

*The Most Important Survival Items That
Went Missing Immediately After Hurricane Harvey*

56 **Items**
That You
Should
Stockpile
In Your
Easy Cellar

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Introduction

The world is a dangerous place. All of our technology can't prevent natural disasters like earthquakes, storms, and volcanic eruptions. If you detonated every nuclear weapon on Earth at once, they would release as much energy as a single major hurricane generates in an hour. Tornadoes can produce winds of up to 300 mph and are capable of bending the frames of high-rise buildings or tearing a normal-sized house right off its foundation. There's a super-volcano under Yellowstone National Park that erupts about every 600,000 to 700,000 years (and last blew 630,000 years ago). If it went off now, the U.S. Geological Service estimates that Billings, MT, 150 miles away, would be buried under three feet of volcanic ash. Des Moines, IA, almost 900 miles away, would have a layer several inches thick, and the ash cloud would reach the East Coast. Up to a third of the USA's farmland would be taken out for at least a year.

And that's only the damage that's caused by natural disasters. What about the disasters we can create ourselves? When the Cold War ended, the world breathed a sigh of relief because the risk of nuclear war seemed to have faded away to almost nothing. Yes, there were still rogue states that had or wanted nuclear weapons but nothing on the scale of the USSR. But now there's North Korea, which has one of the largest militaries on Earth and has already tested half a dozen nuclear weapons. The country's bizarre and fanatical regime is so unhinged that it openly talks about planning a nuclear attack on Guam—and within a year or two, it will probably have the ability to hit cities in the mainland U.S. Worst of all, its sometimes-reluctant ally, China, has a large nuclear arsenal of its

own; if North Korea starts throwing missiles around, it's hard to say where it will end.

It's no surprise that many people are starting to think about building a secure bunker to give themselves a refuge from any catastrophic event. There are many ways to do that, from reinforcing your home's basement to digging a hole and building a custom bunker in it. Options include concrete structures costing well into six figures or an affordable but robust sandbag shelter that you can build yourself for under \$1,000.

Building a bunker isn't the end of the story though. Once your refuge is complete, you need to outfit and stock it so it's all ready for you to move in. A tornado is a short-term event that's usually over in minutes; a hurricane might force you into shelter for a day or two. You can survive those without needing much in the way of supplies. But if there's a nuclear attack and you are living in the fallout zone, you're probably going to have to spend at least two weeks in your bunker before the radiation levels fall enough that you can spend more than a few minutes at a time outside.

You probably already keep a bug-out bag for emergencies, but to keep you and your family alive for two weeks or more, you'll need a lot more than you can grab and take into the bunker with you. Two weeks' worth of water for a family of four will weigh at least 500 pounds, and that's for a bare minimum ration of a gallon a day per person. Then there's food, medical supplies, clothing, tools...it's a lot of gear, and unless you already have most of it in your bunker when you have to evacuate into it, you're not going to have enough time to gather everything you need.

A bunker is a serious piece of preparedness that will help you live through the worst crises, but the time and money you invest in

building it won't do much good if you don't have the right supplies in it. This book will help you make sure you're prepared for anything. The chapters that follow are broken down by survival priorities because that's what it's all about—surviving.

Chapter 1:

Water

Without water, your life expectancy is measured in days—and not many days at that. After three days, dehydration will be a huge problem, and death is almost certain after a week. Making sure you can stay supplied with water is a top survival priority.

Unfortunately, the only water you can rely on is what you already have stored in your bunker. Even if the bunker has plumbing and your system draws water from a well, that's likely to get contaminated by fallout within a few days of a nuclear attack. You need to have enough water stockpiled to get you through the initial period of high radiation.

1. Water Containers

Aim to store, as a bare minimum, a gallon of water per day for each person who'll be in the shelter. You need enough for at least two weeks, but if there's room for more, that's ideal. Water needs to be in sealed containers to keep contamination out. For normal storage, opaque or blue containers are best as a lot of microorganisms rely on sunlight to grow. If you're storing your water in a bunker, that's less important; sunlight won't be reaching it.

Portable containers are better than large barrels. Plastic army-issue five-gallon jerrycans are perfect; they're tough, but they can be carried easily for short distances, and their rectangular shape is good for efficient storage. Plastic gasoline canisters are also good, but only use new ones that haven't held fuel before.

Bottled water works as an alternative, but it has some limits. On the positive side, it's probably going to be cheaper than buying containers and filling them with tap water. As a baseline, assume

that containers will cost you around \$5 a gallon; you can get bottled water for less than half of that. It's also easy to control and account for. Instead of measuring out daily drinking water rations, you can just hand everyone a bottle every morning.

On the other hand, the bottles aren't as robust as a military jerrycan. They're not as tough as a canteen either. You can pick one up and take it with you when you go out, but it's more likely to split than a one-quart GI canteen. Finally, heavy duty containers can be reused many times. A jerrycan will last for years—probably decades—unless you actually drop it off a cliff. That makes them valuable when you start collecting and purifying water.

2. Filters

No matter how much water you stockpile, eventually it's going to run out. After spending two weeks in the bunker, you're going to have to find a water supply, and then you're going to have to purify it. Even if you have your own well, any water supply is potentially contaminated with nuclear fallout.

Fallout can contain many different radioactive substances. Most of them are in the form of tiny particles that a filter will remove from water, and they won't turn the water itself radioactive. However, at least one of them can dissolve in water—and that means a filter won't catch it. This substance is iodine-131.

Your thyroid gland picks up iodine and uses it to make vital hormones; without at least some iodine in your diet, you'll die. Unfortunately, the thyroid will pick up any iodine, including iodine-131. If that collects in your thyroid, it will bombard your throat with beta radiation as it decays to xenon-131; then the xenon releases a single pulse of gamma rays before becoming stable.

The good news is that while simple filtration won't take iodine-131 out of water, an activated charcoal filter probably will. The science isn't totally clear, but there's good evidence that charcoal filters can chemically extract the dangerous atoms. The filters do have a limited life and they'll steadily become radioactive as they collect more iodine-131, but anything that reduces your radiation exposure is worth doing. Activated charcoal also has many other uses, so it's worth stockpiling. To make it last as long as possible, use conventional filters to get rid of particles before running the water through the charcoal.

