Trail Sense

Wilderness Survival Guide

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Overview

This guide covers essential survival skills needed to increase your chances of returning safely from an emergency survival situation. It is not a substitute for professional training or experience and should only be used as a reference.

This guide is intended to be practical and to the point, with the sole purpose of getting you out of a survival situation. Therefore, most bushcraft and other techniques that the average hiker would find impractical have been left out.

If you are in a survival situation, try to stay calm and start with this chapter's "What to Do in a Survival Situation" section.

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Be Prepared

Before entering the wilderness, you should be as prepared as possible. This means you should plan your route as well as alternative routes, pack the

proper gear, learn the necessary skills, and tell at least one responsible adult your plans.

Gear

The gear you bring will depend on your skill level, trip duration, trail popularity/remoteness, terrain, time of day, and weather.

On short nature hikes (under 2 hours), a phone with offline maps, a knife or multi-tool, a lighter, sunglasses, and a bottle of water may be sufficient. You can apply insect repellent or sunscreen before going out.

Many people carry a smartphone with them at all times, and while you shouldn't rely solely on it, it can be very helpful. To make the most of it, download an offline navigation app or maps and place money, bandages, and a Fresnel lens under the back of the case for emergencies.

Necessities:

- Cell phone (with offline maps if possible)
- Whistle
- Pepper or bear spray (check local laws)
- Spare batteries (for flashlight) and a battery pack for your phone
- Assorted bandages
- Gauze
- Surgical tape
- Safety pin or needle
- Tweezers
- Antibiotic ointment
- Sunscreen
- Insect repellent
- Prescription medications (including several days' worth of extra doses), contact lenses, and glasses
- Pain relievers (aspirin, ibuprofen, acetaminophen)
- Hand sanitizer

- Epinephrine auto-injector (if you have severe allergies)
- Asthma inhaler (if you have asthma)
- Emergency space blanket
- Poncho
- Extra socks
- Boots or sturdy shoes
- Sunglasses
- Cordage (paracord)
- Sewing kit (needle and thread)
- In colder climates:
  - Insulating layers (jacket, pants, hat, gloves)
  - Waterproof outer layer
  - Waterproof or insulated boots
  - Thermal underlayers
  - Hand warmers
- For overnight stays:
  - Change of clothing
  - Sleeping bag
  - Sleeping pad
  - Tent
  - Tarp
  - Bear bag or canister
- Water (enough for the duration of your trip, plus a bit extra)
  - Bring a water purification method for longer trips and plan your route to include water sources.
- Water containers (preferably a container that you can boil water in, such as a single-walled stainless steel bottle)
- Firestarter (lighter, waterproof matches, or fire steel)
- Food (enough for the duration of your trip, plus a bit extra). Don't bring food you have never eaten before. Some good options can include:
  - Nuts
  - Seeds
  - Dried fruit

  - Jerky
  - Energy bars
  - Dehydrated meals (with extra water)
  - Canned food (with a can opener if needed)
- Knife or multi-tool with a knife blade
- Map
- Compass
- Flashlight or headlamp
- 7-day weather forecast

Optional:

- Signal mirror

See each chapter for additional gear recommendations.

Knowledge and skills

Start by learning how to do the following:

- Follow local laws and regulations
- Act in a survival situation
- Signal for help
- Plan a trip

See each chapter for additional knowledge and skills recommendations.

Additional reading

This guide only covers a small portion of the vast knowledge of survival and bushcraft. If you want to learn about more skills, then I recommend the following books (not affiliated):

- *Bushcraft 101* by Dave Canterbury
- *SAS Survival Handbook* by John 'Lofty' Wiseman
- *Tom Brown's Field Guide to Wilderness Survival* by Tom Brown Jr., with Brandt Morgan
- *Wilderness & Travel Medicine* by Eric A. Weiss, MD

What to Do in a Survival Situation

If you are in a survival situation, try not to panic and use the following steps as a guide.

Stop

The first and most important thing to do when lost is to stop moving. If you are in immediate danger in your current position, you can move, but otherwise, stay where you are. Use this time to calm down with deep breaths (in through your nose, out through your mouth or nose); you will get home.

Think

Take a moment to think about your situation. Answer (but do not act on) the following questions:

- What are your immediate needs?
- What resources do you have available?
- Did you tell someone your plans before you left? If so, when are they expecting you back?
- Which way did you come from?

Observe

Next, observe your surroundings and assess your situation. The first thing to do is check your smartphone or GPS receiver for your location. If you have a maps app, open it and check if a map is available. You can also check for a signal to call for help. If you have no luck there, then look around and listen for signs of people, vehicles, or trails. You can increase the range of your hearing by cupping your hands behind your ears. Lastly, observe where you are and look for potential hazards (weather / terrain / dangerous animals) or resources (water / shelter materials / firewood).

Plan

Make a plan for your next steps. What you do next is going to depend on your current situation. Here's some general advice for actions you can take, ordered by importance:

- If you are badly injured, treat your injuries.
- If you are wet and have dry clothing, remove the wet clothing and put on the dry clothes. If you only have a dry blanket or sleeping bag, remove the wet clothes and wrap yourself in that.
- If the weather is bad, take shelter.
- Try to put in a call or text for help.
- If it is cold, get warm through insulation, shelter, and then fire (if easily started).
- If it is hot, find shade and slowly drink water.
- If it is close to dark, set up a shelter and maybe a fire.
- Start conserving food and water, but don't let yourself get thirsty.
- If you have a minor injury, treat it.
- Record your current location in your phone or GPS; if you have a bright piece of clothing, tie it to a tree where you can see it. This will help you to avoid getting even more lost.
- If you are out of water or just about to run out, find a water source and purify it.
- Signal for help using the techniques later in this chapter. Do this often for the best odds of being found.
- Try to determine your location using a map.
- Check for signs of the trail nearby, but always keep your initial location in sight.
- Identify nearby points of interest that you might be able to find on a map or hike to later if needed.
- If you are out of food, start thinking about how you will forage or catch something to eat. You can survive for weeks without food but will weaken over time.

- If you have been out for several days to a week, you may need to consider hiking out. Leave a sign that you were here and in which direction you went, such as something tied to a tree and an arrow nearby made of natural materials.

In summary, the priority is to treat severe injuries, seek shelter, signal for help, find water, build a fire (to stay warm and boil water), determine your location, check for ways out, find food, and last and only if you've been out there for a long time, hike out.

Your plan should adapt to your situation as it changes. Reevaluate often and stay hopeful that you will be found.

Act

Once you have a plan, act on it. If at any point you feel unsafe, nervous, unsure, or your situation changes, then stop and reassess.

Planning a Trip

Before going into the wilderness, have a plan that you can stick to. Research the terrain, weather conditions, wildlife, and plants you might encounter. Check local regulations and any permits you may need. Use an up-to-date map to plan your route and some alternative routes if the trails are impassable. Also, look up trail conditions and the weather forecast for your trip. The wrong combination of weather and terrain can prove fatal, so be prepared.

Once you have a trip planned out, pack the necessary gear and supplies and check all of it to ensure it is functional. You should share your plan with at least

one responsible adult, including the routes, who you are going with, when you will be back, and when you will contact them. If you don't have someone to whom you can tell these plans, leave a note with this information in a very visible place in your home. While you are hiking, stick to your route and avoid unnecessary risks.

Signaling for Help

Signaling for help will increase your odds of being found. You should do this often, even if you don't think anyone is nearby or can hear you.

Cell phone

Many phones can call emergency services even without a signal from your carrier. If you can't make a call, try sending a text message. Check your phone periodically to see if you have a signal, but otherwise, keep it off or in airplane mode to conserve battery. You may get a better signal by moving to higher ground or an open area.

Satellite messengers and PLBs

A satellite messenger or personal locator beacon (PLB) can be used to send an SOS signal in an emergency situation. They are typically used in areas where your cell phone does not have a signal. PLBs can only send an SOS signal and are required to be registered, but they don't have a subscription fee. Satellite messengers require a subscription but usually allow you to send more types of messages.

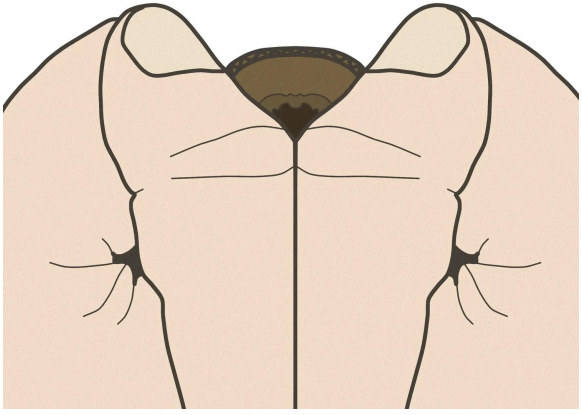
On some smartphones, there may be a satellite feature

available that can be used for this purpose. Visit your phone manufacturer's website or consult the user manual to see if this is available on your device.

Whistle

Three short blasts are the universal signal for help. You may want to cover your ears when using the whistle at full volume.

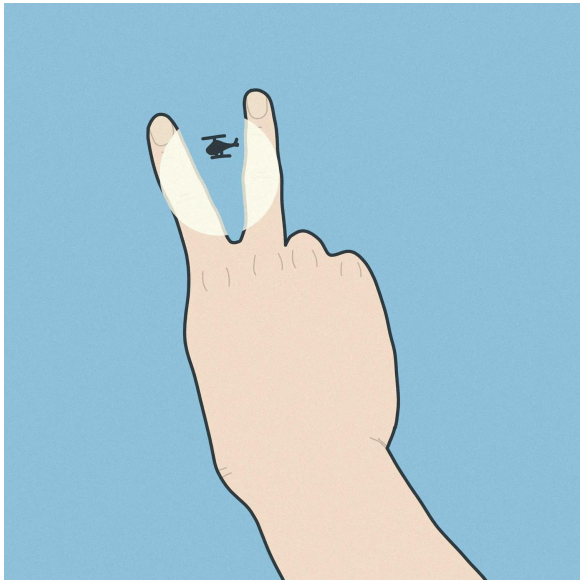
In a pinch, an acorn or bottle cap can be used as a whistle. Hold it with your thumbs as pictured below, then place your lips over your thumbs' knuckles and blow. It won't be as loud as a regular whistle, but it is usable.



