressure Canning Processing Procedures

Fill the pressure canner with about 2 inches of water. It is advisable to boil additional water; you may need it as time goes on.

Carefully put food jars on the rack in the pressure canner and ensure spacing between jars to have an even distribution of steam through the process.

Open the vent port to exit all air from the canner, turn on the heat and

allow the water to boil until steam oozes from the opened vent port.

Keep this going for 8–10 minutes, and afterward, put the weight back on the vent port to pressurize the canner.

If you are using weighted pressure measuring gauge, allow the canner to heat up until the gauge rocks or jiggles and a sound is heard.

If you are using a dial pressure measuring gauge, allow the pressure to rise rapidly to about 8 pounds. At this point, you should lower the temperature and allow the pressure to rise slowly this time to the expected level.

Start timing when the gauge jiggles for the weighted pressure measuring gauge or when the needle reads the expected pressure level for the dial pressure-measuring gauge.

Ensure to maintain the expected pressure level or if the pressure level is above the expected level, ensure to keep it steady.

Turn off the heat after the process timing is complete and allow the pressure canner to cool naturally (not forcefully).

Allow the pressure canner to completely depressurize before attempting to remove the gauge or open the vent port to avoid food spoilage.

When the pressure canner is completely depressurized, remove the weight on the vent port or open the petcock as the case may be, and wait for a few minutes before you unlock the lid. Any hastiness at this stage may damage the canner lid or burn your face. The risky part is not allowing the pressure canner to cool completely before opening it and removing the jars. If by any means there are under-processed food jars in the canner and you don't wait till the canner is completely cool, the under-processed ones tend to spoil.

After opening the canner, use a jar lifter to remove the jars and allow them to cool completely. Remember to place the food jars on a rack or towel while you allow them to cool.

Leave the jars for about 12–24 hours and also ensure sufficient space between the jars when removing them to give the jars enough room to cool.

When the jars are completely cooled, check the seal by pressing the center with your finger (preferably your thumb) or by gently hitting the lid with a spoon. If properly sealed, the lid will give a clear ringing sound, but if not sealed, it gives a rather dull sound. Checking for seals is important to figure out the ones that fail to seal correctly and reprocess them within 24 hours. It is necessary to label the canned foods with the

appropriate information (contents, the date it was processed, etc.) for easy traceability. Store the canned foods in a cool and dry environment; maintain a temperature range between 50–70°F. Avoid a temperature above 95°F or keep the jars close to a source of heat. There is a tendency for the nutritional quality of the canned food to reduce over the years.

Chapter 3

Water Bath Canning

This method is ideal for making homemade jams or jellies, as well as preserving fruits and vegetables. Keep in mind that not all fresh produce is well-suited for this method. Ingredients with high acidity levels are the most ideal foods that can be preserved using water bath canning. The ones that have low acid levels should be stored using the pressure canning technique.

Preparing the Equipment

1. The first step is to clean, examine, and assemble a water bath canner. Always check the canner's dial gauge before you start. This is a very fragile instrument and should always be handled with extreme care. Do not let the dial gauge be submerged in any liquid. You should also inspect if the gauge glass is dented, or if the pot has rusty areas.

Other parts that you should also examine are the overpressure plug, as well as the gasket of the cover lock. Replace them if you notice that they are deformed or worn out.

2. Inspect your glass jars for any cracks or dents. The jars, lids, and metal screw band should be in mint condition so that they will be airtight. Wash your containers and their parts thoroughly before placing any ingredients in them. Pour water on them first and set them aside to remove any germs and bacteria.

3. Fill half of your cooking pot with clean and warm water. Then, add the rack. Make sure the water in the canner is high enough so that the jars will be submerged 2 inches deep.
4. Place the canner on top of the stove. Make sure that the stove burner is at the center of the pot so that the heat will be spread evenly. Then, preheat the water bath canner at 140°F. However, you should change the temperature to 180°F if you are canning a hot pack—a food that is slightly cooked.

While you are waiting for the water to heat up, you can start filling up your jars with fruits and vegetables.

Filling up the Jars and Canner

1. Select the freshest and firmest produce from your stash. Sort them according to their size, and then clean them thoroughly. If you are following a specific recipe, follow the instructions well.
2. Remove the air bubbles inside the food containers using a nonmetallic spatula. Using a damp cloth, wipe its sealing edge gently. Place the metallic bands and adjust them so that the jars will not leak. However, make sure that it is not extremely tight.
3. Using a jar lifter, place the already filled glass containers inside the water bath canner. Their lids should already be intact before loading them into the pot. When moving your food containers with a jar lifter, keep in mind that the tool should be well-placed below the metallic screw band. Your mason jars must always stand upright while you are transferring them.
4. Check if the water level is just right. Pour more if needed.

5. Cover your cooking pot with a lid.
6. Increase the heat of your stove to its highest temperature, and let the water inside boil vigorously.
7. Set the timer according to the appropriate processing time of your preserved food.

During the processing time:

1. Make sure that your canner is covered during the processing time.
2. You can lower the temperature of the stove if you need to. However, the water should still be boiling vigorously.
3. If the water suddenly stops boiling, increase the temperature to its highest state until it starts to boil again.

End of the Canning Phase

1. Once you have already finished bathing the mason jars in scalding water, turn off your stove and remove the canner's lid. Let it cool for at least 5 minutes before removing the food containers from the rack.
2. Slowly remove the mason jars from the rack using the jar lifter. Organize them on a surface covered with a soft towel. Do not place them on an extremely cold surface to prevent the containers from experiencing a thermal shock.
3. Let the jars cool off on their own for at least 8–12 hours. Do not touch the ring bands or the lids.
4. After the containers have cooled down, immediately remove the metallic bands so that they will not rust and become more difficult to remove. Wipe its surface to clean off the residues.
5. Test the seal of each container. Then, remove the metal bands. Label each jar and transfer them to a cool and dry

area. These preserved meals can retain their great taste for at least one year. They are still safe to eat after a few years, as long as they are properly sealed and stored. However, their taste may not be the same after that.

Testing Your Mason Jars

Technique 1: Gently press the top of the lid using your finger. If the cover springs back up when you remove your finger, it means that the glass container is unsealed.

Technique 2: Lightly tap the bottom portion of a teaspoon on the jar's cover. If it produces a high-pitched sound, it is properly sealed.

Technique 3: Place the food container at level and look at the lid. It is sealed shut if it is concaved.

Chapter 4

Pickling

The word “pickling” refers to the process of saving food in an acidic solution. There are two common methods for doing pickling: fermentation & vinegar.

Types of Pickling

Vinegar

Pickled foods may be canned and kept on the shelf or in the fridge right away. This technique is also known as “quick-process.” or “fresh-pack”. Because vinegar is acidic, it keeps the food from spoiling. As far as the acidity level is less than 5%, you may use apple cider vinegar or white vinegar.

This is the technique used to make most professionally produced pickles, and it is the method that most people identify with pickling in contemporary times. Since vinegar-brined pickles are not fermented, they are sometimes known as “fresh pickles.” However, vinegar-brined pickle preparations typically include some salt. You can brine the fruit or veggies in salt, vinegar or water to create pickles using vinegar brine. Glass jars may be used to make these pickles; they can be recycled glass jars or a new set of jars. A home canning method, such as water-bath canning, is used to secure the jars.

Fermentation

You may also traditionally prepare pickles by fermenting them. Fermentation is the breakdown of naturally existing sugars in foods after being allowed to sit for a long time. In the context of pickles, fermentation is accomplished by immersing specific foods in a salt-water mixture and allowing them to rest until the sugars break down and lactic acid is formed. Because the lactic acid produces the acidic solution required for pickling, vinegar is not required. Salt is used to preserve fermented pickles, although vinegar may also be used in certain recipes. This pickling technique is known as natural/wild fermentation, and it’s

ideal for fruit and veggies with a high water content since the brine is made by drawing the water out of the item with salt. Fermented pickles are high in healthful probiotics and other beneficial microorganisms that aren't found in vinegar-brined pickles. For this technique, you need to utilize a suitable fermenting vessel, such as a fermentation crock, or you may get a brand new complete beginner fermentation kit.

The solution's acidity during pickling changes the taste and texture of the food while promoting the development of beneficial bacteria (*Lactobacillus*) and inhibiting the growth of dangerous bacteria such as *C. botulinum*, the bacterium that causes botulism.

Pickles should be prepared using young, fresh produce, vinegar, and entire, fresh spices and herbs. Good ingredients, precise quantities, and well-followed procedures result in delicious pickled goods.

You will find several delicious recipes in this book.

Step by Step Guide to the Pickling Process

We're going to keep things easy since this is a novice's guide to pickling, so let's do it step by step.

Choose Your Vegetables

It is strongly advised you start by visualizing what you would like to see on the plate rather than worrying about pickling.

It's also motivating to think beyond the vegetable box. Consider those pink pearl pickled onions or that bright purple cabbage. Capsicums, purple cabbage, chilies, green beans, carrots, green tomatoes, and radishes are more options.

Clean & Properly Care for Your Glass Jars

Whether you're purchasing new glass containers or recycling old ones, you'll need to thoroughly clean them before sterilizing them. Pickling jars must be sterilized to prevent the pickles from spoiling due to the growth of harmful germs. To sterilize the jars, heat them to the level where no bacteria can live. It's better to disinfect them just before you pickle them.

While the pickling process is enjoyable, the sterilizing step is laborious and time-consuming, yet it is necessary. Before using any spoons, or other utensils, ensure they are sterilized.

The Oven Technique Is One Approach to Sterilizing the Jars

As you are pickling in jars that have rubber seals, you'll need to take

them off before putting them in the oven. Preheat the oven to 130°C (not higher than this). Wash the lids & jars in super-hot soapy water, wash them (do not dry them), and place them on a baking sheet coated with baking paper. Immerse the lids in boiling water for 5–10 minutes while the jars bake for 15–20 minutes. Remove the jars off the jar rack and put them on the clean kitchen counter. The jars need to chill to room temperature first. If you're placing hot jams into jars, you should do it while they're still hot. You risk breaking the jars if you put cold components in hot jars.

The Method of the Microwave

Pickling jars may also be sterilized in the microwave, which is really the quickest way. All you have to do is microwave the clean jars for 45 seconds. Start by rinsing them in hot water and leaving them somewhat damp. Clearly, you cannot microwave the jars' metal lids or tops. Pickling requires allowing the jars to cool on the counter.

Get the Vegetables Ready

Clean the veggies well in water that is safe to consume. Clean your veggies thoroughly. Some veggies must be blanched, while others must be cooked. You must also choose how to store them: whole veggies, thick coin-shaped pieces cut lengthwise, or thinly sliced matchsticks.

Choose Your Aromatic Ingredients

Salt is required, and pure sea salt is required. Experts suggest using 20–40 g of sea salt on each liter of water, or approximately two teaspoons. But after that, it's entirely up to you what you put in the solution with your veggies. You'll need to follow a recipe for the first few times.

Get the Brine Ready

You will need equal parts vinegar and water for a simple, fast pickle. Boil the water and add the salt to make the brine, then it comes to room temperature.

Get the Pickle Jar Ready

Fill the sterilized jar(s) to the brim with the veggies, then add the aromatics, and finally the brine. Place a vine leaf or cabbage leaf on top to prevent your veggies from rising to the surface and being exposed to air, as well as to keep your pickles crisp.

Store Your Jars After Sealing Them

Just put a lid on securely and chill the jar for a few days' worths of pickles. They'll be done in an hour, but one can leave them for several days. The longer you keep the pickles sealed in the jar in the fridge, the

stronger flavors you'll get. If you want prolonged fresh pickles or fridge pickles, keep an eye on the jars and remove the lids every several days to enable the bacteria to start the fermentation and Carbon dioxide build-up within. When the brine starts to cloud, periodically open the jar, then chill the jar for 1–2 weeks, at which point the pickles will begin to mature fully.

You can also do the water bath canning as the recipe states to store them for longer. Jars should be kept in a cold, dry, dark location for up to a year.

Chapter 5

The Prepper's Canning Guide

The Best Foods to Choose

When it comes to choosing the best foods that can be used for canning, there are certain things to consider. Once you begin canning, you will figure out that almost all types of foods can be used for it. However, you have to be cautious about the techniques and their applications. While you might be tempted to store different kinds of meals or foodstuffs, it would be better for your health and safety that you avoid the tricky ones. You see canning does preserve your food for months or even a year, but you have to be prepared to consume them within that time period. This is why it's important to select the ingredients or cooked meals that you really like or that would help you survive in the long term.

If you want to be smart and strategic about food preservation, then you have to pick the foods that work really well with canning. There are some that can be canned very quickly, while others might take an hour or two longer. Basically, canning at home is about using two major methods to secure food items into jars and containers. These are pressure canning and water bath canning. Both the processes are based on heating the foods and are quite easy and simple.

With a water canner, you can just put the containers in water and boil them for a given amount of time so that the lid seals. For pressure canning, you heat the foods in the jars through steam from a pressure cooker. This allows the bacteria and a highly toxic microorganism to be completely killed and removed. Before you make your choices of food, you have to consider these techniques and then list the items down.

Some of the foods that you select will be canned with the water bath procedure, while others will require pressure. In order to pick out the best way, you have to first get a clear idea of the fruits, meats, vegetables or sauces that can be canned and preserved. Now, this involves a bit of scientific knowledge. You see, when you are organizing food items by their canning methods, you have to become familiar with their acidic

nature or values. This can be slightly tricky and might have you wondering as to why it is important.

Well, both the canning processes rely on the amount of acid that is found in a raw or pre-cooked item, so they have to be sorted out accordingly. The foods with low acidic value, that is more than 4.6 pH, have to be canned with pressure, whereas the ones with high acidic content can go through water bath canning. This brings us to the next question. What are the different items that belong to each of these groups? Generally, this is how you break it down.

Items that are low in acid:

- •All vegetables
- •Meats
- •Dairy and such products
- •Seafood
- •Poultry

Items that are high in acid:

- •Fruits including tomatoes
- •Relishes and pickles

These are the basic and everyday foods that you can preserve with canning and make sure that you and your family are covered when things start to fall apart. Other than that, you can also can sauces, chutneys, and fillings for pies through the water bath canning method, as they have a high acidic value. In case you want to keep your condiments with you as well, you can add salsa and ketchup to this list too. For healthy prepared foods such as stock or broth, you will have to look towards pressure canning as it allows them to last longer and maintain their nutrition as well.

If you think about it, canning and preserving food is quite an interesting activity and one that you might enjoy too. You will be able to successfully build up your storage and stockpile for the future without being concerned with your food running out. Before you rush off to look through your pantry and buy a load of groceries to begin canning, you should be well-informed and equipped. Otherwise, you will find yourself stuck with a particular item and struggling to can it in the best way possible.

This is why it's important to know that a few ingredients may not be

directly canned as they are. You will have to pickle them first or just opt for freezing instead. It would be better to preserve broccoli, cauliflower, and cabbage in their pickled and processed form rather than chopping them up raw. Experts have determined that pickling is an efficient way to can items that would otherwise be difficult to can. Once this is done, it becomes easier to seal and lock the jars or containers by water bath canning, as that ideally works for pickled foods.

While you are canning your stock and making preparations, try to avoid storing a lot of sweets or items that have a high content of fats. This is mainly because they will be affected by the heat and lose their appearance or taste. You don't want your meal to become mushy and deposit at the bottom of the container. In the end, the important factor is that the foods you choose must be easy to can and edible after a certain period of time. Desserts and munching candies might not be at the top of the list but you can certainly include them somewhere.

Other than that, there are some foods and ingredients that are incredibly adaptive to canning and require minimal effort to go through the process. These are basically the best foods that you can opt to can quickly when preparing for emergencies.

Tomatoes: You really cannot survive without this absolutely essential item. All you have to do is peel and take out the additional elements from the core. Then you can just put them into jars and put in lemon juice so that the acidity levels rise. Cover with the lid and make sure it's tightly closed. Once this is done, you can introduce them to the heat in the water canning method and boil them for approximately 40–50 minutes.

Beans: This is an efficient foodstuff that can help you get through when there is a low food supply and you cannot find anything else. No matter what your plans are or where you want to go, beans should be one of the first foods that you can. Take the required quantity and seal them tightly in a container or jar. Since they are low in acids, the process you will carry out is pressure canning. It can take up to 20–30 minutes.

Cucumbers: There are different kinds of canned cucumbers that you find in a store. You might come across them in the form of dill or pickles, as the processing helps them maintain their original form and crunchy texture. In canning, you can opt for slicing them before putting them into jars or get the smaller ones which are easier to store in a container. They can then be canned through the water bath procedure in a short span of time. If you choose to pickle them, it should only take

around 5–10 minutes because you do not want to end up overcooking or making the contents soft.

Corn: With this, you can hardly go wrong. When canned, corn retains its freshness and taste throughout consumption. You have to boil it before putting it in a jar and canning it in a pressure canner. Just remember to leave 1 inch or 2 of headspace when closing the lid. While the overall time might be longer than almost all the other foods, it will be well worth it. In pressure canning corn, you may have to wait for 1 hour and 30 minutes to ensure that the containers are properly sealed and locked.

Fruits: Canning these items is fairly easy and only takes up to 15 minutes. The steps required are also quite basic. You take the fresh fruit, wash it and keep it in a jar or container. Do not fill up to the top and save at least ½–1 inch of space. Then you can begin with water bath canning and have your fruits canned safely for eating later.

Fresh greens: Now, you already know that vegetables are to be canned with pressure and it may take an hour or more to finish everything. For leafy greens, you need to take fresh ones and then put them in separate jars. Before you start with the process, you do have the option of adding salt as well.

Once, you have picked out the foods you want to can and have stocked up on the necessary items, you can proceed towards the actual steps.

Jam and Jellies

Maple Blackberry Jam

Preparation time: 15 minutes

Cooking time: 60 minutes

Servings: 6 half-pint jars

Ingredients

- 6 canning bottles

- 6 cups blackberries, crushed

- 1 ½ cup pure maple syrup

- •Zest and juice from 1 lemon

Directions

1. Sterilize the bottles in a water bath canner. Allow the bottles to cool.
2. Set all ingredients in a saucepan and bring to a simmer. Cook for 50 minutes while stirring constantly over medium-low heat or until the mixture thickens.
3. Dip an old spoon into the jam and tip gently. If it runs off in a sheet and if the liquid does not drip, the jam is ready.
4. Set off the heat and allow the mixture to slightly cool before transferring it into the sterilized bottles.
5. Remove the air bubbles in the mixture. Close the lid and place it in the water bath canner.
6. Process for 10 minutes.
7. Store in a cool dark place and consume within a year.

Nutrition

- •Calories: 379

- Protein: 2.9 g

- Carbs: 96 g

- Fat: 0.4 g

- • Sugar: 84.2 g

Pineapple Jam

Preparation time: 15 minutes

Cooking time: 1 hour 10 minutes

Servings: 4-pint jars

Ingredients

- 2 canning bottles

- 1 cup sugar

- 2 fresh lemons, juiced

- •1 medium-sized pineapple, peeled and chopped

Directions

1. Sterilize the bottles in a water bath canner. Allow the bottles to cool.
2. Add all ingredients to a medium-sized pot and bring to a boil. Reduce the heat and simmer for 1 hour until the liquid has evaporated and the mixture thickens.
3. Set off the heat and allow it to slightly cool before transferring it into the bottles.
4. Remove the air bubbles and close the lid.
5. Set in a water bath canner and process for 10 minutes.
6. Consume within a year.

Nutrition

- •Calories: 216

- Protein: 1.3 g

- Carbs: 56.3 g

- Fat: 0.3 g

- • Sugar: 47.3 g

Raspberry Jam

Preparation time: 15 minutes

Cooking time: 27 minutes

Servings: 6 half-pint jars

Ingredients

- 4 canning bottles with lid

- 4 cups crushed ripe raspberries

- 1 tbsp fresh lemon juice

- 6 ½ cups sugar

- ½ tsp unsalted butter

- 3 oz pectin

Directions

1. Sterilize the bottles in a water bath canner. Allow the bottles to cool.
2. Macerate the raspberries and run them through a colander to remove the seeds.
3. Place the strained raspberries in a pot and stir in the lemon juice, sugar, and butter.
4. Set on the heat to medium and bring to a rolling boil for 10 minutes. Reduce the heat to simmer for 5 minutes before adding the pectin. Allow simmering for another 2 minutes.
5. Turn off the heat to cool.
6. Transfer the jam to sterilized bottles and remove the air bubbles.
7. Close the lid.
8. Bring in a water bath canner and process for 10 minutes.
9. Consume within a year.

Nutrition

- •Calories: 581

- Protein: 1.4 g

- •Carbs: 148 g

- Fat: 0.4 g

- •Sugar: 5.9 g

Marmalades

Strawberry and Blackberry Marmalade

Preparation time: 15 minutes

Cooking time: 5 minutes

Servings: 4-pint jars

Ingredients

- 1 lemon

- 1 ¾ cup fresh strawberries, hulled and crushed

- 1 cup fresh blackberries, crushed

- 1 ½ tsp freshly squeezed lemon juice

- 3 tbsp powdered pectin

- 3 ½ cups sugar

Directions

1. Prepare a hot water bath. Set the jars in it to keep warm. Clean the lids and rings in hot, soapy water, and set them aside.
2. Wash the lemon well with warm, soapy water. With a sharp knife, cut away half of the rind from the lemon, removing as much of the pith (white inner membrane) as possible. Slice the rind into thin strips, and then cut the strips into ¼ inch-long pieces.
3. In a small saucepot set over high heat, combine the lemon rind with enough water to cover. Bring to a boil. Strain and reserve the rind.
4. In a medium saucepot set over high heat, combine the strawberries, blackberries, lemon rind, and lemon juice. Slowly stir in the pectin. Set the mixture to a full, rolling boil.
5. Add the sugar. Return the mixture to a full, rolling boiling over high heat. When the jam cannot be stirred down, set a timer for 1 minute and stir constantly. Turn off the heat.
6. With the heat off, stir the marmalade for 1 minute more to ensure even distribution of the rind before filling the jars. Skim off any foam.
7. Ladle the marmalade into the prepared jars, leaving ¼ inch of headspace. Use a nonmetallic utensil to remove any air bubbles. Clean the rims clean and seal with the lids and rings.
8. Bring the jars into a hot water bath for 10 minutes. Set off

the heat and let the jars rest in the water bath for 10 minutes.

9. Carefully detach the jars from the hot water canner. Set aside for 12 hours.
10. Check the lids for proper seals. Detach the rings, wipe the jars, name and date them, and transfer them to a cupboard or pantry. Refrigerate and use within 3 weeks. Properly secure jars will last in the cupboard for 12 months.

Nutrition

- •Calories: 49

- Fat: 0.2 g

- Carbs: 8.7 g

- Protein: 3.6 g

- Sugars: 4.9 g

Grapefruit Marmalade with Vanilla

Preparation time: 25 minutes

Cooking time: 60 minutes

Servings: 4-pint jars

Ingredients

- 3 grapefruits

- 3 cups sugar

- 1 whole vanilla bean

Directions

1. Prepare a hot water bath. Set the jars in it to keep warm. Clean the lids and rings in hot, soapy water, and set them aside.
2. Wash the grapefruits well with warm, soapy water. With a sharp knife, remove the grapefruit rind. Stack into piles and slice into strips. Mince the strips.
3. In a small saucepan over medium heat, merge the minced rind with enough water to cover. Bring to a simmer. Cook for 20 minutes, or until tender.
4. While the rind cooks, remove any remaining pith from the grapefruit with your hands or a knife. Working on a bowl to catch the juice, slice along the membranes, removing each grapefruit segment individually. Attach the segments to the bowl with the juice. When finished, squeeze the remaining membranes over the bowl to collect any additional juice. Discard the membranes and seeds.
5. Strain the rind, reserving 2 cups of the cooking liquid.
6. In a medium saucepot set over medium-high heat, combine the reserved cooking liquid, sugar, rind, and grapefruit segments in their juices. Bring to a full, rolling boil. Cook for 35–45 minutes until it reaches 220°F (104°C), measured with a candy thermometer.
7. Add the vanilla bean seeds. Turn off the heat. Use the plate test to determine if the marmalade sets. If not, return the pot to the burner and cook in 5-minute increments until it sets to your liking.

8. With the heat off, stir the marmalade for 1 minute to evenly distribute the rind. Skim off any foam.
9. Ladle the marmalade into the prepared jars, leaving $\frac{1}{4}$ inch of headspace. Use a nonmetallic utensil to remove any air bubbles. Wipe the rims clean and seal using the lids and rings.
10. Set the jars in a hot water bath for 10 minutes. Set off the heat and bring the jars to rest in the water bath for 10 minutes.
11. Carefully detach the jars from the hot water canner. Set aside to cool for 12 hours.
12. Check the lids for proper seals. Detach the rings, clean the jars, label and date them, and transfer them to a cupboard or pantry.
13. Use within 3 weeks.

Nutrition

- •Calories 149

- Fat: 0.4 g

- Carbs: 37.7 g

- Protein: 1.3 g

Blueberry Orange Marmalade

Preparation time: 15 minutes

Cooking time: 25 minutes

Servings: 3-pint jars

Ingredients

- ½ cup water

- 1/8 tsp baking soda

- 1 small orange, peeled and chopped

- 1 small lemon, peeled and chopped

- 2 cups blueberries, crushed

- 2½ cups sugar

- •½ (6-oz) package of liquid fruit pectin

Directions

1. In a saucepan or cooking pot, merge the water and baking soda.
2. Boil the mixture; cook for about 10 minutes over low heat. Stir continually to prevent scorching.
3. Add the sugar, berries, lemon, and orange.
4. Boil the mixture; cook for about 5 minutes over medium-low heat. Stir continually to prevent scorching.
5. Mix in the pectin and simmer for about 1 minute over medium-low heat until firm and thick. Stir continually to prevent scorching.
6. Spill the hot mixture into pre-sterilized jars directly or with a jar funnel. Keep headspace of ¼ inch from the jar top.
7. To detach tiny air bubbles, insert a nonmetallic spatula and stir the mixture gently.
8. Clean the sealing edges with a damp cloth. Secure the jars with the lids and adjust the bands/rings to seal and prevent any leakage.
9. Set the jars in a hot water bath for 10 minutes.
10. Set the jars in a cool, dry, and dark place. Allow them to cool down completely.
11. Store in your refrigerator and use within 10 days.

Nutrition

- •Calories: 393

- Fat: 0.1 g

- Carbohydrates: 104.1 g

- • Sugar: 99.8 g

- Protein: 0.4 g

- •Cholesterol: 0 mg

Orange Marmalade

Preparation time: 15 minutes

Cooking time: 15 minutes

Servings: 2-pint jars

Ingredients

- ½ cup water

- 4 medium navel oranges, peeled and cut into small pieces

- •2 cups sugar

Directions

1. Add the orange pieces to a blender or food processor. Blend well.
2. In a deep saucepan, combine the orange mixture, water, and sugar.
3. Set the mixture till the thermometer reads 220°F; cook for about 12–15 minutes over medium heat until firm and thick. Stir continually to prevent scorching.
4. Spill the hot mixture into pre-sterilized jars directly or with a jar funnel. Keep headspace of ¼ inch from the jar top.
5. To detach tiny air bubbles, insert a nonmetallic spatula and stir the mixture gently.
6. Clean the sealing edges with a damp cloth. Secure the jars with the lids and adjust the bands/rings to seal and prevent any leakage.
7. Set the jars in a cool, dry, and dark place. Allow them to cool down completely.
8. Store in your refrigerator and use within 10 days.

Nutrition

- •Carbohydrates: 1 g

- Fat: 0 g

- Protein: 1 g

- Sodium: 727 mg

- •Calories: 4 g

Canned Fruits with Syrups

Canned Oranges

Preparation time: 10 minutes

Cooking time: 15 minutes

Servings: 6

Ingredients

- 3 oranges, peel, remove white pith & divide into segments

- 5 whole cloves

- 2 cups water

- ½ tsp cinnamon

- •1 cup sugar

Directions

1. Add sugar and water to a saucepan. Stir in cinnamon. Bring to boil.
2. Reduce heat and simmer for 5 minutes.
3. Pack orange segments into the clean jars and top with cloves.
4. Pour hot sugar syrup over the orange. Leave ¼-inch headspace. Remove air bubbles.
5. Cover the jars with lids and process in a boiling water bath for 10 minutes.
6. Get the jars from the water bath and let them cool completely.
7. Check seals of jars. Label and store.

Nutrition

- •Cholesterol: 0 mg

- •Calories: 169

- Fat: 0.1 g

- Carbohydrates: 44.3 g

- • Sugar: 41.9 g

- Protein: 0.9 g

Fermented Cranberries

Preparation time: 10 minutes

Cooking time: 10 minutes

Servings: 16

Ingredients

- 3 cups fresh cranberries, slightly crush cranberry skins

- 2 cups honey

- 1 orange juice

- 1 cinnamon stick

- 1 tbsp ginger, sliced

Directions

1. Add cranberries, orange juice, cinnamon stick, and ginger into the jars.
2. Pour enough honey to cover the cranberries.
3. Seal the jar with a lid and shake the jar 2–3 times to coat cranberries in the honey.
4. Loosen the jar lid and place the jar in a dark place to ferment.
5. Every few days tighten the jar lid and give the jar a few shakes. Ferment for at least a few weeks.

Nutrition

- •Cholesterol: 0 mg

- •Calories: 144

- Fat: 0 g

- Carbohydrates: 37.6 g

- • Sugar: 36 g

- •Protein: 0.2 g

Salsa and Sauces

Peach Salsa

Preparation time: 15 minutes

Cooking time: 15 minutes

Servings: 32

Ingredients

- 6 cups peaches; peeled, pitted and chopped

- $\frac{1}{2}$ cup white vinegar

- 1¼ cups onion, chopped finely

- 7 oz red bell pepper, seeded and chopped

- *• ½ cup fresh cilantro, chopped finely*

- 4 jalapeño peppers, seeded and chopped

- 1 garlic clove, minced

- 2 tbsp honey

- 2 tbsp fresh lime juice

- 1½ tsp ground cumin

- • $\frac{1}{2}$ tsp cayenne pepper

Directions

1. In a nonreactive saucepan, add peaches and vinegar and mix well.
2. In the saucepan, add the remaining ingredients and mix well.
3. Place the saucepan of peaches over medium-high heat and cook until boiling.
4. Now set the heat to low and cook, uncovered for about 5–10 minutes, stirring frequently.
5. In 8 ($\frac{1}{2}$ -pint) hot sterilized jars, divide the salsa, leaving about $\frac{1}{2}$ -inch space from the top.
6. Slide a small knife around the insides of each jar to remove air bubbles.
7. Wipe any trace of food off the rims of jars with a clean, moist kitchen towel.
8. Close each jar with a lid and screw on the ring.
9. Arrange the jars in a boiling water canner and process for about 15 minutes.
10. Remove the jars from the water canner and place them onto a wood surface several inches apart to cool completely.
11. After cooling with your finger, press the top of each jar's lid to ensure that the seal is tight.
12. The canned salsa can be stored in the refrigerator for up to 1 month.

Nutrition

- •Cholesterol: 0 mg

- •Calories: 27

- • Total fat: 0.2 g

- Saturated fat: 0 g

- Sodium: 47 mg

- • Total carbs: 6.4 g

- •Fiber 1 g

- • Sugar: 5.3 g

- Protein: 0.6 g

Peppers & Tomato Salsa

Preparation time: 15 minutes

Cooking time: 15 minutes

Servings: 48

Ingredients

- 10 cups tomatoes; peeled, cored, and chopped

- 5 cups onions, chopped

- 5 cups green bell peppers, seeded and chopped

- 2 ½ cups jalapeño peppers, seeded and chopped

- 3 garlic cloves, chopped finely

- 2 tbsp fresh cilantro, chopped finely

- 1 ¼ cup cider vinegar

- 1 tbsp salt

Directions

1. In a nonreactive saucepan, add all ingredients over medium-high heat and cook until boiling, stirring continuously.
2. Now set the heat to low and cook for about 10 minutes, stirring frequently.
3. In 6 (1-pint) hot sterilized jars, divide the salsa, leaving about ½ inch space from the top.
4. Slide a small knife around the insides of each jar to remove air bubbles.
5. Wipe any trace of food off the rims of jars with a clean, moist kitchen towel.
6. Close each jar with a lid and screw on the ring.
7. Arrange the jars in a boiling water canner and process for about 15 minutes.
8. Remove the jars from the water canner and place them onto a wood surface several inches apart to cool completely.
9. After cooling with your finger, press the top of each jar's lid to ensure that the seal is tight.
10. The canned salsa can be stored in the refrigerator for up to 1 month.

Nutrition

- •Cholesterol: 0 mg

- •Calories: 19

- •Total fat: 0.2 g

- Saturated fat: 0 g

- Sodium: 241 mg

- • Total carbs: 3.9 g

- Fiber: 1 g

- • Sugar: 2.3 g

- •Protein: 0.7 g

Pickles

Garlic Dill Pickles

Preparation time: 20 minutes

Cooking time: 15 minutes

Servings: 4 pints

Ingredients

- 3 lb Kirby cucumbers

- 1 ½ cup apple cider vinegar

- 1 tsp red chili flakes

- 2 tsp black peppercorns

- 4 tsp dill seed

- 8 peeled garlic cloves

- 2 tbsp pickling salt

- 1 ½ cup water

Directions

1. Wash and dry cucumbers, cut them into spears.
2. Remove the blossom end of cucumbers. In a saucepan combine vinegar, water, and salt to make brine. Bring to boil over medium-high heat. Equally divide the dill seed, garlic cloves, red chili flakes, and black peppercorns between the jars.
3. Pack cucumbers into the canning jars as tightly as you can without crushing them. Pour the brine over the cucumbers, filling jars to ¼-inch from the top. Tap jars to help remove air bubbles from jars.
4. Wipe the rims of jars and secure the lids in place. Add jars to the canning pot and boil for 15 minutes.
5. Remove jars and place them on a towel on the counter to cool at room temperature. Once jars have cooled place them in the fridge. Let the pickles stay for at least one week before eating.

Nutrition

- •Cholesterol: 0 mg

- •Calories: 5

- Fat: 0 g

- •Carbs: 12 g

- Protein: 0 g

- •Sugar: 10 g

Mustard Pickled Vegetables

Preparation time: 20 minutes

Cooking time: 15 minutes

Servings: 4 pints

Ingredients

- 1 head cauliflower

- •20 small green tomatoes

- 3 green bell peppers

- 4 cups pickling onions

- •24 2-inch pickling cucumbers

- 1 cup sugar

- $\frac{3}{4}$ cup flour

- ½ cup dry mustard

- 1 tbsp turmeric

- 7 cups apple cider vinegar

- 7 cups water

- •1 cup pickling (kosher) salt

Directions

1. Wash cauliflower and break into florets.
2. Wash tomatoes and cut in quarters.
3. Wash peppers, cut in quarters, remove stems, seeds, and ribs.
4. Cut into ½-inch strips.
5. Peel onions.
6. Wash cucumbers, removing stem and blossom ends.
7. Toss vegetables in a large non-reactive bowl or pot with salt.
8. Pour a quart of water over all, and let stand overnight.
9. Drain, cover with boiling water and let stand 10 minutes. Drain.
10. Combine sugar, flour, spices, vinegar, and 3 cups of water.
11. Cook until thick.
12. Add vegetables and continue cooking until vegetables are tender-crisp.
13. Pack into pint jars, dividing liquid evenly, and leaving ½-inch head space.
14. Wipe rims; screw-on lids and rings.
15. Process jars in a boiling water bath for 15 minutes.

