

A sepia-toned photograph of a person in winter gear standing in a snowy forest. The person is wearing a heavy jacket, dark pants, and a hat, and is looking towards the right. The background is filled with tall evergreen trees under a hazy sky.

# **SURVIVE!**

**Essential Skills and Tactics  
To Get You Out of Anywhere—Alive**

**LES STROUD**

**with Michael Vlessides**

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**Illustrations by Beverley Hawksley**

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Published by Collins, an imprint of HarperCollins Publishers Ltd

FIRST EDITION

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Illustrations by Beverley Hawksley.

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HarperCollins Publishers Ltd  
2 Bloor Street East, 20th Floor  
Toronto, Ontario, Canada  
M4W 1A8  
[www.harpercollins.ca](http://www.harpercollins.ca)

Library and Archives Canada Cataloging in Publication Data is available upon request.

ISBN 978-0-00-200886-0

Printed and bound in the United States

RRD 10 9 8 7 6 5 4 3 2 1

## Your Personal Survival Kit

A *personal survival kit* isn't a separate pack that you carry in addition to the everyday gear on a wilderness expedition. In fact, your personal survival kit is not really a "kit" at all but the most important survival gear you should carry with you at all times—on your belt, in your pockets, or around your neck. Why? The answer is simple: You may leave a fanny pack behind on a portage or when you stop for a snack. It happens all the time. But you'll never leave a pocket behind.

Your *personal survival kit* starts with a sturdy belt knife, which has a multitude of uses. Consider it a survival kit unto itself. The biggest benefit of a belt knife is its strength, which allows it to be used to pry and twist objects you might not otherwise be able to manipulate. Used properly, a belt knife will split wood. It will easily whittle and shape wood components for traps, snares, and shelters.

Don't underestimate the importance of keeping your knife sharp. If you're not overloaded in terms of weight, carry a sharpening stone in your *complete survival kit* (which we discuss later in this chapter). In a pinch, however, you can sharpen your belt knife on just about any smooth stone you find in the bush. Sandstone is quite effective, and quartz and granite also work well.

Here is a list of the personal survival kit items that you should carry at all times, whether you stash them in your pockets or wear them clipped to your belt or around your neck. Each member of a group should have his or her own

- bandana
- compass
- flashlight (small, LED)
- garbage bags (2, preferably orange, large)
- lighter (my preference is a butane lighter that works like a little blowtorch)
- matches (strike-anywhere type) in a waterproof metal case (with a striker, just in case)
- magnesium flint striker (hey, I like fires!)
- metal cup (folding; for boiling water)
- multi-tool or Swiss Army-style knife (make sure it has a small saw blade)
- painkillers (a few)
- parachute cord or similar rope (about 25 feet [7.5 m] of 1/4-inch [0.6-cm] cord)
- protein bar (e.g., PowerBar)
- sharp belt knife
- solar, or "space," blanket (small)
- whistle
- Ziploc bag (medium or large)

This may sound like a weighty list, but remember that you can also carry a couple of these items, such as the whistle and magnesium flint striker, on a piece of rope or parachute cord around your neck. Remember, too, that when everything is spread out on your belt or among your various pockets (obviously, wearing clothes with lots of pockets is helpful) you'll hardly notice them at all.

## Your Complete Survival Kit

Now that you've ensured your survival by strategically stowing a few basic—yet supremely helpful—items on yourself, it's time to build your *complete survival kit*. Just because you're carrying the same thing on your body (a lighter in your pocket, for example) doesn't mean you shouldn't put one in your complete survival kit. The items in your pockets are your fail-safes; *always* double up on these items between your personal and complete survival kits. When building your complete survival kit, keep in mind that the heavier and bulkier you make it, the more likely it's going to be a hindrance rather than a benefit. And as soon as your kit becomes a burden, you increase the chances that you won't take some of the items with you in the first place or that you'll leave them behind during a trip. If it's a screaming hot day and I'm climbing a mountain, do I want to be carrying around 20 pounds (9 kg) of extra gear? You have to strike the balance: the kit needs to be large enough to carry certain essential items, but small enough that it doesn't become a nuisance. Leave the gear hording to the gear geeks; your job is not to impress your partners but to enjoy your trip or adventure . . . and to survive if you need to.

You can choose any sort of carrying case into which your survival gear will fit, but you want the container to be large enough to hold items of various sizes, easy to stow and carry, durable, and, if possible, waterproof. I like using a coffee can with a lid as my survival kit because it holds almost all the items I need and can also be used to boil liquid or cook food. Assuming the lid fits snugly, I can even use it to carry water or hot coals.

What follows is a list of the items essential to any kit (some can be used for more than one purpose). You can gather all of them quickly by consulting the Complete Survival Kit Checklist on page 354 before setting out on your adventure. Remember that you will have to modify this list depending on your particular destination, season, weather, and activity:

**Bandana:** This multi-purpose garment will protect your head from the sun, but it can also be used as an emergency bandage or, when dipped in water, as a cool compress.

**Belt knife (with sharpening stone):** If you happen to lose your knife, having a backup in your survival kit could be a big help.

**Candle:** A candle can help you get a fire going if you light it and allow the wax to drip into the tinder.

**Cup (metal, collapsible):** A cup can be used for drinking or to boil water.

**Dried food:** Most survival kits contain everything under the sun *except* extra food. I realize dried food adds to the weight and bulkiness of your kit, but nothing will give you a physical and psychological boost like knowing that you have an energy bar or two on hand. Fat is important. Peanuts are an excellent and compact source of fat and protein.

**Duct tape:** The wonders of ultra-durable and super-sticky duct tape have long been lauded in the outdoor community, with good reason: it can repair just about any kind of outdoor equipment. And it can also be useful in bandaging wounds and other minor injuries. Just make sure you use it in conjunction with a piece of cloth; don't apply it directly to a wound.

Recent years have seen the introduction of colored duct tape. And while you may have a problem with patching your gear with pink or yellow, keep in mind that it'll stand out more than battleship gray. Duct tape is also excellent as a fire starter; it holds the flame the way a candle would.

**Fire-starting devices:** Fire is one of the most beneficial things you can have with you, no matter where you find yourself. It doesn't matter if you're in the desert or the jungle, for even in the world's hottest places, fire makes all the difference to survival. Fire-starting devices should be a priority in your kit.

I am always asked what my favorite fire-starting method is. Is it flint and steel? Magnesium flint striker? Fire and piston? What I can tell you is that making fire *without* a fire-starting device is extremely difficult, so



## STROUD'S TIP

Some people think it's a good idea to waterproof their matches by dipping them in wax. Leave that to the gear geeks. Instead, buy solid strike-anywhere matches and invest in a good waterproof container.

make sure you give yourself options. I love knowing that I have several options with me and that I'm prepared for almost any situation.

My preference is a butane lighter, the kind that shoots a flame like a propane torch. These work upside down and in the wind, two great advantages. A lighter will eventually run out of fuel, but only after a few hundred fires. Furthermore, in a survival emergency, the first fire is the most important.

Always carry a high-quality lighter, because depending on where you are, it may well be a challenge to keep your fire going. You don't want to add the stress of fire-starting to your list of worries.

In addition to a lighter, I like to carry a magnesium flint striker (which in a pinch can be used as a signaling device), a fire piston (if weight is not an issue), and some solid strike-anywhere matches *with a striker* (just to be sure) in a waterproof container such as a film canister. Note that plastic containers can be unsafe to keep matches in because, though a remote possibility, static electricity can ignite the matches. A metal container is best.

Just make sure—as with everything in your survival kit—that you know how to use these fire starters. Take the time to practice making a fire with them *before* disaster strikes. I recommend that you carry at least one of these fire starters on you, as part of your personal survival kit (for example, in a pocket), and a couple more in your complete survival kit. See “Fire,” Chapter 6, for more on this topic.

**Fire-starting tinder:** There are a few different types of commercially available tinder, including pellets, pastes, and shavings. I like having three or four wax-and-cotton fuel wads. A small piece of this added to the tinder you collect in the bush will flame up from a simple spark and keep going like a candle flame until your fire is roaring. You should also add bits of tinder, such as birch bark or dried grass, to your survival kit as you come across them during your travels.



The wax-and-cotton cube, one of the best commercially available tinders you can buy, holds a flame for a long time.

#### **First-aid kit:**

- **antidiarrheal tablets and painkillers:** If you get diarrhea on vacation in Mexico, you're disappointed. Get it in the jungles of Borneo and you could be dead. Pain, on the other hand, won't necessarily kill you, but painkillers such as ibuprofen or acetaminophen can increase your chances of survival if you have to make your way down a mountain with a small injury or even a pounding headache. For a really nasty injury such as a broken leg, powerful painkillers such as Demerol (meperidine) can save an injured person from slipping into fatal shock. Pack all medicines in waterproof, airtight containers.
- **antihistamines:** They are handy for allergies, as well as for insect bites and stings.
- **bandages and antiseptic ointment:** An "ouch" kit can help prevent infection.
- **butterfly sutures:** These will hold together deeper and more serious wounds.
- **prescription medicine:** Always bring extra.



- **surgical blades:** Light and small, these are for more than just dressing wounds. They can be used for whittling, cleaning fish, or skinning and gutting game.
- **triangle bandages:** Use these as wound dressings or as slings.

**Fishing lures (3), hooks, sinkers, a leader, and fishing line:** As a rule, you're better off keeping heavier line in your survival kit. The weight and volume difference between 10-pound and 30-pound test is nominal, but the difference in strength is significant. Most people avoid lures, but they don't add much weight to your kit and can significantly improve your chances of catching dinner. Throw in a leader as well, just in case you want to try for "the big one."

**Flares:** You want to be found, right? The more compact the flare, the better. They can also be used to start fires.

**Flashlight (small, LED):** These little lights can be very bright, which makes them good not only for locating things at night, but for signaling too. You might also consider packing a couple of extra batteries. When you buy a flashlight, make sure you get one with a white, yellow, green, or blue light (red LEDs are not very bright).

**GPS (Global Positioning System), in addition to a map and compass:** The GPS has revolutionized wilderness travel. The beauty of a GPS is that it provides you with precise, real-time information regarding your location, at all times and in all weather conditions. As long as it has enough battery power, a GPS will determine your latitude, longitude, and altitude.