3. Sterilization Tablets

With sewer systems destroyed by ground shocks and unburied bodies lying around, disease is going to run wild. That means any water could be contaminated with bacteria or viruses. Use purification tablets to kill any bugs before using it. If you don't have any, use plain (unscented) household bleach; add two drops per quart of water, and let it stand for half an hour.

Chapter 2:

Food

After air and water, food is the next survival priority. During the two weeks after a nuclear attack, you won't be able to leave the shelter to forage for food, so you need to have at least enough stockpiled to survive that long—and the more you have, the better.

Don't just run down to Walmart and stock up on canned food though. There's definitely a place for that in your bunker's pantry, but you also need different types of food for both the shorter and longer term. You probably can live on canned goods forever, but you'll get pretty fed up with it.

4. MREs

In the hours and days after the attack, things are going to be very stressful. You might have injuries to treat or damage to the shelter to repair; there probably won't be time or energy to sort out proper meals. MREs (Meals Ready to Eat) are a great option to keep you going until things settle down into a routine.

You have two options for building up a supply of MREs. One is to buy either military or commercial ones. If you're buying military issue rations, beware: A lot of the ones you find on eBay were salvaged from dumpsters at military posts, and they were in the dumpster because they were life expired. Eating an MRE that's a couple of years past its storage date probably won't do you any harm, but taste and nutritional value can both suffer. If in doubt, stick with the commercial equivalents.

Alternatively, you can make your own MRE-style ration packs. There are plenty of tips about how to do this online. Just focus on foods that are easy to prepare; you probably don't want anything more complex than adding boiling water, and meals that can be eaten cold are a bonus. The good news is that if your packs are designed for use in the shelter instead of being carried with you,

weight is less of a problem, and you can drop the daily calorie allowance.

5. Emergency Food

In general, survival food buckets aren't a great idea. The servings are too small, and the daily calorie allowance—usually about 2,100 calories a day—isn't enough for an active person. In a bunker, however, they come into your own. When you're taking refuge in a bunker for two weeks, you'll just be sitting or lying down most of the time, so 2,100 calories should be fine. The dehydrated foods used in these buckets are also easy to prepare, and there's usually a good variety of meals.

6. Bulk Staples

In the longer term, bulk foods—especially carbohydrates—are going to be the foundation of your diet. Pasta, rice, and flour are things most preppers stockpile anyway, and if you can store them in damp-proof containers, why not keep them in your bunker? That way they're safe and easily available when you need them. Dried beans are good as well; they have lots of protein and fiber. If you're using your shelter as a root cellar and have a ton of potatoes in there, that won't hurt either.

7. Canned Foods

Most canned foods will keep for years—long past the date on the label. To maximize their storage life, keep them in a dry place; if your bunker is a bit damp, consider storing cans in airtight plastic bags or containers. Otherwise you risk rust attacking the cans, which can cause pinhole leaks and spoil the contents.

One really good thing about canned goods is that there's an incredible variety, which helps keep meals interesting. Ready meals like stew or chili are good when you're in a hurry, but plain vegetables are more versatile.

Just be careful about what you choose; try to avoid acidic foods, because the acid will attack the cans and will reduce their shelf life. Canned tomatoes are one item you should definitely avoid for example.

8. Meat

Unless you're a vegetarian, a meat-free diet isn't a lot of fun. Unfortunately, most meat products are difficult to store, unless you have a freezer in your bunker. Jerky is one exception, and you can do a lot with it: cut it into chunks or soak it overnight then add it to stews for example. Your other main option is canned meat. Products like Spam, canned chicken or tuna, devilled ham, or corned beef will last at least two years, and as long as five, after the "Best by" date on the label.

9. Drinks

Drinking plain water all the time gets boring in a hurry. Hot drinks are also a huge morale booster, especially if the weather's cold. It shouldn't be freezing down in your bunker, but it might not be all that warm either, and a mug of coffee can make life seem a lot less miserable. Add coffee, teabags, creamer, and long-life milk to your supplies.

Packs of drink mixes like Kool-Aid and Crystal Light are also a big help. If you are drinking a lot of water, they'll give it some extra

flavor. They can also disguise any lingering taste of chlorine if you've chemically purified the water.

10. Snacks

Items like candy, chocolate, and granola bars are also good for morale. They're also an excellent way to boost your energy levels when you're busy and don't have time for a meal or as rations for short trips outside once it's safe to leave the bunker.

If you have kids with you, being confined in the bunker is likely to make them bored and temperamental. Candy makes a good reward for behaving.

11. Stove

Eating cold food for two weeks isn't good for morale, especially in winter. You'll need a stove to prepare dried foods properly as well. Lighting fires inside your bunker will probably cause mass carbon monoxide poisoning, and solid fuel stoves or charcoal are out for the same reason. Liquid fuel stoves are efficient, but the fuel itself is a serious fire hazard. Your best bet is a gas stove. A large, two-burner one will give you more flexibility. Make sure you have enough gas canisters for two weeks.

12. Work Surface

Preparing meals on the floor isn't fun, and it also increases the risk of dirt getting in your food or something being knocked over. Some sort of work surface will make things much easier and safer. A small folding table is fine as long as it's stable enough to support your stove and whatever you're cooking. If you can scavenge an old

kitchen cupboard, that works too; the counter on top is a good solid surface, and you can store your utensils inside.

13. Utensils

You don't want to try anything too complex when it comes to cooking, so a couple of pans, a skillet, and some wooden spoons should cover most of what you need. Washing up is also a major issue, mostly because of the water it uses, so you should try to minimize how much needs to be done. You might even want to consider storing paper plates and disposable plastic flatware in the bunker; this creates more trash, but it won't use up valuable water and leave you with dirty dishwater to get rid of.