Nutrition

- •Cholesterol: 0 mg

- •Calories: 10.1

- Fat: 0 g

- Carbs: 2 g

- •Protein: 0 g

Fruit Butters

Tart Berry Apple Butter

Preparation time: 10 minutes

Cooking time: 2 hours 30 minutes

Servings: 2 jars

Ingredients

- 6 granny Smith apples, chopped and cored

- •1 cup fresh cranberries

- ½ cup water

- 1 cinnamon stick

- •Raw honey, to taste

Directions

1. Combine the apples, cranberries, and water in a crockpot and cook on high for 2–3 hours, stirring occasionally to prevent sticking. Blend the fruit mixture to desired consistency and pass through a sieve, optional, to get rid of the cranberry skins. Return to the crockpot and add the cinnamon stick. Cook uncovered until you get butter that's thick to your desire. Taste to gauge the sweetness and add raw honey, if desired.
2. Scoop into storage jars, cover tightly and refrigerate or process for canning.

Nutrition

- •Cholesterol: 0 mg

- •Calories: 22

- •Total fat: 0 g

- •Carbs: 2.3 g

- •Dietary Fiber: 1.3 g

- Sugars: 3 g

- Protein: 0 g

- Sodium: 1 mg

Silky Blueberry Butter

Preparation time: 10 minutes

Cooking time: 30 minutes

Servings: 1 jar

Ingredients

- 3 granny Smith apples, chopped and cored

- 2 ½ cups fresh blueberries

- 1 cup clear apple juice

- • Zest of 1 orange

- ¾ cup brown sugar

Directions

1. Combine the chopped apples, blueberries, orange zest, and apple juice in a pot and bring to a boil. Lower the heat and simmer for 20 minutes, stirring to ensure it does stick to the bottom until the apples break apart.
2. Blend the cooked fruit until you achieve desired consistency then transfer the puree to a saucepan. Stir in the sugar and keep stirring over medium heat until the sugar dissolves and the butter thickens. It should stick to a spoon. Pour the butter into prepared storage jars, leaving a ¼-inch headspace. Tightly seal the jars and process for canning by dipping them in a hot water bath for 15 minutes.
3. Store in a cool dry place.

Nutrition

- •Cholesterol: 0 mg

- •Calories: 36

- • Total fat: 0 g

- •Carbs: 4.3 g

- •Dietary Fiber: 4 g

- Sugars: 3 g

- Protein: 0 g

- Sodium: 3.1 mg

Chutneys and Relishes

Beetroot Relish

Preparation time: 30 minutes

Cooking time: 50 minutes

Servings: 3-pint jars

Ingredients

- •700 g beetroot

- 1 red onion, finely chopped

- 1 cup CSR jams sugar

- 1 ½ cup white vinegar

- • Pinch salt

- •½ tsp black pepper

Directions

1. Put a pot of water over heat and bring it to a boil.
2. Clean the beets and cut off the leaves or stems. Place the beets in the boiling water for 20 minutes.
3. Remove the beets from the hot water and let cool. Wear gloves and remove the skin from the beets then grate them into a mixing bowl.
4. Add the grated beets and all other ingredients to a pot and heat over low heat until the sugar dissolves.
5. Let the mixture parboil for 30 minutes or until some liquid has evaporated and the mixture has a jam consistency.
6. Pour the relish into sterilized jars and process the jars in boiling water in the pressure canner for 10 minutes.
7. Detach the jars from the canner and let rest cool before storing them in a cool dry place.

Nutrition

- •Calories: 0

- • Total fat: 0 g

- Carbs: 0 g

- Protein: 0 g

- • Sugar: 0 g

- Fiber: 0 g

- Sodium: 0 mg

- Potassium: 0 mg

Spicy Tomato Relish

Preparation time: 5 minutes

Cooking time: 20 minutes

Servings: 3-pint jars

Ingredients

- 6 tomatoes

- 10 g Indian chili powder plus 1 tbsp

- 1 tbsp sugar

- 1 tbsp salt

- 4 tbsp sesame seed oil

Directions

1. Dice the tomatoes and them in a Dutch oven.
2. Add all other ingredients and cook over medium heat for 30 minutes or until the mixture thickens.
3. The oil should be separated from the mixture on the side. Scoop the oil with a spoon and put it in the satirized pint jar.
4. Process the jars in hot water for 10 minutes then cool completely.
5. Store in a cool dry place.

Nutrition

- •Calories: 40

- •Total fat: 3.5 g

- •Carbs: 2 g

- Protein: 0 g

- • Sugar: 2 g

- Fiber: 0.5 g

- Sodium: 150 mg

- •Potassium: 100 mg

Meat Recipes

Pot Roast in a Jar

Preparation time: 10–20 minutes

Cooking time: 50 minutes

Servings: 6

Ingredients

- •2 lb stewing beef, cut into chunks

- 1 cup chopped onions

- 2 tsp dried thyme

- 2 minced garlic cloves

- •2 bay leaves

- 1 cup beef broth

- 1 cup dry red wine

- 2 tsp salt

- 1 tsp black pepper

- 1 cup chopped carrots

- 1 cup diced potatoes

- •½ cup chopped celery

Directions

1. Sterilize the jars in a pressure canner as indicated in the general guidelines of this book. Allow the jars to cool.
2. Place the beef in a pot and add the onions, thyme, garlic, bay leaves, broth, and wine. Season with salt and black pepper.
3. Seal the lid and turn on the heat. Bring to a boil for 10 minutes and allow to simmer for 10 minutes.
4. Add in the vegetables and simmer for another 5 minutes. Turn off the heat.
5. Transfer the mixture to sterilized jars.
6. Remove the air bubbles and close the lid.
7. Place the jars in the pressure canner. Place it in a pressure canner and process for 25 minutes.

Nutrition

- •Cholesterol: 0 mg

- •Calories: 234

- Protein: 34.2 g

- Fat: 6.2 g

- Carbs: 9.3 g

- • Sugar: 0 g

Canned Ground Beef

Preparation time: 10–20 minutes

Cooking time: 35 minutes

Servings: 5

Ingredients

- 2 lb ground beef

- 3 cups water

- •Pickling salt

Directions

1. Sterilize the jars in a pressure canner as indicated in the general guidelines of this book. Allow the jars to cool.
2. Place beef in a skillet and sauté the meat for 10 minutes until browned.
3. Pack the meat loosely in the sterilized jars. Set aside.
4. Boil water in a pan and add ½ tsp canning salt per pint of water. Stir to dissolve the salt.
5. Pour the canning liquid over the beef and leave a 1-inch headspace.
6. Remove the air bubbles and close the lid.
7. Transfer the jars to the pressure canner and process for 25 minutes.

Nutrition

- •Cholesterol: 0 mg

- •Calories: 392

- Protein: 48.3 g

- Fat: 20.2 g

- Carbs: 0.6 g

- •Sugar: 0 g

Seafood Recipes

Canned Oysters

Preparation time: 15 minutes

Cooking time: 1 hour & 10 minutes

Servings: 6 pints

Ingredients

- 5 lb oysters

- • Salt

- •Water

Directions

1. Wash the oysters in clean water, then heat them in an oven at 400°F for 7 minutes to open. Cool them in ice-cold water. Remove the meat, placing it in water containing salt.
2. Drain the meat and pack in the jars, leaving 1-inch headspace. Add ½ tbsp of salt to each half-pint jar and add water to maintain the headspace.
3. Wipe the jar rims, then place the lids and the rings. Can for 75 minutes at 10 pounds. Wait for the pressure canner to depressurize to zero before removing the jars from the canner.
4. Place the jars on a cooling rack undisturbed, then store them in a cool dry place.

Nutrition

- •Calories: 68

- Fat: 3 g

- Carbs: 0 g

- Protein: 7 g

Canned Trout

Preparation time: 15 minutes

Cooking time: 1 hour & 45 minutes

Servings: 8 pints

Ingredients

- 6 whole trout

- 6 tbsp lemon juice (1 tbsp per jar)

- •6 rosemary springs

Directions

1. Place 1 rosemary spring in the trout's cavity. Salt the inside with $\frac{1}{2}$ tsp of salt and close it. Pack jars with trout. Add 1 tbsp of lemon juice to each jar.
2. Process for 1 hour and 45 minutes at 10 pounds of pressure for the weighted gauge of the pressure canner or 11 pounds if the pressure canner has a dial gauge.
3. Remove the jars and let cool until at room temperature.

Nutrition

- •Calories: 110

- Fat: 6.1 g

- Carbs: 0 g

- Protein: 13.9 g

Minced Clams

Preparation time: 15 minutes

Cooking time: 1 hour & 5 minutes

Servings: 8 pints

Ingredients

- •2 lb live clams

- 1 tsp salt in each jar

- •Boiling water

- Citric acid

Directions

4. Scrub the clamshells thoroughly before rinsing and steaming for 5 minutes. Open to remove the meat; reserve the juices.
5. Wash the collected clam meat with a mixture of water and salt (1 tsp per quart). Rinse and place in a pot filled with boiling water (1 gallon) and lemon juice (2 tbsp) or citric acid ($\frac{1}{2}$ tsp).
6. Heat until boiling, and then boil for 2 minutes. Drain before placing in clean and hot Mason jars.
7. Pack the clam meat loosely before adding in the hot clam juice, filling the jars up to one inch from the top.
8. After getting rid of air bubbles, adjust the jar lids. Process in the pressure canner for 1 hour (for pint jars) or 1 hour and 10 minutes (for quart jars).

Nutrition

- •Calories: 104

- Fat: 4.1 g

- Carbs: 16.3 g

- Protein: 1.3 g

Conclusion

Canning and preserving are somewhat of an exact science. Follow the recipes exactly, and you will be fine. The pointers and tips in this book were meant to help you become more of a pro with canning food. I hope you will soon be comfortable and capable with the basic process of canning. You'll even be creating concoctions of your own!

Canning and pickling is quite a fruitful hobby, and a great way to store food in your pantry. You are not only harboring an eco-friendly hobby but avoiding processed food alternatives, which have been preserved with extra chemicals and unnatural means, to begin with. Use the recipes in this book to make more healthy food for your family, and to get started on your canning journey.

Good luck!

Measurement Conversion Tables and Measurement Conversion Chart

Volume Equivalents (Liquid)

US STANDARD	US STANDARD (OUNCES)	METRIC (APPROXIMATE)
2 tbsp	1 fl. oz	30 mL
¼ cup	2 fl. oz	60 mL
½ cup	4 fl. oz	120 mL
1 cup	8 fl. oz	240 mL
1–½ cups	12 fl. oz	355 mL
2 cups or 1 pint	16 fl. oz	475 mL
4 cups or 1 quart	32 fl. oz	1 L
1 gallon	128 fl. oz	4 L

Volume Equivalents (Dry)

US STANDARD	METRIC (APPROXIMATE)
⅛ tsp	0.5 mL
¼ tsp	1 mL
½ tsp	2 mL
¾ tsp	4 mL
1 tsp	5 mL
1 tbsp	15 mL

¼ cup	59 mL
⅓ cup	79 mL
½ cup	118 mL
⅔ cup	156 mL
¾ cup	177 mL
1 cup	235 mL
2 cups or 1 pint	475 mL
3 cups	700 mL
4 cups or 1 quart	1 L

Oven Temperatures

FAHRENHEIT (F)	CELSIUS (C) (APPROXIMATE)
250°	120°
300°	150°
325°	165°
350°	180°
375°	190°
400°	200°
425°	220°
450°	230°

Weight Equivalents

US STANDARD	METRIC (APPROXIMATE)
½ oz	15 g
1 oz	30 g
2 oz	60 g
4 oz	115 g
8 oz	225 g

12 oz	340 g
16 oz or 1 pound	455 g

BOOK 11
PREPPING WITH RICE AND
BEANS

THE MOST COMPLETE
PREPPER'S COOKBOOK
ON HOW TO STOCKPILE RICE
AND BEANS
UP TO 10 YEARS AND BE
TOTALLY PREPARED
FOR ANY DISASTER

Introduction

This book was written primarily with the prepper in mind. It's common to stock up on beans and rice, but if you don't use them on a regular basis, it'll be difficult to know what to do with them in an emergency. These recipes are specifically for that purpose. You can also use them on a daily basis to spice up your meals and learn how to prepare these highly nutritious foods before disaster strikes.

Beans and rice are excellent foods to stockpile because they keep for a long time if properly stored. In the short term, beans will keep for one to two years in their original packaging if bugs or rodents do not get to them. For the best results, use the freshest beans you can find. Beans can also be stored in plastic, glass, or metal containers for short-term storage. Long-term storage, on the other hand, should be done in mylar bags or jars with an oxygen absorber packet, which will help keep the oxygen out and thus keep the beans fresher for longer. Pack them in plastic food-grade buckets or a galvanized metal trash can to prevent rats and other varmints from chewing through the mylar and ruining your stash.

Benefits of Rice and Beans

Beans are probably the least expensive thing to can. Canned beans are extremely convenient to have on hand. For protein and a low-cost meal, toss a can of beans into soup, stew, or fajitas. Canned beans aren't always cheap at the store. You can store all types of beans for less than \$1 per pound if you buy them in bulk when they are on sale and then pressure can them. The three dishes below demonstrate the variety of dishes you can make with canned beans.

Beans are an excellent addition to your regular meal preparation. Aside from the health benefits, beans can be made into a variety of dishes for very little money.

If you use canned beans, they are simple to prepare. Simply heat for a few minutes, add a few more ingredients, and you're ready to serve a flavorful meal.

You can also use the beans to replace meat in your recipes. This way, you save money on food and are probably healthier as well.

What's the best part about beans? They are, however, very affordable. Simply cook a large batch of dried beans, freeze them, and use them as needed in your dish.

When you cook with beans, whether canned or dried, you are sure to save a lot of money on your food budget.

One of the most significant advantages of stockpiling beans and rice is the ability to plan for both short-term and long-term needs. There are numerous events that may make going to the grocery store difficult or impossible, and even if your area is not experiencing an emergency, it is critical to remember that food shortages can occur anywhere, at any time. Most grocery stores only have enough food to last three days, if that, to meet the needs of their community.

A pantry of rice and beans ensures food safety for you and your family. If you lose your job, lose a working spouse, become ill, have erratic income, or only work seasonally, this is critical. You won't have to worry about feeding your family if you have extra food on hand, which can relieve a lot of stress during difficult times.

When done correctly, food preservation helps to retain the quality and nutritional value of the foods you buy while also allowing you to get the most bang for your buck by preventing food from spoiling. Furthermore, proper food storage can help prevent foodborne illness and bacterial infections, which are the leading causes of illness. Fresh, perishable items should be used as soon as possible after they are manufactured or purchased. The rancid smell and taste of lipids caused by oxidation, slime on the surface of meat, and the fermentation of fruit juices caused by yeast development are all signs of rotting that make food unappealing but do not pose a pathogenic risk. Even if the food is bland, off-odors or a sour taste can indicate serious bacterial decomposition. Some foods, on the other hand, can have a high bacteria count despite the absence of such signs.

Beans and lentils are thought to be the best vegetarian protein sources. They are also high in quality carbohydrates and a variety of vitamins and minerals. It's no surprise that they're dubbed the "ultimate superfood."

You can reap numerous health benefits by incorporating beans into your diet. Here are a few examples.

Do you have any heart problems? Beans are high in iron, magnesium, and folate, which will keep your ticker in top shape.

Beans can also help you lose weight since these are packed with fiber

that will keep you feeling fuller longer. Say goodbye to all those extra pounds, and say hello to a slimmer you.

Legumes are packed with additional vitamins and minerals like vitamin B6 and Zinc. These nutrients can help fight off muscle and memory degeneration. They also contribute to healthy tissue repair.

Why rice and beans are the best survival food

Consider how convenient it would be to have your family's food pantry stocked with pinto beans, black beans, chick peas, navy beans, cannelloni, kidney beans, and large dried limas. I imagine your well-stocked pantry bursting at the seams with jars full of healthful beans of all different colors, shapes, and sizes to assist you in times of disaster.

Beans And rice are essential components of food storage, but unlike most other items, beans have only one primary use. Yes, you can grind them into flour and use them as thickeners, but the main reason you'll use beans is as a dried staple containing both carbohydrates and proteins.

Once you've stocked your shelves with plain and fancy beans and rice, you'll want some ideas for how to use them in recipes. A few recipes for using the beans are also included. These are some of my favorite ethnic-inspired recipes. It is my hope that by using these recipes, you will be inspired to use the beans in your own recipes.

Remember that scientific studies have shown that a bean-rich diet helps prevent cancer, heart disease, stroke, obesity, and promotes good intestinal health. Is it any surprise that health professionals (including myself) recommend that people consume at least three cups of cooked beans per week?

Beans come in a variety of shapes, sizes, and colors, but when it comes to nutritional benefits, they are remarkably similar. So, whether you eat pinto beans, cranberry beans, lentils, baby limas, black beans, white beans, chick peas, or cute little black-eyed peas, you and your family will be supplying your bodies with the twelve essential nutrients found in beans.

Beans have been linked to the prevention of colon cancer and other cancers, as well as heart disease, high cholesterol, and poor digestive health. Beans are high in vitamins and minerals, which are linked to

increased energy and vitality. Beans are also excellent for controlling blood sugar levels.

Beans are high in fiber and protein. They will satisfy you and slow your digestion, preventing you from feeling deprived while on a restricted diet.

Beans can be eaten for breakfast on toast, for lunch on a baked potato, as an appetizer like hummus, for dinner in a cassoulet, or as a snack like falafel. Beans are a tasty staple in a variety of ethnic cuisines, including Cajun, Mexican, Italian, French, American, North African, Caribbean, and many others.

Beans can be dried and stored for years, taking up very little space for this high protein source. Home canned beans can also be stored for years, providing a quick side dish, soup, or main dish that is ready to heat and eat right from your pantry.

Having emergency food supplies on hand is becoming increasingly important over time.

A half-cup serving of cooked beans contains the following essential nutrients:

The bean's main dietary contribution is protein. Beans are a great meat substitute because they lack the fat found in meat.

Calcium is good for bone health, which is especially important for growing children and adolescents. Calcium also prevents bone density loss in the elderly.

Manganese also aids in bone formation and bone health maintenance.

Magnesium is the third essential mineral for the formation and maintenance of strong bones. Magnesium also aids in the regulation of blood sugar and metabolism. Carbohydrates aid in the maintenance of youthful energy levels and play an important role in feeling satisfied after eating a meal. This is critical in helping to maintain a healthy weight. Fiber is essential for digestive health, weight maintenance, cholesterol reduction, and blood sugar regulation.

Copper aids in the fight against free radicals, which are linked to cancers caused by cell damage.

Folate has been linked to a reduction in birth defects as well as a reduction in the cognitive decline that can occur with age. If it weren't for all the other great reasons, that one alone would have me eating beans every day.

Iron in the body is responsible for transporting oxygen through the

bloodstream. Iron is especially important for children and pregnant women. Did you know that beans contain three times as much iron as meat, according to the US Department of Agriculture?

Selenium regulates the thyroid, boosts the immune system, and decreases inflammation.

When it comes to supercharging the immune system, zinc is also a powerful player in the body.

Potassium helps to control high blood pressure and avoid muscle cramps.

Beans are low acid food and in order to safely can them you must use a pressure canner. For legumes, it is dangerous to use any other type of canning process.

CHAPTER 1

BREAKFAST RECIPES

Breakfast Bean Burrito

Preparation Time: 5 Minutes

Cooking Time: 15 Minutes

Servings: 4

Ingredients

- 1 can black beans, drained
- 6 eggs, whisked
- 1 small red pepper, chopped
- 1 small green pepper, chopped
- 1 onion, chopped
- 2 cups shredded cheddar cheese
- Large flour tortillas
- Tomato salsa

Directions

1. In a heated pan, cook onion, red pepper, and green pepper until soft. Add black beans.
2. Add eggs in vegetables. If you want your eggs soft and creamy, then feel free to add a bit of

butter into the filling.

3. Toast the tortilla and sprinkle shredded cheese on top.
4. When the cheese melts, spread egg in the center of the tortilla.
5. Fold the burrito and serve with tomato salsa.

Nutrition: Calories 399, Fat 15.5 g, Sodium 537 mg, Carbohydrates 27.9 g, Protein 34.6 g

Baked Beans on Toast

Preparation Time: 8 Minutes

Cooking Time: 40 Minutes

Servings: 4

Ingredients

- 1 can baked beans, brand of your choice
- 4 slices toast, buttered
- Salt and pepper
- Malt vinegar

Directions

1. Open a can of baked beans and heat in a pan.
2. Spread beans on buttered toast.
3. Season with salt and pepper to taste.
4. Drizzle a bit of malt vinegar on the beans before serving.

Nutrition: Calories 361, Fat 10.1 g, Sodium 502 mg, Carbohydrates 35.8 g, Protein 31.6 g

Ful Medammes

Preparation Time: 8 Minutes

Cooking Time: 40 Minutes

Servings: 4

Ingredients

- 2 cups fava beans, soaked overnight
- 4 cloves garlic, crushed
- 1/3 cup parsley, chopped
- 3 lemons, quartered
- Extra virgin olive oil
- Chilli flakes
- Cumin
- Any flat bread of your choice
- Salt and pepper

Directions

1. Cook beans in unsalted water until tender.
2. Mash beans and add garlic, cumin, and chili flakes into the mix.

3. Season with salt and pepper to taste.
4. Drizzle extra virgin olive oil before serving with flat bread.
5. Garnish with quartered lemon and chopped parsley.

Nutrition: Calories 316, Fat 20.3 g, Sodium 1039 mg, Carbohydrates 4 g, Protein 23.5 g

Moroccan Broad Bean Breakfast Soup

Preparation Time: 8 Minutes

Cooking Time: 35 Minutes

Servings: 4

Ingredients

- 2 cups fava beans, soaked overnight
- 2 cloves garlic, crushed
- 4 cups water
- Extra virgin olive oil
- Cumin
- Paprika
- Sea salt

Directions

1. Cook soaked beans with crushed garlic in water until tender. Set aside the cooking water.
2. Transfer the beans in a food processor and add extra virgin olive oil, cumin, and salt. Puree

until you get a smooth creamy texture.

3. In a cooking pot, cook bean puree with cooking water that was set aside earlier. Add more water if you want to have a thinner soup.
4. Garnish with paprika and sea salt before serving.

Nutrition: Calories 229, Fat 8.3 g, Sodium 286 mg, Carbohydrates 3.7 g, Protein 23.3 g

Scrambled Eggs with Pinto Beans and Salsa

Preparation Time: 8 Minutes

Cooking Time: 40 Minutes

Servings: 4

Ingredients

- 2 cups pinto beans, drained
- 4 large eggs, whisked
- 1 small green bell pepper, chopped
- 4 tablespoons sour cream
- Tomato salsa

Directions

1. Sauté green bell pepper and pinto beans in pan.
2. Add sour cream to whisked eggs and mix.
3. Cook the egg mixture with the vegetables.
4. Serve scrambled eggs hot with tomato salsa.

Nutrition: Calories 199, Fat 8.8 g, Sodium 555 mg, Carbohydrates 19.8 g, Protein 16.5 g

Breakfast Beans and Chorizo

Preparation Time: 8 Minutes

Cooking Time: 50 Minutes

Servings: 4

Ingredients

- 1 can red kidney beans, drained
- 1 can cannellini beans, drained
- 1 jar tomato pasta sauce, brand of your choice
- 250 grams, chorizo sausage, sliced thinly
- 4 large eggs
- 2 garlic cloves, crushed
- 1 red onion, chopped
- Ground cumin
- Lime juice
- Brown sugar

Directions

1. Cook beans, garlic, onion and chorizo in pasta sauce.

2. Season with cumin, lime juice, and sugar once sauce has simmered.
3. Break eggs on top of the sauce and allow the eggs to cook sunny side up.

Nutrition: Calories 353, Fat 17.6 g, Sodium 501 mg, Carbohydrates 29.9 g, Protein 19.7 g

Black Bean Rice Bowl

Preparation Time: 8 Minutes

Cooking Time: 40 Minutes

Servings: 4

Ingredients

- 1 can black beans, drained
- 3 cups brown rice, cooked
- 1 small green onion, chopped
- 1 cup romaine lettuce, chopped
- 1 small jalapeno pepper, seeded and sliced
- Handful of fresh cilantro, chopped
- Juice of 1 small lime
- Sea salt

Directions

1. Mix beans, green onion, romaine lettuce, jalapeno pepper, fresh cilantro and lime juice in a bowl.
2. Top brown rice with vegetable mixture.

3. Season with salt to taste before serving.

Nutrition: Calories: 216.2, Carbs: 4.1g, Protein: 35.1g, Fats: 6.6g, Sodium: 332mg

CHAPTER 2

LUNCH RECIPES

White Beans

Preparation Time: 8 Minutes

Cooking Time: 35 minutes

Servings: 28

Ingredients

- 3¹/₄ pounds dried white beans, soaked for 18 hours and drained
- 4¹/₂ tsps salt

Directions

1. In a Dutch oven, add beans and enough water to cover over high heat and cook until boiling. Adjust the heat to low then cook for about 30 minutes.
2. Drain the beans, reserving cooking liquid. In 7 (1-pint) hot sterilized jars, divide the beans and sprinkle with salt.
3. Fill each jar with hot cooking liquid, leaving 1-inch space from the top. Run your knife around

the insides of each jar to remove any air bubbles.

4. Clean any trace of food off the rims of jars with a clean, moist kitchen towel. Close each jar with a lid and screw on the ring.
5. Carefully place the jars in the pressure canner and process at 10 pounds pressure for about 75 minutes.
6. Remove the jars from pressure canner and place onto a wood surface several inches apart to cool completely.
7. After cooling with your finger, press the top of each jar's lid to ensure that the seal is tight.
Store these canning jars in a cool, dark place.

Nutrition: Calories: 139.8; Fat: 0.4g; Carbs: 3.1g; Protein: 11.8g

Chickpeas

Preparation Time: 8 Minutes

Cooking Time: 35 minutes

Servings: 8

Ingredients

- 1-pound dried chickpeas, soaked for 18 hours and drained
- 1 tsp salt

Directions

1. In a Dutch oven, add chickpeas and enough water to cover over high heat and cook until boiling. Adjust the heat to low then cook for about 30 minutes.
2. Drain the chickpeas, reserving cooking liquid. In 2 (1-pint) hot sterilized jars, divide the chickpeas and sprinkle with salt.
3. Fill each jar with hot cooking liquid, leaving 1-inch space from the top. Run your knife around

the insides of each jar to remove any air bubbles.

4. Clean any trace of food off the rims of jars with a clean, moist kitchen towel. Close each jar with a lid and screw on the ring.
 5. Carefully place the jars in the pressure canner and process at 10 pounds pressure for about 90 minutes.
 6. Remove the jars from pressure canner and place onto a wood surface several inches apart to cool completely.
 7. After cooling with your finger, press the top of each jar's lid to ensure that the seal is tight.
- Store these canning jars in a cool, dark place.

Nutrition: Calories: 177.9; Fat: 3.1g; Carbs: 33.7g; Protein: 11.4g

Thai-Style Beans and Rice with Coconut Milk

Preparation Time: 7 Minutes

Cooking Time: 33 Minutes

Servings: 4-6

Ingredients

- 1 ½ cups Canned Red Kidney Beans, drained and rinsed
- 1 ¾ cups Canned Diced Tomatoes, undrained
- 1 ½ cups Unsweetened Coconut Milk
- 2 – 2 ½ cups Basmati Rice
- 1 small Red Bell Pepper, seeded and chopped
- 1 medium Onion, chopped
- 2 tbsps Fresh Minced Garlic
- 1-2 tbsps Red Curry Paste
- 3 tbsps Vegetable Oil
- 1-2 tbsps Sugar
- 2 tbsps Fresh Lime Juice
- Salt to taste
- Black Pepper to taste

- Chopped Green Onion, for garnish

Directions

1. Bring to the boil a pot filled with water. Add the rice, reduce the heat and simmer until the rice is tender.
2. In the meantime, heat the oil in a Dutch oven over medium-high heat. Add the bell pepper and onions and sauté for about 5 minutes. Two minutes before the onions are done, stir in the garlic. Add the red curry paste and cook for 1 more minute.
3. Pour in the coconut milk and lime juice, add the kidney beans, sugar and diced tomatoes. When it starts boiling, reduce the heat and let it simmer for 35 minutes.
4. When done season with salt and pepper.
5. Serve immediately over hot rice and sprinkle with chopped green onion.

Nutrition: Calories: 340,, Fat: 5 g,, Carbs: 8 g,, Protein: 14 g,,

Sugars: 2.1 g,, Sodium: 200 mg

Tofu and Rice and Lentils Curry

Preparation Time: 7 Minutes

Cooking Time: 43 Minutes

Servings: 4

Ingredients

- ½ cup Split Red Lentils
- 1 cup Chopped Green Beans, topped
- 10 oz Firm Tofu, chopped
- 1/3 cup Chopped Fresh Coriander
- 1 cup Basmati Rice
- 1 medium Brown Onion, chopped
- 2 ½ cups Vegetable Stock
- 11 oz Cauliflower, cut into florets
- 2 medium Carrots, peeled and sliced
- 10-inch piece Ginger, peeled and finely chopped
- 1 large Fresh Chili, halved, deseeded, chopped
- 2 tsps Garam Masala
- 1 tsp Ground Turmeric
- Salt to taste
- Pepper to taste

Directions

1. Bring to the boil a saucepan filled with water. Reduce the heat, add the rice and cook until tender.
2. In a large saucepan, heat the oil over medium heat. Add the onion and sauté for 5 minutes. When the onion is soft, add the ginger, garam masala and turmeric and cook for 1 minute, stirring.
3. Pour in the vegetable stock, add the cauliflower, lentils, chili and carrots. Bring to the boil, reduce the heat to medium-low and simmer, covered for about 15 minutes. Add the beans and tofu and cook for 10 more minutes.
4. When the vegetables are done, season with salt and pepper and gently stir the coriander.
5. Serve immediately with hot rice.

Nutrition: Calories: 240,, Fat: 8 g,, Carbs: 13 g,, Protein: 24 g,, Sugars: 0 g,, Sodium: 433 mg

Pinto Beans Chili

Preparation Time: 15 minutes

Cooking Time: 40 minutes

Servings: 18

Ingredients

- 2 pounds dry pinto beans, rinsed and drained
- 3–4 bay leaves
- Salt, as needed
- 1 tbsp olive oil
- 2 onions, chopped
- 2 (28-ounce) cans petite diced tomatoes
- 1 (15-ounce) can tomato sauce
- 2 cups beef broth
- 3 tsps chili powder
- 2 tsps ground cumin
- 2 tsps garlic powder
- 1 tsp dried oregano
- 1 tsp dried thyme
- Ground black pepper, as needed

Directions

1. In a large stockpot of water, add beans, bay leaves, 1 tablespoon of salt over high heat and cook until boiling. Reduce the heat to low and cook for about 30–35 minutes.
2. Meanwhile, heat oil in a frying pan over medium heat and sauté the onion for about 4–5 minutes. Drain the beans and return to the same pot.
3. In the pot of beans, add the cooked onion and remaining ingredients and stir to combine. Put the pan over high heat and bring to a boil.
4. In 9 (1-pint) hot sterilized jars, divide the chili, leaving 1-inch space from the top. Run your knife around the insides of each jar to remove any air bubbles.
5. Clean any trace of food off the rims of jars with a clean, moist kitchen towel. Close each jar with a lid and screw on the ring.

6. Carefully place the jars in the pressure canner and process at 10 pounds pressure for about 90 minutes.
7. Remove the jars from pressure canner and place onto a wood surface several inches apart to cool completely.
8. After cooling with your finger, press the top of each jar's lid to ensure that the seal is tight.
Store these canning jars in a cool, dark place.

Nutrition: Calories: 219.9; Fat: 1.8g; Carbs: 38.3g; Protein: 13.1g

Kidney Beans Chili

Preparation Time: 15 minutes

Cooking Time: 40 minutes

Servings: 18

Ingredients

- 3 cups dried red kidney beans, soaked overnight and drained
- 1 tbsp salt
- 2 cups onion, chopped
- 1 cup sweet bell pepper, seeded chopped
- 6 garlic cloves, minced
- ¼ cup fresh parsley, minced
- 8 cups tomato juice
- ½ cup tomato paste
- 3 tbsps red chili powder
- 1 tsp ground black pepper
- 2 tsps dried thyme
- 2 tsps ground cumin

Directions

1. In a Dutch oven, add beans and enough water to cover over high heat and cook until boiling. Reduce the heat to low and cook for about 30 minutes. Drain the beans well.
2. For sauce: In a saucepan, add remaining ingredients over medium heat and cook until boiling. Stir in the cooked beans and cook until boiling.
3. In 9 (1-pint) hot sterilized jars, divide the beans. Fill each jar with hot sauce mixture, leaving 1-inch space from the top.
4. Run your knife around the insides of each jar to remove any air bubbles. Wipe any trace of food off the rims of jars with a clean, moist kitchen towel.
5. Close each jar with a lid and screw on the ring. Carefully place the jars in the pressure canner and process at 10 pounds pressure for about 75 minutes.

6. Remove the jars from pressure canner and place onto a wood surface several inches apart to cool completely.
7. After cooling with your finger, press the top of each jar's lid to ensure that the seal is tight.
Store these canning jars in a cool, dark place.

Nutrition: Calories: 137.9; Fat: 0.4g; Carbs: 26.8g; Protein: 8.4g

CHAPTER 3

DINNER RECIPES

Asian Risotto

Preparation Time: 7 Minutes

Cooking Time: 33 Minutes

Servings: 4

Ingredients

- 1/2 cups Snake Beans or thinly sliced Green Beans
- 1 1/2 cups Arborio Risotto Rice
- 3.5 oz Fresh Shiitake Mushrooms (optional)
- 1 bunch Coriander, leaves and stalks separated, roughly chopped, divided
- 2 cloves of Garlic, chopped, divided
- 1 Onion, sliced,
- 1 Red Chili, deseeded, finely chopped,
- 1 stem Lemongrass, only white parts, finely chopped,
- 1 Red Capsicum, deseeded, finely sliced,
- 1 cup White Wine
- 3 1/2 cups Vegetable Stock
- 2 1/2 tbsps Vegetable Oil, divided

- 2 tbsps Ketjap Manis
- 1 tbsp Grated Fresh Ginger,
- Juice of 1 Lime
- ½ cup Mixed Asian Herbs (Vietnamese Mint, Thai Basil)

Directions

1. In a deep frying pan, heat 1 ½ tbsps of oil and add the onion, ginger and a clove of garlic, chili, lemongrass, coriander stalks, and capsicum. Cook for about 1-2 minutes over medium heat. Stir in the rice, reduce the heat and cook for one more minute.
2. Pour in the white wine and cook until the liquid has evaporated. Gradually pour in the vegetable stock, stirring continuously. Cook until the liquid has been absorbed and rice tender.
3. Stir in the beans and cook for 2 more minutes. Remove from the heat, cover loosely and set aside.

4. Heat the remaining oil in a frying pan, add the remaining garlic and shiitake mushrooms and cook over high heat for about 2 minutes, until the shiitake begin to soften. Set aside.
5. Add the ketjap manis, coriander leaves, lime juice and herbs to the rice and stir well to combine.
6. Serve warm into bowls garnished with sautéed shiitake.

Nutrition: Calories: 200, Fat: 13 g, Carbs: 98 g, Protein: 19 g, Sodium: 217 mg

Classic Bean Pasta

Preparation Time: 7 Minutes

Cooking Time: 33 Minutes

Servings: 4

Ingredients

- 1 can cannellini beans, drained
- 250 grams penne pasta, cooked
- 2 cloves garlic, minced
- 1 teaspoon chili flakes
- 1 teaspoon dried oregano
- 2 tablespoons olive oil
- 4 medium sized tomatoes
- 1 small broccoli, chopped
- ½ cup freshly grated parmesan cheese

Directions

1. Sauté garlic, chili, and oregano in oil.
2. Add tomatoes, beans, and broccoli. Bring to a boil and simmer for 5 minutes.