**Garbage bags (2, orange, large):** Garbage bags can make the difference between life and death because of the multitude of purposes for which they are useful. They fold down to practically nothing, don't weigh much, and fit easily into a pocket. But make sure you get the 45-gallon (170-L) orange ones (which can be readily seen), not green bags (which can't).

You can turn a garbage bag into a raincoat, or a makeshift jacket to protect you from cold and wind, by tearing or cutting a hole in the top for your head and holes in the sides for your arms. You can signal with it

because it's bright and highly visible. Your wondrous, orange plastic sheet can also act as a rain-catch if you need water or be used in the construction of vegetation and solar stills (although the best type of bag for a vegetation still is a clear plastic one. See "Water," Chapter 5).

My favorite use for garbage bags is as waterproofing for a shelter. No matter how adept you are, it is exceptionally difficult to build from scratch a shelter that is completely waterproof. If you have a garbage bag on hand, just cut it open so that it forms a single sheet (the 45-gallon ones will be 4 feet x 6 feet [1.2 m x 1.8 m]) and you have a ready-made roof.

**Hand lens (small):** A small hand lens such as a Fresnel lens is essentially a magnifying glass that can be used to start fires or inspect small injuries.

**Map and compass:** Topographical maps are your best source of detailed information in the backcountry; carry them whenever possible. If you are carrying one, you owe it to yourself also to carry a high-quality compass that you know how to use. There are many excellent books and college courses on compass use and map reading. See "Survival Travel and Navigation," Chapter 9.

**Marker or "surveyor's" tape:** Bright red or orange tape can be hung from your shelter to help attract rescue or be used to mark a trail.

**Money:** A \$20 or \$50 bill won't help you procure water in the wilderness, but it sure comes in handy when you eventually make your way out to a highway. Once you scramble out of the bush, the money in your kit will allow you to buy something to eat and drink, and take care of any immediate needs. You may also want to put a credit card in your kit.

**Multi-tool:** When I set out for a week of survival, I believe there's nothing more crucial than a multi-tool. A twist on the classic Swiss Army-style knife, the multi-tool takes things to the next level with the addition of an integrated set of pliers, which has many uses in the wilderness. I often use the pliers on my multi-tool to take a pot of boiling water off a fire.

Make sure that the multi-tool you choose includes a saw blade. You won't use it much for felling trees, but a saw blade is excellent for making traps and snares. Scissors also come in handy in a survival situation, so

make sure your multi-tool has a pair. And remember, quality counts! Don't buy a cheap model or you will regret it.

**Needle and thread:** It's a good idea to carry a needle and thread, yet in all the years I've been participating in survival-related activities, I think I've used these only once, to mend a torn canoe pack. Bring a needle with a very large eye so that it can be threaded with thick materials, such as sinew and coarse thread. Perhaps the best use for the needle is in first aid, to remove splinters and slivers.



### STROUD'S TIP

You can magnetize a needle by rubbing it in one direction on a magnetic item, such as the speaker of a radio. When you float the magnetized needle in water, on a leaf or on a piece of paper, the needle will point north/south. Once you determine which end is north, color that end of the needle with a marker.

**PLB (Personal Locator Beacon) or EPIRB (Emergency Position-Indicating Radio Beacon):** While these units do not contact your family *at the same time* as they contact search and rescue organizations (the way SPOT does), they are excellent for notifying emergency personnel or the military, and have saved many lives.

**Parachute cord or similar rope (about 50 feet [15 m] of 1/4-inch [0.5 cm] cord):** As romantic as it may sound to make rope out of bark and roots, the fact is that the process is slow, tedious, and often difficult. On the other hand, having a good spool of parachute cord can make a tremendous difference in a survival situation. You can use it to make shelters, fire bows, signals, snares or traps, and for countless other purposes.

I've singled out parachute cord here because it is legendary for its strength. Constructed of an outer sheath surrounding seven inner strands, true parachute cord is one of the strongest and lightest ropes you can find, and it's rated at 550-pound test.

Parachute cord can be bulky in large quantities, however, so it helps to come up with innovative ways to carry it. Some travelers wrap it around the handles of their belt knives; others use it in lieu of shoelaces, as every little bit helps when it comes to lightening your load.

**Pencil and notebook:** Use these to write your personal survival log, in which you take note of efforts and discoveries you've made. It will help boost your morale, act as a reference guide, and support your memory should it begin to fail. Perhaps its most important use is in leaving a note for potential rescuers if you move on, to let them know where you have gone.

**Safety pins:** These are helpful when making repairs to clothing and other gear. Safety pins can also be used as fish hooks.

**Saw (folding):** Here's an item I really love, although admittedly a folding saw is bulkier and heavier than most items you'll see in a typical survival kit. Nevertheless, it's worth its weight in gold, because it completely transforms how you can build shelters or keep a fire going, both of which are crucial (physically and psychologically) in a survival ordeal.

It used to be that you could get only poor-quality folding saws, but they've come a long way in recent years in terms of quality and durability. My favorites are the one-piece units with a blade that folds into the handle. When folded they're about 10 inches (25 cm) long.

**Signal mirror:** When choosing a signal mirror, you have a couple of options. Personally, I prefer hand mirrors that are designed to act as signaling devices. You can distinguish these by the small hole in the middle, which is used for sighting passing aircraft.

Like any item in your survival kit, your signal mirror can also serve other functions, such as grooming or first aid. If you get something in your eye (which happens more often than you'd think), a little mirror is invaluable. Something as seemingly innocuous as a pine needle in your eye can cause intense pain if you can't get it out. A good signal mirror can also serve as a fire starter by reflecting the sun's rays.

**Snare wire:** Like parachute cord, snare wire has a multitude of uses, the most important of which is catching your potential dinner! Snare wire meant for rabbits is the most appropriate.

**Solar or “space” blanket (small):** A solar blanket reflects your own body heat back to you, which is effective if you need to get warm in a hurry. Granted, it doesn’t feel warm and cozy, but it works better than anything else you can get for the weight.

The potential danger with solar blankets is that they do not breathe or permit perspiration to escape, so they have the potential to leave you damper and colder than when you started. Don’t roll up in one or use it as an under-layer inside a jacket; simply wrap it around you.

Solar blankets are terrific reflectors and can be used for signaling if necessary, as a makeshift tarp to waterproof your shelter, or as a rain-catch. While surviving in the Canadian Rocky Mountains outside of Revelstoke, British Columbia, I used one as a roof, and it made for the warmest shelter I can remember. Be careful with solar blankets around fire, however. They can melt within seconds when touched by flames.

**SPOT satellite messenger:** The SPOT enables you to send e-mails by satellite, and includes your latitude and longitude coordinates. It will even track you and send your coordinates to 10 contacts by e-mail or text message every 10 minutes. The SPOT goes beyond a GPS to the next level of safety. A GPS will tell *you* where you are. The SPOT will tell *your rescuers* where you are.

**Water purification tablets:** Each iodine-based water purification tablet will purify 1 to 2 quarts (1 to 2 L) of water, depending on the level of contamination.

Iodine-based tablets can also be used in first aid. Simply crush one tablet and add about a teaspoon of water. This will yield a strong topical solution of iodine, which can be used to disinfect wounds.

**Water-purifying straw:** A relatively new innovation, the water-purifying straw uses a combination of iodine and resin to purify water as you drink. Each straw is good for 20 to 25 gallons (75 to 95 L) of water, depending on

how dirty the water is. Some of these nifty little straws claim to reduce bacteria and viruses by as much as 96 percent!

**Whistle:** Get the sturdiest, loudest, brightest, and most obnoxious one you can find. My favorites are manufactured by Fox 40.

**Ziploc bags (large):** In a pinch, these bags have many uses, including storing and carrying water. Ziplocs can also be used for keeping sensitive items, such as fire-starting tinder, dry. You can even fill them with snow and put them under your coat to melt the snow into a drink of water.

Your complete survival kit items should help you make it through almost any situation, provided you know how to use them.



A well-planned, complete survival kit will help you make it through the toughest situations.

## Your Vehicle Survival Kit

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**RANKING HIGH IN THE MOST-IGNORED-BUT-MOST-NEEDED** CATEGORY of survival equipment is a vehicle survival kit. *Every* driver should have one, but it is even more important if you live in (or travel through) areas of remote wilderness, or places prone to extreme weather, such as snowstorms and thunderstorms, where the risk of finding yourself in a survival situation is greater. Regardless of how well stocked your vehicle survival kit may be, make sure you bring additional food and drink with you on any extended journey.

As a rule, if you get into trouble, you should stay with your vehicle until help arrives, especially now that you'll have a well-equipped vehicle survival kit. And if you've got gas, then you have a source of fuel for fire-starting. Your primary concern, however, should be to get your vehicle back on the road and let it carry you to safety.

If you decide to leave your vehicle, do so only when the weather permits and if you feel confident in your ability to travel by land. And don't leave your car or truck without cutting, ripping, and tearing anything and everything out of it that you think may help you in your quest to survive. One day you will be able to buy a new vehicle; buying a new life is not an option.

I once had the privilege of re-creating for television the survival scenario faced by James and Jennifer Stolpa, the couple who became lost with their car (and baby) in a mountain blizzard. In my re-enactment, I made sure I used everything the vehicle offered before I bade it farewell, a strategy the Stolpas failed to employ, even though they had no winter gear with them and only casual shoes. For instance, I cut the foam from inside the seats of the truck, covered it with the vehicle's seat covers, and secured it to my feet with seat-belt material. The result was a set of warm makeshift boots that allowed me to travel on top of the snow, rather than through it, as if I were wearing snowshoes. It may seem like overkill, but it saved my feet from frostbite. The Stolpas were not so lucky.

Your vehicle survival kit should have an appropriate case. If budget is a consideration, any backpack or duffel bag will suffice. Ideally, you should get something that is both sturdy and waterproof. Always keep the kit stowed in your vehicle. See the complete Vehicle Survival Kit Checklist on page 355.

Your vehicle survival kit should include all of the items in the complete survival kit *plus the following*:

**Cell phone:** The problem with a cell phone is that if you're stuck in a remote area, chances are you won't have cell coverage. You can, however, carry speaker wire. Secure the wire to the highest point you can reach (or climb to) and attach it to your phone's antenna. You might not get enough coverage to make a call, but because text messaging operates on a weaker signal, the wire may bring help.