Trash can be folded or crushed, bagged, and stored in your bunker's entrance tunnel. Dishwater is much more of a problem unless your bunker has a proper drainage system. You can improvise by burying a length of drainpipe vertically in a dirt floor, making sure the bottom end is at least five feet underground; waste water can be poured down it. Make a cap for the top to keep any smells in, and be aware that if it's overused, the ground will eventually get saturated. If you have a composting toilet, any solid food waste can be disposed of in that.

14. Condiments

MREs, canned foods, and long-life emergency rations can get pretty boring after a while, but you can liven them up a bit with some extra flavorings. Hot sauce is a good option; if that's too spicy for your tastes, BBQ sauce or even ketchup can make a big

difference to bland foods. Don't forget the basics either—salt and pepper.

15. Oil

Cooking oil isn't easy to store. Like other fats, it tends to go rancid, and even if it's safe to use, anything you cook with it will taste pretty disgusting. Most oil does have preservatives added to it, and if it's in an unopened container, it should last for about a year. Buy oil in smaller containers, and rotate your supply; when you buy groceries, get another couple of bottles, put them in your bunker, and use the oldest ones.

Lighter-colored oils like sunflower and canola have a longer shelf life than darker ones. The longest-lasting fat of all is Crisco, which should last eight to ten years if you store it in a cool place. Crisco is probably slightly less healthy than canola oil, but all things are relative. It's for using in your bunker after a nuclear war, so trans fatty acids aren't your biggest problem.

16. Salt

In fact, store lots of salt. As well as sprinkling it on your dinner, it has plenty of long-term survival value. Salt is excellent for preserving food for example. It can also be added to water to create a mild antiseptic if you don't have anything else. Get iodized salt—if there's nuclear fallout around, adding extra iodine to your diet can be a life saver.

One problem with salt is that it absorbs water very easily. In a damp environment, it can quickly get caked and clumpy. If you bought salt in plastic bags, it should be fine, but if it came in a cardboard

box or canister, consider vacuum packing it or transferring it to an airtight plastic container.

17. Sugar

Forget all the health crank propaganda about sugar being toxic and addictive; it's actually a very dense source of energy. And no, there's no such thing as "empty calories" either. All nutrients are important in the long term, but in the short term, it's lack of calories that's most likely to kill you. Sugar lets you add energy even when you're on restricted rations.

In addition to loose or cube sugar for cooking and drinks, honey is a good thing to store. It lasts for years, and spreading honey on a cracker makes a tasty, high-energy snack. It also contains natural antibiotics, so in an emergency, it can be used as a poultice on wounds and burns. It needs to be covered to keep insects away, but it will help prevent infection.

Chapter 3:

First Aid

A nuclear attack will cause mass casualties. Hospitals and doctors will be overloaded with blast, burn, and radiation victims, and they won't have any time to spare for anything except the most serious cases. If you have a minor illness or injury, you're going to have to deal with it yourself. Infectious disease is likely to spread like wildfire within days of the attack, so you're probably safer staying as far from hospitals as possible. Then, on top of all that, there are the dangers of radiation to think of. You need to be able to treat as much as possible yourself.

18. First Aid Kit

A small personal or car first aid kit is better than nothing, but it's not really enough to cover all the possibilities after an attack or major disaster. For starters, it only has limited supplies. You'll have enough Band-Aids, gauze, and bandages to treat a couple of minor injuries, but then things will start to run out. In the hour after a nuclear attack you might have to deal with multiple injuries—burns, fractures, cuts from flying glass—and a small kit just isn't up to that.

If you can get a larger kit—the sort that's usually found in a small business—that's a much better place to start from. You can get one that meets ANSI standards for a 50-person workplace for less than \$30; \$65 will buy a Coast Guard-approved lifeboat kit that's ideal for treating trauma. Add some extra boxes of Band-Aids (large ones are more versatile), bandages, and sterile gauze since these all get used up with alarming speed in a real emergency.

19. Prescription Medications

If you need to take medication regularly, you should always try to build up a reserve in case there's some disaster that stops you from getting your prescription filled. What you probably shouldn't do is keep a supply in your bunker. Medicines have a shelf life, just like food, and if you set aside an emergency supply, they might be expired by the time you need them. Instead, keep them at home in your bug-out bag. Every time you fill your prescription, take the oldest medications from your reserve and replace them with the new ones you just picked up. That way, you go into any emergency with the longest possible life left on your medicines.

20. Antibiotics

Non-prescription antibiotics are hard to find, and there are good reasons for that. Any antibiotic or antibacterial medications you can get are a great addition to your supplies though. In addition to curing normal infections, they're vital if anyone is suffering from radiation sickness. There isn't anything you can do about actual radiation damage, but a lot of people with mild doses of radiation end up dying from infections. Antibiotics are usually enough to save them.

21. Iodine Tablets

Remember that radioactive iodine in the fallout? One good thing you can do is start taking iodine supplements as soon as you think an attack is likely. Or, even better, get some radiation emergency tablets that contain potassium iodide.

There's a lot of misinformation floating around the Internet about iodine. Some people seem to think it actually protects your body against radiation. It doesn't, so ignore the dramatic claims. However, it can reduce how much radiation you're exposed to in the first place.

If you take supplements, your thyroid will already be loaded with safe, non-radioactive iodine; it won't soak up any iodine-131 that you inhale, so the deadly atoms will pass through your body. That minimizes the damage they'll do. Just remember that there are other radioisotopes in fallout too, and iodine won't protect you from those.

22. Non-Prescription Drugs

It's a good idea to duplicate the contents of your home medicine cabinet in the bunker. First aid kits usually contain some painkillers, but there are a lot of other over-the-counter medications that you probably want to have. Even if they can't cure serious illnesses, they often can manage the symptoms, and that might make the difference between life and death. Store these in your shelter, and rotate them with your medicine cabinet to keep the emergency supply up to date:

- ❖ **Pain relievers:** Get aspirin and an alternative, like Tylenol. Aspirin isn't suitable for everyone, but in addition to being a painkiller, it has other uses, such as helping to manage heart disease or thrombosis for example.
- ❖ **Anti-diarrhea medicine:** Anyone suffering from diarrhea will quickly become dehydrated, and that can easily kill them. Diarrhea is also a very effective way for disease to spread, especially in a confined space with limited washing facilities.