3. Pour over penne pasta and top with parmesan cheese before serving.

Nutrition: Calories: 202, Fat: 12 g, Carbs: 75 g, Protein: 20 g

Arabic Rice and Beans

Preparation Time: 7 Minutes

Cooking Time: 36 Minutes

Servings: 4-6

Ingredients

- 1/3 cup Basmati Rice
- 1 cup Lentils
- 1/4 cup Olive or Vegetable Oil
- 4 cups Water
- 2 large Onions, sliced
- 1 tsp Cumin
- 1/2 tsp Black Pepper
- Salt to taste

Directions

1. Heat the oil in a skillet over medium heat; add the onions and sauté, stirring occasionally, until the onions are golden brown.

2. In another saucepan, add the water, lentils pepper and salt and cook for about 20 minutes, or until the lentils are tender. Stir in the uncooked rice, cumin and the onions (prepared in step 1), mix well, cover the pan and simmer for 15 more minutes. The dish is done when the rice is tender and the liquid absorbed.
3. Serve warm.

Nutrition: Calories: 237, Fat: 10 g, Carbs: 32 g, Protein: 11 g, Sodium: 500 mg

Italian Brown Rice and Beans

Preparation Time: 7 Minutes

Cooking Time: 23 Minutes

Servings: 4

Ingredients

- ½ cup Wild Rice
- ½ cup Long-Grain Brown Rice
- 2 ½ cups Water
- 5 cups Broccoli Florets, coarsely chopped (4 bunches)
- 4 cups Cauliflower Florets, coarsely chopped (1 head)
- 1 ½ cups Canned Green Beans, drained
- 3 cups Canned Diced Tomatoes, undrained
- 4 cloves of Garlic, minced
- 3 tbsps Olive Oil, divided
- 2 tbsps Dried Basil, divided
- 2 tbsps Dried Oregano, divided
- 2 tsps Ground Black Pepper
- Salt to taste

Directions

1. In a small pot, heat 1 tbsp of olive oil over medium heat. Add the rice and 1 tbsp of basil and oregano. Cook for 1 minute and pour in the water and bring to the boil. Reduce the heat, cover the pot and simmer for 30-45 minutes, until the rice is tender.
2. Pour the rest of the oil in a large, deep pan. When heated, add the garlic and cook, stirring frequently until fragrant. Add the cauliflower and broccoli florets. Toss and cook until they soften.
3. Pour in the tomatoes, the remaining basil and oregano and season with salt and pepper. Toss and cover loosely to let some steam out. Uncover frequently to stir. Cook for about 15 minutes, until the vegetables are fork-tender.
4. Add the green beans, stir well to combine. Reduce the heat to low, loosely cover and cook until the rice in another pot is done.

5. Serve a few small spoonfuls of rice on a plate and top with lots of vegetables.

Nutrition: Calories: 143, Protein: 102g, Carbohydrates: 66g, Fat: 18g, Sodium: 97mg

Jamaican Beans and Rice

Preparation Time: 5 Minutes

Cooking Time: 22 Minutes

Servings: 10

Ingredients

- 1 ½ cups Canned Red Kidney Beans, rinsed and drained
- ¼ cup Minced Onion
- 2 cups Long-Grain Rice
- 2 ¼ cups Water
- 1 ¾ cups Coconut Milk
- 1 Scallion, chopped
- 1 clove of Garlic, crushed
- 1 sprig Fresh Thyme
- 1 tsp Coconut Oil
- 1 whole Scotch Bonnet Hot Pepper, not chopped
- Salt to taste
- Ground Pepper to taste

Directions

1. Heat the olive oil in a medium-size saucepan over medium heat. Add the scallion, onion, garlic and thyme. Sauté for a few minutes, until the onions are translucent and lightly browned.
2. Stir in the rice and beans. Pour in the coconut milk and water and season with salt and pepper. Add the whole scotch bonnet pepper, stir to combine and bring to the boil.
3. When it starts boiling, remove the pepper and cook until the rice is tender and almost all the liquid has been absorbed.
4. Cover the saucepan, reduce the heat and let it simmer for about 25 minutes. Remove the saucepan from the heat and let it rest covered for 10 minutes, so that the steam will finish cooking the rice.
5. Serve hot.

Nutrition: Calories: 166, Protein: 106g, Carbohydrates: 52g, Sugars: 0.1g, Fat: 17g, Sodium: 108mg

Lime Rice and Avocado Black Beans

Preparation Time: 7 Minutes

Cooking Time: 33 Minutes

Servings: 4

Ingredients

- 3 cups Canned Black Beans, drained and rinsed
- 1 cup Vegetable Broth
- 1 ½ cups Water
- 2 cloves of Garlic, minced
- ½ small Onion, minced
- 1 tbsp Extra-Virgin Olive Oil
- ¼ tsp Cumin
- 2 tsps Chili Powder
- Salt to taste
- Pepper to taste
- 1 Avocado, peeled and sliced
- For the Lime Rice: 3 cups Water
- 1 cup Long-Grain White Rice
- 3 tsps Chopped Cilantro

- ½ tsp Salt
- 1 tbsp Canola Oil
- Juice of ½ Lime

Directions

1. Heat the oil in a large pot over medium heat.
Add the onion, season with pepper and salt and sauté for about 10 minutes, until soft. Add the minced garlic and sauté for about 30 seconds, stirring continuously. Add the cumin and chili powder and sauté for 30 seconds.
2. Add the drained beans, pour in the water and vegetable broth and bring to the boil. Turn the heat down and let the soup simmer for 15 minutes.
3. Scoop 2 ladles of soup into a food processor or blender and blend until the mixture becomes smooth. Return the mixture to the pot and stir well.
4. To prepare the Lime Rice:

5. In a saucepan, pour the water, oil and salt and bring to the boil. Add the rice, turn the heat down, cover the pot and let it simmer for about 15 minutes, until the rice gets tender. Fluff the rice with a fork and add the chopped cilantro and lime juice. Stir well.
6. When serving, divide the hot rice into bowls and top with the hot beans and avocado slices.

Nutrition: Calories: 140, Protein: 34g, Carbohydrates: 52g, Fat: 17g, Sodium: 118mg

Pressure Canned Baked Beans

Preparation Time: 25 minutes

Cooking Time: 8 Minutes

Servings: 3 jars

Ingredients

- 1 lb. navy beans, dried
- 1 cup onions, finely chopped
- 6 tbsp. tomato paste
- 1 ½ tbsp. Worcestershire sauce
- 1 ½ tbsp. mustard powder
- 1 ½ tbsp. salt
- ½ tbsp. black pepper, ground
- 3 tbsp. brown sugar
- 1 tbsp. kitchen Bouquet
- 2 bay leaves
- 24 oz. bean liquid

Directions

1. Put beans in a pot and add 6 cups of water. Boil the beans for 2 minutes then remove the pot from heat. Let rest for 1 hour while covered.
2. Make the sauce by mixing all other ingredients except the bean liquid and bay leaves in a jug. Set aside.
3. Drain navy beans and discard the soaking water.
4. Add bay leaves to the pot and cover with 2-5cm water. Drain the water and preserve it then remove the bay leaves and discard them.
5. Take 3 cups of the reserved water and add it to the sauce in the jug. Cover jug and place it in microwave for 5 minutes. Remove from the microwave and set aside.
6. Pack the beans in jars leaving a headspace of 3 cm per jar, and then ladle the sauce over the beans maintaining the 3 cm headspace.
7. If you run out of the sauce, add the reserved bean stock to the jars.

8. Remove the bubbles, wipe the rims, and put on the lids. Place the jars in the pressure canner.
9. Process jars at 10 pounds of pressure for 65 minutes. Remove jars from canner and place on a rack to cool.

Nutrition: Cholesterol 0 mg Calories 119, Total fat 0.5 g, Saturated fat 0 g, Total carbs 27 g, Net carbs 22 g Protein 6 g, Sugars 0 g, Fiber 5 g

Mediterranean Beans and Rice

Preparation Time: 7 Minutes

Cooking Time: 43 Minutes

Servings: 2-4

Ingredients

- 1 cup Dry Brown Rice
- 1 ½ cups Canned Great Northern White Beans, drained and rinsed
- 1 clove of Garlic, minced
- 1 Onion, chopped
- 1 tbsp Vegetable Oil
- ¼ cup Canned Black Olives
- 2 stalks Celery, chopped
- 1/3 cup Fresh Chopped Parsley
- Juice of 1 Lemon
- 2 tsps Dry Dill Weed

Directions

1. Cook the rice following the package Directions.
2. Heat the oil in a large pan over medium-high heat. Add the onion and sauté for 5 minutes. Add the garlic and cook for 5 more minutes. Add the beans and cook until heated through. Stir in the olives and celery and fry for a few more minutes, until the celery and olives are softened. Add the parsley and lemon juice and mix well.
3. When the rice is done, stir in the dill. Season with salt and pepper. Add the cooked rice to the bean mixture and mix well.
4. Serve immediately. Serve with some pita breads.

Nutrition: Calories: 110, Protein: 30g, Carbohydrates: 32g, Sugars: 0.1g, Fat: 18g, Sodium: 121mg

Cranberry Beans

Preparation Time: 5 Minutes

Cooking Time: 60 Minutes

Servings: 4

Ingredients

- 2 lbs. shelled cranberry beans
- 3 chopped garlic cloves
- $\frac{3}{4}$ cup white wine
- 4 tablespoons lemon juice
- 6 tablespoons olive oil
- 6 teaspoons fresh marjoram
- $\frac{1}{2}$ teaspoon black pepper
- $\frac{3}{4}$ teaspoon salt
- 2 cups chicken stock

Directions

1. Prepare the canning jars following the Directions: in chapter three.

2. In a large container, combine the beans with all ingredients except the chicken stock.
3. Pack beans into each canning jar and add chicken broth. Remember to leave a one-inch headspace. Use a spatula to remove air bubbles, then use a clean cloth to wipe jar rims. After that, adjust lids and screw band.
4. Set your filled jars in the pressure canner at 11 pounds for dial-gauge or 10 pounds for the weighted canner. Process heat jars for 60 minutes, adjusting for altitude. Switch off the heat and let the pressure drop naturally. Remove the lid and allow the jars to cool in the canner for 5 minutes. Take out the jars and cool further. Inspect lid seals after 24 hours.

Nutrition: Calories: 146, Carbs: 8g, Fat: 7g, Protein: 15g, Sodium: 320 mg

CHAPTER 4

SNACK RECIPES

Crispy Chickpeas

Preparation Time: 7 Minutes

Cooking Time: 55 Minutes

Servings: 4

Ingredients

- 1 can chickpeas, drained
- 4 tablespoons olive oil
- Salt
- Seasoning of your choice

Directions

1. Dry beans completely and lay them out on a baking sheet.
2. Drizzle olive oil and salt on beans. Make sure all beans are covered in oil.
3. Bake for 30 minutes at 400F until golden brown and crunchy.
4. Toss in seasoning before serving.

Nutrition: Calories: 200, Fat: 13 g, Carbs: 98 g, Protein: 19 g,

Sodium: 217 mg

Spicy Chickpeas

Preparation Time: 7 Minutes

Cooking Time: 43 Minutes

Servings: 4

Ingredients

- 1 can chickpeas, drained
- 4 tablespoons olive oil
- 1 teaspoon cumin
- 1 teaspoon chili powder
- 1 teaspoon cayenne pepper
- 1/2 teaspoon sea salt

Directions

1. Dry beans completely and lay them out on a baking sheet.
2. Drizzle olive oil and spices on beans. Make sure all beans are covered in oil.
3. Bake for 30 minutes at 400F until golden brown and crunchy.

4. Season with salt before serving.

Nutrition: Calories: 325, Fat: 5 g, Carbs: 15 g, Protein: 14 g,
Sodium: 950 mg

White Bean Dip

Preparation Time: 7 Minutes

Cooking Time: 33 Minutes

Servings: 4

Ingredients

- 1 can cannellini beans, drained
- 5 tablespoons olive oil
- 3 cloves garlic, minced
- 2 tablespoon lime juice
- ¼ cup fresh parsley, chopped
- Pita bread
- Salt and pepper

Directions

1. Place beans, garlic, olive oil, lime juice and parsley in food processor.
2. Puree until smooth.
3. Season with salt and pepper before serving with warm pita bread.

Nutrition: Calories: 212, Fat: 3 g, Carbs: 16 g, Protein: 20 g,
Sugars: 5 g, Sodium: 418 mg

Champion Bean Dip

Preparation Time: 7 Minutes

Cooking Time: 55 Minutes

Servings: 4

Ingredients

- 1 can pinto beans, drained
- 1 cup cheddar cheese, grated
- 1 cup sour cream
- 1 package cream cheese, softened
- ½ teaspoon cumin
- 1/2 teaspoon chili powder
- ½ teaspoon cayenne
- Tortilla chips

Directions

1. In a large bowl, mash beans.
2. Add all ingredients except for the tortilla chips and eat in the microwave until the beans are heated through.

3. Serve with tortilla chips.

Nutrition: Calories: 254, Fat: 6 g, Carbs: 16 g, Protein: 22 g,
Sodium: 92 mg

Ultimate Black Bean Dip

Preparation Time: 7 Minutes

Cooking Time: 33 Minutes

Servings: 4

Ingredients

- 2 cans black beans, drained
- 1 medium red onion, chopped
- 1 garlic glove, peeled
- 1 tablespoon olive oil
- 2 tablespoons balsamic vinegar
- 1 teaspoon cumin
- Salt and pepper
- Tortilla chips
- Vegetable sticks

Directions

1. Blend first 6 ingredients in a food processor.
2. Transfer to serving bowl and season with salt and pepper.

3. Serve with tortilla chips and assorted vegetable sticks.

Nutrition: Calories: 214, Fat: 3 g, Carbs: 14 g, Protein: 15 g, Sodium: 405 mg

Butter Bean Dip

Preparation Time: 7 Minutes

Cooking Time: 10 Minutes

Servings: 4

Ingredients

- 1 can butter beans, drained
- 1 garlic clove, peeled
- 5 tablespoons extra virgin olive oil
- 1 lemon, juiced
- Handful of basil leaves, chopped
- ½ teaspoon chili flakes

Directions

1. Blend all ingredients in a food processor until smooth.
2. Place in a bowl and serve with chips or toast.

Nutrition: Calories: 220, Fat: 4 g, Carbs: 12 g, Protein: 10 g, Sodium: 870 mg

Bacon Bean Sandwiches

Preparation Time: 7 Minutes

Cooking Time: 25 Minutes

Servings: 4

Ingredients

- 1 can baked beans
- 5 slices bread, lightly toasted
- 10 bacon strips, cooked and drained
- 1 large white onion, sliced into rings
- 5 slices American cheese

Directions

1. Place toast on baking sheet.
2. Spoon beans on top of bread slices.
3. Top with bacon, onion rings and a cheese slice.
4. Bake for 15-20 minutes at 350F or until cheese melts and turns to brown.

Nutrition: Calories 219, Fat 17 g, Sodium 456 mg, Carbs 12.1 g, Protein 31 g

White Bean Fritters

Preparation Time: 7 Minutes

Cooking Time: 33 Minutes

Servings: 4

Ingredients

- 1 can white beans, drained
- 2 cloves garlic, chopped
- 1 small onion, chopped
- 1 sprig parsley, chopped
- 1 tablespoon white flour
- Salt and pepper
- 5 tablespoons olive oil

Directions

1. Place beans, garlic, onions, and parsley in food processor and blend until smooth.
2. Season with salt and pepper to taste.
3. Add flour and mix.
4. Form into fritters and fry in hot olive oil.

Nutrition: Calories 388, Fat 15.2 g, Sodium 572 mg, Carbs 5.4 g, Protein 27 g

Baked Bean Fritters

Preparation Time: 7 Minutes

Cooking Time: 25 Minutes

Servings: 4

Ingredients

- 1 can baked beans in tomato sauce, drained, reserve sauce
- 1 cup self-raising flour
- 3 tablespoons milk
- 2 eggs, beaten
- 1 teaspoon mild curry
- 5 tablespoons olive oil

Directions

1. Blend beans, flour, milk, eggs and curry powder in a food processor.
2. Fry fritters in hot oil until golden brown.
3. Serve with tomato sauce.

Nutrition: Calories 245, Fat 16.3 g, Sodium 515 mg, Carbs 19.3

g, Protein 33.3 g

Black Bean Burger Patties

Preparation Time: 7 Minutes

Cooking Time: 33 Minutes

Servings: 4

Ingredients

- 1 can black beans, drained
- 3 cloves garlic, peeled
- ½ onion, chopped
- ½ green bell pepper, chopped
- 1 egg, beaten
- 1 tablespoon chili powder
- 1 tablespoon cumin
- ½ cup bread crumbs

Directions

1. In a food processor, mash beans, bell pepper, onion, garlic egg, chili powder, and cumin together.

2. Mix in breadcrumbs until you get a thick paste consistency Fry in pan as you would a normal burger.

Nutrition: Calories 357, Fat 32.7 g, Sodium 277 mg, Carbs 17.7 g, Protein 31.2 g

Simple Bean Burger

Preparation Time: 7 Minutes

Cooking Time: 25 Minutes

Servings: 4

Ingredients

- 2 cans pinto beans, drained
- ½ teaspoon garlic powder
- 2 large eggs, beaten
- 1 cup dried breadcrumbs
- Salt and pepper to taste
- 4 pieces hamburger buns

Directions

1. Mash beans and add breadcrumbs, eggs, pepper and garlic powder.
2. Shape into patties and fry or grill according to your preference.
3. Serve warm on hamburger buns.

Nutrition: Calories 300, Fat 16.4 g, Sodium 471 mg, Carbs 8.7

g, Protein 38.5 g

Conclusion

Thank you for reading this book. The principles you've learned while reading this book are tried-and-true methods for developing a successful rice and beans storage plan. But don't just look at the numbers. You have earned the right to enjoy the journey.

Having a successful and useful rice and bean storage plan and food supply is about more than just accumulating food. It's also about relieving stress and worries about the future—putting yourself in a position to enjoy life now and in the future.

Learn that being prepared does not imply being scared, but rather knowing how to react and being ready to react appropriately if something does happen to you. The goal of preparedness and food storage is to provide peace of mind.

You can double the recipes and freeze them for the following week because you're using the same menus. You don't waste your ingredients because you know you're using up the food in your house. You don't need to eat out on a regular basis because you know there's food in your house, that it's healthy, and that your nutritional needs are met.

All of these things give you an incredible advantage over the majority of people. You can live with confidence. You're confident that your family will be taken care of no matter what. You can sleep well at night knowing that you have enough food for tomorrow, the next day, and the month after that.

So please think about sharing what you've learned in this book with someone you care about. If you want to buy a copy of this book for a friend, that's fantastic—but please understand that our goal isn't just to sell more books. It's to spread the word. And the best way we know to do that is for you to put what you've learned into practice and demonstrate its effectiveness.

Good luck.

BOOK 12
DEHYDRATOR COOKBOOK
FOR PREPPERS

1200 DAYS OF CHEAP &
HOMEMADE RECIPES
FOR DEHYDRATING MEAT,
VEGETABLES,
FRUITS & HERBS.

A COMPLETE GUIDE TO NOT
BEING CAUGHT OFF GUARD
DURING THE NEXT
EMERGENCY.

Introduction

Because, with the right knowledge, people can typically have delicious, seasonal food without spending a lot of money and without extra substances or artificial additions, canning and home preservation are becoming more and more popular. These meals can be kept for several months or even years in your storage closet.

Additionally effective and convenient ways to keep your food from spoiling include canning and preserving. The entire family can have a good time doing it. Making your own canned food will allow you to show your family members how to be resourceful and not rely too heavily on store-bought food.

Nowadays, reliance on technology and equipment has expanded. Additionally, we have grown reliant on supplies like food, water, and other requirements. We don't consider how we would survive in those circumstances because we are unaware that we may have to live without them one day. Such issues are resolved by preparation. Emergency services can often be a big hassle. You've probably seen on television how people have to wait in lines to receive supplies like food and water during emergencies. Individuals fight for fuel, there are frequent altercations, there are no shelters, and several people may even lose their lives.

Numerous advantages come with food canning and preservation. While it is simple to buy preserved food in the market, commercial products do not compare to the quality or satisfaction of making your own preserves. In addition, they frequently cost more and come with artificial preservatives. Food preservation can help you stock up, save money, and enjoy your favorite foods all year long, whether you cultivate your own food or buy it in bulk.

Prepping, at its core, is a contraction of the words "preparation" or "preparing," but in current usage, it has come to mean much more. The phrase is now used to describe most fundamental items, such as storing food, water, etc., it goes much beyond than that. This book is intended to be enjoyable and simple to read. It is crammed with interesting facts and information in addition to substantial knowledge and practical advice. You will learn more broad information, discover general and varied

cooking advice, and, of course, perfect the art of canning and preservation. This book aspires to be a first-hand, practical, and trustworthy guide. It provides factual information that is accurate. In terms of functionality, viability, or implementation, the methods are neither oversimplified nor overdone. In this manner, you will be well prepared before beginning. The goal of the book is to reduce food waste and help you make the most of your meals. It aims to assist you in overcoming frequent difficulties and locating fixes for the most typical challenges you might run into in the kitchen. Anyone wishing to make their time in the kitchen less stressful should check out this helpful cookbook. This book is a straightforward introduction to numerous inexpensive, simple-to-learn preservation procedures. These instructions can be followed independently, or you can plan an enjoyable activity for friends and family.

You can preserve your favorite seasonal products fresh all year round. Plus, you can pat yourself on the back whenever you break out one of those jars for dinner because you made it yourself. All of those summer afternoons sweating at the stovetops would be worth it when you pop the cover open every time.

Let's begin.

Chapter 1

How Dehydration Works

Food preservation can be done easily by dehydrating it. You can make wholesome, nutrient-dense pantry staples, spices, snacks, and even whole meals with your dehydrator that can be stored for many months without going bad at room temperature. By managing the factors of temperature and humidity, your dehydrator makes the task simpler and quicker. You can make food for road trips and camping, reduce food waste, stock your pantry, experiment with new snack ideas, and make meals that suit your dietary requirements and personal principles by dehydrating food.

Compared to other food preservation techniques, dehydration maintains many of the nutrients of fresh food far better. While refrigerated, fresh food can lose up to 50% of its nutritious content. But the majority of the vitamins and all the minerals found in fresh food are still present in dried food. Food that has been dehydrated is lighter and takes up less room in the cupboard, making it perfect for road trips, hiking, emergency preparedness, and preparing meals for the workweek.

The preparation of foods for the dehydrator is the first step in the dehydration process. Foods need to be thinly sliced so that they can dehydrate reasonably quickly in order for the process to be effective. If a food is too thick when you put it in the dehydrator, you'll either have to wait a long time for it to dehydrate or you won't be able to get it all the way down to less than 5% moisture, which will allow bacteria to thrive. After cutting up your food, spread it out on the dehydrator trays, turn the machine on, and let the food dry out until there is no more than 5% moisture left. It is best to start all recipes in the morning to avoid having to check on your food into the wee hours of the morning and late into the night because the amount of time required will vary depending on what you are dehydrating.

You should use a dehydrator tray liner if you are making something like dehydrated eggs because it stops wet ingredients from falling through the tray. They correctly dehydrate in this manner. Fruit leathers can also be created using dehydrator tray liners. A fruit recipe will be blended in a

blender until it is fully smooth, and then it will be poured over the dehydrator tray liner to be dried. You will get scrumptious fruit leathers after it is finished.

Although it will use much more energy and the food may slightly cook, dehydrating can also be done in an oven. It is ultimately preferable to use a genuine dehydrator, which can maintain the ideal temperatures and conditions inside the apparatus for proper, safe dehydration, despite the fact that doing so does work.

How to dehydrate

It's a great time to implement a change if you've ever experienced stomach pain (and financial pain) after paying for a single serve bag of dried extravagant mango. Making dried natural product at home is quite simple (given that there is only one ingredient). Furthermore, you actually do need a remarkable piece of gear.

There are a few different ways to get dried natural product—you could use the microwave to make firm natural product chips or the stove to make chewy natural product calfskin—but none is as simple or as convenient as using the kitchen appliance designed for the job.

It is worthwhile, despite the trouble, to invest in a good dehydrator so your bathroom is constantly stocked with a lot of fruity snacks if you depend on banana chips or dried mango slices as a whenever (for example, constantly) bite and must take the handmade route. It's true that you could use a broiler set at the lowest setting, but most burners run too hot to properly dry out organic food without burning it.

Drying your own food is easy and satisfying, whether your goal is to preserve it, change up your eating style, or get ready for a future exploration trip. The drying process slowly removes moisture while preserving additives and flavor. It is important for explorers looking to conserve space and lose weight that it is typically less expensive and lighter than prepackaged food.

However, there are some things, like natural product cowhide, that you can prepare using a stove on a low setting. Most got dried out food plans require a dehydrator. Making flavorful dried food is not required, but a weight cooker and mandoline slicer (used carefully) can speed up the process. If you don't have a mandoline slicer, having excellent knife skills will come in handy.

What foods can you dehydrate?

Compartments of delightful looking got dried out food: most food can be dried out at home, with the general rejection of dairy items and high-fat things. In contrast to organic produce, meat and most vegetables ought to be cooked first before getting dried out. When you have an assortment of dried fixings, you can collect them into dinners. Some entire dinners can be arranged and afterward got dried out, similar to soup and risotto. This limits prep significantly further and permits flavors to merge.

For proficiency, consider getting dried out an assortment of nourishments simultaneously, inasmuch as they require the equivalent drying temperature.

Food shrivels significantly as it loses dampness, so remember that when thinking about the amount to make. For instance, a pound of apples (before cutting) yields about a cup of got dried out apple cuts. Albeit meagerly cut nourishments advance in any event, drying, don't cut pieces excessively little or they can lose all sense of direction in a supper when rehydrate.

- Putting away dehydrated food
- Zip-lock packs of dried out food prepared for the path
- The way to broadening the life of your food is forestalling oxidation.

Appropriately put away, evaporated organic product can last to five years and vegetables up to 10. If you will expend nonmeat things inside a year, keep them in cooler sacks or reusable stockpiling packs with the air crushed out. For long haul safeguarding, vacuum-fixing with an oxygen safeguard is ideal. Store in a cool, dull spot.

Meat and fish can be put away in cooler sacks and kept in a cool, dim spot if devoured inside a month; in any case vacuum-fixing and freezing is ideal. Meat put away appropriately in the cooler can keep going for as long as a year.

Utilize presence of mind—don't devour food that looks or scents malodorous.

Step by step instructions to choose a food dehydrator

There are many dehydrators on the market, and selecting the best one to fit your needs can feel overwhelming. Models come with a wide range of features and vary considerably in price, with basic dehydrators costing around \$40 and top-end models costing \$500 or more. So, how do you find the model that's right for you?

The first step is to think about how you might use the dehydrator. Many different foods can be dehydrated, including fruits and vegetables, grains and legumes, and meats and seafood. You can dehydrate complete meals. You can also dehydrate herbs and flowers, and even make yogurt. All the recipes in this book can be made successfully using any dehydrator on the market.

Round or box dehydrator?

Dehydrators come in box and round models. You will learn about the two types of dehydrators and how they differ in this section.

Round dehydrators typically have the motor and fan at the bottom of the device and circulate air vertically. They cost less and usually have a little less drying space than a box dehydrator. The unit is covered with a lid, and the dehydration trays stack on top of one another. Four to six trays are typically included with round dehydrators. You can increase the amount of drying space available in some models by purchasing additional trays. To stop food debris from falling into the motor, make sure the model has a screen over the fan. You must keep an eye on this, removing food as it dries, and rotating trays to ensure even drying. Food on trays closer to the bottom of the dehydrator may dry more quickly than food on trays at the top. Additionally, the dehydrator you select must have enough power to dry your food; 600 watts are adequate for five or more trays.

Box dehydrators use a motor and fan at the back to push air past all of the trays, circulating it horizontally. Box dehydrators typically cost \$150 or less, but they can cost much more. Compared to a round dehydrator, these models typically have more drying space, but you cannot add more trays. Typically, box units have seven to eleven trays. Look for a dehydrator with a minimum five-inch fan diameter, but the bigger the better as a larger fan distributes air more evenly throughout the machine. You might need to adjust the trays up and down within the machine or rotate them 180 degrees on their rack to ensure that your food dries evenly. By doing this, air will be made sure to reach every piece of food. The quantity of circulation will depend on the volume and type of food in the dehydrator as well as the fan size. When choosing a dehydrator,

keep in mind that box dehydrators typically have a larger footprint and are a little noisier than round dehydrators.

Depending on the size of the plate and the amount of features, dehydrators often range in price from \$30 to several hundred dollars.

A fan for even heating and several temperature settings to properly dry various types of food are two essential features to look for.

For drying sauces, soups, and organic product products, nonstick sheets or material paper is necessary. Specific sheets that fit their dehydrator plate are sold by a few producers.

Key elements

Models of dehydrators come with a wide range of features. Consider these features, among others:

Accessories. Making fruit leather or dishes with more liquid, including stews and soups, requires the use of reusable sheets to cover the mesh on the trays. Some dehydrators sell ingredients for jerky production. Look for dehydrator accessories that come packaged with them or purchase more later. Many dehydrators' accessories are compatible with different brands.

Capacity. Box dehydrators provide approximately 1.3 square feet per tray, or about two cups of food, whereas round dehydrator trays have a drying area of about 1 square foot per tray, or about a cup and a half of food.

Footprint. Take into account where you will put the dehydrator while not in use as well as the amount of counter space you have available for it.

Off/on switch. This might seem like a simple choice, but some dehydrators don't have an on/off button, so you have to plug them in and out to turn them on and off.

Temperature preferences because not all foods dehydrate at the same temperature, stay away from dehydrators that don't let you choose a temperature.

Timer. You can set the dehydrator for a certain period of time using this function. Additionally, this serves as a safety precaution in case you are not around when the dehydrator's cycle is finished. If your dehydrator lacks a timer, you can purchase an appliance timer, connect it in, and set the timer for the required number of hours. When the timer rings, it will turn off on its own.

Food dehydrators with the highest ratings

Here are foodal's current recommendations for eight of the best food dehydrators on the market (plus one for the magnificent excalibur model that was recently acquired).

Gardenmaster nesco fd-1040

The nesco fd-1040 gardenmaster comes with some really great features that are usually reserved for more expensive models, and they get top marks from the home-drying expert.

The current model's presentation is significantly better than that of nearly identical stackable plate units thanks to its 1,000 watts of power, nesco's authorized wind stream framework, and the top-mounted warmer and fan.

It is made in the us from plastic that doesn't contain bpa and has excellent design at a reasonable price. Additionally, its clock and adaptable indoor regulator make activity clear-cut, hassle-free, and simple.

It's not meant for starting your own locally based jerky business because of the limited 1-year warranty and plastic construction. Whatever the case, it is excellent for soundbites, little nursery reaps, and exploiting deals.

This stackable four-plate model is a fantastic incentive for a cautious dryer.

Browse foodal's detailed survey right away, or read more customer reviews on amazon.

3601 dehydro presto

The dehydro electric food dehydrator from presto is a six plate stackable model with a warming unit and fan mounted on the base.

The dehydro, which can accommodate up to 12 plates, also comes with a generous assortment of frill for drying smaller items like herbs, nuts, and flavors as well as for producing natural product cowhide.

Dehydro digital electric food dehydrator by presto 06301

The programmable clock and customized indoor regulator provide excellent presentation at the proper temperatures, while the 700 watt warmer and fan provide the ideal conditions to dry out diverse foods.

With its practical size and affordable price, the presto 3601 dehydro has established itself as a welcome specialty in many kitchens. It is also easy to use and clean.

A reliable dryer for the price, the presto customer service is also top-notch.

Perfect for those who need to dry smaller projected clumps, for occasional use, or for those who would rather not to invest a lot of money in a dehydrator.

Snackmaster pro by nesco

The nesco snackmaster pro food dehydrator is a straightforward and user-friendly stackable food dehydrator and the no. 1 bestseller on amazon in dehydrators.

It will quickly and efficiently dry natural products, such as fruits, vegetables, herbs, nuts, and jerky, allowing you to enjoy the goodness of food that has been properly stored at home.

The fd-75a nesco snackmaster pro food dehydrator

Converga-flow, a licensed drying system developed by nesco, creates vertical and level wind current for speedy, even, and nutrient-rich drying.

The 700 watts of intensity provide the mobile indoor regulator with all the necessary energy, and the top-mounted fan and radiator eliminate the pandemonium of fluid dribbling into the warming chamber.

The snackmaster, which is ideal for the novice, provides straightforward, reliable results and the option to expand for larger amounts once you have your method down pat; all things considered, it's a smashing success.

528 l'equip

A model like the l'equip 528, for example, can be advantageous if you require an all-around made device that will dry foods effectively and in large enough quantities to be profitable.

The 528 is a top-notch stackable plate dehydrator that is affordable, easy to use, and comes with a sizable 10-year manufacturer's warranty.

Food dehydrator l'equipe 528, 500-watt, 6 tray

The l'equip has a less-than-appealing profile, but it comes with 12 square feet of usable drying space on 6 plates and can be expanded all the way up to 20 plates.

The l'equip features a microchip-controlled warming sensor with a strong state variable temperature control that continuously monitors the warmth to provide a steady drying environment for uniform results. In addition, its smooth, timeless design is simple to clean and use, making it a valuable addition to any kitchen.

It's a good entertainer and a good choice for those who value reliable

outcomes and the flexibility of changing cluster sizes.

Smell professional 6 trays

Is it safe to assume that you want to upgrade from food dehydrators with stackable plates to those with rack plates, which have been produced more recently? If so, you may want to take the aroma professional 6 tray food dehydrator into consideration.

The professional provides all the features necessary for great results, with a reasonable size limit and the unwavering quality of rack plate execution.

Food dehydrator aroma professional 6 tray

It is meant to provide consistent, consistently warmed wind current with necessary fixings for reliable, trustworthy results.

The straightforward entryway makes it easy to monitor the ground as food dries and the capacious front mounting plate slides on guides like the racks in a typical broiler.

The integrated trickle plate, which collects any fluids and deposits throughout the drying process, also makes cleanup simple.

The aroma professional is prepared, capable, and ready to take on any responsibilities assigned to it, making it the ideal choice for the home enthusiast, traveler, or anyone attempting to be somewhat more wellbeing conscious.

Stx dehydra 1200w

The stx dehydra is a fantastic drying system with a large capacity that is designed to deliver both quantity and quality for the true food drying enthusiast.

The changeable indoor regulator and 16 square feet of useful drying surface allow for appropriate drying times, while the back mounted radiator and fan provide a strong wind stream to ensure proper dehydration.

Dehydra stx-deh-1200w-xls 10-tray stainless steel digital food dehydrator from stx international

Built from sturdy 304 evaluation tempered steel, both the generously sized plate and the lodging unit boast a 12-hour shutoff clock and a fully automated control board for integrated accommodations.

Located at the highest end of the value spectrum, it is intended for idealists who cherish premium, pristine materials, an exceptionally large limit, and the strength and solidity to operate continuously.

A reliable and enduring performer.

Tribest sedona

Is it safe to assume that you're looking for a propelled rack plate type that, when fully stacked and ready, will operate at a higher level?

The tribest sedona sd-p9000, which is priced higher on the value spectrum, provides a sophisticated, precisely managed dehydration framework.

Food dehydrator with digital control tribest sedona sd-p9000

It boasts a luxurious package with a clear glass doorway and exhibits exceptional performance because to its cutting-edge drying technology and precise temperature management.