Signal mirror

Hold the mirror with one hand and extend your other arm in front of you with your fingers in a V-shape and the target between your fingers. Reflect sunlight

onto your fingers and slowly move the mirror up and down to flash sunlight at the potential rescuers. You can use a phone screen as a signal mirror, but it will be nowhere near as effective as an actual mirror and should be combined with another signal, such as smoke or a ground-to-air signal.



Smoke

Smoke can attract attention during the day. Adding green vegetation to an established fire can create a lot of smoke, but be sure to do this safely. A fire at night can also be used to attract attention.

Flares

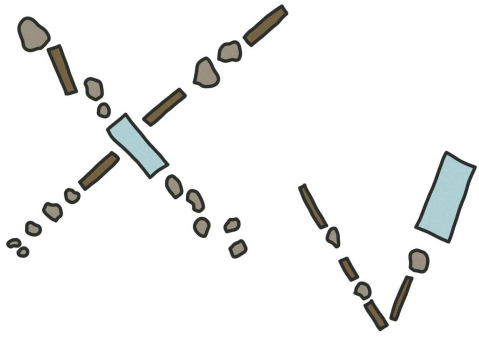
Flares are best seen at night or in low-visibility conditions. Follow the instructions on the flare packaging and be aware of any legal restrictions on their use.

Flashlight / headlamp

At night, a flashlight can be used to signal for help. Use the international distress signal, SOS, which is three short flashes, three long flashes, and three short flashes. If your flashlight changes modes when turned off and on, you can cover the light with your hand instead of turning it off. Aim it in the direction of aircraft or other potential rescuers.

Ground-to-air signals

Ground-to-air signals are large markers you create on the ground to communicate with aircraft. Use rocks, logs, or other materials to create a large "V" (means you require assistance) or an "X" (means you require medical assistance). Use contrasting or artificial colors to make the signal more visible.



Avalanche beacons

An avalanche beacon is a device that broadcasts a signal which can be picked up by other nearby transceivers. It can help rescuers locate you if you are buried in the snow of an avalanche.

Medical

This chapter covers basic medical knowledge and techniques for common injuries and illnesses in the wilderness.

This chapter is for informational purposes only and does not replace professional advice, diagnosis, or treatment; use at your own risk, ensure compliance with local laws, and consult qualified healthcare providers whenever possible.

Be Prepared

Gear

Necessities:

- Assorted bandages
- Gauze
- Surgical tape
- Safety pin or needle
- Tweezers
- Antibiotic ointment
- Sunscreen
- Insect repellent
- Prescription medications (including several days' worth of extra doses), contact lenses, and glasses
- Pain relievers (aspirin, ibuprofen, acetaminophen)
- Hand sanitizer
- Epinephrine auto-injector (if you have severe allergies)
- Asthma inhaler (if you have asthma)

Optional:

- Wound closure strips/butterfly bandages
- Moleskin
- Molefoam
- Tourniquet
- C-Splint
- Aloe vera gel
- Antiseptic wipes
- Hydrocortisone cream
- Antihistamine pills (diphenhydramine; dye-free varieties are available)
- Super glue
- Cotton swabs
- Antidiarrheal medication (loperamide)
- Gas relievers (simethicone)
- Antacid tablets
- Mirror

- Tampons/pads/menstrual cup
- Dental floss
- Toothbrush
- Toothpaste (store this in your bear bag/container at night)
- Toilet paper and/or portable bidet
- Trash bags/container (check local regulations regarding toilet paper and human waste)
- Trowel
- Soap
- Washcloth/microfiber towel
- Lip balm
- Electrolyte mix

Knowledge and skills

Start by learning how to do the following:

- Perform basic first aid and CPR.
- Calm yourself and others.

Once you have mastered these skills, you should learn how to do the following:

- Make charcoal (see the Fire chapter).
- Make tea from plants.
- Identify medicinal plants in your area.
- Perform advanced first aid/wilderness-medicine techniques, such as setting a broken bone or suturing a wound.

Common Medications

This is a list of common medications hikers might carry. It's not a complete list. Only use these in accordance with your doctor's recommendations and follow the package directions. Know the side effects, how much to take, and when to take them before your trip.

- **Aspirin**: A pain reliever used for headaches, sore muscles, joint pain, inflammation, and fevers. Many doctors recommend taking aspirin at the first signs of a heart attack, as it can help prevent further blood clots. High doses can lead to gastrointestinal bleeding.
- **Ibuprofen**: A pain reliever used for headaches, sore muscles, joint pain, inflammation, and fevers. It can cause stomachaches for some people.
- **Acetaminophen**: A pain reliever used for headaches, sore muscles, joint pain, or fevers.
- **Diphenhydramine**: An antihistamine used for allergies, itching, and sleeplessness. It may cause drowsiness.
- **Loperamide**: Used to treat diarrhea.
- **Simethicone**: A gas reliever used for gas pains.
- **Antacid tablets**: Used to treat heartburn and indigestion.
- **Hydrocortisone cream**: Soothes itchy or red skin from bites, rashes, or irritation.
- **Antibiotic ointment**: Helps prevent infection in minor cuts, scrapes, or burns.

Allergic Reactions

Allergic reactions can range from contact dermatitis (like poison ivy) or bug bites to anaphylaxis, a severe reaction that can be life-threatening.

Symptoms

- Rash
- Itching
- Swelling
- Hives
- Runny nose
- Sneezing
- Coughing
- Scratchy throat

Severe:

- Difficulty breathing
- Swelling of the face, lips, or tongue

Treatment

1. Remove the allergen if possible.
2. If there is a rash, apply calamine lotion or hydrocortisone cream.
3. Take antihistamine pills.

Severe:

Severe allergic reactions that affect breathing or cause swelling of the face, lips, or tongue require immediate medical attention. If you have an epinephrine auto-injector, use it:

1. Remove the safety cap.
2. Hold the injector with the tip against the thigh, midway between the hip and knee.
3. Press the injector into the thigh until it clicks.
4. Hold it in place for 10 seconds.

5. Repeat with a new injector in 5 to 15 minutes if symptoms persist.
6. Seek medical attention as soon as possible.

If you have asthma and are having an attack, use your inhaler.

Prevention

- Avoid known allergens.
- Carry at least one epinephrine auto-injector if you have severe allergies.
- Take precautions for bug bites and poisonous plants (see the relevant sections).
- Tell others about your allergies and where your epinephrine auto-injector is kept.

Altitude Sickness

Altitude sickness is caused by low oxygen levels at high altitudes.

Symptoms

- Headache
- Nausea
- Fatigue
- Dizziness
- Shortness of breath
- Poor sleep
- Loss of appetite
- Rapid heartbeat
- Coughing

Treatment

- Take pain relievers (ibuprofen) for headache.
- Do not ascend until symptoms are gone.
- Descend to a lower altitude if symptoms are severe or do not improve within a day.

Prevention

- Ascend slowly.
- Acclimate before ascending further.
- Watch for symptoms above 6,500 feet (2,000 meters).

Bites, Stings, and Attacks

Animals

Many animals bite when threatened, and some can transmit diseases.

Treatment

1. Wash the wound with soap and water.
2. Apply antibiotic ointment.
3. Cover the wound with a bandage. Pack deep wounds with gauze but do not suture or tape them closed.
4. Seek medical attention if the wound is deep, bleeding, or shows signs of infection.

If a mammal bit you, seek medical attention as soon as possible; you may need rabies shots.

Prevention

- Do not approach, corner, or feed wild animals.
- Use a bear bell or make noise to alert animals of your presence.
- Avoid animals with young nearby.
- If approached by an animal:
  - Don't run, as this may trigger a chase.
  - Make yourself look big.
  - Make noise (not high-pitched screaming).
  - Pick up children and pets.
  - Back away slowly or move sideways.
  - Use bear or pepper spray if available.
  - Fight back if attacked, except for grizzly bears.
    * Aim for eyes, nose, or throat with rocks, sticks, or hands.
    * If a **grizzly bear** attacks, play dead unless it stalks you, attacks in your tent,

or continues attacking-then fight back.
- Keep your backpack on; it can offer protection.
- Protect your vital areas (neck, head, and chest).

Leeches

Leeches attach to your skin and suck your blood. They can be found in freshwater lakes, ponds, marshes, and on jungle vegetation.

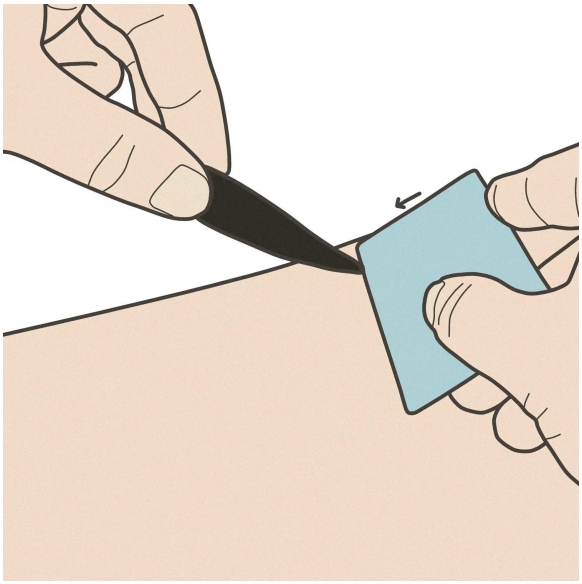
Symptoms

- Leech attached to the skin
- Bleeding
- Swelling
- Pain

Treatment

1. Hold the rear of the leech (the fatter end) and pull it taut (but not too tight). If the rear is suctioned to your skin, a fingernail can be used to detach it.
2. Slide a fingernail or other flat object between the leech's head (the smaller end) and your skin to detach it.
3. Flick the leech away before it can reattach.
4. Clean the wound and apply antibiotic ointment.
5. Apply a bandage to control bleeding. It is normal for the wound to bleed for a while.