**Clothing (warm) and blankets:** Pack an extra set of weather-appropriate clothes, including socks, gloves, and hats for every passenger, as well as blankets, sleeping bags, sleeping pads, and a solar or "space" blanket.

**Cook set:** Cook sets (also known as "mess kits") are compact sets of pots and/or pans. They allow you to boil up a hot brew, or cook food.

**Cook stove and fuel:** This is a luxurious extra, to be sure, but one that will greatly increase your chances of survival if you're stuck for any length of time.

**Drinking water:** Make sure there is enough room in the bottle to allow for expansion should it freeze.

**Flares:** These are great for signaling but can also be used, if necessary, to start a fire. You will likely have just a few of these, so use them only when needed.

**Flashlight (small, LED) with extra batteries:** Also available are flashlights you can crank by hand, which never need batteries. Some of these even come with sirens and cell-phone chargers. Make sure the one you buy is compatible with your phone.





They're not pretty, but boots such as these—which I made from the foam of a truck's seats and some seat-belt webbing—might just save your feet from frostbite.

**Food, including MREs:** MREs—or Meals Ready to Eat—are available at most camping stores and Army & Navy supply shops. This stuff lasts forever and often comes with its own fuel source for heating. Energy bars are also a good option; look for ones that pack the most calories. Many people ignore the importance of salt in their diets. Carry some with your extra food or take along powdered energy drinks high in sodium to replenish electrolytes.

**Road maps (local):** Make sure you carry maps of regions in which you travel frequently, and before traveling to a new area, add a map of the region to your kit.

**Snow shovel (collapsible or folding) and tire chains:** You likely won't need these if you live in Florida, but freak snowstorms have killed people in places where snow hadn't been seen in years. If your vehicle gets stuck in the snow, you can use your hands to dig, but a shovel will do the job faster and better. Tire chains can help you when road conditions are slippery.

**Tarp:** Throw in an orange one, for visibility, sized roughly 8 feet by 9 feet (2.5 m x 2.7 m).

**Toilet paper:** It's an often overlooked item, but toilet paper can sure come in handy—not just for the obvious purpose. It can be stuffed into your clothes to increase their insulating power, and it can be used as tinder for fires.

**Tools:** Useful tools include a screwdriver, pliers, a wrench, a hatchet or axe, and jumper cables.

## Using a Signal Mirror with a Sighting Hole

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1. To effectively use a signal mirror with a sighting hole, hold the mirror fairly close to your face. Through the hole, you should be able to see a bright glow.



2. Align the glow so that it covers your target; this is where the sun's reflection will shine.

## Using a Signal Mirror Without a Sighting Hole

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1. Face the target and stretch out your arm so your hand is just beneath the target.



2. Tilt the mirror rapidly up and down.



3. Aim the reflected light directly onto your outstretched hand as shown.

# Making a Signal Fire

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1. To make a signal fire, begin by making a tripod of three trees.



2. If you have extra rope, weave it across the base of the tripod to make a platform. Fill the platform with dry, quick-burning materials such as birch bark. On top, place smoke-producing materials, like damp moss, punky wood, rubber, or plastic.



3. Ignite the signal fire when you believe a plane will see it.

**Make a Vegetation Still:** Vegetation stills can be used in many parts of the world and require only a few simple components, though collecting the water does demand patience. It can take as long as 24 hours to obtain up to 1 quart (1 L) of water, and that's under ideal conditions.

You will need some green, leafy vegetation—gathered from trees, bushes, shrubs, or grasses—along with a clear plastic bag and a small rock. Choose a sunny location with a slope on which to place the still, and follow these steps:

1. Fill the bag with air by turning the open end into the breeze or by “scooping” air into it.
2. Remove from your gathered vegetation any sticks or spines that might puncture the bag. Fill the bag half to three-quarters full of the vegetation (or tie the bag onto the end of a branch). Do not use poisonous plants; they will produce poisonous liquid.

3. Place a small rock in the bag to weigh it down.
4. If you have a piece of tubing, a small straw, or a hollow reed, insert one end into the mouth of the bag before closing (remember to tie off or plug the tubing so that air will not escape). This will allow you to drink the condensed water without untying the bag. Then tie the bag securely shut as close to the end as possible; it's important to maximize the amount of air space in the bag.
5. Place the bag on a slope in full sunlight. The mouth of the bag should be positioned higher than the base of the bag (which contains the rock), to keep the bag from slipping or blowing away and to keep the water dripping to the lowest point.
6. To drink: If you don't have a tube to draw the condensed water from the still, loosen the tie around the bag's mouth and drain. Retie the mouth securely and reposition the still to allow further condensation.
7. Change the vegetation in the bag after extracting most of the water from it, to ensure a regular supply of water.



If you can't fill a bag with vegetation, tying it to the end of a branch with lots of leaves will do the trick. Just make sure it's in a sunny spot. If this tree had been poisonous, the water it produced could also have been poisonous. Don't take chances unless you're sure of the source tree or bush.

**Make a Solar Still:** I'm always leery of survival skills that require the effort of digging a hole. Nevertheless, the solar still can be an effective method of collecting water, particularly in a very dry location such as a desert. To make a solar still, however, you need four components: a sunny spot, a receptacle in which to catch the water, a clear plastic sheet approximately 6 square feet (.5 m<sup>2</sup>), and some type of weight to place on top of the plastic. You'll also need to dig a hole, so a shovel or trowel would be useful.

You can build a solar still without digging a hole if you are lucky enough to have a large container like a barrel. When surviving on a small tropical island off the coast of Belize, I had at my disposal one half of the large plastic container that my life raft had come in. Using this container saved me a great deal of digging.

Solar stills can take a couple of hours (or more) to make, and their yield is not very high. How much you get depends largely on the ambient temperature, the types of vegetation you include, and access to direct sun. A still such as this may produce water for two to four days depending on the moisture content of the soil or sand itself, and must be moved every so often. The added bonus, however, is that the outside of it also serves as a great dew or rain-catch. You'll likely need at least three solar stills to meet your daily water-consumption needs.

Here are the steps for building a solar still:

1. Select a sunny site where you believe the soil contains the most moisture. The lower and damper the spot, the better.
2. Dig a bowl-shaped hole about 3 feet (1 m) around and 2 feet (.5 m) deep.
3. If possible, fill the hole with non-poisonous vegetation. Pour salt water, water contaminated with bacteria or urine into and onto the sides of the hole.
4. Place your collecting receptacle (the wider the better) at the bottom of the hole, preferably in its own small hole. Do not let any impure water, salt water or urine get in the receptacle (cup).
5. If you are lucky enough to have a drinking tube (or can fashion one out of available materials), settle it into the receptacle and stretch it out so that it terminates above ground. The tube allows you to step up to the still and drink from it without disturbing it.

6. Cover the hole with the plastic sheet; the sheet should be anchored around its perimeter with rocks or other heavy objects. Place a small rock or other weighted object in the center of the plastic sheet, ensuring that the lowest point of the sheet is now directly above the receptacle.

The idea behind a solar still is that solar energy heats the air, soil, and vegetation (if available) in the hole by passing through the plastic sheet. Moisture from the soil—all soil has moisture—evaporates and condenses on the low point in the plastic. Added vegetation (non-poisonous!), such as leaves, grasses, or seaweed, can help speed up the process, and since solar stills also purify water, the condensed water that collects on the underside of the sheet will be fit to drink.

## Creating a Solar Still

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1. A last-ditch water-making method, the solar still can produce and purify enough water to keep you going for a while. Place a receptacle in the middle of a vegetation-lined hole.



2. Put a plastic sheet on top of the hole, with a stone over the receptacle. The receptacle under the plastic catches and collects the droplets that condense from the vegetation.



## Purifying and Filtering Water

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THERE IS ONE HARD AND FAST RULE regarding water purification and filtration: If you have the ability and energy to do it, do it.



## STROUD'S TIP

Here is a neat trick developed by survival expert Allan “Bow” Beauchamp, assuming you’re lucky enough to have two large plastic bottles (like a Pepsi bottle) or similar containers on hand:

“Fill one bottle one-quarter full with urine. Tape the mouth of this container to the mouth of the second container. Now lay them horizontal in the sun. Cover the clean container with some sand or soil and leave the contaminated container exposed to the sun. The contaminated container will heat up, causing evaporation. Moisture will migrate into the previously empty, clean container, leaving the residual waste behind.”

As I mention above, rainwater collected in clean containers or from non-poisonous plants is safe for drinking. You should, however, *purify water from all other sources*. The quickest and easiest way to do so is with water purification tablets, iodine, or chlorine. If using iodine, which has been shown in medical experiments to be more effective than chlorine, mix no more than five drops per quart (liter) of water. Shake well and let the water stand for 30 minutes before drinking. Two drops of chlorine bleach is sufficient for a quart of water.

Note that these quantities are for relatively clean water. If you’re using water that you suspect is contaminated, double the amounts suggested here. You should also increase the amount of time that the water sits before drinking, to give the agents time to kill any microorganisms.

Since it’s unlikely that you’ll have any of these items on hand, you’ll probably have to revert to the old standby: boiling. You should boil water for five minutes to ensure you kill all possible harmful pathogens. Some people say you can get away with as little as one minute of boiling at sea level, adding one minute for each additional 1,000 feet (300 m) above sea level. Note that boiling *will not* neutralize chemical pollutants.

In both Africa and Alaska, I was able to bring water to a boil in plastic and glass bottles. The method is simple and is best accomplished if you have a rope and some long branches. Follow these steps:



Your plastic bottle will become black and misshapen but should not melt through, if you are careful.

1. Make a tripod by propping three similar-sized sticks together.
2. Tie the rope to the top of the bottle using a clove hitch.
3. Suspend the water-filled bottle above a fire so that the flames lick the bottle without completely engulfing it or going above the waterline. Boiling water over hot coals minimizes the risk that your bottle will melt, although this can still happen if the bottle gets too close to the coals. Heat until the water boils; you do not want to overheat the bottle so that it breaks or melts.

4. I suspect some fairly nasty chemicals are released when a common water bottle is heated this way, but I would rather take my chances with them than with the parasites.