With plainly stamped controls and a beautiful led advanced presentation on the front board, it has an easy-to-use structure that makes activity simple.

Additionally, the timer may be programmed for up to 99 hours of effortless work.

The sedona does, however, have several drawbacks, including a lackluster level of price control and subpar post-deal management. Despite its many tempting features, you can still enhance at a cost.

Food dehydrators are simple to use, and the snacks and ingredients they create are fantastic for weight watchers and for livening up meals. I acknowledge that i couldn't function without one in my kitchen.

What should (and shouldn't) be dehydrated

Fruits and vegetables are the easiest and most forgiving foods to process. Dried fruit can be eaten without rehydrating. It's a nutrient-dense food that makes an ideal snack. It can be added to oatmeal, muffins, and hot cereal to improve the nutritional quality of simple meals.

Dried vegetables are convenient for soups, stews, sauces, and dips where they can be rehydrated in the cooking process. Aromatic vegetables such as onions, garlic, carrots, celery, and peppers can be used as ingredients in meals on their own or combined into spice blends to add flavor to other dishes.

Lean meat, poultry, and fish can also be dehydrated, provided a few precautions are taken with these high-protein foods. When dehydrating, temperatures should reach 165°F (74°C) to kill any spoilage organisms. If your dehydrator doesn't go this high, place the food in the dehydrator at 145°F for at least 4 hours, until it is done. Then put it in a preheated oven

at 275°f for 10 minutes so that it reaches an internal temperature of 165°f (74°c).

Cured ham can be successfully dehydrated, but pork should never be dehydrated at home or used for jerky. The temperatures used in a home dehydrator cannot destroy the trichinella parasite nor other harmful bacteria that are commonly found in pork.

Raw eggs and milk products do not dehydrate well. They are prone to bacterial contamination at dehydrating temperatures., Fatty and oily foods cannot be dried adequately in a home dehydrator. The fat won't dry properly and as a result, the food spoils quickly. This includes high-fat foods such as avocados and olives.

When dehydrating meat, you should remove all visible fat. Only lean meat, poultry, or fish should be used for dehydrating. Ground meat should be no more than 10 percent fat. Fish like salmon and mackerel have too high a fat content to make them good candidates for dehydrating; they can be dried for short-term storage, but they should not be used for long-term storage due to the increased risk of spoilage.

Foods high in sugar or alcohol won't dry properly. Foods like alcohol-soaked fruit, honey, or candy tend to absorb moisture from the air and resist dehydration.

Chapter 2

Benefits Of Dehydrating

In the past, people dehydrated food because they didn't know when they would get fresh stuff again. They also needed easy-to-carry food because of frequent traveling. Now, this doesn't describe most of our lives, so why would you need to ever dehydrate? There are still good reasons:

Saves money

Saving money is arguably the top reason to dehydrate. If you buy a bunch of produce and know you can't use it all before it goes bad, dehydrate them. This is a really great idea with herbs, since people rarely use very much at a time, and the herbs end up rotting. You can also save money by never needing to buy out-of-season produce when you're craving it. You can buy fresh when it's in season, dehydrate it, and eat it when the stuff at the store shoots up in price. By dehydrating your own snacks, you're also saving money by not buying packaged stuff, which is prohibitively expensive for a lot of people.

Saves space

Saving space is another reason to start dehydrating. Removing moisture from food dramatically shrinks it, so you can now fit 20+ pounds of dried food easily in a cupboard. For maximum space-saving, using freezer bags is better than glass jars or

containers, because you can lay them flat. They can also be vacuum-sealed and shrink even further. For small kitchens and pantries, storage won't be a problem anymore when you dehydrate what you can.

Taste (and nutrition)

Dehydrated foods often taste better than when they're fresh, because their flavors are intensified. Moisture literally "waters down" flavor, so dried fruits taste much sweeter, even without added sugar. Dehydrated mushrooms are so flavorful that many chefs use them as a spice, not a vegetable, while a small handful of sun-dried tomato flavors an entire pasta dish. The icing on the cake is that dehydrated food also maintains their nutritional value. Removing the moisture doesn't destroy healthy vitamins, minerals, or calories.

Clean-eating

You can buy dried fruits, vegetables, and other snacks at the store, but more often than not, they're full of sugar and artificial ingredients. Even though dried foods last longer than fresh ones, packaged versions usually contain preservatives to make them last even longer. This is especially true for dried meats, which are not only highly-processed, they're usually extremely salty. Processed meat has also been classified as carcinogenic, which means it contains chemicals that might cause certain types of cancer! For all of this, you also pay a pretty penny. Making your own dehydrated snacks at home means you have total control over what goes in and what stays out.

Easy to carry around

There aren't a lot of truly portable snacks and the ones that are, like fruits and vegetables, got easily squished and bruised. When they're dry, they're hardened and much more durable. They also don't take up much space in a bag and they don't squirt juice everywhere when you're trying to eat them. Dehydrated food is the way to go if you're always on the run.

Dehydrating food at home saves money and space, makes clean and tasty snacks, and reduces food waste.

Reduces waste

We throw away a ton of food. In the us, we waste over \$160 billion in food every year. While a lot of that comes from restaurants and grocery stores, the average person wastes a lot of the food they buy. It's basically like throwing away money. By dehydrating foods that don't stay fresh for very long, you're doing your part to reduce waste and get the most bang for your buck.

Emergency preparedness

For emergency food preservation, dehydrated food is suitable. Having a 30-day supply of wholesome food on hand is sage whether you are preparing for a weather event, a spell of unemployment, or a natural calamity.

By dehydrating food that your family already consumes, you may ensure that an actual emergency won't cause too much disturbance. Even if you are unable to visit the grocery store, you can ensure that your family's nutritional needs are met by stocking your pantry with dehydrated food you have prepared from wholesome ingredients.

When properly prepared and packaged for long-term storage,

dehydrated food can serve as the cornerstone of a solid preparedness strategy. Your dehydrated food will stay fresh and retain its nutrients in storage if you take the extra step to package it in mylar bags or glass jars with oxygen absorbers.

However, having the convenience of dehydrated food in your pantry can help with even minor disruptions. You don't have to let a surprise bill, sick family member, or extra dinner guest make you lose confidence. You can handle even minor inconveniences with grace if you already have the dehydrated ingredients to make your favorite comfort foods in your pantry.

High nutritional value

When food is dehydrated, the water is removed, but the nutrition in the food remains stable. The flavor and nutrients become more concentrated, and the caloric value remains the same. Dehydrated food has the same calories, protein, fiber, and carbohydrates as fresh food. It also retains the same minerals, fatty acids, and antioxidants as fresh food, as well as most of the vitamins. Dehydrated food retains many of these nutrients in storage, even over several months and years.

There is some loss of vitamin c and some b vitamins during blanching, because some of these water-soluble vitamins are lost in the blanching water. Vegetables that are blanched before dehydrating have the same vitamins as frozen food, but dehydrated food has a longer shelf life. This vitamin loss can be minimized by blanching with steam before dehydrating, rather than immersing vegetables in boiling water prior to dehydrating.

Hikers and athletes benefit from the concentration of nutrients provided by dehydrated foods, allowing them to eat less while maintaining their energy levels.

To ensure that your dehydrated food retains the most nutrition, it should be dehydrated at its peak of ripeness, when the flavor,

color, and texture are best. Vegetables that are past their prime and are fading in color, scent, or flavor will not make quality dried vegetables. Skip over the fading-green kale in the refrigerator vegetable bin. Choose the most vibrant-colored vegetables to get the most nutrition from your dehydrated food.

Principles of dehydrating

Dehydrators perform a simple operation: a fan and motor circulate heated air through the machine, which results in the removal of moisture from the food on the dehydrator trays. Foods with high water content, such as bell peppers, take longer to dehydrate than foods with a lower water content, such as kale. Likewise, food with a high density, such as a large bean, will take longer to dry than food with a lower density, such as rice.

To get the best results when dehydrating the recipes in this book, pay close attention to the directions for prepping the vegetables. If the recipe calls for cutting the vegetables into ½-inch dice, be sure to cut them to that size so they will dehydrate at the same rate as the rest of the recipe. If you are uncertain what ½-inch dice looks like, measure and cut a piece to that size and set it aside as a guide. Cutting larger pieces than is called for is easy to do by accident, and that will affect how the recipe itself turns out, the drying time, and the consistency of the food.

When food comes out of the dehydrator, it looks vastly different from its original state. Hummus and soups can look as cracked and parched as a desert floor. Food can come off the trays in thin sheets, which you can break into smaller pieces. Properly dried pieces of fruit bend but don't break, and they do not feel moist when you squeeze them. Other foods—vegetables, grains, and legumes—should be hard and dry.

It is possible to burn food in a dehydrator, so pay attention to both the temperature and timing recommendations given in the

recipes. Also, when you're learning how to dehydrate food, be sure to check the food every few hours. You may need to rotate the trays to ensure that the food dries evenly, and if you find that part of your recipe is dry before the rest, remove that part and store it while the rest of the recipe continues to dry. There is often one ingredient in each recipe that takes longer to dry than the rest, and that ingredient will be called out in the recipe as the barometer for when the food is dry. The amount of food that will fit on a dehydrator tray varies somewhat, based on viscosity or density, so some experimentation will be required. Start with about one cup of food and spread it out evenly, to about ½ inch from the edge of the tray. You should have an even, thin layer of food, with no significantly larger chunks. If there is still room on the tray once the food is spread out, you can add a bit more until the entire tray surface is full.

Chapter 3

Dehydrating Methods

Foods being dried outdoors are subject to the whims of mother nature. To dry properly, the sun must be shining, the relative humidity in the air needs to be consistently around 35-65%, and temperatures must be around 100°f. For this reason, sun drying is only an option for part of the year in most locations.

If you do choose to travel this long road: spread items on drying trays. Keep your food covered with chicken wire or some other barrier between it and neighborhood critters. Bring your trays in at night to prevent dew from accumulating on already dried items. Dry for two to four days, turning slices when halfway dried.

Fortunately, there are easier ways. For your first few drying projects, use a regular conventional oven. Experiment with different foods and make sure dried foods are something you will eat a lot of before investing in a dehydrator. We will discuss both methods below as well as how to tell if your food is dried enough and how to store it for the long-term. In all methods, make sure your food is drying slowly. When pieces dry too fast initially, they develop a tough shell that seals in the liquid. It is better to start at a low temperature and increase it as necessary.

Oven drying

Preheat your oven to 130-160°f. It is important to use an oven thermometer for this project because your oven lies. Depending on your location and time of year, the oven may need to be set to

a lower or higher temperature. A closed oven has no air circulation, a necessary component for drying food. For this reason, prop the oven door open slightly to prevent the air in the oven from stagnating.

Place your pieces on drying racks and stack them in the oven. Stir items and rotate pans every two hours until almost dried, then check every half hour. Above is a chart of average drying times for some popular fruits. Thinly sliced pieces may require a lower temperature, while strawberries prefer the oven on the hotter end. Keep an eye on your items and adjust the oven temperature if they are not drying fast enough or are getting scorched. When you think the fruits are done, taste test for adequate dryness.

Dehydrator

A dehydrator is made specifically for drying fruits and vegetables but could put you back a couple of hundred dollars. So, make sure you will dry foods often enough to get your money's worth. Dehydrators work by combining low heat with vertical and horizontal airflow, keeping the humidity at the right level. They use less electricity than the oven method and come with their own trays.

As a general rule of thumb, preheat the dehydrator to 125°F. Place your small or thinly sliced pretreated fruits and vegetables on the trays and stack them in the dehydrator. Slowly increase the temperature to 140°F over several hours. Remove food when it is completely dry.

Test the final product

Before you test whether your items are sufficiently dried, remove them from the heat source and allow them to cool to room temperature.

Properly dried fruits and vegetables have the following characteristics:

- •When squeezed, no juice comes out.
- •Knead a few pieces together. They should not stick together easily.
- •The pieces should not rattle when handling.
- •Vegetables should be leathery or brittle.
- •Fruits should be pliable and springy.
- •Herbs, kale, and other leafy greens should be crisp, brittle, and easily rubbed into a powder.
- •Fruit leather is no longer sticky to the touch.
- •Jerky cracks when you bend it but does not break.

Conditioning

Once you have checked that your items are dry enough, make sure that they are all evenly dried by conditioning them. This step allows over-dried pieces to absorb some of the moisture from under-dried pieces.

To condition your dried food, add the cooled items to a large airtight container. It is important that they are cool otherwise they will sweat in the container. Stir or shake the food once a day for 7-10 days. If moisture develops on the sides or lid within this time, and you made sure they were cool before transferring them to the container, place the food back in the oven or dehydrator until completely dry.

Packaging and storage

To prevent your perfectly dried food from absorbing water from

the room air, packaging your items for long-term storage should be done in a room with good air circulation on a dry day at the warmest part of the day. Remove all stems and other foreign material at this point that you might have missed in pre-treatment.

Dried fruits and vegetables can only survive in regular plastic kitchen bags for a short time. To keep your food fresher longer, package it in waterproof, rodent-proof, insect-proof storage containers or well-sealed polyethylene bags. Companies like Rubbermaid sell airtight plastic food grade containers.

To keep out unwanted critters, place several single serving bags or containers of dried goods in larger tubs, jars, or tins that can be closed tightly. Cooler temperatures will extend the shelf-life of dried food, but in general vegetables and jerky will keep well for about 6 months while fruits and herbs can last up to a year.

Eating dried foods

Some dried fruits, like blueberries and apricots, can be eaten as they are. You may want to rehydrate others, like cranberries or raisins, to add to savory dishes. Vegetables are usually rehydrated before being used in recipes as well. Strain the rehydrated items and cook 10-15 minutes before eating.

To rehydrate fruit: mix together a 2:3 ratio of dried fruit to water. Soak for 8-12 hours, or until plump.

To rehydrate vegetables: mix together a 2:3 to 2:5 ratio of dried vegetables to water. The amount of water you add will depend on the original water content of the item. If you are not sure, add more water rather than less.

Tips for storage of dried food

Store compartments in a cool, dry and dim area. A temperature of 60 f or 15 c (or less) is ideal. Introduction to light will corrupt dried nourishments, so if you store jolts out on your counter or retires, hope to utilize the food in the near future.

Dried vegetables and meats can be hidden away as long as a half year.

Store dried nourishments in the cooler if you'd prefer to utilize them over a more drawn out timeframe.

If buildup shows up inside one of the holders of your home-dried food, it should be dried once more.

Store things so the more seasoned things are in front or on top so you can go through them while they are still of acceptable quality.

Tips for using stored dehydrated fruit and foods

To safeguard newness, store opened holders of dried nourishments in the fridge or cooler.

Assess every single dried food before eating them, and dispose of anything with form. If in question, toss it out.

Drying out food goes past the pragmatic side of loading your wash room with nutritious, delectable nourishments; you increase individual fulfillment realizing that you made this put away abundance with your own hands. You'll feel a feeling of pride and freedom, cultivating an association with ages before who utilized these food dehydration standards.

Getting dried out organic product requires an extraordinary advance called "molding," a procedure that evens out the dampness, because all the natural product pieces probably won't have dried similarly because of their size or position in the

dehydrator. After the dried organic product has cooled, pack it freely in a glass container. Seal the container, and let it sit for 10 days, shaking the container day by day to isolate the pieces. The overabundance dampness of some organic product pieces will be consumed by drier natural product pieces, restraining mold development. Vegetables for the most part don't should be adapted, because they as of now are extremely dry when they've completed the process of getting dried out.

When completely dry, pack the got dried out food in perfect, dry, bug confirmation and dampness safe holders, for example, glass containers, metal jars and plastic cooler compartments or sacks. Ensure the holder has a tight-fitting top. Pack got dried out food in modest quantities, because each time a compartment is revived, the food is presented to dampness and air that cause decay and influence food quality. When opening a holder for utilization, completely examine the got dried out food. Dispose of it promptly if there are any indications of form or waste.

Store dried food in a cool, dry, dim territory; higher temperatures cause shorter capacity lengths. Dried food commonly can be put away for one year at 60 degrees f yet for just a half year at 80 degrees f. Dried vegetables ordinarily have a large portion of the timeframe of realistic usability of dried organic products. For best flavor and expanded timeframe of realistic usability, freeze or refrigerate dried jerky.

“safeguarding food, by any strategy, permits us to eat and appreciate the kinds of summer during winter and late-winter months when our nurseries are resting or not yet in full creation,” says melinda hemmelgarn, a missouri-based enrolled dietitian, editorialist and radio host. “with any technique for food conservation, the objective is to save exactly what you'll require until the following developing season. Take notes. Did you come up short on canned tomatoes, natural product cowhides and solidified berries a year ago? Continuously plan your nursery, gather and conservation techniques as needs be.”

Chapter 4

How To Rehydrate Food

Rehydrating dried food replenishes its moisture, restoring its original shape, size, and appearance. The flavor, texture, and nutritional value of rehydrated food are all retained. Although there are various techniques for rehydrating dry food, in their most basic forms, they all include adding moisture to the meal by using either cold or hot liquids.

Typically, 1 cup of fluids will make 1 cup of dehydrated food. After an hour, if the meal hasn't softened enough, add extra liquid. The liquid can be either milk, juice, broth, or simple water. Additionally, fruit can be reconstituted in brandy or liqueur.

In between one and two hours, most fruits and vegetables rehydrate. However, larger food items could take longer to rehydrate than powders or chunks that have been finely diced. Food that dehydrated more slowly usually takes longer to rehydrate. Use no more liquid than what the meal can absorb. When you use too much liquid, the dish becomes mushy and unpleasant.

Cooking must still be done in addition to soaking. After being reconstituted by soaking, food still needs to be cooked.

Keep the soaking liquid to use in cereals, stews, or soups. The dehydrated food's water-soluble vitamins and minerals are present in it.

Methods

Rehydrating can be done in two ways: cold soaking and hot soaking.

For foods that are frequently consumed raw, such as fruit, cold soaking should be employed. It is a more gradual procedure that enables the food's tissues to loosen up and absorb the liquid. Food that has been rehydrated using hot water loses its shape and texture more quickly than food that has been reconstituted using room temperature or colder water.

Don't add more salt or sugar to the soaking water since they interfere with the rehydration process. Instead, use a soaking liquid, such as juice

or yogurt, to rehydrate the food while imparting additional flavor. Once the meal has been completely moistened, they can be added.

When the food being rehydrated will be cooked or added to a hot dish, use hot soaking. In order to rehydrate the food, hot soaking breaks part of the plant cells, making the food softer. Food can be rehydrated more quickly with hot than cold soaking.

It is quick and simple to rehydrate food while it is being cooked. Add dried vegetables to sauces, soups, and stews to rehydrate them as the sauce simmers on the stove. During the cooking process, add dried fruit to sauces, puddings, and warm cereals. Rehydrate the fruit while the rest of the dish cooks.

Drying herbs and spices

Rich in antioxidants, vitamins, and minerals, herbs and spices are some of our most nutrient-dense foods. Dehydrating intensifies their flavors and aroma. Aromatic molecules in herbs offer both flavor and health benefits supporting healthy digestion, immunity, and circulation, as well as aiding relaxation. However, aromatic molecules are easily evaporated from the plant materials, so herbs and spices must be handled gently and dried at low temperatures to preserve their fragrance and flavor.

Sort herbs by removing dead leaves or discolored plant material. Rinse in cool water to remove dust and any insects that may be lurking in the plants. Pat the herbs dry with a kitchen towel. Place the individual leaves on the dehydrator trays and dry at 105°F for 4 to 6 hours. Remove the herbs from the dehydrator as soon as it's showing signs of being done—overdrying can lead to flavor loss.

You'll want to freeze spices like dill seed or lovage seed for 48 hours prior to dehydrating, to kill any stray insect eggs hiding in the seed. When drying roots such as horseradish, ginger, or turmeric, cut them into uniform slices and allow more time to dehydrate.

Although herbs and spices can be dried together, drying herbs separately from other foods will preserve their flavor and aroma. The heat necessary to dry other foods can cause damage to the delicate nature of herbs.

Herbs and spices are some of the most versatile dehydrated ingredients. Dried herbs and spices can be used as flavorings in your home-cooked meals. Combine dried herbs with aromatic vegetables to create traditional spice blends.

Create unique condiments from fresh garden herbs, like stevia, an herb that's sweeter than sugar, or chipotle peppers, with their smoky heat. Use your creativity to make health-supporting herbal tea from your dried herbs and spices. Aromatic leaves and flowers can fill your teacup with refreshing and energizing beverages all winter long, when you dry the herbs at their peak of readiness.

Most herbs and spices are easy to grow at home, and many can be grown in small containers on your balcony, porch or any area of your house or yard that gets regular sunlight. In addition to being a considerable way to flavor foods, herbs and spices have a number of health benefits associated with them.

Drying is the convenient way to preserve herbs and spices because all you usually have to do is lay out the leaves, flowers or seeds and let them dry and then grind or crush them as you see fit. Herbs and spices should be dried in a dehydrator because drying them in the sun can bring them to lose some of their potency.

The following herbs and spices are good candidates for drying:

- •Bay.
- •Celery leaves.
- •Chervil.
- •Chicory.
- •Chives.
- •Cilantro..
- •Rosemary.
- •Sage.
- •Summer savory.
- •Tarragon.
- •Thyme.

Early in the morning is the best time to harvest herbs and spices. Avoid damaging them during the harvest and gather them before the blossoms open. Don't try to dry broken items. Herbs and spices that are damaged won't get any better after drying.

Spread the herbs or spices out on the dehydrator tray in a single layer, leaving some space between them to allow for air circulation. The majority of herbs and spices should be dried between 115 and 125 degrees fahrenheit, but always check the instructions that come with your dehydrator to determine what temperature is suggested.

Herbs and spices should only need a little amount of time to dry. The majority of herbs and spices should dry in less than 4 hours. When dried herbs and spices feel brittle and crispy to the touch, they are finished. The leaves, stalks, and blooms ought to crumble easily between your fingers.

Some herbs and spices can be dried by hanging them outside. Sage, parsley, thyme, and other herbs can all be hung indoors to dry. The leaves of the basil, oregano, and mint must be put into a paper bag before being hung outside to dry. Both indoors and outdoors can be used for air drying, however if drying outside, make sure to hang the herbs and spices in a shady place. Herbs that are air dried by hanging them up can take a week or more to finish drying.

In a pinch, you can dry some herbs and spices in the microwave. After two minutes on high in the microwave, check them. Microwave them for 30 seconds, then check if they're still wet. The herbs should be microwaved for a further 30 seconds to finish drying.

Dehydrating vegetables, greens and mushrooms

Vitamins and antioxidants found in vegetables lower the risk of several diseases, including cancer. These nutrients are preserved for future meals by drying vegetables at the height of their freshness. There are many ways to use dried veggies, including as side dishes, snacks, or components of soups and stews. Vegetable powders and dried veggies provide shakes, smoothies, and even desserts a flavor and nutritional boost.

All produce that will be dried needs to be free of flaws, soft spots, and mold. Past their prime vegetables won't get better in the dehydrator and may add off flavors when cooked.

Vegetables should be washed in cold water before dehydrating. Avoid soaking veggies for an extended period of time since this can remove water-soluble vitamins and hasten degradation. Instead of peeling young root vegetables, use a vegetable brush to carefully remove dirt because many nutrients are found just beneath the skin.

Vegetables are dried faster and with better color, texture, and flavor if they have been blanched first. But not all vegetables need to be blanched. For detailed instructions, consult the individual recipes.

Making uniform cuts will help ensure even drying of the vegetables (use a food processor or mandoline to help with this). The drying time is shortened and the veggies are more tasty and delicate when the pieces are uniformly small. Vegetables should be dried at lower temperatures than fruit since they have less moisture. This will prevent “case hardening.” when case hardening takes place, the vegetable’s exterior dries out and blocks the moisture inside from evaporating. Vegetables that have been case-hardened appear dry yet feel squishy in the middle. Vegetables are typically dried at 125°f.

As they dry, vegetables shrink and curl. On some dehydrator trays, when the veggies dry, you could notice that they fall through the openings. Use a tray liner if your dehydrator has wider openings to prevent vegetables from falling through.

When vegetables are totally dried, they become leathery and brittle. When bent or squashed, they will crumble or snap cleanly. Refer to individual recipes for detailed directions.

Powders and leathers

Fruits are nature’s candy but without added preservatives. You can dehydrate them in their peak season when they are cheapest and save them to enjoy all year round.

Select only good fruits that are at the peak of their maturity. Get them from the local farmers’ market or local farmers to ensure the best quality. Do not go for damaged fruits as it will yield damaged dehydrated products. They shouldn’t be too ripe (unless you want to turn them into fruits leather) for they will become too sweet and squishy after drying.

Preparing, pre-treating and drying fruits:

After selection, comes the preparation and dehydration stage. Various fruits have their specific pre-treatments, preparation steps, and drying time. Below are the general guidelines.

Apples:remove skin and core, then slice them into the desired size. Blanch for 5 minutes. Treat with ascorbic acid or citric acid to avoid discolouration. Drying time: 12 hours.

Apricots:remove the pit and slice them into the desired size. Blanch for 4

minutes and then treat with ascorbic acid or citric acid. Drying time: 8 to 24 hours.

Bananas: pick ripe banana without any green part. Peel and slice into circles. Then, treat with ascorbic acid or citric acid. Drying time: 8 to 12 hours.

Blueberries, huckleberries and cranberries: wash them and crack skin. Drying time: 12 to 24 hours.

Cherries: remove stem and pit. Cut into halves, or you can leave whole, in that case, crack their skins. Drying time: 12 to 24 hours.

Figs: use ripe figs only and crack skin. Drying time: 6 to 12 hours.

Blackberries, boysenberries, strawberries, raspberries: there's no treatment required for them. Drying time: 12 to 24 hours.

Grapes: slice the grapes in half and de-seed them. If left whole, their skin needs to be cracked. Drying time: 6 to 12 hours.

Nectarines and peaches: pit and cut them in half. Blanch for 3 minutes. Then, treat with ascorbic acid or citric acid. Drying time: 24 to 48 hours.

Pineapple: pick only ripe pineapple. Cut off the thorns and core. Slice them in $\frac{3}{4}$ inch pieces for dehydration. Drying time: 12 to 24 hours.

Fruit leather

Fruit leather is not only a tasty treat but also save your fruits from ending into the bin. You can pick your overripe fruits to make fruits leathers. What you need is a blender or food processor to blend the fruits. Cook apples, peaches, nectarines and pears before blending. Others fruits can be blend directly without cooking. Cooking is essential; otherwise, the leathers will be hard and brittle. For adding sweetness in your leathers, never use powdered or granulated sugar, for it will crystallise over time. Instead mix honey, stevia, or corn syrup.

Blend the fruit well in a blender along with lemon juice and corn starch. Corn starch prevents the leather from cracking, whereas lemon juice boosts the fruit colour along with vitamin c. If you want to increase the flexibility of the leather so can roll it up, add corn syrup while blending. The blended fruits should be flowing smoothly like applesauce. If too thick, add water or fruit juice.

Line your dehydrator trays with drying sheets (comes with most of the dehydrators) before pouring the blended fruits mixture. If you don't have one, you can go for oven liners.

Pour the puree onto the prepared trays and spread it evenly with the help of a spatula. Slapping the dehydrator trays for even spreading can also be done. Make sure it is of uniform thickness. Then, dehydrate them until there is no wet spot left, and fruit puree is like the texture of leather.

When the leather is still warm, you can roll it up in plastic wrap or parchment paper to store it. Or you can also place them flat in an individual zip-lock plastic bag or airtight jars or containers. Make sure to separate each leather with parchment paper inserted in between to keep them from sticking. Store in a cool, dry place; they will keep for up to a year.

Dehydrating meat, making jerky and dehydrating tofu, eggs and dairy

Making jerky

Beef, pork, venison, wild game and smoked turkey breast can be dry preserved to produce a dried meat product that is protein rich, does not need refrigeration, is easily stored and lightweight to carry. Best results are obtained from lean meat sources.

Health concerns

Trichinellosis/trichinosis

This is a disease caused by the consumption of undercooked or raw meat from animals infected with a microscopic parasite known as trichinella.

The infection occurs most commonly in wild, meat eating animals such as wild boar. For in depth information related to all aspects of this infection you can source plenty of reputable information from the centers for disease control and prevention at www.cdc.gov/parasites/trichinellosis/gen_info/faqs.html.

If you are planning to use wild game or pork to make jerky you need to treat the meat first in order to kill the trichinella parasite prior to slicing and marinating.

Treating meat to kill the trichinella parasite

Your meat should be cut into strips not exceeding 6 inches thick. You should then freeze these strips at 0°F or less for at least 30 days.

Safe handling of meat and poultry

All raw meats can become contaminated with microorganisms that cause disease. Use the process outlined below as the most basic guide to the safe handling of poultry and meat.

Rinse hands thoroughly with soap and running water both prior to and after handling raw meat.

Ensure that all utensils and equipment have been properly cleaned.

Clean your utensils and equipment prior to preparing different meat sources.

Poultry and meat should be refrigerated at temperatures less than 40°F. Red meat should be used within 5 days. If not used within 5 days it has to be frozen. Ground beef or poultry should be used within 2 days. If not used within 2 days it has to be frozen

Frozen meat should never be let thaw on a countertop/worktable etc. Frozen meat should always be thawed out in a refrigerator.

Meat should always be left to marinate in a refrigerator. Never leave meat to marinate outside the refrigerator.

Never re-use marinade or save it for future use.

Making jerky from wild game

There are several extra factors to consider when making jerky from wild game.

Be aware of the possibility of trichinellosis as described earlier.

Be aware of the possibility of fecal bacteria which can contaminate the meat. This often occurs as a result of animal gut contents coming into contact with the meat because of the location of the wound. It can also happen as an emanate of the transfer of bacteria from the hunter's hands which might have been in contact with the animals gut content.

Meat that has been contaminated in this manner should never be used for making jerky. If it is to be used for other purposes it should be only used in ways which require thorough cooking through of the meat.

Deer jerky: to lessen the chances of bacterial growth deer carcasses should always be rapidly chilled.

- •Preparing your meat
- •Make slicing easier by partially freezing your meat.
- •Ideally, your meat slices should not exceed ¼ inch.
- •Remove as much fat as possible.
- •If you prefer chewy jerky slice your meat with the grain.
- •If you prefer brittle jerky, slice your meat across the grain.

- If desired, you can also use a tenderizer to break up the meat fibers.
- Marinades can be used to add flavor and increase tenderness.
- Marinade recipes will include common ingredients such as salt, spices and oils as well as acidic ingredients such as lemon juice, vinegar, teriyaki and soy sauce.

How to dry your meat if using a marinade

Drain off and dispose of marinade.

Remove strips of meat and place on clean dry absorbent towels.

Use dehydrator trays or cake racks placed on baking sheets, if you plan to oven dry your meat.

Leave a small gap between each slice to allow for even distribution of hot air. Do not have meat strips overlapping or touching.

Have your oven or dehydrator pre-heated to 140°F.

It is best to utilize a test piece first. This will take about 3 hours. Your test strips of meat should crack and bend but not break.

Heated marinated meats will dry a lot faster than meat that has not been heated in marinade. Heated marinated meat will take 3 – 4 hours depending on size. Non-heated marinated meat will take between 10 to 24 hours.

Use the doneness test described in number 6, when meat is dried remove it from the oven and pat dry using clean, dry absorbent towels. Leave strips on rack to cool a little.

When strips have cooled enough to handle easily, remove from rack and let them cool down totally.

When your meat strips have totally cooled, place them in heavy, food grade, plastic storage bags. If desired you can also vacuum pack your meat.

How to make jerky from ground meat

It is more difficult to reduce the risk of bacterial infection with ground meat than it is with whole meat pieces.

Great care is necessary to be taken when handling the meat.

Always follow the procedures as described in the section on safe

handling of meat and poultry.

Always follow the directions provided by the dehydrator manufacturer.

Use different presses for shaping your meat but always thoroughly clean those shapers before switching meat types.

The key to food safety during the entire jerky making process is to follow all safety procedures and always ensure that the internal temperature of your meat reaches 160°F. A metal stem thermometer is your best friend in this process.

How to store your jerky

To maintain both the flavor and quality of your jerky it is always best to refrigerate or freeze it. If you are not refrigerating or freezing your jerky will only last for two weeks in a sealed container at room temperature.

Chapter 5

The Recipes

Avocado chips

Preparation Time: 15 minutes

Dehydration Time: 6 hours

Servings: 4

Ingredients

- 4 avocados, halved and pitted
- 1/4 tsp. Sea salt
- 1/4 tsp. Cayenne pepper
- 1/4 cup fresh cilantro, chopped
- 1/2 lemon juice

Directions

1. Cut avocado into the slices.
2. Drizzle lemon juice over avocado slices.
3. Arrange avocado slices on dehydrator trays and sprinkle with cayenne pepper, salt and cilantro dehydrate at 160 f/ 71 c for 6 hours.

Nutrition: calories: 62 fat: 5.1g protein: 1.1g carbs: 3.2g

Barbecue beef jerky

Preparation Time: 12 hours and 10 minutes

Dehydration Time: 6 hours

Servings: 4

Ingredients

- 2 lb. Beef round, sliced
- Salt and pepper to taste
- 2 teaspoons dried oregano
- 2 teaspoons ground cumin
- 1 teaspoon onion powder
- 1 teaspoon ground coriander
- 4 cloves garlic, grated
- ½ cup olive oil
- ½ cup lime juice
- 1 teaspoon red pepper flakes

Directions

1. Add the beef slices to a sealable plastic bag.

2. In a bowl, mix the salt, pepper, herbs, spices, garlic, olive oil, lime juice and red pepper flakes.
3. Pour mixture into the plastic bag.
4. Turn to coat beef slices evenly with the mixture.
5. Seal and marinate for 12 hours.
6. Drain the marinade.
7. Place the beef slices to the cosori food dehydrator dehydrator.
8. Set it to 165 degrees f and process for 6 hours.
9. Storage suggestions: keep the beef jerky in a vacuum sealed plastic bag.
10. Preparation & dehydration tip: you can also use lemon juice instead of lime juice.

Nutrition: calories 372 fat 27.5 g carbohydrates 9.6 g protein 24 g

Bbq jerky strips

Preparation Time: 15 minutes

Dehydration Time: 6 hours

Servings: 4

Ingredients

- 2 ½ pounds lean ground beef
- 2 tsp. Salt
- ½ tsp. Garlic powder
- ½ tsp. Onion powder
- 1 ½ tbsp. Brown sugar
- ¼ cup worcestershire sauce
- ½ cup barbecue sauce, slightly diluted with water

Directions

1. Mix ground beef with dry ingredients until incorporated.
2. Combine liquids and coat beef strips with sauce.

3. Press strips into jerky gun. Squeeze onto dehydrator trays and dry at 145-155 degrees for 6-12 hours.

Nutrition: calories: 54, sodium: 329 mg, dietary fiber: 0 g, total fat: 1.2 g, total carbs: 4.6 g, protein: 5.8 g.

Beef jerky

Preparation Time: 10 minutes

Dehydration Time: 6 hours

Servings: 4

Ingredients

- 2 lb. Beef eye of round
- ½ cup soy sauce
- ½ cup worcestershire sauce
- 1 teaspoon salt
- 1 tablespoon honey

Directions

1. Slice the beef eye of round across the grain.
2. Add the soy sauce, worcestershire sauce, salt and honey in a sealable plastic bag.
3. Add the beef to the plastic bag.
4. Turn to coat.
5. Place inside the refrigerator for 12 hours.
6. Drain the marinade.

7. Add the beef to the cosori premium food dehydrator.
8. Process at 165 degrees f for 6 hours.
9. Storage tips: store in a cool dry place. Store in a glass jar with lid for up to 2 weeks.
10. Tip: slices should be about 5 mm thick.