- ❖ Laxatives: Constipation isn't a lot of fun either.
- ❖ Antacids: Stress can cause acid reflux. Antacid tablets will help ease the discomfort.
- ❖ Eye wash: If anyone's been exposed to fallout, they should use lots of eye wash to clear out any radioactive dust.
- ❖ Activated charcoal: This is good for minor stomach complaints or for suspected poisoning.

23. Blood Expanders

If anyone was outside when a nuclear weapon went off, there's a good chance they'll have severe burns. Burn victims lose a lot of fluids, and being able to give blood expanders will help prevent a fatal case of shock. Get a few bags of Hartmann's or Ringer's solution and some sterile giving sets, and learn how to get a cannula into a vein. Blood expanders are also good to have if anyone is suffering from blood loss or radiation sickness.

A useful feature of blood expanders is that because they're just sterile saline solutions, they don't need to be kept refrigerated. In fact, giving expanders to a casualty straight out of the fridge can quickly push them into hypothermia because the cold liquid drops their body's core temperature. Storing them at room temperature is fine.

Because these solutions contain electrolytes, they're also good for anyone who's suffering from dehydration, which can include a lot of radiation sickness cases. Just get them to drink it. It doesn't taste great (it's pretty salty), but it will help keep their electrolytes in balance. Dehydration victims who've lost too much sodium from their system can become weak, confused, or nauseous. Add that to

the other symptoms of radiation sickness, and it can become a lethal combination.

24. Antiseptic

A good supply of antiseptic will help you prevent wounds and burns from getting infected, and it's also useful for keeping cooking areas clean. Bleach can also be used for general disinfecting tasks, but it's too corrosive and toxic to be used for wounds, so get a few bottles of Dettol, and add them to your medical supplies.

Chapter 4:

Safety and Security

After any major disaster, your neighborhood is going to be a dangerous place. Fires and falling rubble from damaged buildings are the most obvious hazards, but there are many more. Other people, either criminals or desperate survivors, might try to steal your supplies. Finally, if there's been a nuclear attack, fallout is going to be a serious hazard for weeks. You should aim to stay in your bunker for as long as possible after any nuclear detonation, but what if an emergency forces you out for a while?

There's no way you can plan for every event that might happen in a major crisis, but if you have the right kit to cover the basics, it's possible to improvise well enough to cover most situations.

25. Protective Gear

Inside your bunker, you'll be well-protected from the radiation released by nuclear fallout, but outside, the danger will be extreme at first, gradually falling as the radiation decays. Leaving the bunker in the first few hours after the explosion will probably be fatal since spending an hour outside can mean a lethal dose. It takes about two weeks for levels to drop enough that you can safely spend time outside.

Unfortunately, you might have to go out. If there's damage to your bunker's ventilation system, for example, that's going to need to be fixed. There isn't a lot you can do to protect yourself against the radiation outside, but you can minimize your total exposure by making sure you don't bring any back in with you. If your clothes, skin, and hair pick up fallout, you'll still be getting radiation once you're back in the bunker—and everyone in there with you will be in danger too.

Fallout is fine dust that easily penetrates the weave of normal clothes, so you need to wear an outer layer that will keep it as far from your clothes and skin as possible. Military NBC or MOPP suits work well but can be expensive. Disposable Tyvek coveralls with a hood, used for spray painting and working with chemicals, are much cheaper—a pack of six costs about \$30. Rubber boots will protect your feet, and a respirator or goggles and dust mask will keep the fallout off your face and out of your eyes and lungs.

Once you've been outside, take your protective clothes off as soon as you're inside the bunker entrance. Don't bring it—and any fallout that's on it—into the main living area. Anything that's contaminated with dust should be bagged and sealed.

Disposable rain capes will give another layer of protection and are extremely cheap. If you can't get coveralls, they'll do a pretty good job of keeping fallout away from your skin.

26. Guns

Your bunker and the supplies in it will be very valuable in a crisis, and there's a risk that someone will try to take them away from you. That means you need to be ready to defend them. Should you store firearms in the bunker? Unless it's an ex-military one with an intruder-proof security door, probably not. That just risks having your guns stolen while the bunker isn't occupied.

However, it does make sense to keep some accessories there. A cleaning kit and reloading components are good candidates; you can never have too many of them, but they're things that can get overlooked when you're moving to the bunker in a hurry. It's easy to grab your guns and go, but will you have time to start messing

around with accessories? If you can add a secure locked box in the bunker, solidly fixed to the structure, you can use that to store ammunition for the weapons you plan to bring in with you.

You'll also need spare parts. Even the best weapon doesn't have an indefinite life, and eventually parts will start to fail. If you don't have replacements, your gun will turn into a badly balanced club. A basic parts kit includes spare firing pins and springs. If you have a rifle with an AR15-style mechanism, a replacement bolt is also a good thing to have; the locking lugs can start to shear off after a few thousand rounds. If you use an optic and your rifle doesn't have iron sights fitted, get a set as a backup. Finally, don't forget magazines. They get lost or damaged, and your rifle is just a clumsy bolt gun without them.

27. Slingshots

In addition to self-defense, weapons will be useful for hunting when you're able to leave the bunker and start getting your life back on track. Firearms are great, but consider storing alternative weapons too. Why use ammunition if you don't have to?

High-powered slingshots can take out small game, and anything small and round can be used as ammo—ball bearings or glass marbles for example. Even round rocks can be used; they're not as accurate as a steel BB, but they're a lot better than nothing. Suitable rocks can be collected from any river.

28. Bows and Arrows

If you can use a bow, that will let you harvest almost any game, and arrows can usually be retrieved and used again. Inside its range, a

powerful bow is as lethal as a rifle, and it's also close to silent; if you want to hunt without letting people know you're there, a bow is ideal.

Modern bows are relatively easy to use, especially compounds, which are very powerful, compact, and accurate. They're more complex to maintain though. Compounds are under constant tension, and changing the string is a major task; you'll need a bow press to control the limbs and several tools to strip and reassemble the bow. It's also difficult and complex to make new strings.