Do not salt, burn, or pull the leech off, as this can cause it to regurgitate into the wound.



Prevention

- Use insect repellent.
- Wear long sleeves and pants.
- Check for leeches frequently.

Snakes

Always check your path for snakes, especially in areas with tall grass, loose rocks, or logs. In hot and arid regions, snakes may hide in shaded areas, under brush or debris, or in holes. In temperate areas, snakes may be in areas exposed to the sun. Most snakes are nonvenomous, but if you don't know the type of snake, treat the bite as venomous.

Treatment

1. Rinse the bite area with water.
2. Clean the wound and cover with a bandage.

3. Remove any rings or jewelry from the affected limb.
4. Wrap the limb with a bandage, starting at the bite and moving up the limb. The bandage should be tight but not cut off circulation. You should be able to slip a finger under the bandage. If you are bitten by a pit viper (like a rattlesnake), do not bandage or apply compression as this can lead to increased tissue damage.
5. Keep the limb immobilized, as you would a fracture, and below the level of the heart.
6. Seek medical attention as soon as possible. Call the hospital ahead of time so they can prepare antivenom if needed.

Do not do the following:

- Cut the wound.
- Suck out the venom.
- Apply a tourniquet.
- Apply ice.

Prevention

- Watch where you step.
- Wear high boots.
- Do not put your hands or feet somewhere you cannot first see.
- Do not try to catch or kill snakes unless you know they are not venomous.

Insects, spiders, and scorpions

Many insects can bite or sting you, causing pain, swelling, and itching. Some insects can also transmit diseases.

Symptoms

- Itching
- Swelling

- Redness
- Pain

Treatment

Bites

To reduce itching, avoid scratching and apply calamine lotion or hydrocortisone cream. To reduce swelling, use a cloth soaked in cold water or filled with snow/ice.

If you were bitten by a spider you believe to be venomous, treat it as you would a snakebite and seek medical attention.

Stings

Remove any stingers, taking care not to squeeze the venom sac. Treat it as if it were a bug bite.

If you were stung by a scorpion or insect you believe to be venomous, treat it as a snakebite and seek medical attention.

Bugs in eyes

See the section on objects in the eye.

Prevention

- Use insect repellent.
- Wear long sleeves and pants.
- Wrap your face with a bandana.
- Wear glasses/sunglasses (to keep bugs out of your eyes).
- Use a bug net.
- Ensure your immunizations are current for bug-borne diseases in the area.

You can make an improvised bug repellent by applying mud to your skin or using fire smoke.

Ticks

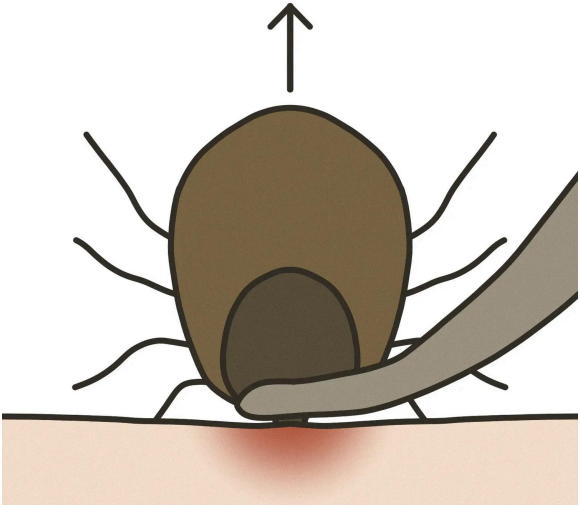
Ticks attach to your skin and will feed on your blood. They can transmit diseases such as Lyme disease and Rocky Mountain spotted fever.

Symptoms

- Itching
- Swelling
- Redness
- Attached tick

Treatment

1. Using tweezers or a tick spoon if available, grasp the tick where it is attached to the skin. You may be able to use your fingernails if they are long enough.
2. Pull straight out with steady, even pressure. Do not twist or jerk the tick. Do not squeeze the tick's body.
3. Treat the area as you would for a bug bite.



Prevention

- Use insect repellent.
- Wear long sleeves and pants.
- Check for ticks frequently, especially if using dry leaves and grass as insulation.

Jellyfish

Many jellyfish have small, venomous stinging cells, typically on tentacles. Even dead jellyfish can sting.

Symptoms

- Pain
- Itching
- Redness
- Rash
- Swelling

Treatment

1. Rub sand on the area to remove the stingers, but be sure to use a barrier of seaweed or cloth over your hands to avoid getting stung there as well. You can also use the edge of a credit card or tweezers to remove the stingers.
2. Rinse the area with seawater (or vinegar if you somehow have it on you). Do not rinse with fresh water, as this can cause the stingers to release more venom.
3. Soak the area in hot water for 30 minutes.
4. Take pain relievers if needed.

Bleeding

Treatment

Seek medical attention if the wound is deep, bleeding profusely, or shows signs of infection. Infected wounds can be identified by redness, swelling, warmth, and pus.

Scrapes and minor cuts

1. Clean the wound with water.
2. Optionally, apply antibiotic ointment.
3. Apply a bandage. You can use medical-grade super glue if needed.

Deeper cuts

1. Apply pressure to the wound with a clean cloth or bandage. You may need to apply pressure for about 10 to 20 minutes to get the bleeding to stop, longer if on blood thinners.
2. Clean the wound and irrigate it with water.
3. Bandage the wound with a sterile dressing.
4. Place new bandages over the old ones if they become soaked with blood.
5. Raise the wound above the level of the heart.
6. Seek medical attention if bleeding does not stop or if the wound is deep.

You can apply a tourniquet to stop blood flow to a limb if direct pressure does not work. This should only be done as a last resort, as it can cause permanent damage. Only a medical professional should remove a tourniquet.

Prevention

- Use caution when handling sharp objects.
- Do not cut toward yourself.
- Watch your footing.

- Be aware of your surroundings.
- To prevent infection:
  - Clean wounds.
  - Use antibiotic ointment.
  - Change bandages frequently.

Blisters

Symptoms

- Red, sore area
- Blister

Treatment

If the blister is small:

1. Cut a doughnut-shaped piece of moleskin.
2. Place the moleskin around the blister, with the blister in the hole.

If the blister is large or painful:

1. Sterilize a needle with hand sanitizer or fire.
2. Pierce the blister near the edge and drain the fluid.
3. Clean and wash the area.
4. Apply a bandage and, optionally, antibiotic ointment.

Prevention

- Keep feet dry.
- Wear properly fitting shoes.
- Wear two pairs of socks.
- Check feet frequently for red areas and blisters.
- Stop hiking at the first sign of your skin rubbing against your boots.
- Apply adhesive tape or moleskin to prevent blisters.

Burns

Treatment

First-degree burns

This is about the level of a mild sunburn.

1. Soak with cool water for 5 minutes.
2. Optionally, take pain relievers.
3. Apply aloe vera gel, calamine lotion, or hydrocortisone cream.

Second-degree burns This is a burn that blisters and can be very painful.

1. Soak with cool water for at least 15 minutes.
2. Take pain relievers.
3. Pat the area dry.
4. Apply a loose bandage.

Do not pop blisters.

Third-degree burns This is a burn that goes through all layers of skin and may be life-threatening. Pain may be minimal due to nerve damage. Second-degree burns are likely also present.

1. Call emergency services.
2. Soak with cool water.
3. Remove clothing and jewelry from the area.
4. Drink water with electrolytes.
5. Bandage loosely.

Prevention

- Use caution around fires, especially when wearing synthetic clothing.
- Do not touch hot objects.
- If your clothes catch fire, stop, drop to the ground, and roll to extinguish the flames.

Choking

If you are choking and someone is nearby, place your hands on your throat to signal that you are choking.

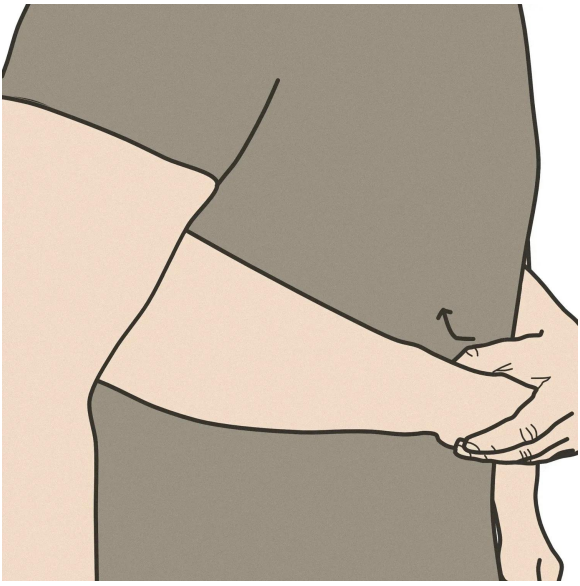
Treatment

Perform the Heimlich maneuver on yourself:

1. If possible, bend over a hard surface.
2. Make a fist with one hand.
3. Place the thumb side of your fist against your abdomen, below your ribcage and above your navel.
4. Grasp your fist with your other hand and press into your abdomen with a quick upward thrust.

Perform the Heimlich maneuver on someone else (only perform this if you know they are choking, upright, and have signaled for help):

1. Stand behind the person.
2. Reach around the person's waist.
3. Make a fist with one hand.
4. Place the thumb side of your fist against the person's abdomen, below the ribcage and above the navel.
5. Grasp your fist with your other hand and press into the person's abdomen with a quick upward thrust.