Nutrition: calories: 59, sodium: 131 mg, dietary fiber: 0.6 g, total fat: 1.1 g, total carbs: 5 g, protein: 5.6 g.

Beef teriyaki jerky

Preparation Time: 12 hours and 10 minutes

Dehydration Time: 6 hours

Servings: 4

Ingredients

- 2 lb. Beef round, sliced
- $\frac{1}{4}$ cup brown sugar
- $\frac{1}{2}$ cup soy sauce
- $\frac{1}{4}$ cup pineapple juice
- 1 clove garlic, crushed
- $\frac{1}{4}$ teaspoon ginger, grated

Directions

1. Add all the ingredients in a bowl.
2. Mix well.
3. Transfer to a sealable plastic bag.
4. Add the beef to the plastic bag.
5. Marinate in the refrigerator for 12 hours.
6. Discard the marinade before dehydrating.

7. Add to the cosori premium food dehydrator.
8. Process at 165 degrees f for 6 hours.
9. Storage suggestions: keep in a glass jar with lid or vacuum sealed bag.
10. Tip: beef should be sliced at least 5 mm thick.

Nutrition: calories 129 fat 3.6 g carbohydrates 23 g protein 2.3 g

Bold beef jerky

Preparation Time: 15 minutes

Dehydration Time: 6 hours

Servings: 4

Ingredients

- 2 pounds sliced lean meat
- ¼ cup soy sauce
- 1 tbsp. Worcestershire sauce
- 1 tsp. Hot sauce
- ¼ tsp. Pepper
- ¼ tsp. Garlic powder
- ¼ tsp. Onion powder
- ¼ tsp. Paprika
- 1 tsp. Liquid smoke

Directions

1. Cut strips into ¼ inch thick slices.
2. Mix all ingredients and coat meat strips.
3. Cover and refrigerate overnight.

4. Place meat slices on dehydrator trays and dry at 145-155 degrees for 6-6 hours.

Nutrition: calories: 51, sodium: 27 mg, dietary fiber: 0 g, total fat: 1.7 g, total carbs: 0 g, protein: 8.3 g.

Broccoli chips

Preparation Time: 15 minutes

Dehydration Time: 12 hours

Servings: 4

Ingredients

- 1 lb. Broccoli, cut into florets
- 1 tsp. Onion powder
- 1 garlic clove
- ½ cup vegetable broth
- ¼ cup hemp seeds
- 2 tbsp. Nutritional yeast

Directions

1. Add broccoli florets in a large mixing bowl and set aside.
2. Add remaining ingredients into the blender and blend until smooth.
3. Pour blended mixture over broccoli florets and toss well.

4. Arrange broccoli florets on dehydrator trays
and dehydrate at 115 f/ 46 c for 10-12 hours.

Nutrition: calories: 106 fat: 4.3g protein: 8.7g carbs: 11.2g

Nutrition: calories 382 fat 1.2 g carbs 67.1 g protein 26.1 g

Brussels sprout chips

Preparation Time: 15 minutes

Dehydration Time: 6 hours

Servings: 4

Ingredients

- 2 lbs. Brussels sprouts, wash, dry, cut the root and separate leaves
- 2 fresh lemon juice
- 1/2 cup water
- 1/4 cup nutritional yeast
- 1 jalapeno pepper halved and remove seeds
- 1 cup cashews
- 2 bell peppers
- 1 tsp. Sea salt

Directions

1. Add brussels sprouts leaves to the large bowl and set aside.

2. Add bell peppers, water, lemon juice, nutritional yeast, jalapeno, cashews, and salt to the blender and blend until smooth.
3. Pour blended mixture over brussels sprouts leaves and toss until well coated.
4. Arrange brussels sprouts on dehydrator trays and dehydrate at 125 f/ 52 c for 6 hours.
5. Allow to cool completely then store in air-tight container.

Nutrition: calories: 237 fat: 11.7g protein: 12.3g carbs: 27.7g

Buffalo jerky

Preparation Time: 15 hours and 10 minutes

Dehydration Time: 6 hours

Servings: 4

Ingredients

- 2 lb. Beef round, sliced
- 1 teaspoon salt
- 1 cup buffalo sauce

Directions

1. Season the beef slices with the salt.
2. Add the buffalo sauce to a bowl.
3. Stir in the seasoned beef.
4. Cover the bowl.
5. Refrigerate for 15 hours.
6. Drain the marinade.
7. Add the beef slices to the cosori premium food dehydrator.
8. Process at 165 degrees f for 6 hours.

9. Storage suggestions: place the beef jerky in a sealable glass container. Store for up to 2 weeks.
10. Tip: you can also add hot sauce to the marinade for extra zing.

Nutrition: calories 372 fat 27.5 g carbohydrates 9.6 g protein 24 g

Candied bacon

Preparation Time: 12 hours and 10 minutes

Dehydration Time: 6 hours

Servings: 4

Ingredients

- 10 slices bacon
- 3 tablespoons brown sugar
- 3 tablespoons soy sauce
- 2 teaspoons mirin
- 2 teaspoons sesame oil
- 2 tablespoons chili garlic sauce

Directions

1. Slice each bacon strip into 3 portions.
2. Add the rest of the ingredients in a bowl.
3. Mix well.
4. Add the bacon slices in the mixture.
5. Cover and refrigerate for 12 hours.

6. Add the bacon to the cosori premium food dehydrator.
7. Dehydrate at 165 degrees f for 6 hours.
8. Storage tips: store candied bacon in a glass jar with lid for up to 2 weeks.
9. Tip: add chili powder to the marinade if you want your candied bacon extra spicy.

Nutrition: calories: 59, sodium: 131 mg, dietary fiber: 0.6 g, total fat: 1.1 g, total carbs: 5 g, protein: 5.6 g.

Carrot crackers

Preparation Time: 20 minutes

Dehydration Time: 12 hours

Servings: 12

Ingredients

- 6 large carrots, peeled
- 1/2 cup ground flax seeds
- 1 tomato, diced
- Juice from 1 lemon
- 1/2 cup sesame seeds
- 1/2 cup chia seeds
- 3/4 cups water

Directions

1. In a food processor, combine the carrots, flax seeds, tomato, lemon juice, and water, and pulse until a paste forms. Add the chia seeds and sesame seeds and stir to combine.

2. Place paraflexx screens on the racks of your excalibur food dehydrator. Spread the paste evenly on the screens about 1/4 inch thick.
3. Set your excalibur to 105f and dehydrate for 12 hours. Remove the crackers from the excalibur and allow cooling completely. The crackers will become crispy as they cool.

Nutrition: calories: 122 fat: 7.4 g, carbs: 10.8 g protein: 3.9 g.

Cucumber chips

Preparation Time: 15 minutes

Dehydration Time: 6 hours

Servings: 4

Ingredients

- 3 cucumber, sliced into rounds
- 1 tablespoon avocado oil
- 2 teaspoons apple cider vinegar
- Salt to taste

Directions

1. Toss the cucumber slices in avocado oil and vinegar.
2. Season with the salt.
3. Add the cucumber slices to the cosori premium food dehydrator.
4. Dehydrate at 135 degrees f for 6 hours.
5. Storage suggestions: store in an airtight container.

6. Tip: you can use a mandoline slicer to slice the cucumbers thinly. Dry the cucumber slices with a paper towel before processing.

Nutrition: calories: 9, sodium: 0 mg, dietary fiber: 0 g, total fat: 0 g, total carbs: 2.1 g, protein: 0.2 g.

Dehydrated beets

Preparation Time: 20 minutes

Dehydration Time: 12 hours

Servings: 4

Ingredients

- 3 beets, sliced thinly
- 1/4 cup water
- 1/4 cup vinegar
- 1 tablespoon olive oil
- Salt to taste

Directions

1. Combine all the ingredients in a bowl.
2. Marinate for 10 minutes.
3. Arrange the beet slices in the cosori premium food dehydrator.
4. Dehydrate at 135 degrees f for 12 hours.
5. Storage suggestions: store in a sealable plastic bag.

6. Tip: use a mandoliner slicer to slice the beets
thinly.

Nutrition: calories 70, fat 4, fiber 4, carbs 30, protein 2

Dehydrated okra

Preparation Time: 15 minutes

Dehydration Time: 12 hours

Servings: 4

Ingredients

- 12 okra, sliced

Directions

1. Add the okra to the cosori premium food dehydrator.
2. Dry at 130 degrees f for 12 hours.
3. Storage suggestions: store in an airtight container.
4. Tip: sprinkle with powdered herb or spice for added flavor.

Nutrition: calories 70, fat 4, fiber 4, carbs 30, protein 2

Dehydrated tomatoes

Preparation Time: 20 minutes

Dehydration Time: 8 hours

Servings: 2

Ingredients

- 2 tomatoes, sliced into quarters
- Salt to taste

Directions

1. Add the tomatoes to the cosori premium food dehydrator.
2. Sprinkle with salt.
3. Set to 135 degrees f.
4. Process for 8 hours.
5. Storage suggestions: store in a sealable plastic bag. Squeeze out the air. Store for up to 2 months in a cool dry place.
6. Freeze and store for up to 6 months.

7. Tip: don't forget to scrape the seeds before drying.

Nutrition: calories 250 fat 7.6 g carbs 41.8 g protein 4.5 g

Dried bell peppers

Preparation Time: 10 minutes

Dehydration Time: 24 hours

Servings: 4

Ingredients

- 4 bell peppers cut in half and de-seed

Directions

1. Cut bell peppers in strips then cut each strip in $\frac{1}{2}$ inch pieces.
2. Arrange bell peppers strips on dehydrator racks and dehydrate at 135 f/ 58 c for 12-24 hours or until crisp.
3. Store in air-tight container.

Nutrition: calories: 38 fat: 0.3g protein: 1.2g carbs: 9g

Dried cauliflower popcorn

Preparation Time: 15 minutes

Dehydration Time: 8 hours

Servings: 1

Ingredients

- 2 cups cauliflower florets
- 4 tablespoons hot sauce
- 3 tablespoons coconut oil
- 1 teaspoon smoked cayenne
- ½ teaspoon ground cumin
- 1 tablespoons paprika

Directions

1. Toss the cauliflower florets in hot sauce and coconut oil.
2. Sprinkle with the smoked cayenne, cumin and paprika.
3. Add the seasoned cauliflower to the cosori premium food dehydrator.

4. Dry at 130 degrees f for 8 hours.
5. Storage suggestions: store in an airtight plastic bag.
6. Tip: add more cayenne pepper for spicier cauliflower popcorn.

Nutrition: calories: 9, sodium: 0 mg, dietary fiber: 0 g, total fat: 0 g, total carbs: 2.1 g, protein: 0.2 g.

Dried parsley, basil oregano powder

Preparation Time: 15 minutes

Dehydration Time: 8 hours

Servings: 5

Ingredients

- 2 tablespoons parsley leaves
- 2 tablespoons basil leaves
- 2 tablespoons oregano leaves
- 2 tablespoons brown sugar
- 2 tablespoons salt

Directions

1. Add the herb leaves to the cosori premium food dehydrator.
2. Dehydrate at 135 degrees f for 8 hours.
3. Transfer the dried leaves to a food processor.
4. Stir in the sugar and salt.

5. Storage suggestions: store in a mason jar with lid.
6. Tip: you can also skip the sugar and salt, and simply mix the dried herbs.

Nutrition: calories 98, fat12, carbs 16, protein 8

Dried sweet potato

Preparation Time: 10 minutes

Dehydration Time: 12 hours

Servings: 4

Ingredients

- 2 sweet potatoes
- 1 teaspoon onion powder

Directions

1. Season the sweet potato slices with onion powder.
2. Arrange in a single layer in the cosori premium food dehydrator.
3. Set at 115 degrees f.
4. Process for 12 hours.
5. Storage suggestions: store in a sealable plastic bag.
6. Tip: use a mandolin slicer to prepare the sweet potatoes.

Nutrition: calories 70, fat 4, fiber 4, carbs 30, protein 2

Fall carrot chips

Preparation Time: 15 minutes

Dehydration Time: 6 hours

Servings: 4

Ingredients

- 1 pound of carrots, peeled
- 3 tbsp. Melted coconut oil
- $\frac{3}{4}$ tsp. Salt
- 2 tsp. Allspice (or combination of cinnamon, allspice or nutmeg)

Directions

1. Wash, dry and slice carrots into uniform disks.
2. Mix together carrots, oil, salt and allspice.
3. Place carrots onto dehydrator trays and dry for 6-6 hours at 125 degrees or until crisp.

Nutrition: calories: 11, sodium: 337 mg, dietary fiber: 0.7 g, total fat: 0 g, total carbs: 2.7 g, protein: 0.2 g.

Flax crackers

Preparation Time: 4 hours and 10 minutes

Dehydration Time: 24 hours

Servings: 12 crackers

Ingredients

- 1 ½ cups water
- 1 clove garlic, minced
- ¾ cup golden flax seeds
- ¼ cup flax seeds
- 3 teaspoons sesame seeds, crushed
- 3 teaspoons poppy seeds, crushed
- 3 teaspoons garlic flakes
- 3 teaspoons onion flakes
- 3 teaspoons salt

Directions

1. Add the water and garlic in a blender.
2. Blend until smooth.
3. Pour the mixture in a bowl with the flaxseeds.

4. Soak for 4 hours.
5. Spread the gelatin mixture in the cosori premium food dehydrator.
6. Score the crackers with a knife.
7. Combine the remaining ingredients in a bowl.
8. Sprinkle the mixture on top of the crackers.
9. Process at 110 degrees f for 24 hours.
10. Storage suggestions: store in a glass jar with lid for up to 5 days.
11. Tip: make your own garlic and onion flakes.

Nutrition: calories: 122 fat: 7.4 g, carbs: 10.8 g protein: 3.9 g.

BOOK 13
FREEZE DRYING COOKBOOK
FOR PREPPERS

THE COMPLETE GUIDE TO
FREEZE DRYING WITH EASY
TASTY AND AFFORDABLE
FREEZE DRIED RECIPES FOR
LONG-TERM SURVIVAL

Introduction

The safest food preservation methods—learned through centuries of trial and error—must come first because they will help us maintain the standard of cleanliness and quality of food that is kept in storage. The good news is that you can do it in any circumstance if you have the proper guidance and tools.

Whether food is prepared for consumption at home, in a commercial kitchen, or for direct sale to clients, food preservation refers to the methods used to prepare food for safe, long-term storage. Because preservation procedures prevent bacterial development and other forms of decomposition, preserved food will be safe and delectable to consume in the future.

Food is ingested to give the body with the nutrients it needs for development, energy, and medicinal purposes. Due to the erratic availability of food and uneven production curves, preservation techniques have been used historically since very early times. Processing is the preservation of food products to provide seasonal agricultural products with additional value by killing microorganisms that cause food spoiling to assure public health safety.

The main phases and variables in the freeze-drying process are the focus of this study. A study of rotting chemistry is crucial in the preservation sciences since seasonal agricultural goods require preservation. Because lyophilization has a low process enthalpy and an early freezing step that barely decreases the product structure, it is unique in drying fragile and thermosensitive items. As a result, its evolution and expansion happen very quickly. The effectiveness of the freeze-drying is controlled by process variables such product thickness, chamber pressure and temperature, freezing, primary drying, and secondary drying. Thermal conductivity, thermal diffusivity, specific heat, density, and enthalpy are among the thermal and freezing product attributes that affect the process parameters.

Lets get started:

Chapter 1

What is freeze drying

Heat energy diffuses the moisture during the combined heat and mass transfer unit activity known as drying. Food goods are dried to create new products, use seasonal foods, and meet consumer convenience while maintaining quality elements like wholesomeness, safety, and nutrition. Nutrient and total solid content of dried fruits is high. Products that have been dried are lighter and easier and less expensive to transport. Customers use sensory analysis to judge a product. Customers want processed goods with consistent physiochemical qualities with those of fresh products.

There are many different types of drying equipment used, including tunnel (Oregon, kiln, cabinet, tower, cross flow, center exhaust, concurrent and counter-current) dryers and the sun, foam mat, puff, conveyer, spray, vacuum, drum, radiant heating, continuous infrared, microwave, and dielectric heaters. These losses can be turned into beneficial goods that promote food security through freeze drying. In terms of the finished product, freeze drying is the most effective procedure. There are various types of freeze-drying machinery, including coupled dielectric energy and coupled infrared heat energy freeze dryers, cabinet or batch, tunnel or semi-continuous, continuous, vacuum spray, and so on. Any climatic factor, like sun drying, has no impact on freeze drying. The least intense temperature is used during freeze-drying, lyophilization, or cryodesiccation, which results in the highest-quality final products. Due to early freezing and sublimation, the product's volume is marginally reduced. Freeze drying is thought to be the finest process for dehydrating agricultural (beef, fruits, vegetables, dairy products) and medicinal (protein hydrolysates, blood plasma, vitamins preparation, penicillin, hormones) products due to its wide range of industrial applications.

How can it help preppers have delicious, stored meals

There are a few things that you can do on your own so that you won't have to spend money on a freeze dryer, but I'm not sure how reliable those methods are.

Harvest Right was where I made my purchase for a freeze drier of medium size. So far? It's wonderful! Three months ago, I had a few problems with it, and I called their customer service line. After about a week of trial and error (during which they had to ship me some things), we were able to work it out, and I was able to continue with my day. Many individuals have the misconception that doing the freeze-drying process on their own is quite impossible. This is not even close to being true. Harvest Right is a company that makes it simple to freeze dry food at home. They sell freeze-drying machines of three different sizes, each of which is capable of doing everything in the machine itself except preparation and packaging. That is up to you to decide.

The medium-sized freeze drier is the one that we make use of here at Freeze Drying Mama. You can view the sizes that are available at Harvest Right by clicking [here](#).

The first thing that this machine does is freeze the food items, which are placed on stainless steel trays, to a temperature of -41 degrees or lower. This takes approximately ten hours to complete. After that, a vacuum pump is activated, which pulls air out of the drum and leaves it in a state of vacuum. This is the drying step, and the temperature of the tray will oscillate up and down to a rather heated degree as it goes through this process. This causes the frozen things to discharge any water that is trapped inside of them in the form of vapor. The vacuum draws the moisture to the drum, and as it does so, it condenses into the form of ice on the drum's innermost ring. The next step is the final dry, which is essentially the same process as the previous one but has a time limit attached to it.

Does food lose nutrients when it is frozen?

Almost nothing compared to what you might expect. According to various figures I saw online while looking for other information, freeze-dried foods retain 99% of their original nutritional value. Foods that have been canned, frozen, or dried can lose up to 60% of their original nutritional value during just the first step in the preparation process. In light of these data

There are some nutrients lost during pretreatment and drying. Any time

the food is exposed to heat, light or oxygen, there will be some degradation of nutritional value. The longer the exposure, the greater the damage. Most fruits start degrading as soon as they're harvested. This degradation is sped up by cutting into them or otherwise exposing the flesh to oxygen.

Many fruits contain enzymes that react to the air and cause browning and nutrient loss to begin as soon as they're cut into. If you've ever left an apple or a banana out for a while and seen it turn brown, you've seen these enzymes in action. This reaction to the oxygen in the air can be slowed to a crawl by pretreating or blanching the fruit after it's been cut.

Commercial foods that undergo intense treatment lose a lot more nutrients than fruit dried at home. While commercially dried foods can lose up to 80% of certain vitamins, foods dried at home usually don't come anywhere near that magnitude.

Take the following precautions to reduce the amount of vitamins lost while treating and drying produce:

Carefully regulate heat.

High heat can accelerate nutrient loss, so its important heat is monitored closely. Using a dehydrator allows you the most control over the amount of heat drying food is exposed to. Blanching also exposes food to heat and can damage nutrients, but may be critical to ensuring food can be properly stored. Blanching isn't as critical of a process with fruit as it is with vegetables.

Move food into pretreatment shortly after it's been cut.

Time is of essence when treating fruit that's prone to discoloration. It's important to slow down enzymatic reactions as early as possible to avoid nutrient loss.

Store dried food in an airtight container.

This will minimize the amount of air the food comes in contact with. If air is allowed into the container, the food can take up moisture from the air, drastically shortening how long the food will last.

Store food in small, single-serving containers.

Every time you open a container, more air is let in. Using single serving containers only exposes the food you plan on eating to new air.

No minerals are lost during the drying process, but pretreatment can cause some mineral loss. Boiling or otherwise exposing fruit to water may cause some of the minerals to leach out into the water. This can

happen during blanching and again during rehydration. The drying process itself doesn't affect minerals.

Calories and sugar are largely unaffected by the drying process, but they will be concentrated into a smaller package.

For this reason, it's important not to overeat when it comes to dried fruit and vegetables. They can be a healthy part of most diets, but only if consumed in moderation.

Work on small batches of food at a time.

When you work on large batches and try to get a lot of fruit done at once, the pieces you cut into first are left to sit out while you process the rest of the produce. This can result in the earlier pieces degrading a lot faster than those cut later on.

How to prepare foods for freeze-drying

One major advantage is that dehydration can be accomplished without additional cooking. As a result, freeze-drying maintains a food's original nutritional value without affecting its flavor, texture, or appearance. Another advantage is the time saved in food preparation as the traditional way of cooking is not required. As a result, people who dislike cooking can still enjoy nutritious food while it is still at its peak of freshness.

Due to the lack of water, the freeze-drying technique gives food a lengthy shelf life. The process produces a stable dry product since it lacks moisture and bacteria. Due to the food's stable and long-lasting state, it is also simple to preserve since it can be put right into a freezer. Foods just need to be warmed up till they reach their original temperature before they can be consumed thanks to the preservative method.

Some perishable goods are also preserved using the freeze-drying method. Food items must be appropriately packed while being processed in the freezing machine to guarantee that they are reliably preserved through freeze drying. For instance, before the freeze-drying process begins, some varieties of meat must be frozen at temperatures between -20 and -40 °C.

Foods that have been freeze-dried are also very practical because they can be transported easily and have a long shelf life. Food does not need to be transported right away thanks to the freeze-drying preservation procedure. Instead, it can be frozen and yet maintain its safety, quality,

and nutritional value upon arrival. In addition, the food can be transported at room temperature, saving money in comparison to other preservation techniques that call for cold storage facilities along transportation routes. Furthermore, if properly packaged, freeze-dried food can be kept on the shelf for many years.

Additionally practical is freeze-dried food's ease of storage. Food contains no water that could expand and harm the packaging or the food itself, so it can be stored for a long time without fear of freezer burn. Food can also be sterilized by freeze-drying since freezing kills harmful bacteria.

Freeze-dried food from a survival standpoint

Yes, in the present day, prepping for survival is a hot topic of conversation amongst practically everyone. paying more for less-than-optimal preparations than would otherwise be necessary.

Imagine if you could get more out of your budget. The initial investment in freeze-drying equipment is quickly recouped, making the process financially viable in as little as eight months. We make a living by selling the freeze-dried goods we produce, a service we provide for others in exchange for the commodities we need to continue running our business: food, storage equipment, and other goods.

Chapter 2

Science Behind Freeze-Drying

When a food is frozen, the food shrinks and deforms less. In order to create a vacuum, a vacuum pump must drop the pressure below the triple point of water while continuously monitoring it with sensors like a capacitance manometer.

Heaters offer the sublimation's latent heat. A refrigerated condenser is used by the vacuum pump to draw sublimated vapors from the process chamber and condense them into ice. The ice/sublimation front advances when ice molecules sublime, which causes the drying rate to slow down.

Distillation is slowed down by low pressure or vacuum. Comparing to drying procedures, the volume reduction when removing ice from a porous material is minimal. A refrigerated condenser can be used to recover evaporated vapors that have been lost during drying.

The microscopic porous structure helps reconstitution by effectively recapturing the maximum amount of water, enhancing product quality, regaining crispy texture, and cutting down on the rehydration cycle time.

Food formulations, baby foods, prepared meals, nutraceutical foods, organoleptic foods, and specialized end foods for armies and space missions all involve processed foods. Both thermal and non-thermal methods can be used to process agricultural goods. Non-thermal processing makes use of non-thermic processes, including high-pressure processing, lightgasses, chemicals, and ionizing radiation. Thermal processing involves applying heat treatment at ambient temperature levels through processes like extrusion, freezing, blanching, pasteurization, radiofrequency heating, drying, chilling, and frying. In Pakistan, thermal processing is mostly used to produce food.

Ascorbic acid, nutrients, and vitamins should all be retained to the greatest extent possible during the drying process, which should also shorten processing times and cut down on medical expenses. Fruits, vegetables, and meat are solid (and are freeze-dried), whereas raw liquid materials are also (homogenous solutions). There is no need for raw material pre-treatment because the freeze-drying procedure may be finished in three major stages.

Water in a sample food is frozen below its eutectic temperature using a plate, blow, immersion, or liquid blow freezing technique. When 95 percent of the water has turned into ice, freezing has been accomplished. The distribution of pore size changes when something is frozen.

The best freezing rate must be selected because it affects the drying rate and the final product's quality. Cryo-microscopy, differentiating scanning calorimetry, and methods based on time versus temperature curves are a few examples of thermal analysis techniques that can be used to identify the eutectic point.

The rate of freezing controls the formation of crystals and the morphology of ice. The tissues of the product are damaged by slow freezing, which also reduces the effectiveness of rehydration. Slow freezing produces larger crystals, a porous structure, and an increased drying rate. Accelerated freezing generates minute ice crystals that facilitate rapid drying and strong nucleation.

The process chamber pressure is lower than the ice vapor pressure in the sample material to sublime ice. Latent sublimation heat is provided by conduction and radiation via the bottom and top plates. A dry layer forms on the top surface of the sample product as a result of initial drying or ice sublimation. The drying pace is determined by diffusion through this half dry layer or heat transport through the frozen and dry layers. Diffused vapors are condensed using a chilled condenser, and non-condensable gases are removed by a vacuum pump. This is the most time-consuming stage of the freeze-drying process.

A temperature range of -10 to +10 is maintained during first drying. Because convection lacks a medium due to the absence of air, heat transfer can only occur through conduction or radiation. The product is heated to a temperature that is lower than its glass transition temperature. The condenser temperature should be lower than the product temperature during first drying. The maximum heat should be smaller than the eutectic temperature, as this increases the pressure difference between the condenser and the product. When the product and shelf temperatures reach the same, heat transfer ceases, resulting in reduced system pressure and condenser temperature values due to no evaporated load. Using comparable pressure measuring methods, the end of first drying can be reliably identified.

The nutritional value, heat-sensitive components, color, shape, texture, size, aroma, and flavor of agricultural goods are all preserved by freeze-drying. The continual advancement of freeze-drying, as well as future

elements, make its implementation quite possible. Freeze-drying is an ancient technique that has evolved and continues to improve based on the chemistry of the exposed product. Freeze-drying, on the other hand, has a high process and fixed cost. The freeze dryer freezes the product's water before sublimating it with latent sublimation heat and then increasing the heat to eliminate any leftover water.

Methods to Store Freeze Drying Food

Currently, your food options are freeze-dried. What would be a significant next step for you? When food sources have finished drying, place them in a plastic sack or compartment that seals.

There is no compelling reason to keep the items in the refrigerator or more relaxed. If all else is equal, store them in a cool place with temperatures no higher than 75°F.

This could be a root cellar, storage room, or bureau in many homes.

Food security did not appear to be this simple for many years, but we are fortunate. You can dry your food for long-term storage in just a few hours.

You can also store it for an extended period without any special requirements. You may have considered freeze-drying if you're looking for a simple way to save food.

Chapter 3

How-to Freeze-Drying Works

Freeze drying machines are pretty standard for industrial or laboratory purposes-but the technology has made its way into kitchens and homes across the world. It is the way of the future to keep food safe and maximize its preservation.

Let's start at the beginning. After your fresh food has been harvested (i.e. Grapes, apples, vegetables), it is brought through an intake area where it is cleaned and prepped for freezing.

It then goes onto a pre-chill room, where it is slowly cooled to temperatures around 200 degrees Fahrenheit. This slows down the freezing process, which lasts up to 12 hours. The food is then frozen solid.

The food is then taken into another freezer for about a week (depending on the volume and volume-to-weight ratio of your food), where it is allowed to 'cure'. After this day, the food will have been allowed time to thaw (about 2 days) and can be used.

These steps are necessary to ensure that the food retains as much nutritional value and quality as possible.

Once the food is frozen, it is transferred to a hopper, broken into small pieces and passed through a series of filters. These filters eliminate any air from within your food. The air is replaced with nitrogen or argon gas, which preserves the food (the exact gases depend on your needs and your manufacturer's specifications).

The food then enters a chamber where it is exposed to a vacuum. Within this chamber, the water molecules within the particles of your food begin to evaporate and are removed from the food via this vacuum.

This process is repeated until all the frozen or unfrozen moisture has been removed from your food, leaving behind the nutrient-rich powder you know and love.

Once all of your product has been processed, it is placed into a container and then re-frozen. The cycle can be repeated as often as possible until your food is ready to eat!

Freeze Drying Without a Machine

It's easy to freeze-dry with a machine, but it's not very difficult without one.

The duration of the interaction is the primary distinction between utilizing a machine and not using one. Without a machine, you should dry food as you normally would before securing it in some other way. Place the meal on an air-drying rack once it is done cooking so that the air can completely surround it. The platter should be placed in a deep cooler and left there. Instantaneously, the food will freeze. In a few weeks, the food will become dried out.

By removing one piece, you can see that the meal has completely dried out. The interaction is complete if the food doesn't change color while it defrosts.

The four stages in the process of freeze drying

Pretreatment

With regards to food, this is about its correct preparation to ensure the success of the whole process. Although whole meals can be freeze-dried, some products require to be treated individually to achieve the best results and be properly prepared. When choosing your food item, always pick the freshest and wash thoroughly to remove any unwanted dirt, particles, and contaminants. This will ensure the result will be at its best when consumption takes place. Also cutting some foods into small pieces (such as fruit and vegetables) will help in the expulsion of water during the freeze-drying process.

Freezing

The food product is frozen under atmospheric pressure. During this stage, the food is frozen often at a temperature below which the phases (solid, liquid, gas) that the item goes through exist. These low temperatures will ensure the item goes from a solid to a gas state, avoiding melting. This is fine for other items, but with food, it can cause ice crystals to form inside which would affect the texture and nutrient content of the food.

To avoid this the freezing process is done rapidly, taking the item below its melting point. This prevents the formation of large ice crystals

thereby preserving the food item perfectly. A temperature of around -50 C (-58 F) to -80 C (-112 F) is often the chosen setting used.

Primary drying

During this phase, the pressure is lowered to the extent that any frozen excess water is removed (known as the sublimation stage).

Secondary drying

During this phase, the pressure is normally lower and the temperature is raised to allow desorption drying to take place. This is where any remaining water is removed from the product and the item reaches its ideal humidity.

Freeze Drying with a machine

Purchasing one of these machines could be a good idea if you want to start a commercial freeze-drying operation or are just curious in the process. Owning a farm or fruit orchard means you will benefit greatly from investing in a freeze-drying machine. Not having a freeze drier at home would not save you much time if you need to quickly prepare food for storage. Alternative approaches are better if you need results quickly and effectively. It is forbidden to overload the freeze dryer's trays and containers. Thin slices of meat and fruit can dry in as little as one day, but larger, thicker chunks of food can take three days.

If you want to dive headfirst into freeze-drying, you need know that there are three phases involved in making a quality freeze-dried product. A freeze-drying machine can be purchased, or one can be improvised with the help of online resources like YouTube. Building a vacuum chamber at home is a rather straightforward process, and there are several guides available to help you do it.

Freezing is the first stage in building a homemade freeze-drying apparatus. You'll need a sturdy freezer that can hold up to -30 degrees Fahrenheit. In addition to using flash freezing with liquid nitrogen, you can do this with either method. Second, a vacuum pump and a vacuum-sealed container are required to remove excess moisture from food. Second, there is the process of first drying, also called sublimation. In the end, there occurs a process called desorption, which is a type of secondary drying. In order to evaporate any remaining moisture, you should install a thermostat and heater on the rig. This is necessary so that the temperature of the chamber can be changed and the sublimation

process can be repeated. To check if all of the moisture has been removed from your food items, you'll also need a humidity sensor.

With this information in hand, you should ponder the following before embarking on your freeze-drying journey: I'm curious as to your plans for this. What other outdoor activities outside camping and backpacking do you plan on engaging in with it? Do you plan to stockpile cooked goods and freeze-dry them for later use? Alternatively, you can be a "doomsday prepper," someone who stocks up on supplies in case the world ends or nuclear war breaks out.

No of your motivation, a freeze-drying machine is not cheap. In almost all cases, thinking about why you feel the way you do is the best course of action. You don't want to waste a grand on tools that will get used once and then sit in your storage room. These appliances are not only cumbersome but also take up a lot of valuable counter space in your kitchen.

Freeze-drying is an excellent method for extending the shelf life of perishable food items or extra produce from the garden. The process of sublimation evaporates or sublimates the water from the meal. Because almost all of a food's nutritional value is preserved during freeze-drying, it is one of the finest methods for long-term storage.

The nutritional value of food is reduced by half and its flavor and color are altered when it is canned or dehydrated. The shelf life of freeze-dried foods is 25 years, regardless of whether they are kept in the freezer, the pantry, or the basement. They're lightweight and compact, so you may take them camping or use them in an emergency. If they do not have a freeze-dryer, most homeowners can still get their hands on dry ice and a freezer.

Harvest Machine

Freeze-drying works by lowering the water content to -40 degrees Fahrenheit, preventing the ice from melting when heated again. This means that the food is still edible after being freeze-dried.

Harvest Right freeze-drying machines are designed for small enterprises and individual use. They're designed to be simple to use, which means they're not as complicated as some freeze-drying machines. This allows you to focus on preserving the food rather than the machine's settings. The Harvest Right freeze-drying machine has a pump that circulates coolant throughout the system. This enables it to transport heat away

from the product and through the condenser coils. The following stage is to remove the heat, which is routed through a series of radiators before returning to the system.

This constant circulation keeps the freeze-drying chamber cool enough to freeze-dry food without melting the ice. This cold process is kept going by Harvest Right's climate control system. These systems are designed to eliminate heat generated by the pump as well as any hot air or steam within the system.

Harvest Right freeze dryers function best with little products, such as fruits and vegetables, thanks to the vacuum chamber. It also allows you to add different tools depending on what you're attempting to accomplish. Instead of having one vacuum chamber, it may have three connected by a series of tubes.

This allows you to delete the air from the vacuum chamber and any other parts that could be affected by air contact. The vacuum chamber is what freeze-dries your product. It's meant to maintain the temperatures required to keep its contents frozen as they dry out. Including a humidification system ensures that no condensation forms on your product during the drying process.

The FT4N model is a popular Harvest Right freeze-drying machine. This specific Harvest Right freeze-drying machine may accommodate up to four trays at once. It also has an extra tray option, making it a 6-tray freeze dryer. Each of these trays is 9" x 13" and is 5/8" thick. It's compatible with standard mason jars, so you may use it with this freeze dryer with ease.

There are numerous advantages to having a Harvest Right freeze-drying machine in your kitchen. In addition to being able to freeze dry your food, you can also dehydrate it.

Dehydration takes far less time and energy than freezing, making it ideal for when you're in a hurry yet still want to preserve your food. During the freeze-drying process, the temperature is reduced to -40 degrees Fahrenheit. This creates an atmosphere within the machine that encourages the formation of ice crystals on the product's surface.

The pump then extracts the water from the product and transports it to the condenser. The condenser takes the heat from the product, causing it to solidify more.

Because this solid weights less than its liquid form, it may be withdrawn from whichever medium it was frozen in and placed in a dish. Fill this

bowl with hot water to melt the frozen food back into its original liquid state.