Filtration without a high-quality, store-bought filter is not as ideal as purification because filtration likely won't remove harmful microorganisms from the water. What filtration will do is remove larger matter such as dirt and sediment, sticks, leaves, and any bugs or critters living in the water.

The simplest way of filtering or clearing stagnant, foul-smelling water is to place it in a container and let it stand for 12 hours or so. There are several, more active methods of filtering; most involve letting the water flow through layers of different types of material such as pebbles, sand, cloth, and charcoal. You can layer these materials over a receptacle with openings at either end, such as a piece of bamboo or hollow log.

Construct your filter so that the water passes through successively less porous layers of filtering material over a receptacle. A typical filter might begin with pebbles or stones, followed by sand, cloth, and then crushed charcoal (not ash), which is by far the best filtering medium available. As with most filtering systems, the water will become progressively clearer the more you filter it.

## Making a Chimney

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1. Smoke inhalation is an issue with an inside fire, so make sure your smoke can escape through a chimney.



2. Constructing a chimney tunnel with a direct route to your flames will feed air to your fire without cooling you down.



3. This birch bark vent allows air to circulate from outside of the shelter right to your interior fire.

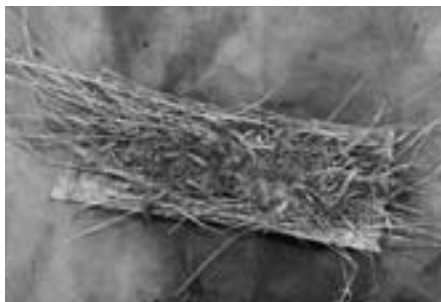


4. Your shelter will be warm from the fire and the chimney will allow oxygen to circulate to keep the fire going.

## How to Carry Fire

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WHEN YOUR CIRCUMSTANCES FORCE YOU TO MOVE, taking your fire with you may save you a lot of trouble in the long run. This is why I recommend including a coffee tin with a lid in your survival kit. You can put some red coals and other tinder inside, where it will smolder while you travel. You can also make a fire bundle, light the end as if it were a large cigar, and carry the glowing bundle to your next destination.



A fire bundle is a collection of tinder that begins with the finest material in the middle and graduates out to the shell or covering.



Tie the material tightly together into a cigar shape. Once lit, it should smolder for hours.



A properly lit fire bundle can last for days.

## Lighting a Fire with a Magnesium Flint Striker

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1. Use a knife or similar hard object to shave a pile of magnesium off the striker. The pile should be about the size of a nickel, and 1/4 of an inch (0.5 cm) high.



2. Strike a spark into the filings for a fast, hot flame.

## Making a Charred Cloth

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1. You will need a can, a punctured lid, and a fire.



2. Place the closed can on the fire. Once you see flame coming out of the can's holes, you're nearing the end of the process. Smoke will soon follow, signaling that you should remove the can from the coals.

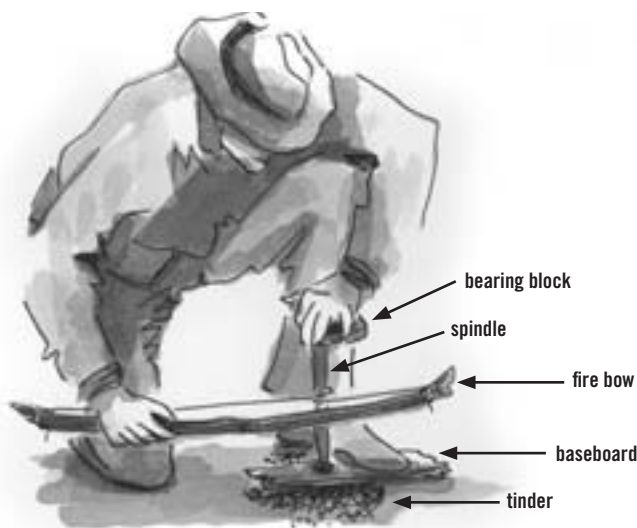




3. Allow the can to cool, then open it up. It doesn't look like much, but this charred cloth is ready to take a new spark . . . and re-ignite easily the next time you want to start a fire.

# The Fire Bow

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## Fire Bow Components

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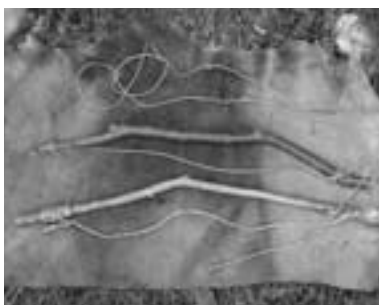
Various baseboards, each of which successfully resulted in fire with the fire bow.



An alternative two-stick method for the baseboard (courtesy of Allan “Bow” Beauchamp): instead of making a notch in the base, simply place the spindle in the groove of the two branches, and the dust will fall through.



A bearing block can be made from almost anything, as long as the material is heavy and allows you to bear down on the spindle.



Fire bows, with some handmade cord made from basswood bark.



They're different shapes, sizes, and types of wood, but these spindles all worked.

## The Fire Bow Method

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1. Make a fire bow using a piece of wood with a slight bend in it and any piece of cord (shoelace, string, rope, etc.).



2. Next, prepare the baseboard by making a small indentation for the spindle to grind into.



3. Cut the spindle on each end like a pointed crayon.



4. Loop the spindle in the fire bow string. The string should be tense, but not too tight or too loose.



5. Grip the string and bow as shown so that you can adjust the tension. As I push and pull the bow, I like to feel the string with my fingers, which allows me to tighten the pressure on it as needed. Be sure to spin the spindle only enough to make a small indentation.



6. Your body position, the string tension, and the smoothness of your motion are critical to success with the fire bow. You should be able to drive an imaginary straight line down through the shoulder of the arm holding the fire bow, your hand, and the spindle. Get the feel of the motion while “seating” the spindle in the indentation.



7. Note how the black wood dust that was created by the spinning has spread around the hole, with no place to go to form an ember.



8. Cut a notch into the baseboard, next to the indentation, to give the hot dust a place to fall and catch a spark. Note how the notch nearly reaches the center of the indentation.



9. Put the finest tinder under the indentation, just below the notch. Surround the rest of your baseboard with stage 1 tinder.



10. Return to the action position described in Step 6, and begin to spin again while slowly increasing the downward pressure on the spindle through the bearing block.



11. When smoke begins to form, this is your signal to give it all you've got. Once the actual ember forms, the curl of smoke you see will be thicker and whiter than the wisps you first noticed when spinning the spindle.



12. Lift the baseboard slowly and carefully, and transfer the ember from the notch in the baseboard to the middle of the stage 1 tinder pile.



13. You might find that the ember sticks to the baseboard. The best way to dislodge it is to give the board a couple of light taps or a nudge with a twig, so that the ember breaks away and falls into the tinder bundle.





14. Gently lift the tinder bundle.



15. Blow into the tinder pile from underneath (as if you are praying to the fire gods), so you don't burn your hands. If you're lucky, the tinder will ignite into flame.



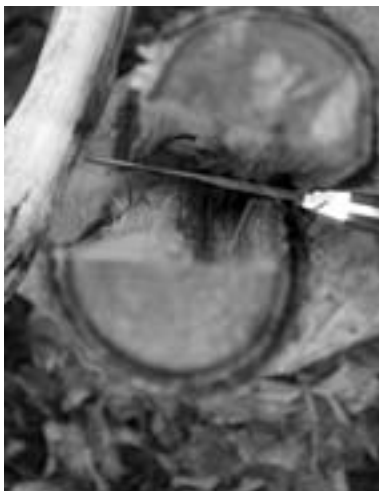
16. But remember: it's only a flame! You don't have a full-fledged fire yet. Carefully transfer the flame to your stage 2 tinder.

## Splitting Wood with a Knife

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1. Stand the branch on its end and place the blade of your belt knife (or a sharp object such as a stone) on the top center of the log.



2. Strike the back of your blade with a heavy object, preferably wood or bone, knocking it farther down until the wood eventually splits.



3. Hit the tip of the knife once it becomes embedded in the wood.



4. Using this method, you can continue to split the wood into successively thinner pieces, all of which will be completely dry.

**The Bent-Pole Frame Shelter:** The bent-pole frame shelter is a fantastic solution if you are in an area with a lot of 6-foot (1.8-m) shrubs or underbrush with trunks approximately the thickness of a pool cue. Collect at least 20 of these “poles,” then strip them of their branches and leaves.



1. After you've collected at least 20 poles, strip them of their branches and leaves. Jab the branches into the ground while making the general shape of the shelter.



2. Tie off the branches at the top to hold them in place.



3. Then, using whatever materials you have on hand, layer your insulation and windproof materials over top.

## Making a Snow Cave

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1. Start by digging a snow trench. A snow trench is the emergency short-term version of the snow cave. As you dig, use the excess snow to make the walls higher.



2. Make a bed on the floor of the trench using available materials and cover the top with branches to make the roof frame.



3. Close the roof off to the weather with a tarp or emergency blanket. If you don't have this type of man-made material on hand, you can also use boughs, bark, or leaves.

## Making a Quinzee

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1. Find a spot that has a large enough deposit of snow for a quinzee, or the right pitch and angle to allow you to dig a snow cave. This is a task unto itself.



2. Place a few sticks at strategic locations throughout your snow shelter. Then, if you come upon one when you're digging out from the inside of the quinzee, you'll know how far you've come and how thick the wall is.



3. Hollow out the snow pile to create a cave. The inside platform must be higher than the entrance so that the cold air flows out and the warm air stays in.



4. Keep a pole inside with you while you dig your cave. It can save your life if the roof collapses. Should this happen, twist the pole slowly until it bores an opening in the snow above you.



This bottle trap will work wherever scorpions are found. It even works with just a hole, if you make the sides steep enough. Scorpions can't climb vertically very well. The trap needs to be placed right at the opening of the small scorpion hole, as shown.



# Fishing Techniques

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Build walls in narrow channels to trap fish in one area. Then, you can spear them (but beware—it's not easy!).



Build a rustic “fishing pole” that has several lines instead of just one. This way, you increase your chances of catching a fish.



Use sticks and logs to create a fish trap. Once you corral the fish, they are easier to catch.



A simple snare is nothing more than a noose positioned along an animal's path and attached to a stake. The idea is that the noose tightens around the animal's throat as it passes through the snare. As the animal struggles to get out, the noose tightens.