Cramps

Cramps can be caused by dehydration, overexertion, or lack of electrolytes.

Symptoms

- Muscle pain
- Muscle spasms
- Muscle weakness

Treatment

- Gently stretch the muscle.
- Massage the muscle.
- Apply heat or cold to the muscle.
- Drink water or an electrolyte solution containing sodium and potassium.
- Eat salty foods.
- Eat potassium-rich foods (such as bananas or potatoes).
- Slow down or stop physical activity.

Prevention

- Stay hydrated.
- Replenish electrolytes.
- Warm up your muscles before physical activity.
- Stretch before and after physical activity.
- Maintain a slow and steady pace.

Dehydration

Symptoms

- Thirst
- Dry mouth and throat
- Fatigue
- Dizziness
- Dark urine
- Reduced urine output
- Dry skin
- Headache
- Confusion
- Nausea

Treatment

Rehydrate by slowly drinking water, an electrolyte solution, or another non-alcoholic beverage. Avoid diuretics.

Prevention

- Drink water frequently, increasing intake during physical activity.

Embedded Fishhooks

Fishhooks are designed to penetrate flesh and are difficult to remove without causing further injury. Unless you need to remove the hook to prevent further injury, it's best to leave the hook in place and seek medical attention.

Treatment

Do not attempt to remove a fishhook if it is embedded in the eye.

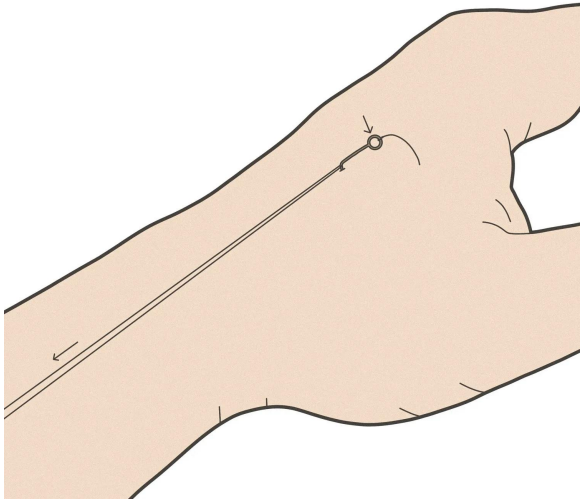
Method 1

1. Advance the hook through the skin until the barb is exposed.
2. Cut the barb off with wire cutters like those on a multitool or pliers.
3. Pull the hook opposite from how it entered; it should come out easily.
4. Clean the wound and apply antibiotic ointment.

Method 2

1. Run a fishing line or cordage through the bend of the hook.
2. Grab the ends of the line.
3. Apply downward pressure on the eye of the hook.
4. Quickly pull the line, causing the hook to come out the way it went in.
5. Clean the wound and apply antibiotic ointment.

In some cases, you may be able to use a pair of pliers instead of the fishing line to perform the same motion.



Prevention

- Be careful when handling fishhooks, especially lures with multiple treble hooks.
- Be extra careful when removing a hook from a thrashing or slippery fish.
- Barbless hooks are easier to remove if you get hooked, but it can be more difficult to successfully land the fish.

Fractures

A fracture is a broken bone. A fracture can be closed (bone is broken, but skin is intact) or open (bone is broken and protruding from the skin).

Symptoms

- Pain
- Swelling
- Bruising
- Deformity
- Loss of function
- Inability to bear weight
- Bone protruding from the skin

Treatment

If the bone is out of place and medical attention is unavailable for several hours, you may need to set it. Otherwise, splint it in place and seek medical attention.

Setting a bone

1. Irrigate and clean the wound if the bone is protruding.
2. Grab the limb below the fracture.
3. Pull the limb to straighten the bone. It may pop into place, and pain may decrease.
4. Splint the bone while holding it in place.
5. Cover the open wound with a sterile dressing and bandage.

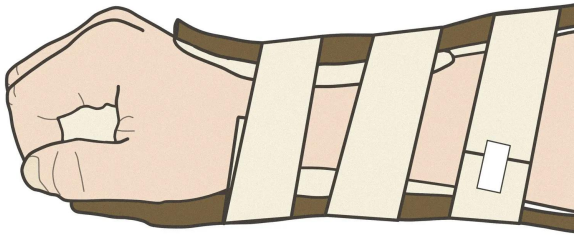
Splinting a bone

1. Remove all jewelry and tight clothing from the area.
2. Apply padding around the fracture.
3. Construct a splint using a rigid object (stick, trekking pole, tent pole). It should extend past

the bone break on both sides.

4. Secure the splint with bandages, tape, or cordage. It should be tight but not cut off circulation. If splinting a finger, tape it to the one next to it.
5. Apply a sling if the fracture is in the arm to help immobilize the limb. You can create a makeshift sling by placing your arm in a jacket or cloth and tying the loose ends behind your neck.

Splint:



Sling:

Prevention

- Be cautious when walking on uneven terrain.
- Wear proper footwear.
- Do not overexert yourself.
- Be careful when handling heavy objects.

Frostbite

Frostbite is caused by exposure to cold temperatures, which freezes the skin and underlying tissues. If not treated, it can lead to permanent damage.

Symptoms

Frostnip:

- Redness
- Numbness
- Pale or white skin
- The area is still soft and pliable

Frostbite:

- White or grayish-yellow skin
- Hard or waxy skin
- Numbness

Treatment

Frostnip:

Rewarm the area using body heat (such as placing a hand under the armpit), warm water, or a hand warmer.

Frostbite:

Only thaw the area if you can keep it thawed. Refreezing can cause more damage. Do not use a fire to thaw the area. Do not rub the area. Seek medical attention as soon as possible.

1. Take pain medicine before thawing.
2. Prepare hot water (104-108°F / 40-42°C).
3. Thaw the area for 30 to 45 minutes or until it is pink/red and soft. If the water cools, change it-remove the area from the water before changing it.

4. Wrap the area in a sterile dressing and keep warm.

Prevention

- Bring and wear proper clothing.
- Keep dry and change out of wet clothing.
- Keep moving.
- Keep warm.
- Stay hydrated and well-fed.
- Treat at the first sign of frostnip.

Gastrointestinal Issues

Gastrointestinal issues can be caused by contaminated food or water.

Symptoms

- Diarrhea
- Vomiting
- Nausea
- Stomach cramps
- Gas

Treatment

- Rehydrate with purified water.
- Drink a cup of tea every few hours. You can make tea by boiling the following plants:
  - For diarrhea:
    - Blackberry/brambles roots
    - Cranberry or hazel leaves
    - White oak bark
  - For constipation:
    - Dandelion leaves
    - Rose hips
    - Walnut bark
  - For gas and cramps:
    - Mint leaves
- Eating campfire ash can also help with diarrhea.
- Make a solution of a handful of ground charcoal in a cup of water. Drink a couple of spoonfuls every few hours.
  - If you ate something poisonous, seek medical help immediately. If you can't contact help, drinking charcoal may help. Do not induce vomiting.

Prevention

- Boil water before drinking.
- Wash hands before eating.
- Cook food thoroughly.
- Only eat foods you know are safe.
- Store food properly.

Headache

Headaches can be caused by various factors, such as dehydration, stress, lack of sleep, eye strain, tight muscles, or illness.

Treatment

- Take pain relievers (aspirin, ibuprofen, acetaminophen).
- Drink water or an electrolyte solution.
- Rest.
- Eat salty foods.
- Massage tight muscles in your upper body.

Prevention

- Stay hydrated.
- Replenish electrolytes.
- Wear sunglasses if needed.
- Do not overexert yourself.

Heart Problems

To be safe, seek medical attention as soon as possible if you experience symptoms of heart problems.

Symptoms

- Chest pain
- Shortness of breath
- Pain in the arms, back, neck, jaw, or stomach
- Nausea
- Lightheadedness
- Cold sweat

Treatment

1. Stop and sit comfortably.
2. If you have as-needed heart medication, take it. Otherwise, take aspirin. Chew the aspirin for faster absorption.
3. Call emergency services and have help come to you.

If someone else becomes unresponsive and you suspect heart problems:

CPR:

1. Check for responsiveness, breathing, and pulse.
2. Call emergency services and start CPR. You can put your phone on speaker to do the two at the same time.
3. Make sure the person is on their back on a hard, stable surface.
4. Place the heel of one hand on the center of the chest.
5. Place the heel of the other hand on top of the first hand.
6. Interlock fingers.

7. Keep your arms straight and your shoulders directly over your hands.
8. Push hard and fast at least 2 inches (5 cm) at 100 to 120 compressions per minute.
9. Let the chest rise completely between compressions.
10. Continue until the patient is responsive, emergency services arrive, or you are too exhausted to continue.

If you are fully trained in CPR, perform rescue breathing after 30 compressions. Otherwise, just do compressions.

Rescue breathing:

1. With the airway clear, tilt the head back and lift the chin.
2. Pinch the nose shut.
3. Give two breaths, each lasting about 1 second and causing the chest to rise.
4. Repeat the cycle of 30 compressions and two

breaths.

Prevention

- Stay hydrated.
- Do not overexert yourself.
- Talk to your doctor about your heart health and risk factors.
- Seek medical attention if you have symptoms of heart problems.

Heat Exhaustion and Heatstroke

Heat exhaustion and heatstroke are caused by exposure to high temperatures and dehydration.

Symptoms

Heat exhaustion:

- Pale skin
- Sweating
- Fatigue
- Rapid heartbeat
- Dizziness
- Nausea or vomiting
- Muscle cramps
- Headache
- Chills

Heatstroke:

- Same symptoms as heat exhaustion, but more severe
- Confusion
- Seizures
- Unconsciousness

Treatment

Heat exhaustion:

1. Move to a cool place.
2. Slowly drink a lot of water or an electrolyte solution.
3. Douse yourself with water or slowly immerse yourself in water.