We'd recommend the Harvest Right FT4N model out of all the freeze-drying machines available.

What can be frozen and dried

A safer and arguably more flavorful method of food storage than canning is freeze drying. When compared to canning, freeze-dried foods may be simpler to prepare in advance and take up less time in the kitchen.

Fruits: Fruits are a common type of freeze-dried food. The list of fruits and berries below includes a variety of them.

plums, cherries, cranberries, kiwis, mangoes, grapes, grapeseed oil, and so on. People freeze-dry well and make a delicious dessert or quick meal because they don't include any added sugar or preservatives. For those whose diets fall short on vitamin C, cranberries are a healthy supply. Cherries contain a lot of antioxidants. When added to milkshakes, salads, and smoothies, kiwis are a great addition.

Berries: Strawberries and blackberries are two berries that freeze well. Various components, including sweeteners (sugar or honey), fruit pectin, or gelatine, may be required for other berries. These berries need additional preparation because they don't always freeze well (for example, blackberries turn to purple mush when frozen).

Vegetables: The four vegetables listed below are a great illustration of how various vegetables behave when frozen. They consist of corn, potatoes, Brussels sprouts, and spinach. Before purchasing a large quantity, start with small batches of each vegetable because not all vegetables freeze well. (For example, after being dried, corn gets more grungier. Instead of eating them one at a time, Brussels sprouts can be utilized as an ingredient in other dishes because they have a powerful flavor when freeze-dried.)

Dairy products: Unlike freeze-dried eggs or vegetables, freeze-dried milk won't upset your stomach because lactose, the sugar in milk. Additionally, milk will be stored without any preservatives.

Greek yogurt, regular yogurt, whey, cream, and butter. Yogurt is a fantastic source of vitamin B12 and protein. Whey is a valuable source of minerals and calcium for both pregnant women and young children.

The cream has a similar consistency and flavor like butter and won't

curdle when heated, making it a great replacement for butter for cooking or making desserts. A low-carb diet can benefit from the availability of butter in powder form, which can be added to other dishes by adding water. Additionally, it has a lot of healthy fats like vitamin E and beta carotene, which guard against heart disease and cancer.

Seeds: Another common category of freeze-dried foods is dried seeds. The most common ones are soybeans, sunflower seeds, and vegan bars.

Flaxseed, pumpkin, chia, and sunflower seeds, as well as sesame seeds. Sesame seeds are rich in fiber and protein, both of which aid to regulate blood sugar levels and decrease cholesterol. Foods that are naturally gluten-free and high in soluble fiber include flaxseeds. They can be thrown into smoothies, added to cereal, or topped with yogurt or salads. As for sunflower and pumpkin seeds, you can use them as a topping for just about anything because they are high in healthy fats and make a great on-the-go snack.

These seeds are also used more for breathing than for eating. Chia seeds are rich in protein and fiber and support weight loss.

Meat: Meat-dried meals like beef jerky, chicken strips, and salmon jerky are all great examples since they provide nutrients your body needs, such as protein, minerals, and vitamins.

Chicken strips, salmon jerky, and beef jerky (only available in liquid form). For pregnant women and small children, beef jerky is essential since it is rich in protein and iron. Chicken strips can be easily season to taste excellent with a variety of spices and have more calcium than most other meats.

Drying pecans, almonds, and cashews is simple. They are low-temperature meals, so they don't even need a dehydrator. Due to their high fat content, which can melt if dried at very high temperatures or for an extended period of time, Brazil, walnut, and macadamia nuts require a little longer to dry (i.e., they are high-temperature foods).

Nuts; Almonds, cashews, and pecans. Pecans are rich in healthy fats that make you feel satiated for longer, which is particularly advantageous if you're trying to lose weight. Almonds include vitamin E, which is helpful for a healthy heart, good eyesight, healthy skin, and healthy breathing. E. Cashews are rich in protein and magnesium, which keep metabolism active and lessen fatigue (i.e. They mesh well with coconut milk).

Edible flowers: The most typical examples of freeze-dried food are edible flowers. For texture, they are typically sweetened with sugar, fruit

pectin, agave, or gelatine. Although edible flowers are marketed as “flowers” in supermarkets (such as roses), they can also be found freeze-dried in different forms, such as powders or fruits (such as rose petals) (i.e. Hibiscus). They can be used to adorn sweets and beverages like lattes and matcha. Examples of edible flowers include violets, hibiscus, lavender, and roses.

Dry Ice

This is a much faster method than using the normal freezer, as moisture is evaporated quicker from the food by the dry ice.

To use:

- Place the food in freezer-safe bags.
- Put these in a cooler
- Cover the bags completely in dry ice and leave for around 24 hours.
- Once freeze-dried remove the bags and store them in your freezer or pantry

Food Dried Using Liquid Nitrogen

You can also use liquid nitrogen, another technique that will surely come up in your online search results for home freeze drying. Naturally, when liquid nitrogen comes into touch with food, it freezes instantly. At -320 degrees Fahrenheit, liquid nitrogen will instantly freeze any anything it comes into contact with. If the food needs to be chilled to a temperature below freezing before a vacuum pump can remove all of the moisture, liquid nitrogen is often utilized as a speedier alternative to conventional freezing methods. To preserve food without a dryer, you can use liquid nitrogen to “flash freeze” it first, then place it in the freezer.

Chapter 4

Things to consider before freeze-drying your food

To ensure an equal freeze, place items in your freezer with enough space between them to allow cold air to circulate. Only stack items on top of one another once they are totally frozen. Avoid opening and closing your freezer numerous times each day. The contents of the freezer will repeatedly thaw and freeze as a result of the temperature fluctuations. Smaller ice crystals will eventually become larger as a result of even little fluctuations in the freezer, severely damaging the meat's cell structure and ultimately giving the meat a softer and mushier texture. The meat will become less juicy and healthier as a result of temperature changes since water will leak out of the meat.

Include the sauce, gravy, or marinade in the package when freezing cooked meat. Additionally, it can lessen the risk of freezer burn and moisture loss. Additionally, you should let pre-cooked food get to room temperature before putting it in the freezer. Even Nevertheless, cooling and freezing hot food consumes far more energy, increasing your electricity bill. Your items' quality will be preserved and the freezing process will be slowed by allowing them to cool to room temperature.

Some loose food items, including cheaper meat and fruits and vegetables, can be tray-packed. Items that are packaged in trays are first put together on a tray that will be immediately frozen so that the parts don't touch, or in one thin layer that will be quickly torn apart when frozen. The things are then gathered and put for easier access into a more compact container or bag. Tray-packable foods include things like berries, broccoli, sliced chicken, chicken wings, patties, and nuggets.

If you're only freezing a few things for your home, you don't need to acquire a vacuum sealer if you don't already have one. Because you won't be able to get rid of all the air in the bag, it is crucial to remember that this is not vacuum packing. To accomplish this, put the meat in a sealable freezer bag and half-fill a large dish with water. Nearly close the zipper, leaving about a quarter-inch of room open. Slowly pull the bag

down while submerging it in the water until all the air is expelled and only the open tip is visible above the surface.

When chopped and separated by smaller pieces of parchment or baking paper, butter and margarine can also be frozen. Cut the butter or margarine into smaller, flat squares while it is still cool; sandwich parchment paper between the layers; and freeze.

Try to divide the ingredients into the number of servings you will need. This will prevent your food from rotting as a result of frequent thawing.

Your food will expand when frozen because water expands. Give your meats some wiggle room before placing them in resealable plastic bags to avoid spillage. Make sure all of your things are properly labeled before placing them in the refrigerator. You'll spend less time looking for the appropriate things as a result. Additionally, it minimizes the time spent opening the freezer while you search.

Use a plate or tray underneath the food while it thaws or defrosts in the refrigerator to catch the fluids. The food will spoil if it is allowed to thaw in a heated environment. When freezing food, take into account the enzymes responsible for its deterioration. These enzymes speed up plant maturation or ripening as well as the disintegration of meat's cellular structures. The food will alter in terms of color, flavor, and texture if these reactions are allowed to continue. Many people blanch food rapidly to avoid this or add ascorbic acid to stop browning.

Blanching involves immediately submerging food in boiling water for 30 to 60 seconds, then quickly cooling it in an ice bath. The majority of the time, this is done to vegetables to block and inactivate the enzymes as well as eliminate any surface-residing microorganisms. By blanching your vegetables, you may preserve them for extended periods of time while using up less freezer space.

Fruits that are traditionally eaten raw can avoid browning due to chemical ingredients like ascorbic acid, popularly known as vitamin C, and cannot be blanched. Vitamin C can be replaced by lemon juice if it is not available.

When it comes to meat, rancidity is the most frequent problem. If the meat has previously been vacuum-packed and frozen, freezing it for use in a few weeks is acceptable. However, it is advisable to trim the excess fat off fresh meats from the butcher before putting them in an airtight wrap or a vacuum-sealed plastic bag if you intend to keep them for a long time. Additionally, this extra step will aid in avoiding freezer burn, which is harm to meat or other food products brought on by moisture

loss and air exposure. The meat may develop dark or gray patches, and the surface may resemble leather, but it is still safe to eat. Fruits and vegetables, on the other hand, will shrivel and dry out when their water content freezes into ice crystals.

The texture of the meal is a different consideration. Food's cell walls collapse or burst when it is frozen because water swells during the freezing process. The meal will have a softer or mushier texture once it has fully defrosted. Some fruits and vegetables show this impact more than meat because they contain more water. Therefore, it is better to serve frozen fruit chunks that are still partially frozen if you locate them in your freezer.

Prior cooking of the food weakens the cell walls, minimizing the negative effects. Food that is frozen immediately sometimes performs better. Research indicates that the food takes longer to freeze the larger the ice crystals are. It will consequently harm cells more. However, if the meal is frozen quickly, the ice crystals become smaller, reducing cell damage. Because of this, fresh seafood is frequently flash frozen to maintain quality before being prepared for consumption. Additionally, this is done to every sort of meat that is generally sold refrigerated in supermarkets, thawed beforehand for the convenience of the customer.

Thankfully, this approach is not just used by big firms. Rapid freezing is another something you can perform at home without any special tools. All you need is a freezer, and fortunately, your refrigerator's freezer usually works just well.

How to maintain the quality when freeze-drying

While it is true that certain freeze dryers continue to lyophilize well for decades, the typical lifespan of a freeze dryer in the laboratory environments of today is between 10 and 15 years.

Do you want to know the tricks to extending the life of your freezer?

- Let's dissect application, usage, and maintenance to identify several factors that affect how long and how well your freezer works. Dos and Don'ts to guide you
- Learn how to use and properly care for your freezer drier.
- Make sure your freezer is compatible with the eutectic temperature

of your sample.

- •Before using the unit, make sure your sample is compatible with your frozen dry system. A solid rule of thumb is to plan for your most difficult example and choose a system based on that need.
- •The temperature of a freeze dryer's condenser cannot be changed.
- •The temperature of the cooler should be 10 to 15°C below the eutonic point of the sample. For example, low freezing point solutions shouldn't be used on -50°C units.
- •Certain acids should only be used with PTFE models and not with bare stainless steel. Systems that reach -84°C are ideal for lyophilizing samples with low eutectic temperatures (such as those that contain acetone).
- •Systems that can handle -105°C temperatures ethanol in little levels in the samples.
- •Perform routine vacuum pump maintenance.
- •Have you ever experienced issues with your freezer not drawing in enough vacuum?
- •If so, you're not alone; this is one of the most prevalent problems with freezing dry shooting. The good news is that doing routine pump maintenance can help to solve the issue, decreasing immediate downtime and boosting unit life over time.
- •Last but definitely not least, make sure you change the oil in your vacuum pump every 1,000 hours (or sooner if your application requires it). Check the appearance of the oil if in doubt. It has to be changed if it's cloudy or darker than the color of iced tea.
- •Be aware that some pumps, including hydrocarbon-free scroll pumps, can pull a deep vacuum for freezing without using oil. If you choose a scroll pump, be sure to replace the scrolls after 40,000 hours of use.
- •Each time you use the freeze drier, clean it.
- •After every standard run, the condenser needs to be defrosted and dried.
- •Remember that you will also need to neutralize the chamber if you are using acids.
- •Regardless of the sample used, you must rinse and clean any components that may have come into contact with chemicals to lessen the risk of damage. Avoid letting water, especially water that

has been chemically contaminated, sit on the stainless, acrylic, or rubber parts of your freeze dryer.

How not to use your freezer!

Samples that have not completely frozen should be placed in the freezer. A sample must be completely frozen in order to be included in a lyophilization run. If it doesn't, a significant portion of the sample will evaporate, resulting in a high initial vapor load.

Overload your freezer drier.

Overloading your freeze dryer might make sessions last longer or perhaps make them wholly unsuccessful. When a sample is initially loaded, the condenser must accommodate the greatest vapour load.

The instantaneous load capacity rating is the maximum amount of vapour that a freeze drier can hold at once. This is a different measurement from the capacity to hold snow or the 24-hour collection rate.

Make sure the condenser temperature doesn't rise too quickly when the sample is loaded when freezing drying many, large volumes. If this occurs, you are close to going over the permitted load capacity. Consider staggered loading in these situations so that samples are started at various intervals.

Neglecting maintenance

It is simple to remove your completed samples at the conclusion of a run without remembering to defrost and clean the condenser, which not only prolongs the procedure for the following user but may also damage the unit if done frequently.

Maintenance is crucial for vacuum pumps as well. Although it can be time-consuming, routinely changing the oil is essential. Maintaining a diary of oil changes and proper cleanings can help guarantee none of these crucial duties are overlooked, particularly when there are multiple users of a single system.

Tools and equipment

Containers

Pack meat in appropriate containers. Different foods necessitate slightly different containers. Use caution when using large containers because

they will cause the items to freeze slowly, which is counterintuitive to our goal. Generally, freezer containers should be food-grade, moisture-proof, waterproof, durable, odorless, leakproof, and designed for the freezer. This means they should not crack or become brittle after prolonged use in the freezer.

Freezer-grade containers include plastic resealable freezer bags, rigid and resealable metal, glass, or plastic containers, and flexible or soft plastic/silicone containers. Carefully read the back labels of any containers you intend to purchase.

They should be clearly labeled as freezer-safe. Most manufacturers would also include temperature limits for their products. Choose items that can withstand temperatures as low as 0°F.

Rigid containers hold liquids, soft foods, and easily broken-down foods. The straight and rigid sides make it simple to remove the food with a wet towel applied to the outside surface of the container.

Most of them are meant to nest or stack on top of one another. Plastic and metal are the most popular materials used to make these containers. Glass is another option; however, it should be noted that it has been tested for freezer use. Regular glass containers, such as canning jars, can easily crack when temperatures drop below freezing. When using rigid containers, ensure the lids are tightly closed and airtight. If they are not, use freezer tape (tape designed for temperatures below freezing). Masking tapes should not be used because they may not adhere correctly. The resealable plastic freezer bags and wraps that are widely available in stores are the most commonly used. Heavy-duty aluminum foil can also be used in a pinch.

To avoid puncturing, keep them away from sharp objects and corners inside the freezer – using cardboard dividers in the freezer can protect the plastic wraps and aluminum foils.

These bags are ideal for drier foods such as chops and steaks, as well as raw meat, fish, poultry, fruits, and vegetables.

Another container that has recently gained popularity on social media is the resealable silicone container, which can also be used as a freezer container. Because it is a hybrid of stiff, softer, more flexible wraps and bags, many people prefer it. Additionally, it is more durable than plastic freezer bags and is an environmentally friendly alternative to freezer bags.

Freezers

Freezers come in two varieties: chest and upright. The majority of us are likely accustomed to upright freezers. Either a refrigerator and freezer combination or a stand-alone freezer is available. There are several variations in terms of size, style, and appearance. The uprights are smaller because they are taller rather than wider.

These freezers, however, are typically significantly smaller (especially when connected to a refrigerator) and quickly lose their cold air when opened. Chest freezers are ideal for doing intense freezing. Because cool air tends to settle to the bottom, they are larger and continue to stay cold long when the door is opened. They do need a bigger floor space. Whatever you decide, make sure to keep it away from heat sources, like your oven, and leave 2 to 4 inches between the back of the appliance and the wall to allow for good airflow, which reduces how hard the appliance has to work to maintain a chilly temperature.

A Silicone Ice-Cube Tray

There are numerous items that can be frozen in ice cube trays. These trays can also be used to portion out ingredients like lemon juice that significantly affect little quantities. Since they make it simpler to remove items from these trays, silicone ice cube trays are preferred.

Bags and a vacuum sealant

A vacuum sealer takes all of the air out of a specially made bag, which adheres to a frozen item and eliminates oxygen. Commercial-grade sous vide sealers range in price from \$70 to \$1,000 for simple sealers. For pricey commodities like meats and proteins, vacuum sealers are ideal because they make sure that as little air as possible comes into contact with the product, reducing freezer burn. This is a great way to prepare individual servings of large batches of food since it maximizes storage space by getting rid of any extra space.

Trouble shooting freeze drying and how to solve them

Freeze drying is a freeze-dried process in which food or pharmaceuticals are frozen to achieve long-term storage without refrigeration. However, many obstacles can occur during this process that can affect the quality of the original product:

Clogging of evaporators

Usually, after several freeze-dry cycles, you will find that the evaporator

will be clogged. In particular, freeze-dried products will be filled with wax and fat if the evaporator has not been cleaned or appropriately washed.

It is not a good idea to ignore problems like this. Instead of cleaning it immediately, you might want to wait for several freeze-dry cycles and then try to clean it.

Drying time

The drying time for freeze-dried materials will always reflect the time needed for the material to cool down from 25°C – 10°C. It takes about 3 hours for freeze-drying materials to cool down.

Freezing water in the material

Freezing water inside your product is primarily a result of over-drying. To evade this, you can make sure that the temperature of your product should be between -40°C – -50°C. It's also essential to use pure solvent for freeze drying. On average, freeze-drying materials take about 10 hours to cool from 40°C to 10°C.

Frozen spray-dried coffee is challenging to filter

This is a common problem, especially when coffee beans are freeze-dried without being ground first. Some techniques can be applied for filtering out these particles; one of them is grit and grit cheese!

The chemicals from the cheese can help float the coffee beans stuck in your filter. However, this is only one technique that you can use. Most people prefer to grind the rose first before freeze drying them.

Ice crystals formed on the surface of the product

During freeze drying, some ice crystals form on your product's surface. There are some techniques that you can use to solve this problem. One of them is spray-drying.

You can also make a mixture of water and acetone and then freeze-dry the mixture. This way, you can remove the layers of ice crystals from your product.

While doing that, the product must be dehydrated before you continue with the next step.

Improperly Troubleshooting Product Problems

One of the most important things to do when starting a freeze-drying cycle is to choose the correct formulation. The formulation should be so that it will adequately resist ultra-low temperatures to prevent damage during the drying process. This can be determined using various testing and reviewing research reports regarding the product.

Inadequate Equipment

Proper equipment is an absolute necessity to produce a quality freeze-dried product. Consult with Freeze Dryers of America to learn more about the different kinds and equipment needed for your production requirements.

Little or no solid state

If you find that your products are filled with minimal solid state, then it's probably because of the following reasons:

The drying time was too long. When the product takes a longer time to dry, there will be a melting of ice.

This will create a layer between the product and the solvent.

In some cases, this layer will remain on the surface of your product even after drying. As a result, you will notice that your product is filled with a minimal solid state.

You are using impure solvents. In this case, the impurities will remain in the product after freeze-drying.

Poor yield

Sometimes, you may get poor yields after freeze-drying a product. Most of the time, this is due to under-drying the product. If not dried properly, the water molecules in your products will not be removed entirely. However, you can ensure this does not happen by monitoring the temperature during freeze-drying and placing it within the range of -50°C – -60°C .

Product sticking to the evaporation tube

This happens when your product is floated on the surface of the solvent during freeze-drying. In most instances, it's straightforward to remove this product that is stuck on the evaporator.

Most people prefer a material called Grit Cheese.

This cheese can help flatten and eventually remove any solid build-up from freeze drying.

How to reconstitute food

The first thing you must remember is that the freeze-drying process removes the water as a result. You can either add water to the meal to rehydrate it or make the food's moisture content higher. That pretty much wraps everything up.

The only ingredient you need to add is water. It doesn't matter if you eat the food like a snack and it reconstitutes in your mouth, soak it in boiling water like ground meat, eat it like a snack and it reconstitutes in your mouth, or cook it in a casserole dish or pan with other ingredients' juices.

Each component can be rehydrated in a few different methods, but most of the time you just need to add water. That will allow you to reverse the effects of freeze-drying.

How to Properly Store Frozen Food

Although frozen food can be stored for long periods, its quality and nutrition degrade over time. Even though food can be stored in the freezer indefinitely, don't try to keep it for 50,000 years. Eating beef sitting in the back of your freezer for over a decade is still dangerous. Here's a convenient list that shows how long food can be kept in the freezer.

Seafood

- •Two to three months for fatty fish (perch, salmon, and mackerel).
- •Three to six months for lean fish (flounder, cod, and sole).
- •Cooked fish: 4 to 6 months
- •Smoked fish: 2 months (sealed and vacuum-packed)
- •Shellfish (e.g., mussels, oysters, scallops): 3 to 6 months; shrimp: 3 to 5 months
- •2 months (cooked crab)

Processed Meat

- •Bacon takes 1 to 2 months.
- •Luncheon meat (open/sealed package or deli-sliced): 1 to 2 months
- •Burgers and ground meat patties can be aged for 3 to 4 months (beef, pork, poultry, veal, lamb, and other meats)
- •1–2 months for (opened or sealed) grilled dogs
- •Raw sausages should be stored for 1 to 2 months (made from beef, chicken, pork, or turkey)
- •For cooked sausages, 1 to 2 months (made from beef, chicken, pork, or turkey)

- •2 months' worth of frozen sausages (made from beef, chicken, pork, or turkey)
- •5 to 6 months for uncooked and uncured raw ham
- •3 to 4 months for cooked and uncured fresh ham
- •1–2 months for fresh cured, cooked, and vacuum-sealed ham (unopened)
- •1 month for ham from the country
- •Unopened cans (labeled “keep refrigerated”): There is no need to freeze it; it will keep in the fridge for 6 to 9 months.
- •Cans that have been opened have a shelf life of 1-2 months (shelf-stable)
- •One month for Italian and Spanish cured hams (Parma, Prosciutto, Serrano, and so on)
- •Grazing period for lamb and beef is 2 to 3 months. new pork meat choppings from one to two months new beef patty
- •Fresh whole beef slices have a storage life of 6 to 12 months (for steaks and chops)
- •3-6 months for fresh whole pork loins (for steaks and chops)
- •Sliced veal and lamb can be frozen for up to two months, but fresh whole animals must be frozen for one to two months (for steaks and chops)
- •Beef is considered fresh when it is aged between 6 and 12 months (for roasts)
- •Fresh pork can be kept in the refrigerator for up to six months (for roasts)
- •Depending on the season, 6-9 months for cooking lamb or veal..

Poultry

- •A entire chicken takes 12 months to mature.
- •6 months for chicken, chopped or cut
- •A full turkey takes 12 months to mature.
- •6 months if the turkey is sliced or cut
- •6 months for a whole goose and duck
- •Three months for giblets
- •8 to 12 months for raw wild game
- •Food that has already been cooked

- •stews or casseroles: 3 months (meat, poultry, and fish)
- •3 months to make beef pies
- •8 months to make fruit pies (unbaked)
- •For baked fruit pies, allow 2 to 4 months.
- •Three months for bread
- •The dessert took three months to make.
- •Three months for cookies (baked and unbaked)
- •Dairy butter can be stored for 6 to 9 months.
- •a year for margarine
- •Fresh milk has a shelf life of one month.
- •2 months for thick cream
- •Whipping cream: 1 month
- •Ice cream takes two months to make.
- •Organic and natural cheeses take 5 to 8 weeks to mature.
- •4 months for cheeses that have been pasteurized

Eggs

- •1 year for raw beaten eggs (raw eggs keep better in the freezer when beaten)
- •Raw eggs (in shells) can be stored for 12 months; however, they must be refrigerated until thawed.

Overall, food stored properly in subzero temperatures will last a long time, if not indefinitely, but be cautious if the frozen item has been sleeping in the back of a freezer for years. To avoid food poisoning, avoid consuming anything that seems and smells odd or rotten.

Chapter 5

Meat and poultry recipes

Alfredo Pasta with Asparagus

Preparation Time: 10 mins

Cooking Time: 20 mins

Servings: 2

Ingredients

- 8 oz alfredo pasta
- $\frac{3}{4}$ cup cashew nuts (cut in half)
- 1 tbsp avocado oil
- 1 garlic clove
- 1 tbsp lemon juice
- 2 tsp nutritional yeast
- $\frac{1}{2}$ tsp pepper
- $\frac{1}{2}$ tsp salt
- 1 bunch of asparagus
- $\frac{1}{8}$ tsp nutmeg
- $\frac{1}{4}$ cup parsley(chopped)

Directions

1. Place the cashews in a jar, cover with water, close the lid and leave overnight.
2. Following day, drain and rinse the cashews. Put them in a blender with $\frac{1}{2}$ cup water, garlic, lemon juice, yeast, nutmeg, pepper, and salt. Blend until a smooth mixture is obtained.
3. Cut the ends off the asparagus and cut them into 2-inch lengths. Sprinkle them with avocado oil, salt, and pepper, and grill them.
4. Add the pasta to a large pot of boiling water. Mix the pasta with the sauce and the asparagus and transfer to serving bowls. Sprinkle parmesan on top to complete this tasty dish.
5. To freeze- dry:
6. When cooking the pasta if you are freeze-drying it to store, then only partially cook the pasta (al dente) so when it rehydrates it doesn't become all soggy and stick together.
7. The rest of the recipe can be freeze-dried and transferred to mylar bags.

Nutrition: calories: 313 fat: 25.1g carbs: 24.7g protein: 4.9g
fiber: 0g

Barbecued Turkey Meatballs

Preparation Time: 30 mins

Cooking Time: 15-20 mins

Servings: 3-4

Ingredients

- 1 lb. Ground turkey
- 1 cup whole wheat bread crumbs
- 1 garlic clove (minced)
- ¼ cup parmesan cheese (grated)
- 1 egg (beaten)
- ¼ cup onion (minced)
- 2 tsp fresh thyme
- ½ tsp black pepper
- ½ tsp salt

Directions

1. Mix all the ingredients and form 2" meatballs.
2. On a baking sheet broil for 10 mins.

Ingredients for the sauce:

- 1 tbsp soy sauce.
- 1 tbsp coconut oil
- 3 garlic cloves(minced)
- 1 small onion(diced)
- 1 tsp mustard powder
- 1 tsp chili powder
- 1 tsp cumin
- 1 tsp oregano
- 2 cups chicken stock
- 6 oz tomato paste
- 2 tbsp apple cider vinegar
- 1 tsp stevia

Directions

1. Cook the onion and garlic in the coconut oil, then add the rest of the ingredients
2. Simmer until a thick sauce is obtained.
3. To freeze- dry:
4. Arrange the meatballs on the freeze-dry tray/trays

5. Set to a standard setting to freeze dry.
6. Transfer to an airtight container
7. To rehydrate, add hot water slowly in a covered dish or in a microwave until all the water is absorbed.

Nutrition: calories: 71 fat: 0.3g carbs: 18.3g protein: 1.3g fiber: 0g

Pork and Broccoli Stir Fry

Preparation Time: 10 mins

Cooking Time: 10 mins

Servings: 4

Ingredients

- For the stir fry:
 - 500 g sliced pork tenderloin
 - 300 g Tenderstem broccoli
 - 2 tbsp sesame oil
 - 3 nests of egg noodles
- For the sauce:
 - 3 tbsp Shaoxing wine
 - 3 tbsp sesame oil
 - 1 tbsp honey
 - 2 tbsp light soy sauce
 - 1 tbsp oyster sauce
 - 3 garlic cloves
 - 6cm ginger piece (peeled and grated)

Directions

1. In a pot mix all the sauce ingredients and bring to a boil. Simmer and reduce to a consistency to use for coating.
2. In a wok fry the broccoli in the sesame oil until soft but with bite and remove to a plate.
3. Add the pork to the wok and fry for 2 mins, then add the broccoli and the sauce. Toss everything to cover in the sauce.
4. Cook the egg noodles, add to the mixture, and serve.
5. To freeze- dry:
6. When freeze drying undercook the noodles so they don't become soggy when re-hydrated. After freeze-drying on a tray bag the meal and store it. When using add water to rehydrate and toss in a wok to warm and finish the noodles.

Nutrition: calories: 213 fat: 3.1g carbs: 6g protein: 8g fiber: 4.3g

Beef Casserole

Preparation Time: 10 mins

Cooking Time: 90 mins

Servings: 4

Ingredients

- 1 ½ lb. Of beef steak
- 1 large onion(chopped)
- 1 oz corn flour
- 7 mushrooms(sliced)
- 3 carrots(sliced)
- 1-pint beef stock or 2 stock cubes in 575 ml of warm water
- 1 dessertspoon cooking oil
- 1 tbsp tomato puree
- Salt and pepper to taste

Directions

1. Preheat oven to 150 degrees C /325 degrees F.
2. Cut the beef into strips

3. In a pan heat the oil and fry the carrots, mushrooms, and onions for 2-3 mins.
4. Pour into a casserole dish.
5. Fry the beef strips.
6. Add the cooked beef strips to the casserole dish leaving the liquid in the pan.
7. Mix the corn flour with the water and add to the juice in the pan. Cook for 2-3 mins.
8. Stir in the stock and bring it to a boil.
9. Add the tomato puree, salt, and pepper.
10. Add the sauce to the casserole dish and cook for 1 ½ hour.
11. To freeze dry:
12. Add the finished meal to freeze-dry trays, process, and then divide into equal portions into mylar bags for the family to enjoy another time.

Nutrition: calories: 123 fat: 3g carbs: 6g protein: 2.5g fiber: 0g

Italian Beef Lasagna

Preparation Time: 15 mins

Cooking Time: 4 hours

Servings: 8-10

Ingredients

- Ragu
- 1 lb. Minced ground beef
- 1 lb. Minced ground pork
- 1 tbsp olive oil
- 2 ½ cups passata (sieved tomatoes).
- 3 tbsp tomato paste
- 1 cup red wine(250ml)
- 6 cups beef stock
- 1 cup finely chopped white onion.
- 1 cup chopped celery stalks
- 1 cup finely chopped carrot
- 2 bay leaves
- 1 tsp sea salt
- 1 tsp pepper

Ingredients White sauce

- 5 tbsp flour
- 1 cup grated parmesan
- 5 tbsp butter
- 4 cups of full-fat milk
- ½ tsp nutmeg
- 1 tsp sea salt and pepper to taste

Ingredients Lasagna

- 1 lb. Lasagna pasta sheets
- 2 balls of mozzarella (8 oz.)

Directions Ragu

1. Sauté the vegetables in the frying pan with olive oil.
2. When they are soft add the beef and pork to brown.
3. Expel any surplus fat and add red wine to reduce it.

4. Then add the tomatoes, paste, 4 cups of beef stock, salt, and pepper.
5. Simmer uncovered for 2.5-3 hours, adding the remaining beef stock halfway.

Directions White sauce

1. Melt the butter in a saucepan.
2. Add the flour and mix to form a paste and cook for 1 minute.
3. Whisk in half the butter and flour. Once thickened, add the remaining milk, parmesan, nutmeg, salt, and pepper to taste.
4. Stir the sauce until thickened. Remove from heat and put to one side.
5. Assemble the lasagna:
6. On the base of the dish add a layer of ragu, then a layer of pasta sheets.
7. Add more spoons of ragu covering the pasta, then cover with the white sauce.

8. Continue layering until all of the mixture is used, leaving some white sauce for the topping.
9. Pull apart the mozzarella and cover the top.
10. To freeze- dry:
11. Divide into individual portions and freeze-dry
12. Place in mylar bags with an oxygen absorber.
13. To cook, remove portions from the bags, add water to rehydrate, and transfer to a baking dish.
14. Cook in the oven at 350 degrees F (180 C) for 45 minutes.
15. Allow to cool for 5-10 minutes then serve,
Enjoy!

Nutrition: calories: 123 fat: 3g carbs: 6g protein: 2.5g fiber: 0g

Spaghetti Bolognese

Preparation Time: 10 mins

Cooking Time: 20 mins

Servings: 2

Ingredients

- 1 diced onion
- 1 diced carrot
- 1 celery stick(diced)
- 2 minced garlic cloves
- 2 tbsp olive oil
- ½ lb. Lean beef, (ground)
- 6 oz. Italian sausage(ground)
- 18 oz can tomatoes(chopped)
- 1 cup red wine
- 12 oz spaghetti
- 1 tsp fresh sage
- 1 tsp fresh rosemary
- Salt and pepper to taste
- Parmesan cheese to garnish
- Parsley to garnish.

Directions

1. In a large saucepan heat the olive oil.
2. Add the celery, carrots, and onions and cook until they are soft. (5 mins).
3. Add the beef and sausage, browning for around 7-10 mins. Finally, add the garlic.
4. Use the wine to make a sauce in the pan.
5. Add the seasonings and the tomatoes and simmer for an hour.
6. Add salt and pepper to taste.
7. Cook and drain the spaghetti, then add it to the pasta sauce.
8. Decorate with parmesan and parsley to serve.
9. To freeze- dry:
10. Once the spaghetti is cooked, keep separate from the meat sauce to freeze dry on trays.
11. Add water to the meat sauce to rehydrate and mix in the noodles to serve.

Nutrition: calories: 117 fat: 2g carbs: 6g protein: 9.7g fiber: 2g

Margherita Pizza

Preparation Time: 25 mins

Cooking Time: 10 mins

Servings: 4(2 pizzas)

Ingredients

- Base:

- 300 g strong bread flour

- 1 tbsp olive oil

- 1 tsp instant yeast

- 1 tsp salt

- Tomato sauce:

- 100 ml passata

- 1 crushed garlic clove

- 1 tsp dried basil

- Topping:

- 125g mozzarella sliced

- Parmesan cheese (or veg option)

- Cherry tomatoes (cut in half)

- Finish:

- Basil to top

Directions Base

1. In a large bowl add the flour, yeast, and salt.
2. Add 200mls of warm water and olive oil and mix until a soft dough is achieved.
3. Knead on a floured surface for 5 minutes. Set to one side, covered to rise.
4. Sauce:
5. Add together the passata, garlic, and basil and set to one side.
6. Base:
7. Knead, divide into two equal balls, and roll out into 2 x 25cm round bases.
8. Transfer to two floured baking sheets.
9. Bake:
10. Preheat oven to 260 degrees F/130 degrees C
11. Spread the sauce over the bases. Add the cheese, tomatoes, and olive oil.
12. Bake in the oven for 8-10 minutes.
13. Transfer to a pizza board and drizzle a little olive oil on top with basil leaves.

14. To freeze dry:
15. Cut up the pizza into slices and lay it on your freeze-dry tray.
16. Once freeze-dried, to rehydrate for consumption, spray with water or cover with paper towels.