**Rabbit snare:** Use a rope or cord to make a noose; drape it loosely over some foliage growing close to the ground. Attach the lead rope of the snare to a bowed branch overhead, then continue the lead rope to a trigger mechanism that will release at the slightest movement. If you're lucky, the rabbit will walk through the noose but catch the rope with a leg or paw. This releases the trigger, sending the bowed branch skyward and catching the rabbit in the noose.



The catch mechanism is a critical part of the rabbit snare. It must be tight enough that it doesn't release accidentally but sensitive enough to release when the rabbit passes through it.



The cord shown here is attached to a bowed branch. The branch needs to be strong enough to support the weight of a rabbit.

**Squirrel snare:** Since squirrels are relatively plentiful in many parts of the world, squirrel snares can be a huge boost to your survival efforts. A squirrel snare is a long pole or branch that you lean against a tree at approximately a 45-degree angle.

The idea behind the squirrel snare is that the squirrel will use the pole to climb the tree. Should it feel the noose on its neck, it will try to leap to safety and hang itself.



To build a squirrel snare, loosely wrap three or four wire nooses (a few inches in diameter) on the top and sides of the pole. You want the squirrel to pass through at least one of them when going up or down the pole. Placing bait between the snares is effective.

## Traps

Even without snare wire or some kind of string or rope, you can catch game by building traps. These run the gamut from very simple and basic to extremely intricate and may include the use of rope. As with so many things in survival, the simpler the better . . . and often the more successful.

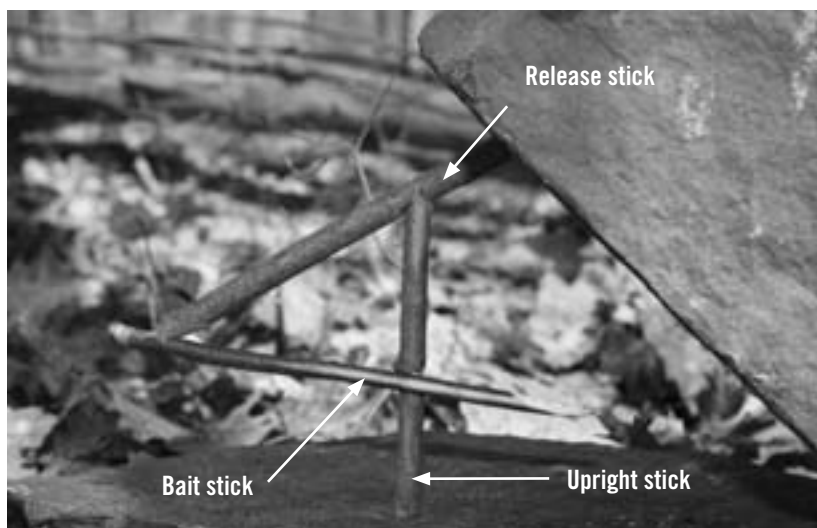
**Figure-four deadfall:** A figure-four deadfall works by crushing its prey. To be effective, the weight must be heavy enough to kill, or at least immobilize your intended prey.

To make the trap, gather three sticks of approximately the same size—anything from a few inches to a couple of feet (7.5 to 60 cm) if you are going after big game—and notch them as shown in the picture.

Note that making an effective figure-four deadfall takes practice; the skill with which you cut the angles in the sticks will determine how effectively it releases.



Figure-four deadfall sticks (top to bottom): the upright stick, the release stick, and the bait stick.

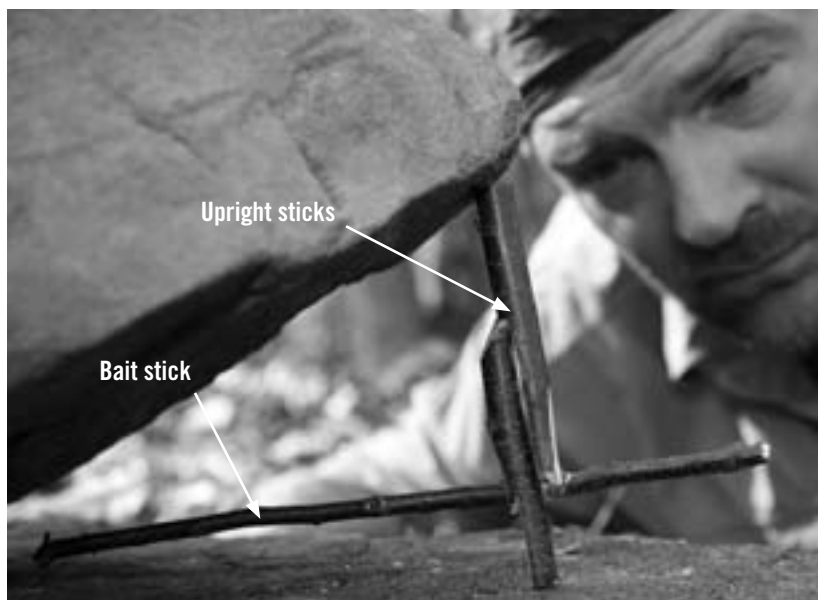


Bait is set on the bait stick first. The sticks are then placed together in the shape of the number four, with the weight leaning against the (release) top stick. When the animal begins to nibble on the bait, the trap releases, crushing the animal.

**Doug's deadfall:** This is similar to the figure-four deadfall. To build this trap you need three sticks of varying length (two short ones and one longer one) and a heavy crushing object such as a flat stone.



Doug's deadfall uses components similar to those of the figure-four deadfall: two upright sticks and a bait stick.



For Doug's deadfall, bait is placed on the end of the longer stick. When an animal disturbs the upright sticks, the rock or trap should fall, crushing the prey beneath.

## Making a Paiute Deadfall

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1. Gather and whittle Paiute deadfall sticks: (from top to bottom) the diagonal stick, the catch stick, the upright stick, and the bait stick.



2. To set up a Paiute deadfall, bait the stick, then set up the trap as shown. The diagonal stick holds the weight of the rock.



3. Here is the Paiute deadfall from another angle. If an animal disturbs the bait stick, the catch stick will release. The diagonal stick will fly up, the rock will fall, and dinner will be served.



## Region-Specific Food Considerations

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THE KEY TO SUCCESS IN GATHERING AND CATCHING FOOD in a wilderness environment is knowing a few plants and creatures native to each region. The wild plants and creatures listed below are safe to eat, easy to identify, and found in relative abundance.

### Arid Regions, Deserts, and Canyons

Top Three Wild Edibles:

- pads of the prickly pear cactus
- fruit of the prickly pear cactus
- mesquite beans

Top Three Critters:

- mice and rats
- grasshoppers and scorpions
- rattlesnakes: Be sure to cut off and bury the head and its potentially lethal fangs.

### Boreal and Other Temperate Forests

Top Three Wild Edibles:

- cattails
- berries (in season)
- wild teas (from needles, leaves, and fruit): spruce, blueberry, blackberry, raspberry, Labrador

Top Three Critters:

- creepy crawlies (earthworms, grubs, grasshoppers)
- rodents (including squirrels)
- rabbits

## The Arctic and Polar Regions

### Top Three Wild Edibles:

- caribou lichen (reindeer moss)
- berries (in season)
- willow shoots

### Top Three Critters:

- rodents
- bird eggs (in season): The Arctic is one of the few places where you can find entire colonies of bird eggs.
- fish: Fishing in a place like the boreal forest is an uncertain undertaking. You could walk through miles of thick bush without finding a lake. In the Arctic in the summer, however, there are all kinds of running streams. (There aren't always fish in them, but checking streams is worth a shot.)

## On the Sea or Open Water

### Top Three Wild Edibles:

- bull kelp
- seaweed
- any other type of greenery

### Top Three Critters:

- barnacles and other crustaceans that attach themselves to the bottom of your vessel
- small fish that follow in the shade of your vessel
- plankton: You can catch plankton by trailing an open sock behind your vessel. The plankton collect in the sock, giving you a teaspoonful of salty mush.

(Of course, you should also try your hand at catching big fish from your vessel, but this isn't easy to do. Some have sustained themselves by killing birds that occasionally landed on their vessels.)

## Jungles

### Top Three Wild Edibles:

- fruit
- palm nuts
- palm hearts

### Top Three Critters:

- fish from feeder streams (small, shallow, muddy little runoffs from rainfall):  
If you have a net, you can often scoop small fish and crustaceans from these streams.
- fish from rivers
- insects and grubs (as long as you can distinguish the benign ones from the poisonous ones)

## Coastal Regions

### Top Three Wild Edibles:

- bull kelp
- bladderwrack seaweed
- sea lettuce

### Top Three Critters:

- creepy crawlies (earthworms, grubs, grasshoppers)
- rodents (including squirrels)
- rabbits

## Mountains

### Top Three Wild Edibles:

- berries (in season)
- wild teas
- mushrooms (only if an experienced mushroom hunter has taught you which ones are safe)

Top Three Critters:

- rodents (including squirrels)
- rabbits
- creepy crawlies (earthworms, grubs, grasshoppers)

## Swamps

Top Three Wild Edibles:

- cattails
- pond lily tubers
- wild teas

Top Three Critters:

- frogs and leeches
- snakes and turtles
- rodents

## Africa

Top Three Wild Edibles:

- wild cucumbers
- wild melons
- gemsbuck (marama) bean roots and bulbs

Top Three Critters:

- snakes, lizards, and tortoises
- ground birds and sociable weaver birds (found in big nests in trees)
- rodents and mongoose

## Making a Makeshift Carry Bag

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1. To construct a makeshift carry bag, lay all your equipment out on a blanket or similar ground cover.



2. Roll up and tie as shown.



3. Using this roll-up method, you can carry your supplies on your shoulder and have your hands relatively free.

## Making Rafts

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Rafts can be hard to make in survival situations. Depending on your circumstances, you may be able to tie up a raft that can transport you some distance.



Make a simple raft platform by collecting logs of a uniform size and tying them together in any of the three ways shown.

Construct a rudder pole on your raft, if possible. This way, you'll be able to steer yourself away from obstacles.



In a world where the techno-savvy are all too used to having electronic gadgets flash and beep at them, the simple compass sometimes seems almost boring. After all, it just sits there, pointing north. Yet, simple though it may be, the compass is the one instrument above all others that will help you find your way out of the wilderness. Basic compass understanding is vital to your survival.