It takes a lot more practice to become accurate with a traditional bow, such as a longbow. On the other hand, once you've become an expert with one, there's a lot less maintenance needed. Traditional wooden arrow shafts, and even a yew or Osage self-bow, can be made by anyone who has reasonable woodworking skills. Strings can be twisted from any strong fiber. Turkey wing feathers are perfect for fletching.

Make sure you have spare strings and string wax stored. Learn to make your own arrows, and stockpile components you can't make yourself; broadheads and nocks are the main ones.

29. Firefighting

Your bunker will be a pretty cramped space, and a lot of what you will store in it is flammable. A fire in the bunker can quickly turn into a disaster if it gets out of control. You don't want to be left with a choice of burning to death or being forced out into the fallout. If a fire starts, it's vital that you can put it out quickly. Buckets of sand or water are effective and so is a fire extinguisher, but if the fire is small, a fire blanket will put it out more neatly. Throwing sand

around or using an extinguisher is not going to make life more comfortable, so if a blanket will do the job, you should go for that option.

30. Radiation Detection

Radiation is invisible, and by the time you spot any symptoms of exposure, the damage has already been done. If you spend an hour exposed to the first wave of fallout from a nuclear explosion, you'll feel fine—but you've already received a lethal radiation dose, and whatever you do when you start to feel ill will be too late. To detect radiation, you need a Geiger counter.

Geiger counters used to be expensive, but they've become a lot more affordable. You can now get a decent one for less than \$50. You can even get one that plugs into a smartphone and displays results through an app, but these are vulnerable to an EMP; you're better off with a simple counter. Many of the affordable ones are Russian-made and based on military designs.

Whatever model you get, make sure you also get enough spare batteries to keep it working for extended periods. It's also worth getting some personal dosimeter cards. These have film panels that react to different radiation doses; they're completely resistant to an EMP and don't need any batteries.

Don't keep a Geiger counter switched on all the time; that will eat batteries. Instead, check around the inside of the bunker regularly—every hour for the first 72 hours and at least twice a day after that. Pay attention to entrances, ventilation systems, and any other openings. If radiation levels start rising, you know there's a problem that needs to be fixed.

A Geiger counter will also let you assess how long you can spend outside. Two weeks is a good ballpark figure, but it can be less or more time depending on how much fallout landed on you. Being able to read the radiation level slashes the risk of getting it dangerously wrong.

31. Outdoor Clothing

Imagine coming out of your bunker in the Midwest in the middle of winter. The already harsh weather will be a lot worse because urban heat islands will have disappeared and the sun will be filtered through a veil of smoke and dust. Your house will still be standing, but the windows will be broken, the roof will be damaged, and there will be no power. If all you have to wear is the jeans and T-shirt you had on when the air raid alarm went off, you're going to be pretty cold.

You probably don't want to buy extra cold weather gear to store in the shelter, but make sure you know where it is and that it's easily accessible. Things you can store are hand warmers, gloves, and sunscreen—after a major nuclear attack, there's likely to be a lot more UV reaching the surface, and you don't want to survive a nuclear war only to die of skin cancer because you got sunburned.

32. Everyday Clothing

In addition to bad weather clothing, you'll also need day-to-day stuff. At a minimum, the bunker should contain one full change of clothes for everyone who will be in it. That way, even if you can't wash clothes, you can rotate them and give them a chance to air

out. It's usually possible to wash clothes, though, even if your bunker doesn't have plumbing.

All you need is a heavy-duty trash bag; just add some laundry detergent, pour in water until the clothes stop soaking it up, seal the neck of the bag tightly with string (use a knot you can untie!), then gently knead and agitate the bag for a while. Pour out the water, wring the clothes, then rinse them in another bag. Obviously, this is only practical if you have plenty of water and a drain or waste water container.

33. Security System

Your bunker should be secure when it's occupied, but if you're not in there, it will be vulnerable. A properly stocked survival refuge contains a lot of valuable supplies, and that makes it a tempting target for thieves. If tensions are rising and people are worried about a war, the risk will rise sharply. In addition to ordinary criminals, normally law-abiding people might be tempted to raid your stocks.

The best way to keep a bunker secure is to keep it secret, but if you've built one near (or under) your house, chances are your neighbors know it's there. If they haven't prepared for a disaster, in desperation, they might try to take over your preparations. You need some way to deter or stop intruders.

If possible, give your bunker a strong, lockable metal door. A keypad lock is good—that way there's no way you'll be searching for a key as the missiles come in. Make sure everyone in your family knows the code as well as the importance of keeping it secret.

Motion-activated lights are cheap, are easily installed, and can deter an intruder. An alarm system is good too; it will alert you to anyone breaking in, hopefully in time for you to stop them from stealing or damaging anything. If your bunker has an airlock system, fit the alarm on the outer door; that lets you catch intruders before they can damage the inner door and compromise the bunker's sealing.

34. Field Phones

Modern communication systems are fast and versatile, but they're also incredibly fragile. It really wouldn't take much damage to cripple or completely shut down most of the systems we rely on. Unfortunately, communications will still be important after disaster strikes. That means you're going to need systems that don't rely on any infrastructure you don't control.

If you have neighbors who are also prepared and have their own bunkers, consider picking up a couple of military surplus field telephones. A U.S. Army TA-312 field phone runs on two D-cell batteries, will send signals up to 22 miles, and connects with a simple twin-core cable. You can get one for under \$100 on eBay. The British SPT-9000 doesn't need any batteries at all (it's powered by a crank) and costs even less. Field phones are also pretty resistant to an EMP (although you should disconnect it from the cables if you expect an attack). Bury the cable in the ground—all you need to do is cut a slot with a spade, push the cable into it, and stamp it down—and you'll have a robust, unjammable, and undetectable link between bunkers. Anyone with the right equipment can detect and localize radio signals, but the only signals a field telephone sends go down the wire.

35. Radios

If you're mobile, the only way to keep in touch is radio. Hand-held UHF and VHF radios can have a range of up to five miles, and they're cheap, compact, and lightweight. The signals are pretty much line of sight, though, so a handheld inside the bunker won't talk to one outside it. Some models can take an external antenna, or you can get a larger vehicle-mount radio for the bunker and run it from a car battery.