Nutrition: calories: 117 fat: 2g carbs: 6g protein: 9.7g fiber: 2g

Cheesy Macaroni

Preparation Time: 15 mins

Cooking Time: 20 mins

Servings: 8

Ingredients

- 16 oz. Pasta (raw)
- 2 $\frac{3}{4}$ cups milk
- $\frac{1}{4}$ cup all-purpose flour
- 1 cup smoked gouda cheese (shredded)
- 1 cup cheddar cheese (shredded)
- $\frac{1}{2}$ cup cheddar cheese powder
- $\frac{1}{2}$ tsp mustard powder
- $\frac{1}{2}$ tsp smoked paprika
- $\frac{1}{2}$ tsp black pepper
- $\frac{1}{2}$ tsp salt to taste

Directions

1. In salted boiling water cook the pasta and leave to one side.

2. In a large pan add the flour, cheese powder, and milk, and bring to a boil.
3. Take off the heat and add the cheese and seasonings. Stir until the cheese has melted.
4. Add the pasta to the cheese mixture.
5. To freeze dry:
6. Pour the mixture onto the trays and pre-freeze.
7. Using the non-liquid setting freeze dry the meal.
8. When done, add the mixture to a mylar bag with an oxygen absorber.
9. To enjoy this meal later take out the oxygen absorber from the bag and add hot water. Fold the bag's top and leave for 10 mins, stirring halfway. Then transfer to your dish and tuck in!

Nutrition: calories: 312 fat: 6g carbs: 11g protein: 8g fiber: 2g

Chapter 6

Seafood and Fish recipes

Fish in Lemon Glaze

Preparation Time: 15 minutes

Cooking Time: 0 minutes

Ingredients

- 5–10 lbs. fresh, cleaned fish, whole or fillets
- ½ C. lemon juice
- 3 ½ C. water
- 2 packets unflavored gelatin

Directions

1. Place the fish on a tray and put it in the freezer. Allow 10 minutes for chilling. Mix lemon juice and water together. With a separate dish, dissolve the gelatin in 1 ½ C. water. Bring the rest of the liquid to a boil. Pour the gelatin mixture into the hot water slowly. Stir the solution to cool to room temperature before using it. Dip chilled fish in gelatin, drain, and return to freezer for 10 minutes before

repeating the process. Allow the fish to solidify on the surface. Freeze after packaging, weighing, and labeling. It lasts for up to 6 months. Use unsweetened, unflavored gelatin and concentrated commercial lemon juice.

2. Combine all of the lemon juice and water in a mixing bowl; moderately warm water is preferable. 1 ½ C. should be transferred to another bowl. Stir in the gelatin until it dissolves. Toss in the remaining lemon mixture and bring to a boil. Turn off the stove and slowly pour in the dissolved gelatin. Allow the mixture to cool to room temperature before using. Before immersing the fish, make sure it's frigid. Cold fish should be dipped in the glaze. On the surface, a thin ice layer should form. If you put a piece of parchment paper on the tray, the fish will not stick to it.
3. Put the salmon in the freezer. Freeze for 10 minutes before dipping again. Make sure the

fish isn't touching on the tray. After that, put them in the fridge for around 30 minutes. To keep the fish from sticking together after they've been frozen firm, cover them in plastic wrap or set them in freezer bags.

Salmon and Pesto

Preparation Time 5 mins

Cook time: 5 mins

Servings: 4

Ingredients

- 4 salmon fillets
- 1 cup pesto sauce

Directions

1. Broil or bake the salmon for a few minutes until cooked
2. Add a spoonful of pesto to the top of each one.
3. To freeze-dry:
4. Line the freeze-dry trays with paper towels to help soak up any excess oil from the fillets.
5. Lay the fillets on the tray evenly spaced and process as per your machine's instructions.
6. Check to see that all moisture has been removed from the fillet's centers.

7. Store the fillets in a mylar bag with an oxygen absorber, labeling them with the date you freeze-dried them.
8. To rehydrate, add some hot water slowly until the fish returns to its usual consistency.
9. Rice and vegetables could be added to the fish to make it a complete meal.

Nutrition: calories: 133 fat: 5g fiber: 9.7g carbs: 21.7g protein: 6g

Fish Casserole

Preparation Time: 5 min

Bake time: 35 mins

Servings: 4

Ingredients

- 1 pound cod
- 1 ½ cups fish broth
- 3 cups broccoli(chopped)
- ½ cup long grain rice
- ¼ tsp garlic powder
- ¼ tsp Italian seasoning
- 1 tbsp parmesan cheese(grated)
- ½ cup cheddar cheese shredded
- 1 can (28 ounces) of fried onions
- Pinch of paprika

Directions

1. Add together the broth, seasoning, garlic powder, and rice in a pan and bring to a boil.

- Transfer to an 11x7 in greased baking dish.
2. Cover and bake for 10 mins at 375 degrees.F/190 degrees C
 3. Add the parmesan cheese, the broccoli, and half of the onions.
 4. Finish off with the cod fillets and a little paprika.
 5. Bake covered for 20-25 mins or until the fish is flaky. Removing the cover add the cheddar cheese and the onions. Pop back into the oven for 2-3 mins for the cheese to melt.
 6. To freeze- dry:
 7. Prior freeze drying divide the casserole into separate portions.
 8. Freeze- dry and place in mylar bags for future use.

Nutrition: calories: 189 fat: 11.6g fiber: 3.4g carbs: 7.9g protein: 17.2g

Fish Sticks

Preparation Time: 5 minutes

Cooking Time: 20 minutes

Servings: 2

Ingredients

- Avocado oil (to grease)
- 1 pound frozen cod filets (defrosted)
- 1 cup all-purpose flour
- 4 large-size eggs (beaten)
- 2½ cups seasoned panko breadcrumbs
- 1 tsp sea salt

Directions

1. First, preheat the main oven to 400 degrees F.
2. Prepare 2 roasting pans. Place a wire cooking rack inside each pan. Lightly grease the racks with avocado oil.
3. Partially defrost the fish, before slicing the fish into 24-30 (½” wide by 3” long) strips. Pat the

strip dry with kitchen paper towels.

4. Add the flour to a shallow bowl, and the beaten egg to a second shallow bowl and then the breadcrumbs to a third shallow bowl.
5. In batches, dredge the fish sticks, first in the flour, second in the egg, and third in the breadcrumbs. Make sure that the sticks are evenly coated.
6. Place the breaded fish stick on top of the wire racks. Season with salt.
7. Bake the fish sticks in the oven for 8 minutes. Turn them over and bake on the other side for 6 minutes before transferring them to the broiler to brown for approximately 60 seconds.
8. Serve hot.
9. For easy freezing: Place the uncooked fish sticks on a baking sheet in the freezer until firm. When firm, transfer them to a freezer-safe container.

10. To cook from frozen: Preheat the main oven to 400 degrees F. Arrange the frozen fish sticks on a wire rack that is lightly greased with avocado oil. Place the rack inside a roasting pan and cook for approximately 20 minutes, flipping over halfway through cooking. Broil for 60 seconds to brown.

Nutrition: calories: 189 fat: 11.6g fiber: 3.4g carbs: 7.9g protein: 17.2g

Mediterranean Shrimp

Preparation Time: 5 minutes

Cooking Time: 20 minutes

Servings: 5

Ingredients

- ¼ cup olive oil
- 3 cloves garlic (peeled and minced)
- 3 tbsp fresh lemon juice
- ¼ tsp black pepper
- 1 tsp salt
- ½ tsp dried oregano
- ⅛ tsp red pepper flakes
- ½ tsp dried basil
- 1 pound large, fresh shrimp (peeled, then deveined)
- Small handful fresh parsley (chopped)
- 3 tbsp feta cheese (crumbled)
- Lemon wedges

Directions

1. In your bowl, combine the olive oil, minced garlic, lemon juice, black pepper, salt, oregano, red pepper flakes, and dried basil to create a marinade.
2. Add the shrimp to the marinade, toss to combine, and chill for half an hour.
3. Preheat your oven's broiler and cover a baking sheet with kitchen foil.
4. Take the shrimp out of the marinade and arrange on the baking sheet. Place the shrimp under the broiler and cook for 2 minutes on each side or until cooked through.
5. Serve the shrimp garnished with fresh parsley, crumbled feta cheese, and lemon wedges.
6. For easy freezing: Prepare the marinade as instructed in step 1. Transfer to a freezer-safe bag. Add the shrimp to a second freezer-safe bag. Freeze the marinade and shrimp.
7. To cook from frozen: Add the bags of frozen marinade and shrimp to a bowl of water to a

thaw, this should take 15-20 minutes. Continue with the recipe from step 2.

Nutrition: calories: 404 fat: 9g fiber: 26.9g carbs: 56g protein: 25.3g

Pecan-Crusted Snapper

Preparation Time: 5 minutes

Cooking Time: 20 minutes

Servings: 2

Ingredients

- ½ cup dried breadcrumbs
- ½ tsp salt
- 2 tbsp pecans (finely chopped)
- ¼ tsp black pepper
- ¼ tsp powdered garlic
- ½ tsp hot sauce
- ½ cup buttermilk
- 3 tbsp all-purpose flour
- 4 (6 ounces) snapper fillets
- 1 tbsp canola oil

Directions

1. In your shallow dish, combine the breadcrumbs, salt, pecans, black pepper, and

garlic.

2. To a second shallow dish, add hot sauce and buttermilk – stir to combine.
3. Next, add the flour to a third shallow dish.
4. Dredge each fish fillet in the flour firstly, then the buttermilk, and finally the breadcrumbs.
5. Warm half of the oil in your skillet over moderately high heat. Add two pieces of the fish to the pan and sauté for 3 minutes on each side until cooked through.
6. Repeat with the remaining oil and fish.
7. For easy freezing: Allow the cooked snapper to cool completely. Transfer each fillet to a freezer-safe ziplock bag and freeze.
8. To cook from frozen: Cook the fish from frozen in the oven for 15 minutes at 400 degrees F.

Nutrition: calories: 122 fat: 5.5g fiber: 2.4g carbs: 17.6g
protein: 3.2g

Thai Fishcake Pops

Preparation Time: 15 minutes

Cooking Time: 40 minutes

Servings: 4

Ingredients

- 2 tbsp. Of Thai red curry paste
- 6 kaffir lime leaves, sliced thin
- 17 oz. Of boneless white fish fillets, chopped
- 2 tsp. Of fish sauce
- 1 cucumber, chopped
- 2 fresh red chilies, thinly sliced
- 1 tsp. Of sea salt
- 1 egg

Directions

1. Add all the ingredients (except for cucumber & chili) to a food processor. Pulse until smooth.
2. Make the mixture into smooth balls.

3. Place on a parchment-lined baking sheet. Cover in plastic wrap, keep in the freezer.
4. Thaw in the fridge for few hours.
5. Fry in hot oil for 2-4 minutes on all sides until cooked completely.
6. On each skewer, add the cucumber, chili slice with fishcake.

Nutrition: Kcal 158 | Protein 11 g | Carbs 8 g

Chapter 7

Vegetables recipes

Mini Vegetable Lasagna Cups

Preparation Time: 15 minutes

Cooking Time: 40 minutes

Servings: 4

Ingredients

- Half cup of ricotta cheese
- Half tsp. Of Salt & pepper
- 1 cup of lasagna noodles, oven-ready & broken up
- Half cup of mozzarella cheese, grated
- Half of the red & yellow pepper, each diced
- 1 to 2 tbsp. Chopped fresh basil
- 1 tbsp. Of olive oil
- Half cup of each sliced mushrooms, chopped
broccoli & chopped zucchini
- 3/4 cup of tomato sauce

Directions

1. Let the oven preheat to 400 degrees Fahrenheit. Take 4 ramekins, coat with olive oil. Combine tomato sauce, black pepper & salt in a bowl.
2. Beginning with the ricotta cheese, distribute the other ingredients equally in the ramekins, beginning with the ricotta, lasagna noodles, vegetables, again ricotta. Top with additional noodles and a drizzle of tomato sauce. Sprinkle shredded mozzarella cheese on top. Cook for 15 to 20 minutes.
3. Cool completely, wrap in plastic & foil.
4. Reheat in the oven for 20-30 minutes from frozen.

Nutrition: Kcal 216 | Protein 17.5 g | Carbs 19.1

Tomato & Garlic Butter Bean Dinner

Preparation Time: 15 minutes

Cooking Time: 40 minutes

Servings: 4

Ingredients

- 2 garlic cloves, minced
- 1/4 tsp. Of black pepper
- 6 cups of fresh baby spinach
- 2 cans of (~15 oz. Each) diced tomatoes, with liquid
- 1 tbsp. Of olive oil
- 1 can of (16 oz.) Butter beans, rinsed
- Half tsp. Of Italian seasoning

Directions

1. Sauté garlic in hot oil on a medium flame for 30 to 45 seconds.

2. Add the rest of the ingredients. Cook until heated well.
3. Cool completely, store in the freezer containers. Thaw overnight in the fridge and reheat with a little bit of water.

Nutrition for 1 ¼ cups: Kcal 147 | Protein 8 g | Carbs 28 g

Garden Minestrone

Preparation Time: 15 minutes

Cooking Time: 20 minutes

Servings: 4

Ingredients

- 7 carrots, diced
- Chopped yellow summer squash: 3 cups
- 7 celery ribs, diced
- 2 tbsp. Of olive oil
- 1 onion, chopped
- 3 zucchinis, chopped
- 2 bay leaves
- Half tsp. Of salt
- 2 cans of (32 oz. Each) chicken broth
- 1/4 tsp. Of each pepper, dried sage leaves & dried thyme
- 1 can of (15 oz.) Crushed tomatoes
- 3 cloves of garlic, finely chopped
- 12 cups of chopped fresh spinach
- 2 cans of (~16 oz. Each) northern beans, rinsed

- 1 cup of ditalini pasta, uncooked

Directions

1. In a large pot, sauté onion, carrots & celery in hot oil for 6 to 8 minutes.
2. Add squash & zucchini with seasonings, cook for 4 to 6 minutes.
3. Add garlic and cook for 60 seconds.
4. Take half a cup of beans, mash them. Add to the pot with tomatoes.
5. Add broth, let it come to a boil, turn the heat low and simmer, covered, for 10 to 12 minutes.
6. Add beans. Take the bay leaf out.
7. Cool completely, store in the freezer containers. Thaw overnight in the fridge and reheat with a little bit of water. Add pasta and cook for 7-9 minutes. Add spinach, cook, until it wilts.
8. Serve.

Nutrition for 1 ½ cups: Kcal 209 | Protein 12 g | Carbs 35 g

Spaghetti, Pepperoni & Lentil Bake

Preparation Time: 15 minutes

Cooking Time: 45 minutes

Servings: 4

Ingredients

- 8.8 oz. Of dried spaghetti
- 1 cup of grated parmesan
- 2 eggs
- 3.5 oz. Of sliced pepperoni
- 2 ½ cups of thickened cream
- 3 tsp. Of fresh rosemary, chopped
- 2 jars of Bolognese pasta sauce
- 1 ½ cups of grated mozzarella
- 14 oz. Of canned brown lentils, rinsed

Directions

1. Let the oven preheat to 356 F. Oil spray a baking dish.

2. In a bowl, whisk eggs, parmesan, rosemary & cream. Season with salt & pepper.
3. In the dish, add half a cup of the sauce and spread.
4. Add spaghetti (half) on top. Add the cream mixture, with the rest of the spaghetti on top.
5. In a bowl, add the lentils, chopped pepperoni & pasta sauce. Pour on the spaghetti.
6. Add cheese on top. Bake for 40 minutes.
7. Cool completely, wrap in layers of foil. Freeze for three months.

Nutrition: Kcal 840 | Protein 29 g | Carbs 51 g

Peach Freezer Jam

Preparation Time: 15 minutes

Cooking Time: 20 minutes

Servings: 4

Ingredients

- 1-3/4 cups of apple juice, unsweetened
- 3 cups of chopped peaches
- 3 cups of sugar
- 1 tbsp. Of lemon juice
- 3 tbsp. Of sugar-less Pectin

Directions

1. Mix the fruit juice, lemon juice & pectin. Stir until dissolved. Place on medium flame and boil for 1 minute on high flame. Keep stirring. Turn the heat off.
2. Add the fruit, stir for 1 minute.
3. Add sugar and stir well.

4. In sterilized hot jars, add the mixture, leave half-inch space from above. Remove any air bubbles. Wipe the jar's rim, place the lid on top.
5. Let it rest for 24 hours at room temperature.
6. Keep in the freezer for 1 year.

Nutrition: Kcal 312 | Protein 0 g | Carbs 12 g

Date Sweetened Peach Drizzle

Preparation Time: 15 minutes

Cooking Time: 30 minutes

Servings: 4

Ingredients

- 2 pounds of peeled peaches
- 1 cup of water
- 1 pound of dates, pitted

Directions

1. Add all the ingredients to a pot.
2. Place on high flame, let it come to a boil. Turn the heat low and simmer for 15 to 20 minutes.
3. Turn the heat off, and cool for few minutes.
Puree with a stick blender.
4. Cook on medium flame, keep stirring.
5. In jars, add the mixture, leave half-inch space from above. Remove any air bubbles. Wipe the jar's rim, place the lid on top.

6. Keep in the freezer for 6 months.

Nutrition: Kcal 302 | Protein 0 g | Carbs 21 g

Frozen Herbs

Preparation Time: 15 minutes

Cooking Time: 40 minutes

Servings: 6

Ingredients

- Fresh Herb leaves: 2 cups
- Olive oil: 1/3 cup

Directions

1. In a food processor, add all the ingredients.
2. Pour it into a freezer bag and make it into a thin layer.
3. Keep in the freezer; use as needed.

Nutrition: Kcal 3 | Protein 0 g | Carbs 2 g

Mango Coconut Fro-Yo Bark

•(Preparation time: 15 minutes |Cooking time: 0 minutes| Processing time: 0 minutes |Yield: 10 servings) Ingredients

- 1 pack of (10 g) freeze-dried mango
- Half cup of diced mango
- 1/4 cup of toasted coconut flakes
- 1 1/4 cups of Yoghurt

Directions

1. Oil spray a lamington pan (~7 x 11"). Place the parchment paper inside and let it hang from the sides.
2. In a food processor, add mango and puree.
3. Add yogurt to the pan and spread. Add mango puree on top swirl with a knife.
4. Add coconut flakes & dried mangoes on top.
5. Freeze for 6 hours. Break and store in freezer containers.

Nutrition: Kcal 267 | Protein 2.2 g | Carbs 12 g

Egg Burritos

Preparation Time: 15 minutes

Cooking Time: 40 minutes

Servings: 4

Ingredients

- 12 chopped bacon strips
- 1/4 tsp. Of black pepper
- 12 eggs
- Half tsp. Of salt
- 4 green onions, sliced thin
- 10 (8-inches) of flour tortillas
- 1-1/2 cups of cheddar cheese, shredded

Directions

1. Cook bacon in a pan until crispy. Take it out on a plate. Drain all but 1 to 2 tbsp. Of drippings.
2. Add eggs with salt & pepper to a bowl and whisk. Cook on medium flame, turn the heat off.

3. In each tortilla, add egg mixture (1/4 cup), with the rest of the ingredients equally. Roll the burritos.
4. Cool completely & wrap in tissue & foil. Keep in the freezer bags.
5. Reheat in microwave & serve.

Nutrition: Kcal 376 | Protein 19 g | Carbs 29 g

Sweet Potato & Black Bean Burritos

Preparation Time: 15 minutes

Cooking Time: 50 minutes

Servings: 4

Ingredients

- Salt and black pepper
- Half tsp. Of dried oregano
- Half onion, diced
- 1 jalapeno, chopped without seeds
- 1 1/2 pounds of sweet potatoes, cubed
- 1 tbsp. Of each chili powder & tomato paste
- 1 bunch of fresh cilantro, chopped
- 1 cup of crumbled queso fresco
- 2 minced cloves garlic
- 2 cups of fresh baby spinach, packed
- 1 can of (~15 oz.) Black beans, drained
- 10 whole-wheat tortillas
- 1 can of (~15 oz.) Diced tomatoes
- 1 lime's juice

Directions

1. Let the oven preheat to 425 F.
2. Place the sweet potatoes on a baking pan.
Season with salt and black pepper and brush with olive oil. Roast for 15-20 minutes, or until the potatoes are barely soft.
3. In a pan, heat two tbsp. Of olive oil over medium flame. Sauté the garlic and onion for approximately 5 minutes, or until the onion is transparent. Then mix in the jalapeno until everything is well combined. Combine the chili powder, oregano & tomato paste in a mixing bowl. Stir to mix, then cook for a further 2 minutes. After that, toss in the spinach, tomatoes and beans. To mix, carefully fold the ingredients together. Cook for 7 -10 minutes, or until the spinach has wilted. Mix in the queso fresco, sweet potatoes & lime juice after removing the pan from the heat. As required, season with salt and pepper.

4. Using a spatula, divide up the mixture in each tortilla. Roll the tortillas, top with cilantro and spicy sauce, and serve right away. Wrap securely in plastic wrap and keep in an airtight container. Freeze for up to three months in advance.
5. Place the wrapped tortilla in the microwave for 3 minutes, turning once to warm. Remove the wrapper, serve.

Nutrition: Kcal 315 | Protein 18 g | Carbs 22 g

Tasty Burritos

Preparation Time: 15 minutes

Cooking Time: 30 minutes

Servings: 4

Ingredients

- 1 can of (16 oz.) Refried beans
- 1 pound of ground beef
- 4 tsp. Of canola oil
- 1 envelope of taco seasoning
- 6 (12") flour tortillas
- 1 cup of shredded cheese

Directions

1. Cook beef until browned in a pan over medium heat and drain. After stirring in taco seasoning, take it out on a plate. Clean the skillet with a paper towel.
2. Add & cook the Refried beans for 2 to 3 minutes.

3. Place approximately 1/3 cup beans in the middle of every tortilla and 1/4 cup meat mixture on top. Cheese should be sprinkled on top. Fold the tortillas' edges and ends over the contents and roll them up.
4. Brown tortillas in oil on both sides in the same pan over medium-high heat. Wrap cooled burritos separately in tissues and foil and place them in a freezer container. Remove the foil off the burrito and put it on a microwave-safe dish. Microwave on high for 3 to 4 minutes, rotating once, until well cooked. Allow for 20 seconds of resting time.

Nutrition: Kcal 287 | Protein 18.5 g | Carbs 12 g

Chapter 8

Fruits and nuts recipes

Strawberry Smoothie

Preparation Time: 5 mins

Servings: 1

Ingredients

- 10 strawberries (hulled)
- 100mls orange juice
- 1 sliced small banana

Directions

1. In a blender pulse the ingredients until a smooth consistency is obtained.
2. Pour into a smoothie glass and enjoy!
3. To freeze- dry:
4. Pour the liquid straight onto your freeze dry tray and follow the manufacturer's recommendations.
5. Transfer the dried flakes to a storage jar for later use

6. When ready to consume just add cold water slowly to achieve the desired consistency.

Nutrition: calories: 67 fat: 2.4g fiber: 1.7g carbs: 11.3g protein: 1.1g

Blueberry Smoothie

Preparation Time 5 mins

Servings: 2

Ingredients

- ½ cup apple juice. Also, could use grape juice/dairy milk or almond milk
- 1 ½ cups blueberries
- 1 banana (cut in two)
- ¾ cup vanilla Greek yogurt
- Extra blueberries and mint leaves to garnish

Directions

1. In a blender mix the apple juice, Greek yogurt, banana, and blueberries.
2. Blend until smooth
3. Pour into glasses and decorate with the extra blueberries and mint leaves.
4. To freeze- dry: Follow the method as per the previous recipe.

Nutrition: calories: 1205 fat: 7.2g fiber: 5.5g carbs: 13.9g
protein: 3.2g

Banana Smoothie

Preparation Time: 5 mins

Servings: 1

Ingredients

- 1 banana(chopped)
- ½ orange (peeled, cut in quarters)
- 1/3 cup Greek yogurt
- ¼ cup water or milk
- 1-2 tsp honey

Directions

1. Add the banana and orange to a blender.
2. Then add the yogurt and water (or milk).
3. Blend until smooth and creamy.
4. Add the honey if required.
5. To freeze-dry: Follow previous smoothie recipes

Nutrition: calories: 241 fat: 17.2g fiber: 2.1g carbs: 6.4g
protein: 16.9g

Cantaloupe Smoothie

Preparation Time: 5 mins

Ingredients

- 2-3 cups cantaloupe(cubed)
- 1 banana(sliced)
- ½ cup yogurt
- 1 cup milk
- 1-2 cups ice cubes

Directions

1. In a blender add the cantaloupe, banana, milk, yogurt, and ice.
2. Blend until smooth.
3. To freeze-dry: Follow previous smoothie recipes

Nutrition: calories: 241 fat: 17.2g fiber: 2.1g carbs: 6.4g
protein: 16.9g

Grape Freezer Jelly

Preparation Time: 15 minutes

Cooking Time: 0 minutes

Servings: 4

Ingredients

- 2 to 3 oz. Of Liquid Fruit Pectin
- 2 cups of grape juice, unsweetened
- 4 cups of sugar

Directions

1. In a bowl, add juice and sugar, mix well. Let it rest for 10 minutes.
2. Add pectin, stir for three minutes.
3. In jars, add the mixture, leave half-inch space from above. Remove any air bubbles. Wipe the jar's rim, place the lid on top.
4. Let it rest for 24 hours at room temperature.
5. Keep in the freezer for 1 year.

Nutrition: Kcal 287 | Protein 0 g | Carbs 12 g

Apricot Freezer Jam

Preparation Time: 15 minutes

Cooking Time: 5 minutes

Servings: 4

Ingredients

- 3/4 cup of water
- 2-1/2 cups of apricots, chopped
- 5-1/2 cups of sugar
- 2 tbsp. Of lemon juice
- 5 tbsp. Of Instant Pectin

Directions

1. Mix fruits with lemon juice. Add sugar and mix well. Let it rest for 10 minutes.
2. Mix the pectin with water in a pan and boil for 1 minute on a high flame.
3. Add to the fruit mixture, mix for 3 minutes.
4. In sterilized hot jars, add the mixture, leave half-inch space from above. Remove any air

bubbles. Wipe the jar's rim, place the lid on top and screw the bands (do not screw too tightly).

5. Keep in the freezer for 1 year.

Nutrition: Kcal 309 | Protein 2 g | Carbs 19.1 g

Three-Berry Freezer Jam

Preparation Time: 15 minutes

Cooking Time: 5 minutes

Servings: 4

Ingredients

- 2 tbsp. Of lemon juice
- 2 cups of each fresh strawberry, raspberries & blackberries
- 3/4 cup of water
- 5-1/4 cups of sugar
- 1-3/4 oz. Of powdered fruit pectin

Directions

1. Pulse the berries in a food processor until chopped. Take them out in a bowl.
2. Mix with lemon juice & sugar. Let it rest for 10 minutes.
3. Mix the pectin & water, boil for 1 minute while keep stirring.

4. Add the pectin to the fruits, stir for 4 to 5 minutes.
5. In sterilized hot jars, add the mixture, leave half-inch space from above. Remove any air bubbles. Wipe the jar's rim, place the lid on top.
6. Keep in the freezer for 1 year.

Nutrition for 2 tbsp.: Kcal 92 | Protein 0 g | Carbs 24 g

Strawberry Baked Oatmeal Cups

Preparation Time: 15 minutes

Cooking Time: 25 minutes

Servings: 4

Ingredients

- 1 ½ tsp. Of ground cinnamon
- 2 tsp. Of vanilla extract
- 1 tsp. Of baking powder
- Half tsp. Of salt
- 2 ½ cups of almond milk
- Half cup of vanilla protein powder
- ¼ cup of coconut sugar
- 4 cups of oats, old-fashioned
- ⅓ cup of maple syrup
- 1 cup of chopped strawberries

Directions

1. Let the oven preheat to 375 F.
2. Add all ingredients to a bowl and mix.

3. Oil spray a muffin tin and add the mixture to the cups, make sure to equally divide the liquids.
4. Bake for 20 minutes.
5. Cool completely, store in the freezer containers.
6. Reheat in microwave and serve.

Nutrition: Kcal 153 | Protein 7 g | Carbs 27 g

Berry-Basil Limeade Jam

Preparation Time: 15 minutes

Cooking Time: 20 minutes

Servings: 4

Ingredients

- 8 cups of fresh strawberries
- 1 3/4 oz. Of powdered fruit pectin
- 1/3 cup of lime juice
- 7 cups of sugar
- 4 tsp. Of grated zest
- 1/4 cup of fresh basil, chopped
- 1 tsp. Of butter

Directions

1. Wash 9 one-cup plastic containers with boiling water, dry well.
2. Crush the strawberries and place them in a stockpot.

3. Add butter, lime juice & pectin. Boil on high heat; keep stirring.
4. Add sugar and boil for 1 minute. Add lime zest & basil.
5. In the plastic containers, add the mixture. Wipe the rim, place the lid on top.
6. Let it rest for 24 hours at room temperature.
7. Keep in the freezer for 1 year.

Nutrition: Kcal 309 | Protein 2 g | Carbs 19.1 g

Freezer Raspberry Sauce

Preparation Time: 15 minutes

Cooking Time: 45 minutes

Servings: 4

Ingredients

- 1 cup of light corn syrup
- 3 oz. Of liquid fruit pectin
- 10 cups of fresh raspberries
- 2 tbsp. Of lemon juice
- 3 cups of sugar

Directions

1. Wash 4 one-pint plastic containers with boiling water. Dry well.
2. In a bowl, add raspberries (6 cups) and crush. Add corn syrup & sugar, mix and let it rest for 10 minutes. Stirring often.
3. In a bowl, add lemon juice & pectin, mix and add to the raspberry mixture, keep stirring for 3

minutes.

4. Add the whole raspberries.
5. In sterilized hot jars, add the mixture, leave half-inch space from above. Remove any air bubbles. Wipe the jar's rim, place the lid on top and screw the bands (do not screw too tightly).
6. Let it rest for 24 hours.
7. Keep in the freezer for 1 year.

Nutrition for 2 tbsp.: Kcal 58 | Protein 0 g | Carbs 15 g

Chapter 9

Soups and broths recipes

Portuguese-Style Bean Soup

Preparation Time: 15 minutes

Cooking Time: 40 minutes

Servings: 4

Ingredients

1 pound of smoked sausage, sliced thin

- 2 celery ribs, sliced thin
- 2 cans of (~15 oz. Each) diced tomatoes, with liquids
- 1 onion, cut into half-moons
- 4 cans of (~16 oz. Each) navy beans, rinsed
- 4 minced garlic cloves, minced
- 1 red bell pepper, sliced thin
- 2 carrots, sliced thin
- 5 cups of chicken stock
- 1 tbsp. Of each hot pepper sauce & sweet paprika
- 1 cup of dry white wine
- 2 bay leaves
- 1 (3") orange zest strip

- Half tsp. Of each salt & ground cumin
- 1 (3”) lemon zest strip
- Half cup of each chopped fresh parsley, scallions & fresh cilantro
- 1 tsp. Of each dried thyme & dried savory
- 1/4 tsp. Of black pepper

Directions

1. In a slow cooker, add all ingredients (except for parsley, scallions & cilantro). Cook on low for 7 to 9 hours.
2. Take the zest strips & bay leaves out.
3. Take four cups of soup out in a blender. Pulse until smooth, pour back in the soup.
4. Add the parsley, scallions & cilantro.
5. Cool completely, store in the freezer containers. Thaw overnight in the fridge and reheat with a little bit of water.

Nutrition for 1 cup: Kcal 235 | Protein 14 g | Carbs 28 g

King Ranch Chicken Soup

Preparation Time: 15 minutes

Cooking Time: 40 minutes

Servings: 4

Ingredients

- 1/4 cup of whole wheat flour
- 1 can of (10 oz.) Of diced tomatoes with green chilies
- 1 tbsp. Of garlic powder
- 4 cups of chicken broth, low-sodium
- 2 tsp. Of minced garlic
- 4 tbsp. Of butter
- 4 tsp. Of chili powder
- 1 tbsp. Of cumin
- 1 tsp. Of salt
- 1 onion, chopped
- Black pepper, to taste
- 4 chicken breasts, boneless & skinless
- 1 jalapeno pepper, chopped
- 2 cups of cheddar cheese, shredded

- 1 sweet green pepper, diced
- 1 red sweet pepper, diced
- ¼ cup of chopped cilantro

Directions

1. Melt butter in a pan. Sauté garlic, cook for 1 minute.
2. Add flour and whisk.
3. Add the chicken broth, keep whisking. Cook until it thickens.
4. Turn the heat off, add the spices and mix.
5. Oil spray a slow cooker.
6. Add chicken breast to the cooker.
7. Add onion, diced tomatoes, bell peppers and jalapenos on top of the chicken.
8. Add sauce on top.
9. Cook for 4-6 hours on low, covered.
10. Take the chicken to a plate, add cheese to the slow cooker. Shred the chicken and placed it in the slow cooker.

11. Cook for 15 minutes. Place in freezer containers & freeze.

12. Thaw before reheating.

Nutrition: Kcal 386 | Protein 31 g | Carbs 14 g

Turkey Noodle Soup

Preparation Time: 20 mins

Cooking Time: 1 hour

Servings: 4-6

Ingredients

- 24 oz packet of frozen egg noodles (thaw and boil for 20 mins)
- 2 cartons turkey broth (32 oz each)
- 2 lbs. Cooked turkey
- 3 cups chopped celery
- 3 cups chopped carrots
- 1 cup chopped onion
- 1 can cream of chicken soup
- 2 cups heavy cream
- ½ cube butter
- 2 packets dry Italian dressing seasoning
- Salt and pepper to taste

Directions

1. In a large pot add the turkey broth and bring to a boil.
2. Add the cooked noodles, onion, celery, carrots, turkey, and seasoning.
3. Adjust to simmer for 30 mins.
4. Cool down the soup slightly and add the cream of chicken soup and the butter.
5. Stir until the soup is creamy.
6. To freeze dry:
7. Add the soup mix to your trays and run through the freeze-dryer.
8. Transfer to an airtight mylar bag.
9. When rehydrating add hot water until the soup reaches the thickness that you require and stir in the heavy cream and enjoy.

Nutrition: calories: 241 fat: 17.2g fiber: 2.1g carbs: 6.4g protein: 16.9g

Lentil Soup

Preparation Time: 15-20 mins

Cooking Time: 75 mins

Servings: 8

Ingredients

- 1 onion(chopped)
- 2 cups dry lentils
- 2 carrots(diced)
- 2 celery sticks(chopped)
- ¼ cup olive oil
- 2 garlic cloves(minced)
- 1 bay leaf
- 1 tsp dried basil
- 1 tsp dried oregano
- 1 (14.5 oz) can of tomatoes
- ½ cup spinach (sliced thin)
- 8 cups water
- 2 tbsp vinegar
- Salt and pepper to taste

Directions

1. In a large soup pot, heat the oil over medium heat.
2. Add the celery, carrots, and onions and cook for 3-5 mins (until the onions are soft).
3. Stir in the basil, oregano, bay leaf, and garlic and cook for 2 minutes.
4. Add the lentils, water, and tomatoes and bring them to a boil.
5. Reduce to simmer for 1 hour (until the lentils are soft).
6. Stir in the spinach to cook, add vinegar, salt, and pepper and serve in bowls. Enjoy!
7. To freeze-dry:
8. Pour the mixture onto the freeze-dry trays and process.
9. Transfer to mylar bags to store until their use.
10. Add warm water to rehydrate.

Nutrition: calories 116 fat: 9.5g fiber: 1.3g carbs: 5.6g protein: 3g

Vegan Soup

Preparation Time: 20 minutes

Cooking Time: 30 minutes

Servings: 1 cup

Ingredients

- 4 tbsp. Of olive oil
- 2 c. Chopped leeks, white part only (from approximately three medium leeks)
- 2 tbsp. Finely minced garlic, Kosher salt
- 2 c. Carrots, peeled and chopped into rounds (about two medium)
- 2 c. Peeled and diced potatoes
- 2 c. Fresh green beans, broken or cut into 3/4-inch pieces
- 2 qt. Of chicken or vegetable broth
- 4 c. Peeled, seeded, and chopped tomatoes
- 2 ears of corn, kernels removed
- 1/2 tsp. Freshly ground black pepper
- 1/4 c. Packed, chopped fresh parsley leaves
- 1 to 2 tsp. Freshly squeezed lemon juice

Directions

1. In a sizable, heavy-bottomed stockpot, warm the olive oil over medium-low heat.
2. Once hot, add the leeks, garlic, and a dash of salt, and cook for 7 to 8 minutes, or until they start to soften.
3. Stirring occasionally, add the carrots, potatoes, and green beans. Cook for 4 to 5 minutes.
4. Add the stock, increase the heat to high, and bring to a simmer. Once simmering, add the tomatoes, corn kernels, and pepper.
5. Reduce the heat to low, cover, and cook until the vegetables are fork-tender, approximately 25 to 30 minutes.
6. Remove from heat and add the parsley and lemon juice—season to taste with kosher salt. Serve immediately.