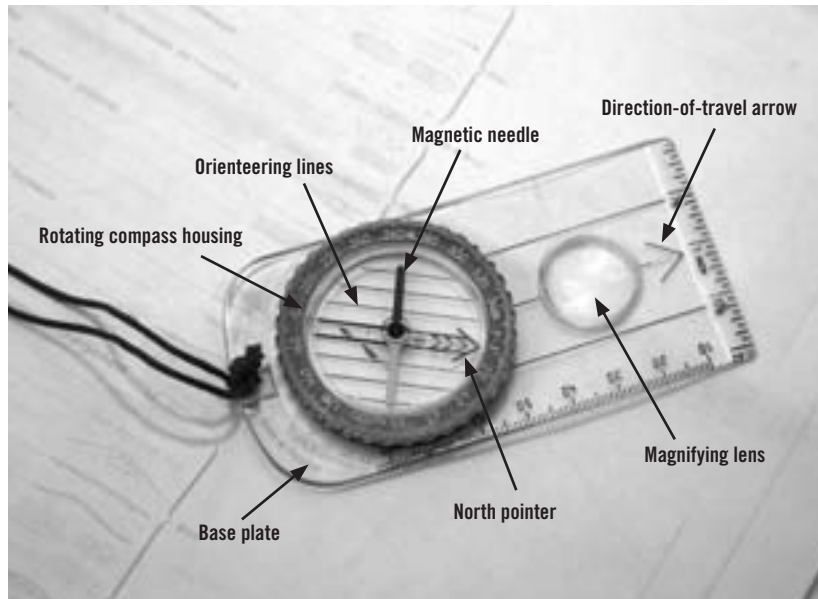
If you can comfortably and effectively use a compass, you can stand in the middle of nowhere, pick a destination off in the distance and be confident that no matter how many obstacles lie in your path, you will get there.

## Parts of a Compass

To use a compass, you first have to understand its various parts. The compass shown below is an orienteering compass, a very practical one when used with a topographic map.

The compass has three basic parts:

**Base plate:** Shows the direction-of-travel arrow, parallel orienteering lines that are used in conjunction with a map, and the index mark.



Parts of a compass.

**Rotating compass housing:** Rotates in either direction. Its border is inscribed with numbers and markings. It begins with N for north and ends where it began, 360 degrees later. On the bottom of the compass housing is the red orienteering arrow, as well as parallel orienteering lines.

**Magnetic needle:** Balanced inside the compass housing, the magnetic needle is usually red and always points to magnetic north (as long as the compass is held flat and is not placed near certain types of metal).

## Taking a Bearing Without a Map

In simple terms, a bearing (one of the 360 points on a compass) is the direction you want to travel in relation to magnetic north. The idea behind taking a bearing is that it allows you to travel in a chosen direction using landmarks as navigational aids. Hillsides, big rocks, unique-looking trees, ponds, and lakes can all be used for this purpose. See the picture captions and other steps that follow for instructions on taking a bearing.



1. Face the direction you want to go. Level the compass to allow the magnetic needle to swing freely, and point the direction-of-travel arrow in the direction that you have chosen.
2. Now spin the compass housing until the orienteering arrow is directly underneath the magnetic needle. The bearing is shown at the index mark (e.g., 148°). Choose a topographical landmark in that direction that you can easily differentiate from others around it.



3. Keeping your compass at the chosen setting, take your eyes away from the compass and make your way toward the object. Once you reach the object, find another landmark in your path in the same direction. This is done by doing the “compass shuffle.” As before, put the compass flat in your hand. Make sure the bearing still reads  $148^{\circ}$  (or whichever bearing you’ve chosen) and shuffle your body until the red end of the magnetic needle is directly over top of the red portion of the orienteering arrow. The direction-of-travel arrow will point to where you want to go.
4. Always place the back end of the compass near or against your stomach with the direction-of-travel arrow pointing ahead. This way both you and the compass will always be facing the same direction. Don’t simply stare at your compass and walk, as you could easily sway to one side and not actually head in a straight line. If you choose a landmark in the right direction, you can put the compass down and make your way to that landmark, walking around obstacles en route. Adventure racers use this method very effectively, noting a landmark in the distance and running between landmarks at top speed.

To reverse your steps you can do one of two things:

1. Align the white (south) end of the magnetic needle with the red portion of the orienteering arrow and follow the direction-of-travel arrow back, OR
2. Add 180 degrees (half of the 360 degrees of a circle) to your original 148-degree setting ( $180 + 148 = 328$ ) and travel back to where you started. Ensure in this case that all red arrows are aligned.

## The Map and Compass

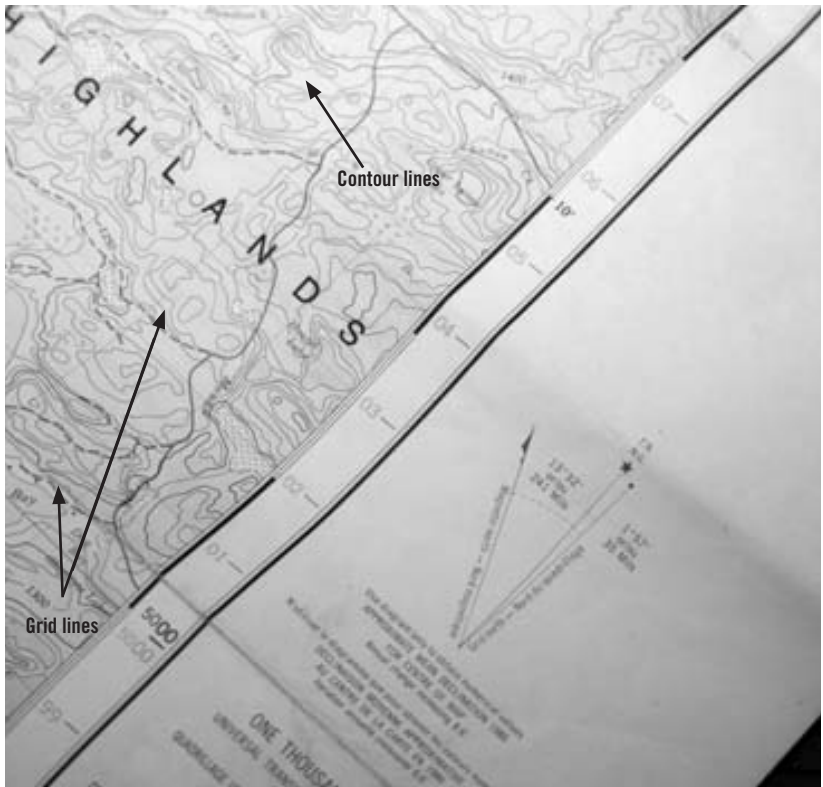
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**THE BEST MAP TO USE** in conjunction with an orienteering compass is a topographic map. The following is a basic introduction to working with a map and compass. As I explain above, it’s wise to further your studies in the field of orienteering with a local educator.

## The Topographic Map

A topographic map is a scaled replica of an outdoor location. The average topographic map has a scale of 1:50,000, where 1 inch equals 50,000 inches. It shows contour lines, grid lines, man-made objects, and natural features such as lakes, swamps, and rivers.

The contour lines are to help you to decipher various terrain features such as peaks and valleys, cliffs and slopes. Grid lines run both north and south (up and down, called grid north) as well as east and west (left and right). On a 1:50,000 scaled map, the grid lines represent one square mile. The north/south lines run almost the same direction as true north, but not necessarily the same direction as magnetic north. The difference between the map's grid north and magnetic north is called the angle of declination.



A topographic map gives you geographic detail about the landscape you'll encounter.

## Taking a Bearing with a Map

Using a pencil, mark on your map (a) the location from which you want to take a bearing and (b) your chosen destination. Then draw a straight line connecting the two. Place the side of the compass along this line with the direction-of-travel arrow pointing in the direction that you want to proceed. Rotate the compass housing so that one of the orienteering lines runs exactly parallel to or completely covers one of the north/south grid lines on the map.



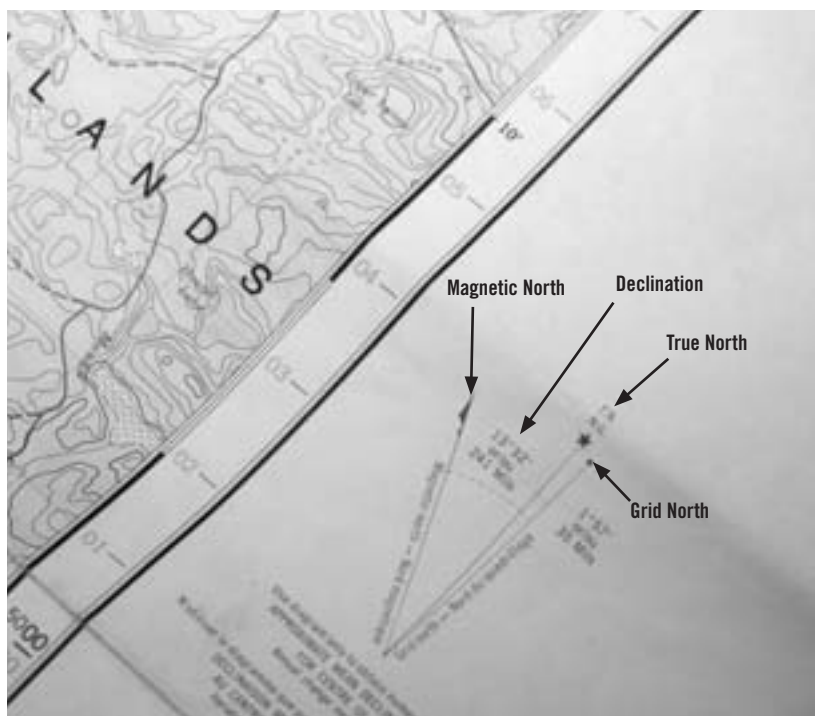
To achieve the correct reading, it is imperative that the orienteering arrow end points toward the top of the map. The correct bearing is shown at the index mark.