Heatstroke:

1. Call emergency services.
2. Move to a cool place.

3. Remove excess clothing.
4. Immerse yourself in water.
5. Be cautious when rehydrating, as seizures and vomiting can lead to choking.

Prevention

- Stay hydrated.
- Wear proper clothing.
- Stay in the shade.
- Take breaks in the shade.
- Avoid physical activity during the hottest part of the day.
- Do not overexert yourself.

Hygiene

Washing

If you do not have soap, you can substitute white ashes, sand, or loamy soil.

Wash hands:

- Before and after preparing food.
- Before eating.
- After urinating or defecating.
- Before dressing a wound.
- After touching something likely to carry germs or be poisonous.

Teeth

If you do not have a toothbrush, you can clean your teeth with a small stick (fray it by chewing on one end) or a piece of cloth. An inner strand of paracord can be used as dental floss. You can grind up charcoal and combine it with water to make a mildly abrasive toothpaste.

Feet

Do the following to prevent foot problems:

- Change and wash socks daily.
- Wash, dry, and massage your feet.
- Check frequently for blisters and red areas. Use adhesive tape/moleskin to prevent blisters.

Clothing

Keep clothing clean and dry. Wash clothes with water and soap or boil them. To dry clothes, lay them in the sun on rocks, or hang them in the sun or near a fire (not too close).

Bowel movements and urination

- Dig a hole 6 to 8 inches (15 to 20 centimeters) deep for bowel movements and cover it with dirt.
  - If you do not have a trowel, use a stick to dig the hole.
- If you do not have toilet paper or a bidet, use non-poisonous leaves, moss, or smooth rocks to clean yourself.
- Always wash your hands after using the bathroom.
- Do not defecate or urinate near water sources (at least 200 feet / 60 meters away).

Hypothermia

Hypothermia is caused by exposure to cold temperatures, causing the body to lose heat faster than it can produce.

Symptoms

- Shivering. If shivering stops and you have not warmed up, it is a sign of severe hypothermia.
- Coldness
- Impaired coordination
- Memory loss
- Slurred speech
- Drowsiness
- Slow breathing and heart rate

Treatment

- Change into dry clothes.
- Increase layers of dry clothing.
- Add insulation into clothing (such as dry leaves).
- Consume warm liquids.
- Warm near a fire.
- Use a sleeping bag or blanket.
- Use the body heat of another person.

Prevention

- Wear proper clothing.
- Keep dry.
- Keep moving.
- Keep warm.

Objects in the Eye

It is common to get objects in your eye while in the wilderness, such as dirt, sand, bugs, or an eyelash.

Symptoms

- Pain and discomfort of the eye
- Redness of the eye
- Excess tearing
- Difficulty keeping the eye open

Treatment

1. Avoid rubbing the eye.
2. Using clean water, irrigate the eye by pouring water into the eye.
3. If the object is still in the eye, use a mirror to locate it and attempt to remove it using a damp cloth or cotton swab. Be very gentle.
4. If the object is under the upper eyelid and you have a partner, have them place the tip of a cotton swab in the middle of your upper eyelid and gently fold the eyelid over the cotton swab. They can then remove the object using a damp cloth or cotton swab.
5. After the object is removed, if the eye feels scratchy, place a cold, damp cloth over it, keep the eye closed and rest, use eye drops, or construct an eye patch using a bandage or cloth.
6. Seek medical attention if the object is not removed or symptoms persist.

Prevention

- Wear glasses or sunglasses.
- Don't lift objects with dirt or loose debris on them above your head without eye protection.

- Carefully apply bug repellent on your face to deter bugs from going near your eyes.

Panic Attacks and Calming Techniques

Symptoms

- Rapid heartbeat
- Sweating
- Trembling
- Shortness of breath
- Hyperventilation
- Chest pain
- Nausea
- Dizziness
- Fear
- Numbness or tingling

Treatment

1. Sit down.
2. Close your eyes.
3. Do one or more of the following:
    - Take slow, deep breaths in through your nose, out through your nose or mouth.
    - Count to 10.
    - Recite a calming phrase.
    - Visualize a calming place.
    - Meditate.
    - Tense up and relax each muscle starting at your head and working down to your feet.
    - Listen to music or white noise.
    - Assure yourself that you will be okay.

Poison Ivy and Contact Dermatitis

Contact dermatitis is caused by contact with poisonous plants, such as poison ivy/poison oak, poison sumac, stinging nettle, and many other plants around the world (always check what is dangerous in your area).

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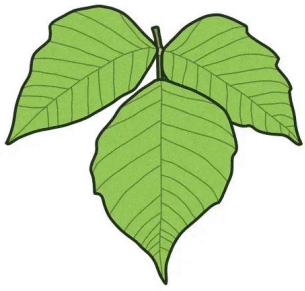

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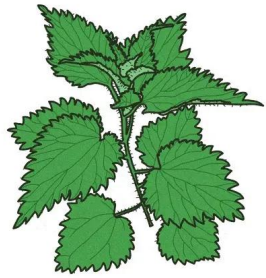


1. **Poison ivy**: A toxic plant with three glossy, pointed leaflets, commonly found in forests, fields, and along trails. Contact with its oil causes itchy rashes and skin irritation.
2. **Stinging nettle**: A plant with serrated leaves and tiny stinging hairs, commonly found in moist, shaded areas. Contact causes a painful, itchy rash.

Symptoms

- Burning, reddening, and swelling rash
- Itching
- Blisters

Treatment

1. Try to remove oil from the plant using soap and water with vigorous scrubbing (imagine trying to remove oil from your skin). Sand or dirt can be

used as a substitute, unless there are blisters.
2. Dry the area.
3. Apply calamine lotion or hydrocortisone cream to reduce the itch. If unavailable, apply a tannic acid solution (boil acorns or oak bark in water) or crushed jewelweed.
4. Optionally, take antihistamine pills to reduce itching.

If you touched stinging nettle, apply mud to the area and remove it when it dries. You can also use tape to pull the small needles out.

Some plants, such as wild parsnip or giant hogweed, have compounds that react to sunlight and can cause a sunburn-like rash. Wash as you would with poison ivy and wear protective clothing to hide the area from sunlight.

Avoid scratching the rash, as it can cause infection. Leave blisters alone.

Seek medical attention if needed, especially if you got sap in your eyes or if blisters appear.

Prevention

Learn to identify and avoid contact with the following plants:

- Cowhage
- Poison ivy
- Poison oak
- Poison sumac
- Rengas tree
- Trumpet vine
- Stinging nettle
- Gympie-gympie/stinging tree
- Wild parsnip
- Giant hogweed

Research and learn to identify other dangerous plants

in your region.

If you come into contact with these plants, wash the area with soap and water as soon as possible. Do not wait for a rash to appear. Do not burn these plants, as the smoke can cause irritation.

Sleeping

Falling asleep can be difficult in the wilderness, but getting adequate rest is important for maintaining energy. To help yourself fall asleep, wind down at night by avoiding strenuous activity and calming your mind, perhaps using meditation. Ensure you aren't too hot or cold and that your sleeping area is comfortable. You might find it easier to sleep if you make a pillow by stuffing spare clothing or a stuff sack with dry leaves or other soft materials.

Some people may also find it necessary to block out noise using earplugs or by listening to music or white noise if available.

Snow Blindness

Snow blindness is caused when too much sunlight reflects off snow, ice, or water into your eyes.

Symptoms

- Eyes are red, scratchy, and watery
- Sensitivity to light
- Headache

Treatment

Cover your eyes with a dark cloth until symptoms disappear.

Prevention

Wear UV-protective sunglasses or snow goggles. If you do not have these, you can make snow goggles from a piece of cloth or a piece of bark with slits cut in it. You can also put soot under your eyes to reduce glare.

Splinters, Thorns, Spines, and Needles

Splinters and thorns can be painful and may lead to infection if not removed.

Treatment

If the splinter is deep or very large, seek medical attention and do not try to remove it yourself.

1. Inspect the splinter to see if any part is exposed and determine which direction it entered.
2. If no part is exposed, sterilize a needle with hand sanitizer or fire and gently dig at the skin to expose one end of the splinter.
3. Use tweezers to grab the exposed end of the splinter, preferably pulling in the opposite direction from how it entered.
4. Slowly pull the splinter out.
5. Repeat if any pieces remain.
6. If the splinter drew blood when removed, treat it as a cut. Applying antibiotic ointment and a bandage won't hurt.

Thorns, spines, and needles can be removed the same way as splinters. Some thorns may be easy to remove without tweezers.

For urchin spines, soak the area in hot (not scalding) water for 10 to 90 minutes before removal.

You should make sure your tetanus immunization is up to date for any puncture wounds.

Prevention

- Use caution when handling dry wood or thorn bushes.
- Avoid walking through thorn bushes.

- Wear long sleeves and pants if going off-trail.
- Don't touch cacti or porcupines.
- Watch out for urchins if walking in the ocean.

Sprains and Strains

Sprains are injuries to a tendon or ligament, while strains are injuries to a muscle or tendon.

Symptoms

- Pain
- Swelling
- Bruising
- Loss of functional movement
- Muscle spasms and cramping
- Muscle weakness
- A pop or tear may be heard or felt during injury

Treatment

1. Rest the injured area.
2. Ice the area for 24 to 48 hours. You can improvise using a cloth soaked in cold water or filled with snow/ice.
3. Compress the area with a bandage or splint.
4. Elevate the area.

Prevention

- Warm up before physical activity.
- Wear proper footwear.
- Do not overexert yourself.
- Watch your step.