Nutrition: calories: 149 fat: 3.7g fiber: 11.7g carbs: 28.9g protein: 5.1g

Pea, Scallion, and Ginger Ramen Soup

Preparation Time: 15 minutes

Cooking Time: 12 minutes

Servings: 2 cups

Ingredients

- 1 tbsp bouillon granules
- 1 tbsp powdered soy sauce
- 1/2 tsp ground ginger
- 1/8 tsp ground garlic
- 1/8 teaspoon freshly ground black pepper
- 1/4 cup freezedried peas
- 2 tbsp freezedried scallions
- 1/2 cup Ramen noodles (broken).
- 1 3/4 cups boiling water (divided)

Directions

1. Mix the bouillon powder, ground soy sauce, powdered garlic, fresh ginger, freezedried

- scallions and ramen noodles together in a ziplock bag or jar that holds 1 quart. Mix well.
2. Mix the Ingredients in a bowl or mug with a 2+ cup capacity.
 3. Stir in half the boiling water and mix well until it is all incorporated. Stir in the remaining boiling water.
 4. Cover with a towel and let it rest for between 8-10 minutes.

Nutrition: calories: 376 fat: 24.1g fiber: 1.8g carbs: 14.6g protein: 25.2g

Potato and Chive freezedried Soup

Preparation Time: 5 minutes

Cooking Time: 15 minutes

Servings: 2 cups

Ingredients

- 1/3 cup instant potato flakes
- 2 tbsp grated Parmesan cheese canned and dried
- 1 1/2 tsp cornstarch
- 1 tbsp freezedried chives
- 2 tbsp bouillon granules 1/4 cup powdered milk
- 1/8 tsp onion powder
- 1/8 Tsp garlic powder
- 1/8 teaspoon freshly ground black pepper
- 1/8 tsp salt
- 1 3/4 cups boiling water (divided).

Directions

1. Add the instant potato chips, frozen cheese, cornstarch and freeze-dried herbs, bouillon powder granules milk powder, powdered milk powder, onion powder, garlic powder, fresh ground black pepper salt, and powdered milk to a ziplock bag or jar with a 1 quart capacity.
Mix well.
2. Mix the Ingredients in a 2+ cup mug or bowl.
3. Stir in half the boiling water and mix well until it is all incorporated. Stir in the remaining boiling water.
4. Cover with a towel and let it rest for between 8-10 minutes.

Nutrition: calories: 376 fat: 24.1g fiber: 1.8g carbs: 14.6g
protein: 25.2g

Stuffed Pepper Soup

Preparation Time: 5 minutes

Cooking Time: 15 minutes

Servings: 2

Ingredients

- 1/4 cup instant 1-minute rice
- 1/4 cup frozen-dried green bell peppers
- 1/4 cup frozen-dried red bell peppers
- 1/4 cup frozen-dried orange bell pepper
- 1/4 cup frozen-dried ground beef
- 1/4 cup frozen-dried tomato powder
- 3 cups boiling water (divided).
- To serve, pinch of oregano
- Serve with a pinch of thyme
- Splash of pepper sauce (to serve)

Directions

1. To a ziplock bag, or jar, add the instant rice, frozen green bell peppers and red bell peppers

as well as freeze-dried orange bell peppers, frozen-dried ground beef and freeze-dried tomato paste. Mix well.

2. Mix the Ingredients in a 3+ cup mug or bowl.
3. Stir in half the water. Continue stirring until it is completely dissolved. Add the remaining boiling water to the bowl and stir.
4. Cover with a towel and let it rest for between 8-10 minutes.
5. Season the soup by adding a pinch of oregano, thyme, and a splash pepper sauce.

Nutrition: calories 170, fat 6, fiber 2, carbs 5, protein 6

Thai Coconut Milk Soup with Rice

Preparation Time: 5 minutes

Cooking Time: 10 minutes

Servings: 2

Ingredients

- ½ cup powdered coconut milk
- 1 ½ tbsp bouillon granules)
- 1 tsp powdered soy sauce ½ tsp brown sugar
- 2 tsp cornstarch
- ½ tsp dried basil
- ½ tsp ground ginger
- ⅛ tsp ground garlic
- Ground cayenne in a pinch
- 1/5 tsp powdered lime juice crystals powder
- ¼ cup chopped freeze-dried mushrooms
- 1 tbsp freeze-dried scallions
- 2 tbsp freeze-dried peas
- ¼ cup instant 1-minute Rice
- 1 ¾ cups boiling water (divided).

Directions

1. You can add the powdered coconut milk and bouillon powder granules, as well as brown sugar, cornstarch or dried ginger, ground garlic, cayenne pepper, lime juice crystals and freeze-dried mushrooms, freeze -dried scallions and freeze-dried peas to a jar, or ziplock bag that holds a 1-quart jar. Mix the Ingredients together by stirring or massaging them until they are well combined.
2. Mix the Ingredients in a 2+ cup mug or bowl.
3. Stir in half the boiling water and mix well until it is all incorporated. Stir in the remaining boiling water.
4. Cover with a towel and let it rest for between 8-10 minutes.

Nutrition: calories 141, fat 6, fiber 2, carbs 4, protein 7

Tomato and Basil Soup

Preparation Time: 5 minutes

Cooking Time: 10 minutes

Servings: 2

Ingredients

- 1/4 cup tomato powder
- 1/3 cup instant dried milk powder
- 2 tbsp bouillon granules
- 1 tsp dried basil
- 1/8 tsp of garlic powder 1/8 Tsp onion powder
- 1/8 teaspoon freshly ground black pepper
- 1/4 tsp salt
- 1 3/4 cups boiling water (divided)

Directions

1. Toss in the tomato powder, instant milk powder, bouillon powders, dried basil, garlic powder and onion powder.

2. Mix the Ingredients together by stirring or massaging them until they are well combined.
3. Mix the Ingredients in a 2+ cup mug or bowl.
4. Stir in half the boiling water and mix well until it is all incorporated. Stir in the remaining boiling water.
5. Cover with a towel and let it rest for between 8-10 minutes

Nutrition: calories 151, fat 3, fiber 2, carbs 4, protein 6

Conclusion

Thank you for your time spent reading this book. Although almost any food can be freeze-dried, some perform better than others. To be more suitable for this process, the meat you plan to freeze-dry should be sliced into smaller bits, as smaller-sized items will fare better. Coffee, soups, and other liquids also do well after freeze-drying. The majority of the instant coffees we use on a daily basis to keep us awake and alert are either freeze-dried or spray-dried. Fruits and vegetables that have been freeze-dried are becoming more popular in retailers as healthier alternatives to dehydrated foods. These meals are also less expensive to manufacture.

Because a low temperature is employed during the procedure, the end result is a product that retains not only its taste and look but also its nutritional value. This is due to freezing limiting changes in the physical state of the product, delaying deterioration, extending its life, and allowing the rehydrated product to be in extremely good condition.

As a result, while freeze-drying has other applications, its use and importance in food preservation has proven to be crucial and an indispensable tool for the survivalist.

In terms of time scales, the skill of freeze-drying is not a new invention, with its origins dating back to the 12th century, when the Incas discovered that food stored at high altitudes will first freeze and then dehydrate over time. This was discovered when potatoes were stored high in the Andes Mountain peaks. They were exposed to subzero conditions at night. During the day, they would squeeze the water from the potatoes and leave them to dry in the sun.

Freeze-dried meals are not only healthier than dehydrated counterparts, but they are also tastier and of superior quality. Because freeze drying removes all of the moisture from the food, any harmful bacteria that may be present are killed off (this is especially important if you plan to consume raw, freeze-dried food). Because water molecules are eliminated during this procedure, nutrients can remain within the food product.

All the best in freeze drying:

Glossary

Air bubble remover tool: The opposite end of a headspace measure tool used to release trapped air in jars packed with foods. It is also used to tamp down food in jars to pack more in. This tool can also be the handle of a wooden spoon, a small silicone spatula, or a chopstick.

Ascorbic acid: Another name for vitamin C. A water-soluble vitamin that is used in food preparation to minimize browning of some vegetables and fruits. Often used together with citric acid, which is derived from lemon or lime juice, in commercially prepared blends to treat fruits to prevent browning.

Bacteria: Microorganisms found in the air, soil, and water. Harmful bacteria can survive in low-acid environments and produce toxins that can be deadly. For this reason, low-acid foods are pressure canned to enable heating to a minimum of 240°F, a temperature that kills these bacteria.

Blanch: The process of placing a food item in boiling water or steam for a short period of time. Blanching is always followed by an ice-water bath to quickly cool the food item and prevent further cooking. This process is used to inactivate enzymes in foods, as well as to loosen the skin or peel of some fruits and vegetables.

Boil: Bringing a liquid to the temperature in which bubbles continuously break its surface. At sea level, the boiling point is 212°F, while at altitudes above 1,000 feet, this is achieved at a lower temperature.

Boil, full rolling: Boiling that cannot be stirred down.

Botulism: A deadly form of food poisoning caused by the bacterium *Clostridium botulinum*. These spores are present in the soil and air around us, but are able to activate only when there is a lack of oxygen and low acid levels. For this reason, it is highly important to process low-acid foods properly, for the recommended length and temperature, to kill the spores that produce this toxin.

Bouquet garni: A bouquet garni is a bundle of herbs usually tied together with string and mainly used to flavor soups, stocks, casseroles and various stews.

Brine: A solution used in the pickling process. Typically contains salt

and water, although other ingredients such as spices or sugar can also be included.

Cassoulet: Cassoulet is a rich, slow-cooked casserole originating in the south of France, containing meat, pork skin, and white beans. The dish is named after its traditional cooking vessel, the cassole, a deep, round, earthenware pot with slanting sides.

Cheesecloth: A woven cloth designed for kitchen use. Used to strain stocks, drain juice from fruits, and form a spice bag to hold whole spices during cooking.

Enzyme: A protein found in foods that begins the process of both ripening and decomposition. Enzymes can change the texture, color, and flavor of fruits and vegetables. Food preservation methods deactivate these enzymes to permit long-term storage of foods.

Food mill: A mechanical kitchen tool used to purée soft foods. A food mill separates the skins and seeds of the fruits or vegetables on its top, and the puréed food is collected below.

Headspace: The space at the top of a canning jar that is left unfilled. Headspace varies based on the food type and is essential for creating a proper lid seal.

Headspace measuring tool: A tool created specifically for home canning to properly measure the free oxygen left in the interior of the jar after it is filled with food. It is notched to rest on the rim of the jar with etched inches measurements.

Hot pack method: Using preheated, hot food to fill jars prior to processing. Filling jars with preheated food expels air from the fibers of the food and allows food to be packed more tightly.

Lemon juice: The juice extracted from lemons. In home canning recipes, it is used to ensure the proper acidic pH level. Because the acid in fresh lemons is variable, it is important to use bottled lemon juice when the recipe specifies it to ensure the safety of the finished product. When fresh lemon juice is called for, either bottled or fresh can be used.

Syrup: A blend of sugar and water created in a variety of thicknesses used to preserve fruit to help keep the fruit's color and provide a sweet flavor.

Vinegar, apple cider: A vinegar produced from apples that has a tart, fruity flavor. Cider vinegar has a golden color and may darken a recipe. Always use vinegar with 5 percent acidity when using cider vinegar for canning.

Vinegar, distilled white: A standard type of vinegar produced from grain alcohol. It is clear and colorless, making it suitable for a lot of different canning projects, as it does not compete with the colors or flavors of the foods. Always use vinegar with 5 percent acidity when canning.

Whole, or cut, fruits in a syrup: Best for berries (blackberries, blueberries, currants, raspberries, strawberries); tree fruits (apples, apricots, nectarines, peaches, pears, plums); tropical fruits (guava, mango, passion fruit, pineapple); grapes; peppers (bell peppers and chiles).

Measurement conversion table

US Dry Volume Measurements

1/16 teaspoon = 1 dash

1/8 teaspoon = a pinch

3 teaspoons = 1 tablespoon

1/8 cup = 2 tablespoons (= 1 standard coffee scoop)

1/4 cup = 4 tablespoons

1/3 cup = 5 tablespoons plus 1 teaspoon

1/2 cup = 8 tablespoons

3/4 cup = 12 tablespoons

1 cup = 16 tablespoons

1 pound = 16 ounces

US Liquid Volume Measurements

8 Fluid ounces = 1 cup

1 Pint = 2 cups (= 16 fluid ounces)

1 Quart = 2 Pints (= 4 cups)

1 Gallon = 4 Quarts (= 16 cups)

US to Metric Conversions

1/5 teaspoon = 1 ml (ml stands for milliliter, one thousandth of a liter)

1 teaspoon = 5 ml

1 tablespoon = 15 ml

1 fluid oz. = 30 ml

1/5 cup = 50 ml

1 cup = 240 ml

2 cups (1 pint) = 470 ml

4 cups (1 quart) = 0.95 liter

4 quarts (1 gallon) = 3.8 liters

1 oz. = 28 grams

1 pound = 454 grams

Metric to US Conversions

1 milliliter = 1/5 teaspoon

5 ml = 1 teaspoon

15 ml = 1 tablespoon

30 ml = 1 fluid oz.

100 ml = 3.4 fluid oz.

240 ml = 1 cup

1 liter = 34 fluid oz.

1 liter = 4.2 cups

1 liter = 2.1 pints

1 liter = 1.06 quarts

1 liter = 0.26 gallon

1 gram = 0.035 ounces

100 grams = 3.5 ounces

500 grams = 1.10 pounds

1 kilogram = 2.205 pounds

1 kilogram = 35 oz.

Pan Size Equivalents

9-by-13-inches baking dish = 22-by-33-centimeter baking dish

8-by-8-inches baking dish = 20-by-20-centimeter baking dish

9-by-5-inches loaf pan = 23-by-12-centimeter loaf pan (= 8 cups or 2 litres in capacity)

10-inch cake or tart pan = 25-centimeter cake or tart pan

9-inch cake pan = 22-centimeter cake pan

Oven Temperature Conversions

275° Fahrenheit = 140° Celsius = Gas Mark: 1—cool

300° Fahrenheit = 150° Celsius = Gas Mark: 2

325° Fahrenheit = 165° Celsius = Gas Mark: 3—very moderate

350° Fahrenheit = 180° Celsius = Gas Mark: 4—moderate

375° Fahrenheit = 190° Celsius = Gas Mark: 5

400° Fahrenheit = 200° Celsius = Gas Mark: 6—moderately hot

425° Fahrenheit = 220° Celsius = Gas Mark: 7—hot

450° Fahrenheit = 230° Celsius = Gas Mark: 9

475° Fahrenheit = 240° Celsius = Gas Mark: 10—very hot

Ratios for Selected Foods

Butter:

1 stick = 4 ounces = 113 grams = 8 tablespoons = ½ cup

4 sticks = 16 ounces = 452 grams = 32 tablespoons = 2 cups

Lemon:

1 lemon = 1 to 3 tablespoons of juice, 1 to 1 ½ teaspoon grated zest

4 lemons = 1 cup juice, ¼ cup grated zest

Creams:

Half and half = ½ milk ½ cream = 10.5 to 18% butterfat

Light cream = 18% butterfat

Heavy cream = whipping cream = 36% or more butterfat

Light whipping cream = 26-30% butterfat

Double cream = extra-thick double cream = 42% butterfat

Chocolate:

1-ounce = ¼ cup grated 40 grams

6-ounces = 1 cup chips 160 grams

Cocoa powder = 1 cup 115 grams

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BOOK 14
MEAT CANNING COOKBOOK

Pork Stock



Preparation Time: 10 minutes

Cooking Time: 1 hour

Cooking Level: Difficult

Servings: 8-pint jars

Ingredients

- Water enough to cover meat
- 10 lbs pork bones

Directions

1. If you're creating pork broth, Rinse pork bones (freshly cut) before placing m in stock pot with plenty of water to Cover m. Bring to boil, n reduce heat to low, continue to cook for 3–4 hours.
2. Remove bones and cool liquid before skimming off fat. ReHeat broth, n pour it into clean, hot Mason jars, leaving one inch of headspace in each.
3. After removing air bubbles from lids, a Process 20 minutes (pints) or 25minutes (quarts) in pressure canner (quarts).
4. Fill a big stockpot halfway with large pork bones if you're creating broth.
5. Pour in enough water to submerge bones, cover, and cook for 30–45 minutes.
6. Remove bones and Chill soup before straining off fat. Reheat before transferring into hot, clean Mason jars, leaving one inch of headspace in each.

7. During processing inside pressure canner for 20 minutes (for pint jars) or twenty-5minutes (for quart jars), make sure jar lids are properly adjusted (for quart jars).

Nutrition: Calories: 64 kcal Carbohydrates: 1 g Protein: 3 g Fat: 5 g Fiber 9g Sugar 14g

Pork Goulash



Preparation Time: 10 – 20 minutes

Cooking Time: 0 minutes

Cooking Level: Easy

Servings: 8

Ingredients

- 4 lbs. cubed pork
- 3 bay leaves
- 20 peppercorns
- 2 tsp. caraway seeds
- 4 halved carrots
- 6 celery stalks

- 3 onions
- 3 tbsps. Paprika
- 2 tsp. dry mustard
- 1/3 cup vegetable oil
- 1/3 cup vinegar
- 1 ½ cups water
- 1 tbsp. salt

Directions

1. Sterilize jars.
2. Combine celery, carrots, and onion in pot.
3. Mix together salt, paprika, and mustard and rub mixture all over pork.
4. Pour oil in pan and Brown meat in it in batches, transferring it into pot.
5. Deglaze pan with water and pour it into pot, n Combine peppercorns, caraway seeds, and bay leaves in spice bag and throw it into pot. Add vinegar and Bring pot to boil, n reduce heat, simmer for 1 hour, stirring occasionally.

6. Discard vegetables and spice bag, and pour mix into sterilized jars, leaving one-inch of headspace.
7. Cover jars with lid and Apply bands making sure that it is tightened.
8. Pressure for 1 hour 30 minutes in pressure canner.
9. Remove, allow to cool, and n label jars.

Nutrition: Calories: 556 Fat: 24.9g Carbs: 2.1g Proteins: 76.5g
Fiber 12g Sugar 17g

Black-eyed Peas with Pork



Preparation Time: 10 – 20 minutes

Cooking Time: 0 minutes

Cooking Level: Easy

Servings: 2

Ingredients

- 2 lbs. chopped pork
- 3 lbs. dried black-eyed peas
- 6 crushed cloves garlic
- 2 cups diced green bell pepper
- 2 cups diced tomato
- 2 chopped onions

- 1 diced jalapeño pepper
- Hot water, as needed

Directions

1. Layer ingredients in each of your jars in order listed, leaving 1 inch of headspace.
2. Add hot water over contents of jars, allowing 1 inch of headspace for peas to expand.
3. Use a rubber utensil to slide around edges of jar to remove air pockets. Add more liquid if necessary.
4. Put in pressure canner at 10 PSI for 90 minutes with lids on, adjusting for altitude.

Nutrition: Calories: 860 Fat: 70g Carbs: 1g Protein: 52g Fiber 12g Sugar 17g

Pork Chops with Apple



Preparation Time: 10 – 20 minutes

Cooking Time: 0 minutes

Cooking Level: Easy

Servings: 1

Ingredients

- 3 chopped onions
- 6 cloves garlic
- 1 tbsp. brown sugar per jar
- $\frac{1}{4}$ tsp. salt
- $\frac{1}{8}$ Tsp. ground cloves per jar
- 6 lbs. boneless pork chops

- 3 tart apples
- 1/4 tsp. black pepper

Directions

1. In each jar, layer half a cooking onion, a clove of crushed garlic, sugar, ground cloves, salt, and pepper.
2. Trim visible excess fat off your pork and cut it into pieces that will easily fit in jars.
3. Fill each jar halfway with pork, n layer 4 slices of apple in each.
4. Add more pork, n top off jars with rest of apples. Do not add any cooking liquid.
5. Clean jar rims with a vinegar-dampened cloth, n cap jars.
6. Pressure can at 11 PSI for 90 minutes, adjusting for altitude.

Nutrition: Calories: 291 Fat: 15.3g Carbs: 19.6g Protein: 19.5g
Fiber 16g Sugar 22g

Pork Carnitas with Bay Leaf



Preparation Time: 10 – 20 minutes

Cooking Time: 0 minutes

Cooking Level: Easy

Servings: 12

Ingredients

- 15 lbs. pork
- 1 minced garlic clove
- 1/8 Cup minced onion
- 1/2 tsp. ground cumin
- 1/2 tsp. chili powder
- 1/2 tsp. dried oregano

- 1/8 Tsp. salt
- 1 bay leaf
- 1 tbsp. lime juice

Directions

1. If necessary, cut pork into bite-sized pieces.
Trim visible fat off roast.
2. Add pork to quart jars, allowing room for additional ingredients.
3. Top each jar with seasonings above in order listed. Do not add any additional liquid.
4. Rinse jar rims with a paper towel dipped in vinegar, n Put lids on.
5. Process 90 minutes at 11 PSI in pressure canner.

Nutrition: Calories: 160 Fat: 7g Carbs: 1g Protein: 20g Fiber 12g Sugar 17g

Canned Meatballs



Preparation Time: 10 – 20 minutes

Cooking Time: 30 minutes

Cooking Level: Intermediate

Servings: 5

Ingredients

- 2 lbs. ground pork
- Herbs of your choice
- 2 tsps. Salt
- 2 cups tomato juice

Directions

1. 1. Sterilize jars in pressure canner as indicated in general guidelines of this book. Allow jars to cool.
2. 2. Put meat in bowl and stir in herbs and salt. Mix until well combined.
3. 3. Boil enough water in saucepan. Make balls out of ground meat mixture and gently drop m into boiling water. Allow m to cook for 5 minutes, n strain meatballs.
4. 4. Gently pack meatballs inside sterilized jars. Pour in enough tomato juice to Cover meatballs. Leave an inch of headspace.
5. 5. Remove air bubbles and close lid.
6. 6. Place jars in pressure canner and Process 25 minutes.

Nutrition: Calories: 272 Protein: 35.8g Fat: 14g Carbs: 0.8g
Fiber 5g Sugar 17g

Pork and Potato Stew



Preparation Time: 10 – 20 minutes

Cooking Time: 5 Minutes

Cooking Level: Easy

Servings: 7

Ingredients

- 4 lbs. cubed pork
- 4 lbs. sliced carrots
- 3 cups chopped celery
- 3 cups chopped onions
- 3 lbs. cubed potatoes
- 1½ tbsps. Salt

- 2 tsps. Thyme
- ½ tsp. pepper
- Boiling water or broth

Directions

1. 1. In large pot, Brown pork cubes in small amount of vegetable oil.
2. 2. In nor large pot or saucepan, Place carrots, celery, onions, and potatoes.
3. 3. Pour water to cover, n simmer for 2 minutes.
4. 4. Drain vegetables and Add m to large pot with browned meat.
5. 5. Add seasonings and mix carefully but thoroughly, keeping mixture hot. Pack stew into hot jars, leaving 1-inch headspace.
6. 6. Ladle boiling water or broth over stew, again leaving 1-inch headspace.
7. 7. Following “Pressure Canning” directions, process quarts for 90 minutes and pints for 75 minutes at 10 psi, adjusting psi as necessary for

your altitude according to altitude adjustment
directions.

Nutrition: Calories: 318 Fat: 7g Carbs: 28g Protein: 36g Fiber
12g Sugar 25g

Chopped Pork Sausage



Preparation Time: 10 minutes

Cooking Time: 1 hour

Cooking Level: Difficult

Servings: 8–9 pints

Ingredients

- 10 lbs Preferred fresh, chilled meat, chopped/ground
- Meat broth, boiling/water/ tomato juice enough to cover meat
- 1 tsp salt

Directions

- 1. 1.** Prepare cold fresh meat by chopping it into tiny bits. If you're using venison, grind it after adding one cup of high-quality pig fat to every 3–4 cups of deer. If using fresh sausage, season with cayenne salt and pepper.
- 2. 2.** Make meatballs or patties out of mixture. Chop cased sausage into 3–4-inch links if using.
- 3. 3.** Cook meat until it has become a light brown color. If you're using ground beef, cook it without shaping it.
- 4. 4.** Fill clean and hot Mason jars with cooked meat. Each one is salty (1 tsp).
- 5. 5.** Bring beef broth to boil. Fill jars with tomato juice, beef broth, or water until y are 1 inch from top.
- 6. 6.** Remove any air bubbles while fitting lids, n
Process 1 hour and 15 minutes (pints) or 1 hour

and 30 minutes (quarts) in pressure canner
(quarts).

Nutrition: Calories: 64 kcal Fiber 12g Sugar 17g
Carbohydrates: 1 g Protein: 3 g Fat: 5 g

Pork Meatballs with Parsley



Preparation Time: 60 Minutes

Cooking Time: 0 minutes

Cooking Level: Easy

Servings: 4

Ingredients

- 4 lbs. lean ground pork
- 2 sliced onions
- 2 tbsps. Dried parsley
- 1 tsp. ground pepper, fresh
- 2 crushed garlic cloves
- 2 tsps. Salt

- Spice mixture
- 1 ¼ tsps. Ground cloves
- 2 tsps. Dry mustard
- 1 tsp. ground cinnamon
- Vegetable oil
- 1 tsp. ground mace
- 3 cups liquid broth

Directions

1. 1. Prepare canning jars following directions.
2. 2. Mix ground pork with all ingredients, including spice mixture. Combine well.
3. 3. Form meat mix into 1-inch meatballs with about 1 tsp of seasoning per each ball.
4. 4. Place a large saucepot over medium-high heat. Add vegetable oil and Fry meatballs until turning brown, working in batches.
5. 5. Once you've finished frying meatballs, slowly pour liquid broth into pot, scraping up

brown small pieces from pan. Allow to boil.

Take out burnt or large pieces with spoon.

6. 6. Pack meatballs into each canning jar and n equally share hot liquid among jars. Add boiling water to fill each jar. Remember to leave a one-inch headspace. Use a spatula to remove air bubbles, n use a clean cloth to wipe jar rims. After that, adjust lids and screw band.
7. 7. Set filled jars in pressure canner at 11 pounds pressure for dial-gauge or 10 pounds for weighted-gauge canner. Process heat jars for 75 minutes, adjusting for altitude. Switch off heat, Let pressure drop naturally. Remove lid and cool jars in canner for 10 minutes. Take out jars and finish cooling. Inspect lids for proper sealing after 24 hours.

Nutrition: Calories: 400 Fat: 22g Carbs: 31g Protein: 29g Fiber 12g Sugar 17g

Mexican Beef Garden Soup



Preparation Time: 20 minutes

Cooking Time: 50 minutes

Cooking Level: Intermediate

Processing Time: 75 minutes

Servings: 9 1-quart jars

Ingredients

- 5 lb beef chuck roast, cubed
- 2 cups corn
- 1 tbsp black pepper
- 2 carrots, cut into rounds
- 2 peeled sweet potatoes, chopped

- 2 tbsp oil
- 4 Poblano chili peppers, chopped without seeds
- 5 quarts beef broth
- 8 Roma tomatoes, chopped without seeds
- 1 ½ cup chopped onions
- 4 jalapeño peppers, chopped without seeds
- 12 garlic cloves minced
- 2 tbsp salt
- 1 tbsp chili powder

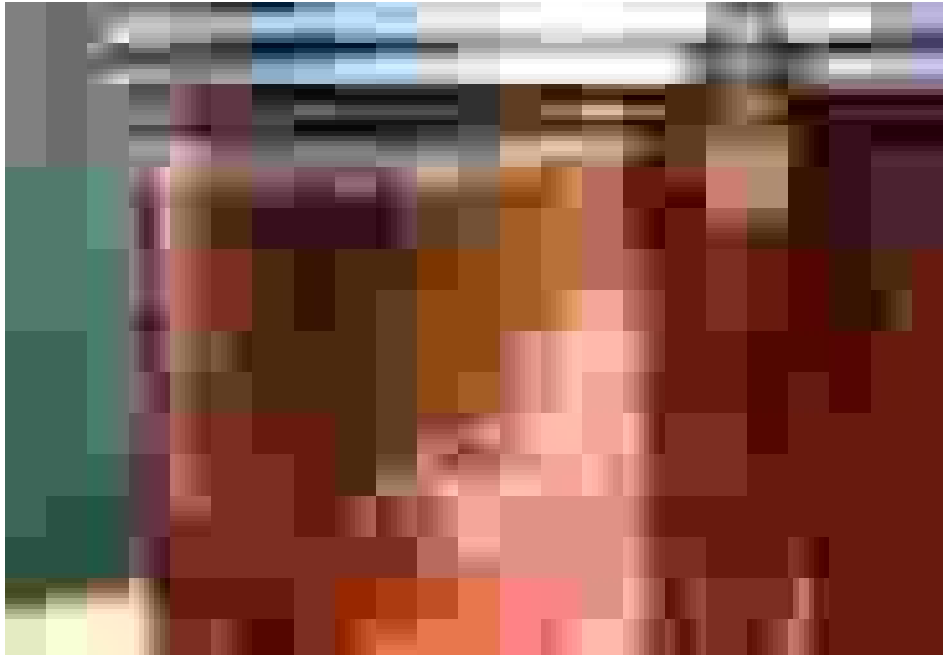
Directions

1. Brown beef in hot oil, and do it in batches if needed. Add broth, Let it boil, turn heat low and simmer for 75 minutes.
2. Add rest of ingredients. Boil for 5 minutes.
3. In sterilized hot jars, Add mixture, leave ½-inch space from above. Remove any air bubbles. Wipe jar's rim, Place lid on top and screw bands (do not screw too tightly).

4. Process jars in pressure canner at 11 pounds (dial) or 10 pounds (weight) for 75 minutes. Make sure to adjust for altitude. Completely drop pressure to zero; wait for 10 minutes.
5. Take jars out and cool for 12–24 hours, and lid should not pop down or up. Store in cool, dark place

Nutrition: Calories: 260 kcal Protein: 32 g Carbs: 16 g Fats: 12g
Fiber 15g Sugar 20g

Pressure Canned Beef Round



Preparation Time: 10 – 20 minutes

Cooking Time: 0 minutes

Cooking Level: Easy

Servings: 4

Ingredients

- 4 lbs. beef rounds
- Cooking spray
- Water
- Salt

Directions

1. Trim any gristle from beef, n cut it into cubes.
2. Put a skillet over medium heat, spray it with cooking spray. Brown beef rounds in batches and Transfer m to covered bowl to keep m hot.
3. Pack beef in 1/2-liter jars, leaving 1-inch headspace. Add a 1/2 tablespoon of salt to each jar.
4. Add boiling water or stock maintaining 1-inch headspace.
5. Rinse rims and Place lids on. Transfer jars to pressure canner and Process m at 10 pounds for 75 minutes.
6. Wait for pressure canner to depressurize to zero before removing jars.
7. Transfer jars on a cooling rack for 12-24 hours n store in cool dry place.

Nutrition: Calories: 94 Fat: 1.8g Carbs: 0g Protein: 18.8g Fiber 7g Sugar 25g

Corned Beef and Potatoes



Preparation Time: 10 – 20 minutes

Cooking Time: 30 minutes

Cooking Level: Intermediate

Servings: 8

Ingredients

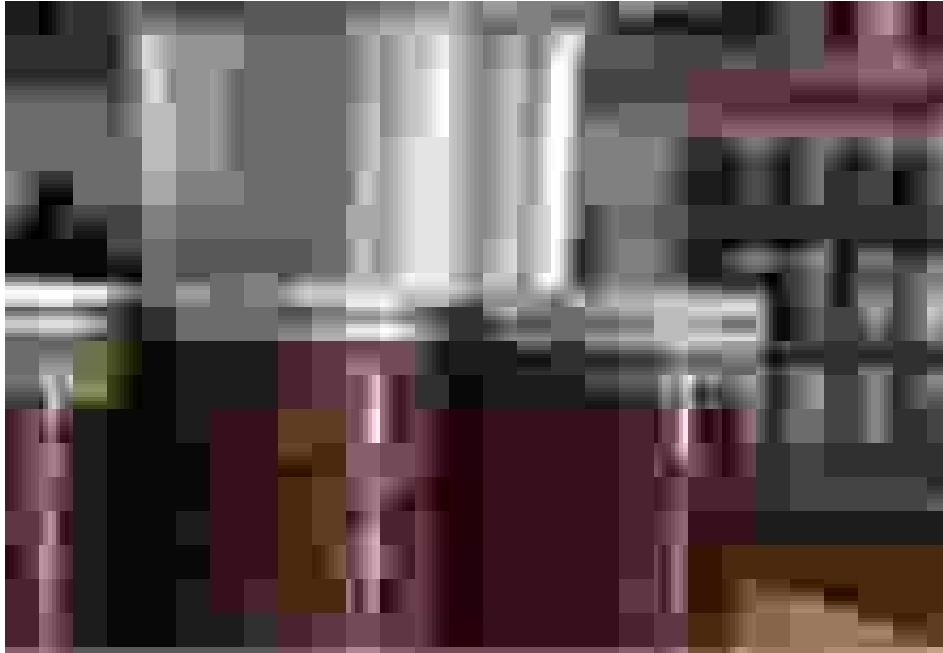
- 8 cups water
- 1 tbsp. pickling spice blend
- 5 lbs. brisket
- 10 cups cubed russet potatoes

Directions

1. Boil water in kettle.
2. In meantime, place 1/4 tbsp. of spice blend into each quart jar.
3. Layer brisket and potatoes into jars. Leave 1-inch headspace.
4. Fill jars with boiled water. Leave 1-inch headspace.
5. Remove air bubbles adjusting headspace.
6. Clean rims of jars using a clean damp towel.
7. Now apply 2-piece metal caps.
8. Process pint jars in pressure canner for about 85 minutes at 11 pounds pressure (if using a dial-gauge canner) or 10 pounds pressure if using a weighted-gauge canner.

Nutrition: Calories: 465 Fat: 15.9g Carbs: 27.8g Protein 99.4g
Fiber 12g Sugar 17g

Roast Beef and Potatoes



Preparation Time: 10 – 20 minutes

Cooking Time: 25 Minutes

Cooking Level: Easy

Servings: 4

Ingredients

- 7 oz. baby potatoes
- 1 tbsp. olive oil
- 8 roast beef slices
- 8 oz. halved cherry tomatoes
- 2 cups salad leaves

Dressing

- 1 tbsp. horseradish
- 1 tbsp. red wine vinegar
- 1 tsp. Dijon mustard
- 4 tbsps. Olive oil

Directions

1. PreHeat oven to 350°F.
2. Place potatoes on a baking sheet and drizzle olive oil to coat. Place sheet in oven and cook for 25 minutes or until golden brown and tender in center.
3. Allow m to cool completely after removing from oven.
4. Whisk dressing ingredients until thoroughly blended.
5. Divide dressing into 4 pint-sized jars, followed by a layer of potatoes.
6. Add beef, tomatoes, and salad leaves.
7. Cover with lids and refrigerate.

Nutrition: Calories: 461 Fats: 37g Carbs: 22g Protein: 14g Fiber
12g Sugar 17g

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