## Adjusting for Declination

Now that you have taken the bearing, an adjustment must be made to correct for declination. Using the diagram on the side of the map, find the degrees of difference between the map's grid north and the com-

pass's magnetic north. Notice that the map below shows magnetic north, true north (T.N.), and grid north. (For the purpose of map-and-compass work, T.N. should be ignored.) The degree of declination is also shown. Because the bearing was established using the map's grid line, the grid north marking on the diagram dictates which direction the compass housing should be rotated. If the diagram shows magnetic north toward the left of grid north, turn the compass housing to the left (counter-clockwise). If the diagram shows magnetic north toward the right of grid north, turn the compass housing to the right (clockwise). In either case you will rotate the compass housing the number of degrees indicated on the map.

Keep in mind that magnetic north changes slightly each year. The map will indicate how far it moves each year and how you can adjust for the difference. The compass should now be adjusted for declination, and will give you a true indication of what direction to travel.



A topographical map showing declination.

## Adjusting for Declination from Field to Map

If you want to convert a bearing taken in the field to a map, use the magnetic needle as your starting point. Using the topographical map's diagram for declination as a reference, rotate the compass housing toward grid north.

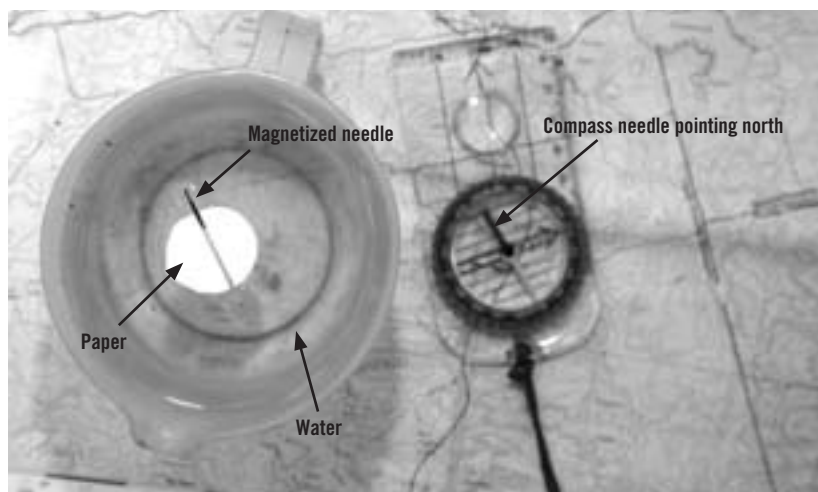


### STROUD'S TIP

When transferring from map to field, rotate the compass housing toward magnetic north. When transferring from field to map, rotate the compass housing toward grid north.

## Making Improvised Compasses

ALTHOUGH IT MAY BE DAUNTING TO SEE YOUR COMPASS FLOAT down the river or plummet to the bottom of a crevasse, don't panic. There are ways to determine north, south, east, and west from ordinary materials that you may be carrying or that you can find in your immediate surroundings. None of these methods is very accurate, but each will give you an idea of where the major directions lie.



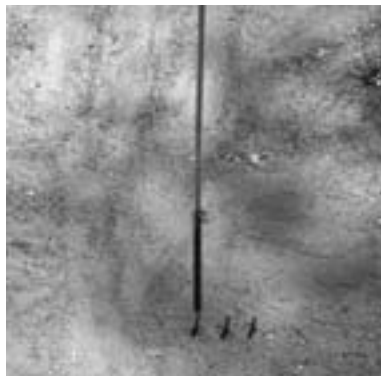
Magnetized needle and paper in water method. A magnetized needle will always point north/south. See tip on page 27 to learn how to magnetize a needle.

**Shadow stick:** The shadow stick method uses the sun to determine direction. Stand with the west mark to your left. North is in front of you, east to the right, and south behind. This method cannot be used effectively in regions above 60 degrees latitude.

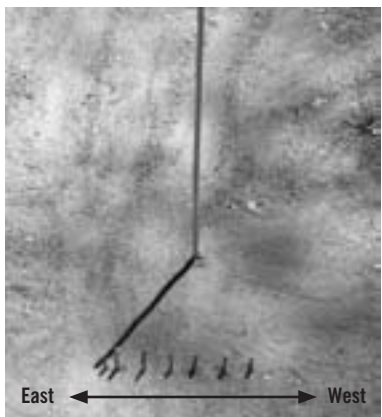
## Using a Shadow Stick to Determine Direction



1. Start by poking a stick or branch into the ground. Choose a level spot where you know a distinctive shadow will be cast. Mark the tip of the shadow; this mark will always be west.



2. Wait about 15 minutes, during which time the shadow tip will move. Mark the new position of the tip. Repeat.

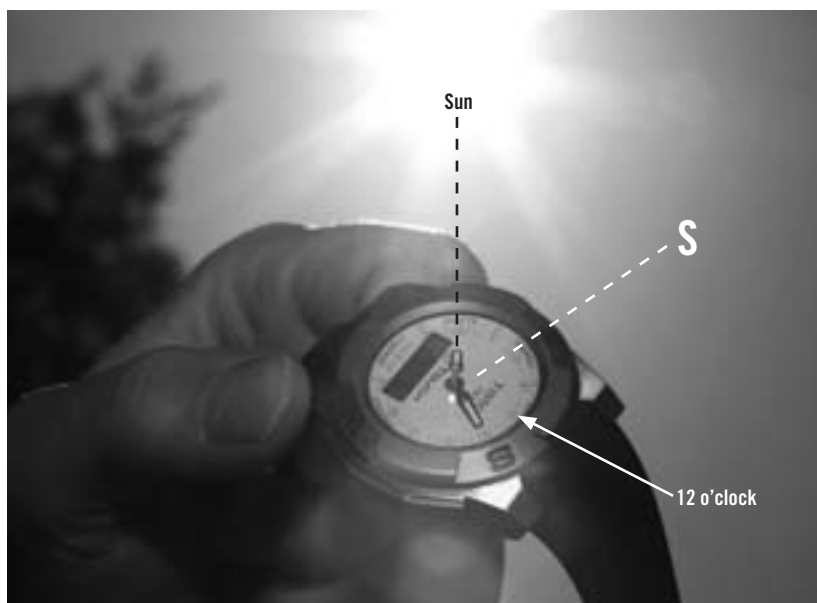


3. Draw a straight line through the marks; this is an approximate east/west line.

**Watch method:** Although it can be off by as much as 24 degrees and doesn't work everywhere on the planet, a watch can sometimes be used as a makeshift compass. If your watch is digital, draw a watch (with hands) on a circle of paper with the correct time on it and use the following method to determine your direction.

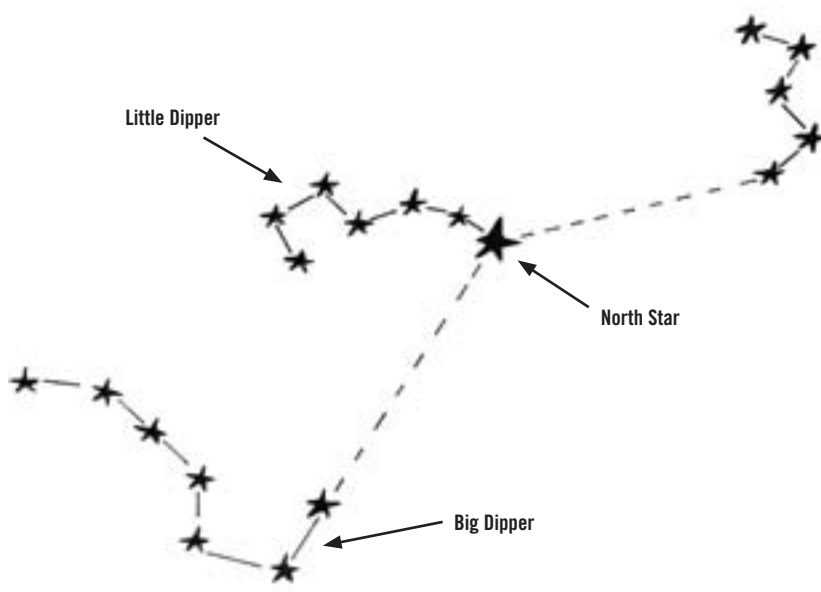
This method should be used during standard time; in daylight saving time, the north/south line is found between the hour hand and 1 o'clock. If it is before noon, use halfway to the right side of the hour hand; if it is after noon, use halfway to the left of the hour hand.

In the south temperate zone (the area between the Tropic of Capricorn and the Antarctic Circle), point 12 o'clock toward the sun. Halfway between the 12 o'clock position and the hour hand will be a north line. During daylight saving time, the north line lies midway between the hour hand and 1 o'clock. Note that this method becomes less accurate the nearer you are to the equator.



If you are in the north temperate zone (the area between the Tropic of Cancer and the Arctic Circle), point the hour hand of your watch directly at the sun. Then draw an imaginary line halfway between the hour hand and 12 o'clock. This imaginary line points south.

Celestial objects are good navigation tools, particularly the North Star. Although you may think that the stars are constantly moving across the night sky, in the Northern Hemisphere, the North Star always holds its position. To find the North Star, first find the Big Dipper. Draw an imaginary line connecting the two stars that form the right-most part of the ladle. Continue the line a distance about five times greater than the depth of the ladle, which will lead you to the last star in the handle of the Little Dipper. This is the North Star. Make a marking or lay a stick on the ground pointing north (to the star). Once daylight comes, you can use this to establish your direction.



You can find the North Star by locating the end stars of the Big Dipper. Follow the line they make diagonally north and you'll find the bright light of the North Star.

In the southern hemisphere, you can use the Southern Cross (and its two pointer stars) to determine south. Start with the star that marks the top of the cross and draw an imaginary line through its long axis. Now draw a line that starts midway between the two pointer stars and comes out at a right angle to it. This line should cross your first imaginary line through



the long axis of the cross. The intersection of these two lines is close to the South Pole.

You can also use the moon to navigate or at least gain a rough idea of where north and south lie. If the moon is a crescent, draw an imaginary line through the ends of the crescent down to the horizon. If you're in the northern hemisphere, the point where it touches is south; if you're in the southern hemisphere, it's north.

# Twisting Rope

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1. It may sound complicated, but basic rope twisting is simple. Start with fibrous material, such as husks from the yucca plant. Separate the husks into strands.