Submerged in Water

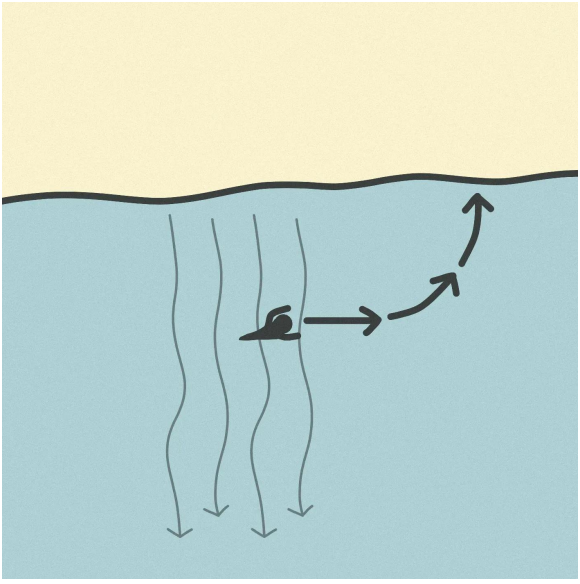
Falling through ice

If you fall through the ice and are still at the surface of the water, do the following:

1. Turn back the way you came.
2. Kick your legs to push yourself onto the ice.
3. Roll away from the hole.
4. Crawl or slide on your stomach to safety.
5. Move to a safe, warm location as quickly as possible.
6. Get out of wet clothes and into dry clothes.
7. Use leaves or dry grass as insulation and warm up near a fire.

Rip currents

If caught in a rip current, swim parallel to the shore until you are out of the current. Then, swim back to shore.



Sunburn

Sunburn is caused by prolonged exposure to the sun's ultraviolet (UV) radiation.

Symptoms

- Redness
- Pain
- Swelling
- Blisters

Treatment

1. Get out of the sun.
2. Run cool water over the burn or apply a cold compress to relieve pain.
3. To reduce pain and swelling, apply aloe vera gel, calamine lotion, or hydrocortisone cream.
4. Optionally, take pain relievers.
5. Drink extra water.

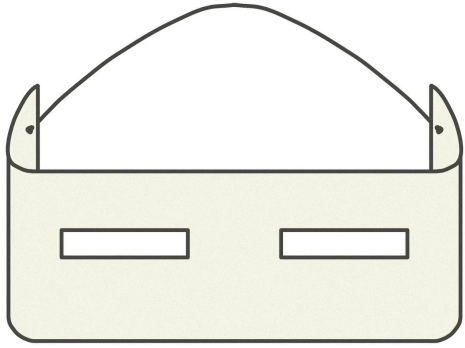
Do not pop blisters.

Prevention

- Wear sunscreen with an SPF of at least 30.
- Wear a hat.
- Wear long sleeves and pants.
- Stay in the shade.
- Take extra precautions on days with a high UV index.

Craft: Sunglasses

You can make sunglasses using a piece of cloth or birch bark with slits cut in it. This helps protect your eyes from UV rays and glare.



Resources

- Cloth or birch bark
- Cordage

Instructions

1. Trim a piece of cloth or birch bark large enough to cover your eyes.
2. Cut small rectangular slits over where your eyes will be. Don't cut the slits while wearing the mask.
3. Attach cordage to both ends of the mask and ensure it fits snugly on your face.

Shelter

This chapter covers how to dress appropriately for the environment and build shelters to protect yourself from the elements.

This chapter is for informational purposes only and does not replace professional advice; use at your own risk and ensure compliance with local laws.

Be Prepared

Gear

Necessities:

- Emergency space blanket
- Poncho
- Extra socks
- Boots or sturdy shoes
- Sunglasses
- Cordage (paracord)
- Sewing kit (needle and thread)
- In colder climates:
  - Insulating layers (jacket, pants, hat, gloves)
  - Waterproof outer layer
  - Waterproof/insulated boots

  - Thermal underlayers
  - Hand warmers
- For overnight stays:
  - Change of clothing
  - Sleeping bag
  - Sleeping pad
  - Tent
  - Tarp

Optional:

- Additional changes of clothing
- Hat or bandana
- Pillow
- Gloves
- Bug net
- Gaiters
- Hammock
- Duct tape

Knowledge and skills

Start by learning how to do the following:

- Choose clothing appropriate for your environment.
- Use an emergency space blanket.
- Get warm quickly.
- Layer clothing for warmth.
- Set up a tent and sleeping bag.
- Identify environmental hazards when selecting a shelter location.
- Tie several types of knots.

Once you have mastered these skills, you should learn how to do the following:

- Construct a natural shelter.
- Repair clothing.

Clothing

Your first line of defense in any environment is your clothing. Proper attire should keep you dry, regulate your body temperature, protect you from the sun, and prevent insect bites.

Materials

When choosing clothing, consider the following materials:

- Wool: Retains warmth even when wet.
- Polyester/nylon: Quick-drying and moisture-wicking.
- Down: Lightweight and insulating but loses warmth when wet.
- Cotton: Retains moisture and loses warmth when wet. Do not wear cotton in cold or wet environments.

Layers

You should plan to wear multiple layers of clothing to protect against the elements. Layering allows you to adjust your clothing to changing conditions and maintain body temperature.

In cold environments, remove or add layers to prevent sweating while staying warm. Remove mid layers before physical exertion and add them back in after you stop.

In warm environments, you may only need to wear a base layer as long as you have sunscreen and bug repellent on. But you should still always pack rain gear, such as an emergency poncho, in case of sudden weather changes.

If you need extra insulation in a pinch, stuff your clothing with dry leaves, grass, or other insulating

materials.

- **Base layer**: Wicks moisture away from the skin. This layer should be tight-fitting.
  - Undergarments
  - Socks
  - Pants
  - Shirt
- **Middle layer**: Insulates and retains heat. This layer should be loose-fitting.
  - Sweater
  - Fleece jacket
  - Insulated pants
  - Vest
- **Outer layer**: Protects against wind, rain, and snow. This layer should be loose-fitting.
  - Rain gear
  - Windbreaker
- **Accessories**: Protect against sun, wind, cold, and insects.
  - Hat
  - Sunglasses
  - Gloves
  - Scarf or bandana

Footwear

Be sure to choose footwear that is appropriate for your environment. In cold climates, wear insulated, waterproof boots. In hot climates, wear breathable, lightweight shoes. Always break in new footwear before a trip to avoid blisters.

If you plan to be hiking in wet conditions, consider wearing waterproof boots or all-terrain footwear that can handle water and dries fast.

Bring extra socks, preferably made from wool, and ensure they are taller than your boots to avoid blisters.

Preparing a Shelter Site

When selecting a site for your shelter, look for areas near building materials and resources such as water and food. Make sure the area is protected from the elements but is also free of threats such as dead trees/branches, slopes that could lead to avalanches/rock slides, flooding, insects, poisonous plants, and dangerous animals. It should not be so secluded that you can't signal for help. If you can avoid it, do not build a shelter above the tree line in mountainous regions, as you will be exposed to the elements.

While gathering materials for your shelter, prefer wood and debris that are already on the ground and require minimal effort to use. Avoid logs that are too thick to break by hand.

Building a Shelter

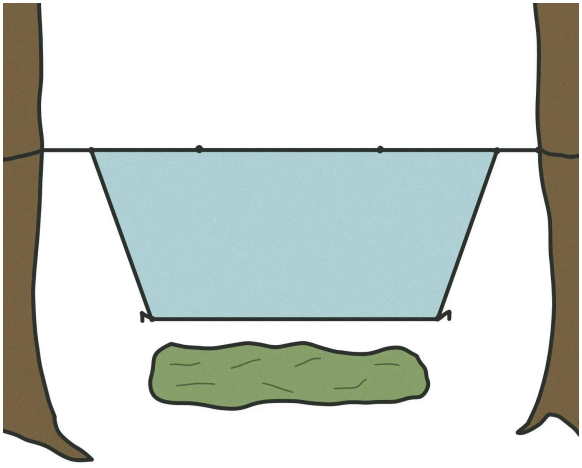
You can construct various shelters using tarps, ponchos, or natural elements. To retain heat, build the smallest shelter that meets your needs and position it against prevailing winds to avoid excess heat loss. Before sleeping in your shelter, make sure there is adequate airflow to manage condensation and smoke from your fire.

Lean-to

A lean-to is a simple shelter made by leaning a large sheet of material against a support like a tree or a ridgepole. It protects from wind and rain.

1. Lash a ridgepole to two trees or supports. If you

are using a tarp or poncho, your 'ridgepole' can be a cord.
2. Lay a tarp or poncho over the ridgepole, allowing one side to touch the ground. If using natural materials, lay branches and leaves over the ridgepole.
3. Secure the sides with stakes or rocks.

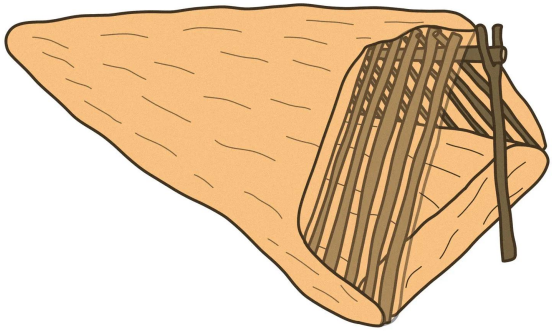


If you're constructing a ridgeline with cordage, form a bowline at one end, wrap the cordage around a tree, and pass the free end through the bowline's loop. Secure the other end to a second tree using either a taut-line hitch or a trucker's hitch, then tighten it. To attach a tarp, pull a small section of the ridgeline through the grommets and insert a stick through the resulting loop to hold it in place.

A-frame

A-frames are a more enclosed shelter that provides better protection from the elements.