You should also have at least one AM/FM radio in your bunker. Radio broadcasts are the first communications the government will rebuild after an attack—military PSYOPS and civil affairs units have deployable radio stations for example—so being able to listen in is a good way to find out what's going on. If you get a wind-up one, it will double as a flashlight and USB charger.

Chapter 5:

Comfort

Comfort might not seem like a high priority, but when you're cooped up underground for weeks, discomfort and boredom will soon become seriously demoralizing. In fact, they can even add dangerously to the stress you'll be experiencing. Anything you can do to make life in your shelter more bearable is worth the effort.

There are plenty of things you can do to make life more bearable. They range from making sure you can sleep properly to providing ways to keep busy when there's no maintenance or housekeeping to be done. It doesn't have to cost much or take up a lot of space either. A few little things can make a big difference.

36. Camp Cots

Sleeping on the floor of the shelter is a lot better than sleeping outside in the fallout, but it's also cold and uncomfortable. Army camp cots fold up small, keep you off the ground, and are pretty comfortable. Their only drawback is that the nylon fabric doesn't give you much insulation from below. Fix that by putting a foam sleeping pad on top.

37. Bedding

This is something else you won't hang around to collect when the sirens start going off, so you need to have it already in the bunker. Sleeping bags are usually going to be the practical option. They don't have to be high-end ones, because the inside of a bunker usually doesn't suffer from extreme temperatures. Get some extra pillows as well because they make it a lot easier to get a good night's sleep. Doing without them will leave you with a stiff neck a lot of the time.

38. Chairs

Sitting on camp cots, boxes, or the floor will soon get old. Make life in your shelter more comfortable by adding some chairs. Folding ones are fine, especially the camp chair style. These can be picked up quite cheaply, and you can even get a set that includes a matching table.

39. Lighting

When your bunker is closed up, it's going to be dark in there—very dark. If it's properly sealed against blast and fallout, no light will be getting in at all. Obviously, you can't live in pitch darkness for weeks. Connecting lights to the domestic supply won't work either, because that's going to go down within minutes—even seconds—after a nuclear attack. If you have a very elaborate shelter, it might have its own generator, but most likely you're going to have to rely on non-electric lighting.

Candles are a simple option, and using them in a ventilated bunker won't cause any problems with air quality. However, they are a fire hazard. The same applies to liquid fuel lanterns. If you're going to use them, hang them from the ceiling, where they can't get knocked over. Gas lanterns are safer, and battery-powered LED lanterns are safest of all, but they do contain electronics, so unless you store them in a Faraday cage, they're vulnerable to an EMP.

Another option is to set up a 12-volt lighting system powered by car batteries; the battery charge can be topped up with a hand-cranked generator. You might have to do some basic electronics to make a charging circuit; if you do, make sure the charging unit is stored in a Faraday cage until it's needed.

If you're really good with electrics, you can explore options like solar panels and micro turbines; the tricky bit with these is setting them up so they're protected from the blast, heat, EMP, and radiation but can still be deployed into operating position without you having to leave the shelter.

Finally, get some light sticks. They won't be affected by an EMP, so they make an ideal fallback light source. They're also cold lights. If your generator starts leaking gas, you can safely use a light stick as illumination while you fix it because there's no risk of it igniting the vapor.

40. Toiletries

When you're spending two weeks or more in a confined underground space with your family, it's important to stay as hygienic as you can. Part of that is about comfort—if you don't have any soap down there, it's going to get smelly in a hurry—but there are more practical reasons too. Bad personal hygiene helps disease to spread, and that's potentially disastrous. Run out of toothpaste and you risk dental problems, which won't be much fun if it takes a while for dentists to open for business again.

You don't need a huge selection of hygiene products, but soap, toothpaste, a few spare toothbrushes, and some razor blades will help keep everyone clean and healthy. Wet wipes are good to have as well. And, of course, don't forget a good stock of toilet paper!

41. Playing Cards

A couple of decks of cards are a great way to pass the time, and they hardly take up any space. They're not the sort of thing you're likely

to remember if you have to evacuate your house in a hurry though, so stash some in the bunker. It helps to make sure someone who'll be in the bunker already knows how to play a couple of simple games; they can teach the rest.

42. Books

Reading is another way to keep yourself occupied. Most thrift shops have a load of cheap novels, so it's easy to put together a small library. If you have to spend an extended time in your bunker, you'll be grateful for anything to read, even if it's not something you'd normally bother with.

43. Board Games

If you have any old board games in the back of a closet, move them to your bunker. They'll gain a new lease on life once an EMP has killed off all the tablets and game consoles. A game of Monopoly or a checkers tournament will help take everyone's minds off the boredom of living in a bunker.

Chapter 6: Agriculture

Once it's safe to come out of your shelter, finding longer-term food supplies is going to be a high priority. Canned and prepackaged foods should be safe to use as long as you clear any fallout off the packaging, but they're a limited resource. Depending on the time of year, there might be crops in the fields, but you can't rely on that. Radiation can kill many crops, especially if they're newly planted at the time. The plants are also likely to have a lot of fallout trapped in them. At some point, you're going to have to start growing your own food.

44. Seeds

If there was high background radiation from fallout, any seeds exposed to it could be infertile or even potentially mutated. They won't be radioactive, but even if they grow, there's no guarantee that they'll produce a decent crop or that the results will be edible. The only way to guarantee that you can grow food after a nuclear attack is to store your own seed supply in the bunker, where radiation can't get at it.

You can buy normal packets of seeds, but these aren't very well sealed and will deteriorate. There also aren't that many seeds in each packet; they're more suitable for small gardens than real self-sufficiency. A better idea is to buy a "seed vault," which contains much larger quantities of seeds sealed into foil pouches. One of these is enough to let you set up a small farm capable of feeding your family.

You might be able to extend the life of normal seed packets by vacuum sealing them, but this isn't very reliable. With a seed vault, you get seeds that are properly packed for long-term storage, and

when you add up the number of seeds you actually get for your money, it usually works out to be a lot cheaper.