2. Gather sufficient strands to be able to build a rope as thick as you need it. Roll or rough up strands together to get separate pieces.



3. Twist each piece between two fingers in a clockwise motion. Then, wrap the two pieces together in a counter-clockwise motion.



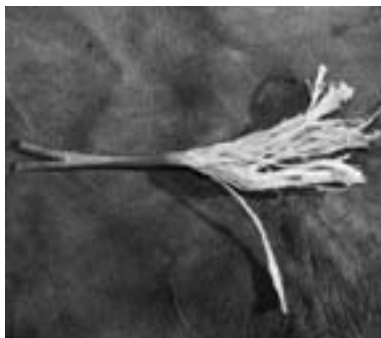
4. This simple method works with many different types of materials.



5. Once you've completed winding the pieces together, you will have a strong rope to use for many purposes.

## Making Rope from Sinew

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1. Rub the sinew on a rough surface to separate it into strands.



2. These fibers can be woven together to form a durable rope.

## Making Knots

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A NATURAL PARTNER TO ROPE MAKING is the ability to tie knots. Like many survival skills, this one can be *overlearned*, because there are hundreds of different types of knots, some of which have very specific uses.

You don't need to learn hundreds. I've found that knowing just a few simple knots will help you through almost any survival situation, enabling you to make more effective shelters, fishing implements, snares, and traps.

### Les's Top Three Knots

**Bowline:** The bowline is a perfect survival knot because of its great strength and the ease with which it can be tied. It forms a loop (though not a noose) at the end of a rope, and it is typically used for securing a rope to an object.

To tie a bowline, start by making a loop a short distance from the end of the rope. Pass the working end of the rope *up* through the loop, wrap it around the base, and pull it back *down* through the loop to finish the bowline.

**Clove Hitch:** The clove hitch is nothing more than two loops "stacked" on each other. It's a great simple knot for securing rope between trees or poles, and for hanging things from a horizontal pole. Be aware, though, that to



A bowline knot is a simple one to learn, and it's very strong.

be effective it requires a load on each end, and it has been known to slip.

To tie a clove hitch, work from left to right. Make a loop somewhere along the length of the rope. Then make a second identical loop to the immediate right of the first. Stack the second (right) loop on top of the first. Place both loops over the pole and pull the free ends of the rope to tighten.

If you're tying a clove hitch to a standing object such as a tree, begin by wrapping the rope once around the tree. After the working end of the rope passes around the tree, it should cross *over* the main stem of the rope. Wrap the working end of the rope around the tree again, this time passing it through the loop you've just created. Pull both ends of the rope taut to finish the knot.

**Figure Eight (and Double Figure Eight):** Though traditionally used in climbing, the figure eight and double figure eight are also great for tying rope to other objects. They bind so well, though, that untying them can be a real chore. Make a long loop by passing the working end of the rope back *under* the main rope stem. Cross the working end *over* the main rope stem and pass it *up* through the loop from the bottom. Repeat this procedure for the double figure eight.

## Clove Hitch

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1. Form two loops as shown.



2. Stack one on top of the other.



3. When tied properly around a tree or pole, this knot will self-tighten.



4. Here I used a clove hitch and a small stone to secure a tarp corner.

## Figure Eight

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To make a figure eight knot, the string goes around the tree and then follows its own path back.



1. The figure eight: first stage.



2. The double figure eight: second stage.

## Splitting a Rock to Make an Edge

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1. Splitting a rock in two can be a relatively easy undertaking, provided you find the right rock. Use a larger rock to hammer the smaller one.



2. Here, I've made a perfect split.



3. Given the right material, a split rock can be used effectively as a cutting or scraping edge, and can be further sharpened by rubbing it against another rock.



4. Your rudimentary rock knife has many uses, so keep it safe. Here, I'm making tinder by cutting into a dry branch.



You can use a variety of materials to make cutting edges and knives, as well as handles for any metal blades you are lucky enough to salvage.



Shards of bone are useful as knives in a pinch, though they need refinement after shattering.

Lay the bone on a hard object and shatter it by striking it with a heavy object. Chances are you'll find a suitably pointy piece among the shattered bits. You can refine its shape by rubbing the bone piece on a rough rock. If you have only small bones or shards to work with, before rubbing, tie one to a piece of wood or other similar object.

You can also make a bone blade by scoring the bone along its length until you can insert a chisel of sorts and split the bone lengthwise.





Scoring a bone.



Bone blades of various shapes and sizes made by scoring.

# CHECKLISTS

## Personal Survival Kit Checklist

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Please see pages 19 to 21 for a detailed description of the elements of this survival kit.

- ☐ bandana
- ☐ compass
- ☐ flashlight (small, LED)
- ☐ garbage bags (2, preferably orange, large)
- ☐ lighter (my preference is a butane lighter that works like a little blowtorch)
- ☐ matches (strike-anywhere type) in a waterproof metal case (with a striker, just in case)
- ☐ magnesium flint striker (hey, I like fires!)
- ☐ metal cup (folding, for boiling water)
- ☐ multi-tool or Swiss Army-style knife (make sure it has a small saw blade)
- ☐ painkillers (a few)
- ☐ parachute cord or similar rope (about 25 feet [7.5 m] of 1/4-inch [0.6-cm] cord)
- ☐ protein bar
- ☐ sharp belt knife
- ☐ solar, or “space,” blanket (small)
- ☐ whistle
- ☐ Ziploc bag (medium or large)
- ☐ coffee can or similar receptacle (in which to place all items)

## Complete Survival Kit Checklist

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Please see pages 21 to 30 for a detailed description of the elements of this survival kit.

- ☐ bandana
- ☐ belt knife (with sharpening stone)
- ☐ candle
- ☐ cup (metal, collapsible; for boiling water)
- ☐ dried food
- ☐ duct tape
- ☐ fire-starting devices: lighter and/or magnesium flint striker and strike-anywhere matches in a waterproof case (with a striker)
- ☐ fire-starting tinder
- ☐ first-aid kit: See checklist on page 356
- ☐ fishing lures (3), hooks, sinkers, and fishing line
- ☐ flares
- ☐ flashlight (small, LED)
- ☐ GPS (Global Positioning System)
- ☐ garbage bags (2, preferably orange)
- ☐ hand lens (small)
- ☐ map and compass
- ☐ marker or “surveyor’s” tape
- ☐ money
- ☐ multi-tool or Swiss Army–style knife (with a small saw blade)
- ☐ needle and thread
- ☐ parachute cord or similar rope (about 25 feet [15 m] of 1/4-inch [0.6-cm] cord)
- ☐ pencil and notebook
- ☐ protein bars
- ☐ safety pins
- ☐ saw (folding)
- ☐ signal mirror
- ☐ snare wire
- ☐ solar, or “space,” blanket
- ☐ SPOT satellite messenger/EPIRB/PLB
- ☐ water purification tablets
- ☐ water-purifying straw
- ☐ whistle
- ☐ Ziploc bags (large)

## Vehicle Survival Kit Checklist

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Please see pages 33 to 36 for a detailed description of the elements of this survival kit. *In addition to* the complete survival kit, you should keep the following in your vehicle:

- ☐ cell phone
- ☐ clothing (warm) and blankets
- ☐ cook set (pots/pans)
- ☐ cook stove and fuel
- ☐ drinking water
- ☐ flares
- ☐ flashlight
- ☐ food, including MREs (Meals Ready to Eat)
- ☐ road maps (local)
- ☐ snow shovel (collapsible or folding) and tire chains
- ☐ tarp
- ☐ toilet paper
- ☐ tools

## First-Aid Kit Checklist

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Please see pages 24 and 25 for a detailed description of the elements of this first-aid kit.

- ☐ antidiarrheal tablets
- ☐ antihistamines
- ☐ antiseptic ointment
- ☐ bandages
- ☐ butterfly sutures
- ☐ painkillers
- ☐ prescription medicines (if applicable)
- ☐ surgical blades
- ☐ triangle bandages

# Home Survival Kit Checklist

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When assembling this survival kit, keep in mind that the size of your household will affect the quantity needed for several kit items.

## Essential Items

- ☐ axe or saw
- ☐ basic tool box (hammer, nails, screwdriver, pliers, adjustable wrench, screw-in hooks, etc.)
- ☐ belt knife (with sharpening stone)
- ☐ camp stove (one burner) with all necessary supplies
- ☐ cash
- ☐ child-care items, if applicable (diapers, formula, bottles, etc.)
- ☐ clothing and footwear suitable for outdoor temperatures
- ☐ cooking container(s)
- ☐ duct tape
- ☐ emergency candles
- ☐ fire extinguisher
- ☐ first-aid kit and extra prescription medicines
- ☐ flashlight
- ☐ garbage bags (2, preferably orange, large)
- ☐ lighter (butane is best)
- ☐ matches (strike-anywhere type) in a waterproof metal case
- ☐ meal-replacement drinks (7-day supply per person)
- ☐ multi-tool or Swiss Army-style knife
- ☐ non-perishable food (7-day supply per person)
- ☐ pencil/pen and paper
- ☐ portable toilet and sanitation supplies
- ☐ rope or parachute cord
- ☐ rubber gloves
- ☐ shovel
- ☐ sleeping bags
- ☐ solar or hand-crank powered light, radio, and cell phone charger
- ☐ thermal blankets
- ☐ tissue packs and wet wipes
- ☐ tube tent and/or tarp >>

## Home Survival Kit Checklist (continued)

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- ☐ water purification tablets
- ☐ water, for drinking, cooking, and washing (7-day supply of 7.5 gallons [28L] per person)
- ☐ waterless soap or hand sanitizer

### Other Useful Items:

- ☐ emergency plans, contact lists, meeting place information, etc.
- ☐ eyewear (extra glasses, contact lenses, cleaning solution)
- ☐ fishing and/or hunting equipment
- ☐ generator with extension cord
- ☐ light sticks
- ☐ pet-care items, if applicable (litter, carriers, bags, leashes, etc.)
- ☐ portable heater
- ☐ rain ponchos with hood
- ☐ recreational items (board games, cards, books, harmonica)
- ☐ siphon hose (rubber)
- ☐ smoke/carbon monoxide detector (for stove/heater use)
- ☐ spare gasoline for vehicle
- ☐ wash basin
- ☐ water filter