1. Lash two sticks together into an A-shape. You can also use a fork in a tree or stick, a stump, or a large rock as a support.
2. Place one end of the ridgepole on top of the A-frame (or fork/stump/rock) and the other end on the ground.
3. Lay a tarp or poncho over the ridgepole, securing the sides with stakes or rocks. If using natural materials, lay branches over the ridgepole angled slightly upward, then add leaves or other debris from the bottom up.



Cave

Caves offer protection from the elements and require minimal effort to use. Be careful when entering caves, though, as they can be home to animals or have poor ventilation. Avoid lighting a fire if possible, since smoke can accumulate; if you do light a fire, do it away from the entrance so the smoke isn't blown back into the

cave.

Emergency space blanket

Wrap yourself in an emergency space blanket to reflect body heat and protect against the elements. You can also use it to create a shelter by tying it between two trees or supports. Be gentle when handling the blanket, as it can tear easily.

Tent

If you have a tent, set it up according to the manufacturer's instructions. Ensure the tent is staked securely and the rainfly is in place. Most tents can be set up by inserting poles into sleeves or clips and securing the tent to the ground with stakes. If there is even a slight chance of rain and your tent comes with a rainfly, be sure to set it up.

Hammock

If you have a hammock, set it up between two trees or supports. Ensure the hammock is secure and the rainfly is in place. Be sure the trees or supports are strong enough to hold your weight.

Insulation

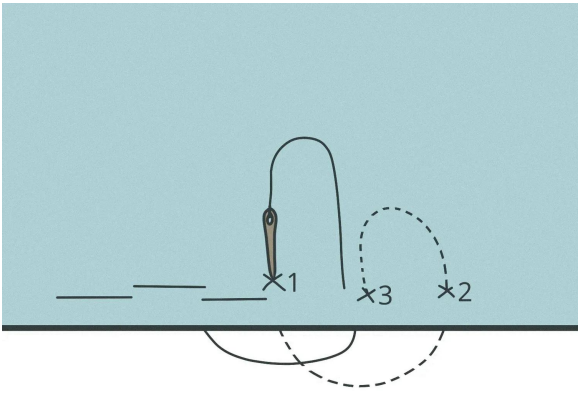
You can place insulating materials like leaves, grass, or clothing between you and the shelter walls or ground to retain body heat. This barrier prevents heat loss and keeps you warm. If you have a sleeping pad, place it under your sleeping bag for additional insulation.

Repair

Sewing

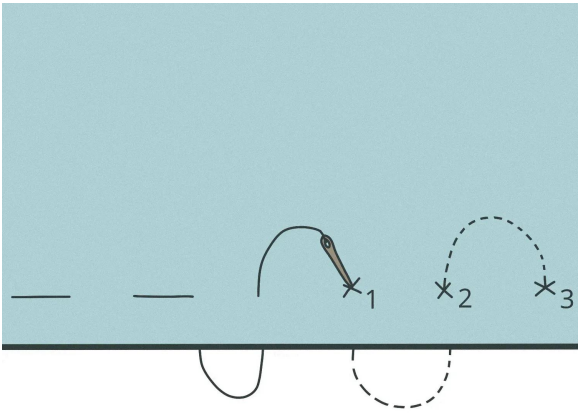
Back stitch

Used for seams that require strength, such as on backpacks or tents.



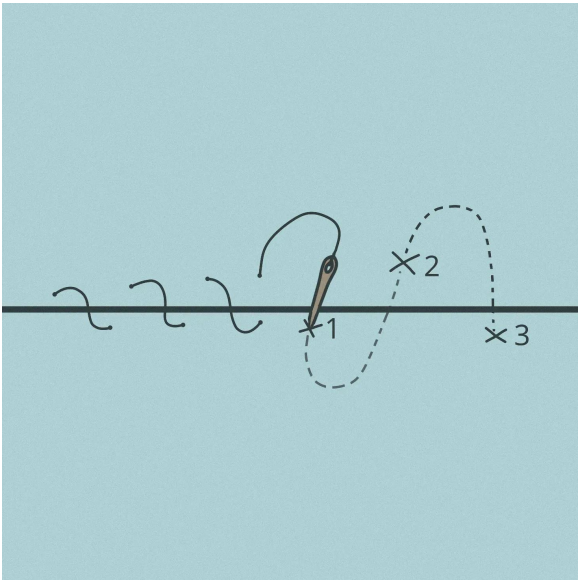
Running stitch

Used for quick repairs on clothing or gear in places where strength is not critical.



Whip stitch

Used to repair tears or holes in fabric. It can also be used to connect two pieces of fabric.



Tarps

If your tarp's grommet breaks, you can still attach it to a rope by creating a button. A button is formed by wrapping a small rock in the tarp and securing your cordage around that using a clove hitch or jam knot.

If your tarp has a hole, you can repair it using duct tape or by sewing it shut.

Other methods

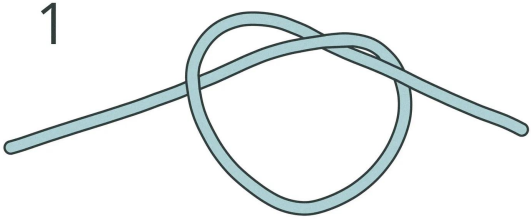
If you do not have a sewing kit, you can use duct tape, safety pins, super glue, or cordage as temporary fixes.

Knots

Overhand knot

Used to prevent the end of a rope from untwisting. This is hard to undo but very easy to tie.

1

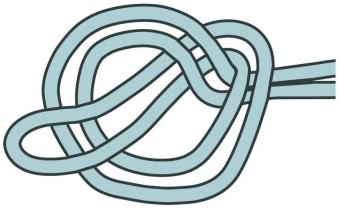


2

Overhand loop

Used to create a loop at the end of a line. In most cases, a bowline would be a better choice, but this knot is easy to tie.

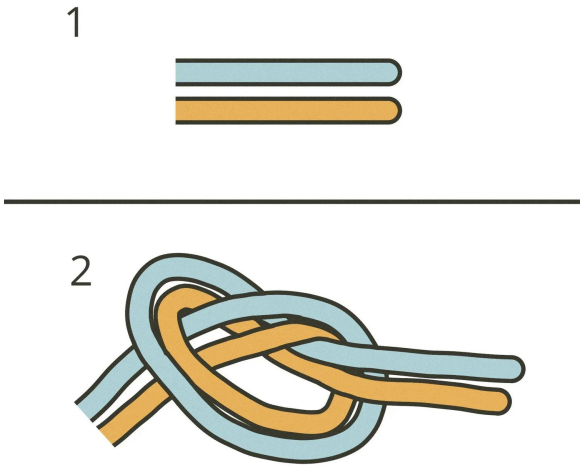
1



2

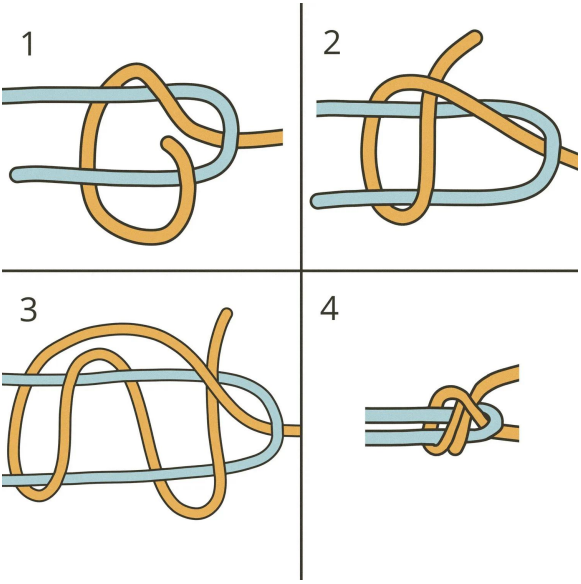
Overhand bend

Used to join two lines together. This knot is easy to tie but hard to undo. In most cases, a double sheet bend would be a better choice.



Double sheet bend

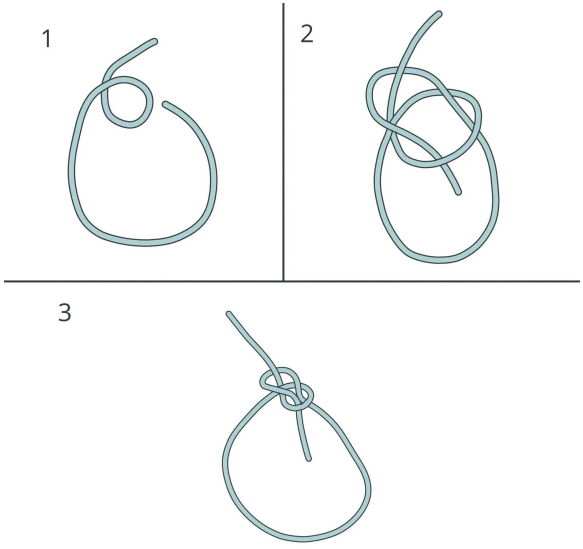
Used for tying two lines together.



Bowline

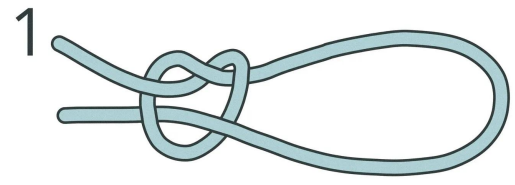
Used to create a loop at the end of a line. You can pass a line around a tree and through the bowline loop to secure the end of a line to the tree.

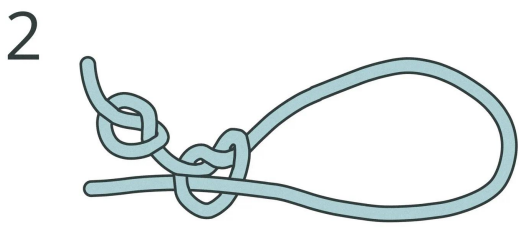
You can use a bowline to attach a line to a grommet on a tarp.