45. Fertilizer

Specifically, use fertilizer that contains potassium. The aim here isn't really to help your crops grow; it's to protect you against radiation.

Fallout contains several different radioactive substances, and most of them decay quite quickly. Some don't though. One substance that's produced in a nuclear reaction is cesium-135, and this has a half-life of 2.3 million years. There isn't a lot of it in fallout, but it hangs around for a very long time, and it emits beta radiation. Unfortunately, it's also chemically similar to potassium, which plants absorb from the soil.

You really don't want to be eating crops that contain cesium-135, and that's where the fertilizer comes in. If you load the soil with extra potassium, the plants will absorb that instead. After the Fukushima reactor accident in Japan, most local crops showed no detectable radiation. One factor was the clay soil, which absorbs cesium and keeps it away from the plants' roots; the other was that the farmers had been using potassium-rich fertilizers.

46. Tools

It's worth storing a few basic gardening tools—spade, fork, hoe, and so on—in your bunker. Anything larger and more sophisticated could be damaged or disabled by a nuclear attack, and hand tools might be stolen by looters while you're still in your shelter. It's also possible that radiation could create radioactive isotopes in the metal of your tools if you leave them outside the bunker. Planting

and maintaining a large plot with hand tools is hard work, but doing it with no tools at all is next to impossible.

Chapter 7:

Reconstruction

Once it's safe to come out of your bunker, there's probably going to be a lot of work to do. An 800Kt nuclear warhead—fitted to many of the latest Russian ICBMs—will break every window within about ten miles of Ground Zero; it can even break windows over twelve miles away. Doors, gutters, drainpipes, and roof shingles will suffer if the blast is a bit closer. Within an eight-mile radius, there will be increasingly major structural damage. If you want to move back into your home, repairs will probably be needed.

It's also likely you'll need to fix stuff while you're in the bunker. There might be blast damage to deal with early on; later, essential gear can break. Some things you can do without, but others need to be repaired right away. Obviously, this means you need the tools and materials to carry out repairs.

47. Hand Tools

Modern power tools are great, but obviously they rely on having power. You probably already have a plan for restoring electricity after a major event, like a generator or some kind of renewable energy source. It's not smart to completely rely on them though. EMP damage is impossible to fully predict or completely defend against, and what if the circuits in your solar panels get fried?

At least a basic set of hand tools is essential; with those, you can start repairing or fabricating the parts you need to get power tools running again. Add a hammer, mallet, wood saw, and hacksaw to your stores. A hand drill and a set of files will let you do a lot too. Don't forget a measuring tape, steel ruler, and triangle—these will move you from jerry-built to precision work.

Fasteners are also important. Your stocks should include assorted nails and screws. Nuts, bolts and threaded rods are useful too, and you'll need them if you're working with metal. Twin-pack glue and wood glue will cover most situations where other fasteners don't work.

The worst case is that you're going to have to build a new house; your old one might be too damaged by the blast or fire to be repaired. Aim to have all the tools you need to build at least a log cabin.

48. Materials

There's probably no need to store a lot of building materials. Most of what you need—bricks, timber, and so on—can be salvaged from wrecked buildings. You should be able to find cement as well, if you need it.

Some other things might be a bit trickier, like window glass for example. If all your windows are broken, chances are so are all the other windows for a long way around you. A roll of heavy-duty clear plastic will let you do temporary repairs until society starts coming back together.

What you will need is a small stock of materials for repairing the bunker itself. If a door is damaged or you need to block a failed ventilation duct, you might not be able to go outside to get materials. A few sheets of plywood, sealant, and a load of duct tape will cover most emergency repairs.

49 Information

After the SHTF, knowledge is going to be a precious thing. It doesn't matter what tools and supplies you have; if you don't know how to use them, they aren't going to do you a lot of good. You also have to consider the worst—what if you do know how to use everything you have stockpiled but something happens to you? Does your family have the same knowledge?

We've all gotten used to being able to look stuff up online, but that will stop being an option. The Internet really was designed to survive a nuclear war, but that only applies to the main backbone and the links between military and government bunkers; your wireless router probably isn't going to make it. Assume that you'll lose access to the Internet for a long time and that a lot of what's online right now will never reappear. If you want information to be available, it's going to be a hard copy.

If anything you store in the bunker has a user manual, make sure that's stored with it. Manuals you've lost can be downloaded and printed out. Make sure that the manuals are usable; the ones that come with a lot of Chinese products don't make much sense in English for example. If necessary, write up and print out a simple guide to go with the manual.

Chances are, as someone who believes in preparedness, you're already pretty good at making and fixing stuff. There are probably some skills you don't have though, so identify these and put together a small reference library. DIY books are good, or just download and print guides from the Internet. Collect and organize anything you print in a three-ring binder so it's easy to find what you need when you need it.

Here are a few examples of skills it's good to have at least basic information on:

- **Auto mechanics:** Getting vehicles and other engines running again will be vital. A lot of modern vehicles are going to be totally fried by an EMP, and there's almost no way to repair them short of a total factory rebuild. Older model cars and trucks are more robust though. Being able to fix them will help you get mobile again. There are other uses too. If you can adapt a car engine into a generator, you'll have a pretty substantial power station—easily enough to run a house on.
- **Carpentry:** Most of us can do some basic woodworking, but it's good to know more advanced skills as well. Making a new door, chair, or window frame isn't easy, but just having access to a few techniques will make it a realistic project.
- **Food preservation:** Once you start growing your own food, you're going to have to preserve some to keep you going through the winter. There are plenty of techniques, including drying, salting, and canning, but if you get them wrong, you're going to have real problems. The best case is that you spoil a large part of your food stocks and spend the winter grubbing up frozen roots to keep you alive; the worst case is that you get food poisoning and die. Even if you don't use these techniques already, make sure you know how to.
- **Ham radio:** If you can maintain and operate—or maybe even build—a ham radio set, you'll be able to stay in touch with other survivors. That lets you share valuable information, and there's a lot of stuff it could be critical to know. For example, if survivors can let each other know about major fires, fallout, or gangs of looters, it will be easier to protect yourself or get together with other groups

to tackle a big problem. You can also give and ask for advice about how to solve repair or rebuilding issues.

- **Sewing:** You can replace lost buttons on your shirt, but can you make a new shirt? Probably not. It's a good skill to have though. If you can make new clothes or repurpose old ones, that's one other thing you're not going to run out of. Old, torn clothes give less protection from the weather and disease-carrying insects, so being able to stay properly dressed isn't just a fashion issue—it can save your life.

Chapter 8:

Miscellaneous Items

The previous chapters cover all the main areas that your post-apocalypse survival stores need to do, but there are always other items that don't fit neatly into a category but are useful, or even essential, to have. Most of them aren't very exciting, but you'll struggle without them. Here are some undramatic survival items you can't do without.

50. Matches

A lot of modern stoves and lanterns have igniters built in, but these usually fail long before the burners and fuel system do. A match will light them if that happens. Of course, older appliances and candles don't have igniters, so you'll need matches anyway. Pack them in an airtight container—the air in bunkers can be damp, and that will make matches less reliable.

Butane lighters are a lot more convenient than matches, so feel free to throw in a box of those, but they're also less reliable. Some of them won't work in low temperatures either. Even if you have other ways of creating a flame, matches are an essential survival item.

51. Batteries

Lots of handy gadgets need batteries, and we'll want to keep using a lot of those gadgets even in an emergency. Make sure you have a good stock of batteries in the right sizes. If you have a way to generate power, even if it's just a small solar panel, consider rechargeable batteries. A rechargeable battery takes up the same amount of space as a standard one but is good for a couple of hundred charge cycles if properly treated.

Modern devices often have built-in rechargeable Li-ion cells. A lot of them will be useless after a nuclear attack—don't expect good cell coverage—but if there are any that you'll need, make sure you store some spare charging cables and some way to get power into your devices. There are plenty of cheap, hand-cranked devices that include an AM/FM radio, a flashlight, and USB charging ports. Some now have built-in power banks too. These are handy because when you don't have anything else to do, you can charge them up. Then there's power available when you need it.

52. Kleenex

Paper tissues have many uses, from cleaning up minor spills to emergency toilet paper or blowing your nose. They're soft enough to be used for lens cleaning, whether it's glasses or a rifle scope. A pad of folded Kleenex can keep dirt out of a wound—and most of the blood in—until you can get to the first aid kit.

53. Duct Tape

Duct tape has already been mentioned a couple of times, but it deserves a heading of its own. Duct tape has so many uses it's probably impossible to count them. From fixing a leaking pipe to immobilizing a broken limb, this amazing substance can do it all. Make sure there are several rolls on your bunker's supply shelves.

54. Bleach

Bleach has also been mentioned before; you can use it to sterilize water because it's very good at killing bacteria and viruses. That also makes it excellent for general hygiene. When you're washing

anything in the bunker, add a capful of bleach to the water. Living in a confined space is always going to make it easier for disease to spread, so anything you can do to make life difficult for disease organisms is a good move.

You can kill other things with bleach too. If your bunker has any wooden structure that's being attacked by mold or rot, bleach will kill the organisms and help protect the wood. Just dilute about a tablespoon of bleach per pint of water, spray or brush it on the wood, then scrub clean.

55. Trash Bags

Heavy-duty trash bags let you seal and dispose of any waste you generate—used paper plates and flatware, empty food containers, and anything else you want to get rid of. When you're down in the bunker, you can't just take the trash out when the bin is full, but bagging it will keep in any odors and prevent flies, which spread disease, from getting at it and breeding.

56. Mousetraps

You might think your doomsday refuge is well sealed, but is it buttoned up tightly enough to keep out a mouse? Probably not. Incredibly, an adult mouse can squeeze through a hole just a quarter of an inch wide—about the diameter of a ballpoint pen. Sooner or later, they're going to find your bunker and get in. Then they're going to breed at an incredible rate. If you don't control them, they'll quickly chew their way into any supplies that aren't stored in a metal box, and in addition to eating your food, they can spread disease.

You have two options for mousetraps. Modern baited traps don't need to be checked regularly, but the bait will eventually deteriorate or be eaten. Old-fashioned spring traps need to be checked at least daily and re-armed if they've caught something, but they'll last pretty much forever. To protect the bunker when it's not in use, bait traps are your best bet, but keep some of the spring ones too for long-term use, and whenever the bunker is occupied, make sure they're armed. Bait them with a dab of peanut butter.

Final Thoughts

Properly equipping a bunker is a big investment in time, effort, and money—big enough that even in the midst of the Cold War, many people didn't think it was worthwhile. That's understandable, but it's not very realistic anymore. The fact is, the world is more unstable now than it was in the 1960s and '70s.

The Soviet Union might have had a repressive and often brutal political system, but it was basically a rational adversary. The Soviets were as frightened of us as we were of them; Lenin and Stalin's inflammatory threats about world domination were balanced by Russian memories of being invaded by several of the Western allies over the previous century. They wanted their system to win, but they weren't eager to die in the process—and their top priority, like ours, was to defend themselves.

Today's potential enemies aren't like that. Whether it's North Korea's crazy dictatorship or the Islamic fundamentalists who already control nuclear weapons in one country and are working on getting them in several more, these are people who don't think rationally. The North Korean leadership are delusional enough to think they could defeat the USA in a nuclear war; the Islamists simply don't care—they want the end of the world. Some of the fingers on nuclear triggers aren't under the control of sane minds.

If a crisis blows up now, there's not much chance of it being resolved by a superpower summit. Instead, we could have nuclear weapons heading for U.S. cities minutes after some dictator loses his temper. That makes a bunker start to look like a very sensible investment.

Obviously, we all hope there won't be a nuclear war, but your bunker still won't be wasted. It will also protect against natural disasters, it's a good place to store your emergency supplies, and it can also double as a storeroom and root cellar. In the best-case scenario, you'll never have to use your bunker as a survival refuge. But the worst case is needing that refuge—and not having one.