Jam knot

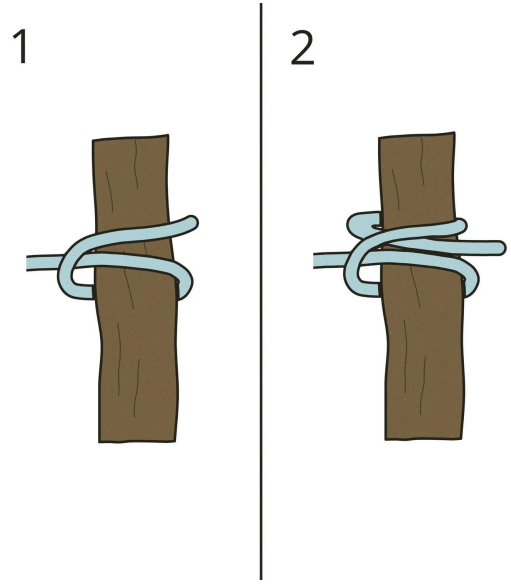
Used to fasten a rope to a timber or pole. This can be used in place of lashings. It can be loosened by pulling on the knot at the end. It is hard to untie this knot.





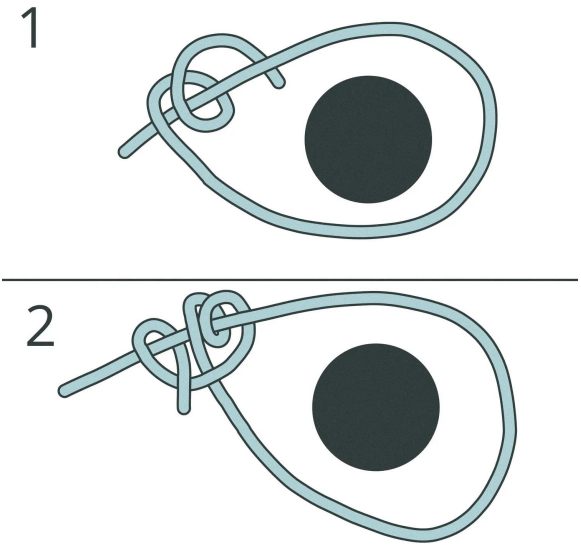
Clove hitch

Used to fasten a rope to a timber or pole. It can be tied at any point in a rope.



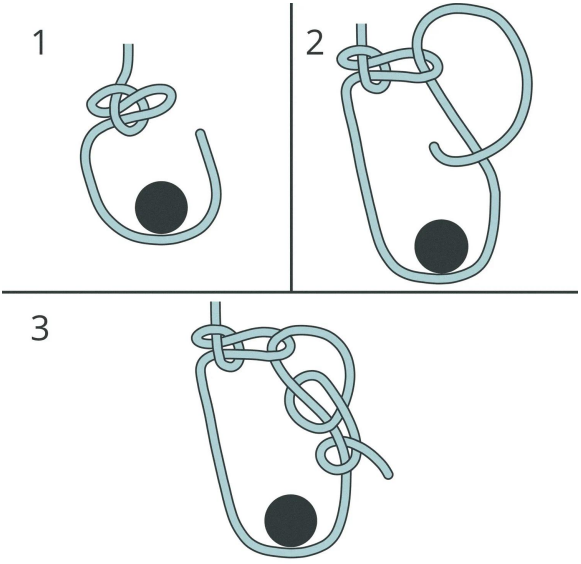
Taut-line hitch

Used to tighten a line.



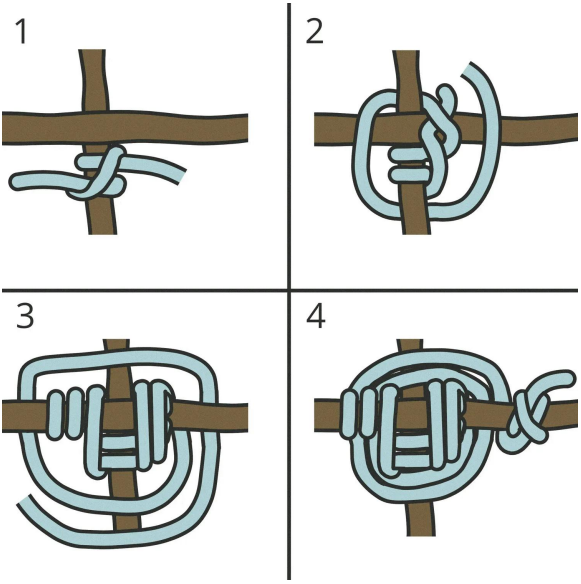
Trucker's hitch

Used to secure a load or tighten a line. Can be cinched down tighter than a taut-line hitch.



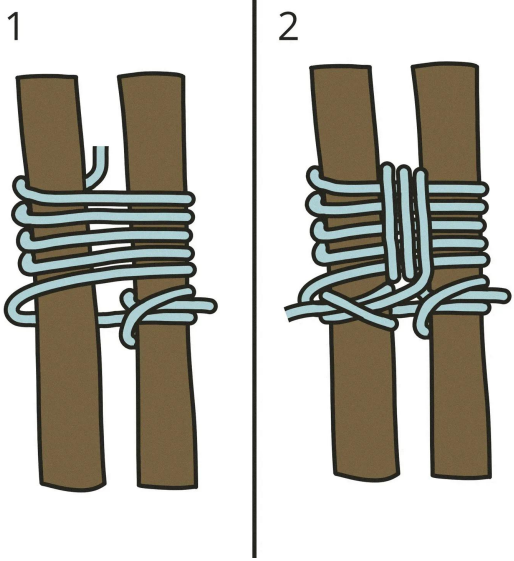
Square lashing

Used to secure one pole at a right angle to another pole. This lashing starts and ends with a clove hitch, though you can use an overhand or jam knot as well.



Shear lashing

Used for lashing two or more poles next to each other. It can be used to construct a tripod. This lashing starts and ends with a clove hitch, though you can use an overhand or jam knot as well.



Craft: Cordage

Cordage can be made by twisting fibers together. It is weaker than rope but can be used for sewing, fishing line, or light-duty cordage.

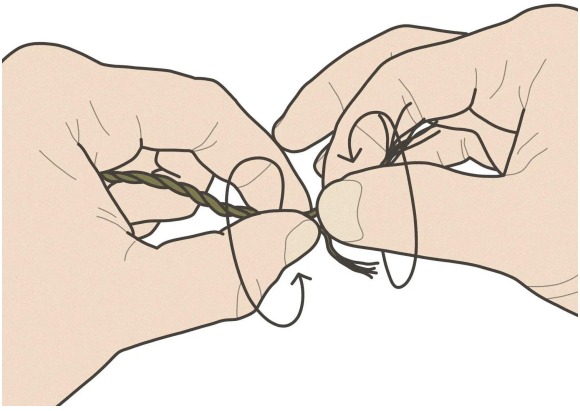
Resources

Any fibrous material can be used to make cordage. Some examples include:

- Grasses and sedges (sedges are stronger)
- Bark or palm fiber

Instructions

1. Gather the fibers into a loose bundle.
2. Hold the bundle near the center and twist one side clockwise until a kink forms.
3. Fold the bundle in half at the kink.
4. Twist the top half clockwise.
5. Twist the two halves together counterclockwise.
6. Repeat the process until you have a full strand. If material is running out, add more material and twist it in.



Craft: Tent Stakes

Resources

- A short stick
- A knife
- Something to use as a hammer, such as a rock or thick stick

Instructions

1. Sharpen one end of a stake to a point.
2. Hammer the stake into the ground at a slight angle, leaning away from your shelter.
3. Secure a line to your tent or tarp with a bowline.
4. Secure the other end of the line to the stake with a jam knot or hitch.

Water

You can only survive at most a few days without water. Knowing how to find and purify water is vital in a survival situation.

This chapter is for informational purposes only and does not replace professional advice; use at your own risk and ensure compliance with local laws.

Be Prepared

Gear

Necessities:

- Water (enough for the duration of your trip, plus a bit extra).
  - Bring a water purification method for longer trips and plan your route to include water sources.
- Water containers (preferably a container that you can boil water in, such as a single-walled stainless steel bottle)

Optional:

- Water purification method (tablets or filter)

- Cooking pot or container
- Clear plastic sheet/tarp

Knowledge and skills

Start by learning how to do the following:

- Plan your water needs for the trip
- Locate water sources
- Purify water by boiling

Once you have mastered these skills, you should learn how to do the following:

- Purify water using chemical treatment or filtration
- Collect water from plants and other sources
- Collect water using a solar still
- Boil water using hot rocks
- Desalinate water

Hydration Essentials

Assume all surface water is contaminated and requires purification, and, if you have to choose a water source, try to find running water. To avoid getting sick or becoming dehydrated quickly, avoid drinking alcohol, saltwater, stagnant water, urine, or eating snow.

At 70°F (20°C), you will need around 2 to 3 quarts/liters of water daily. This amount increases with physical activity and exposure to higher temperatures.

Dehydration

Dehydration occurs when the body loses more fluids than it takes in. Symptoms include thirst, dry mouth and throat, fatigue, dizziness, dark urine, reduced urine output, dry skin, headache, and confusion.

Finding Water

You can find water in many places if you know where to look. Unless otherwise stated, you should purify all water that you collect.

Precipitation

Rainwater collected directly in clean containers does not need purification, but it should be purified if it has touched another surface. Snow and ice should be melted using a fire or body heat before drinking; eating it directly can lower your core body temperature.

Bodies of water

Flowing water from rivers or streams is typically safer than lakes, ponds, and stagnant water. Saltwater can be put into a solar still to remove the salt and should never be consumed directly.

Groundwater

Water is available in many places by just digging a hole in the ground and allowing water to seep in. You can find groundwater in dry environments by looking for green vegetation, valleys, low areas, or dry riverbeds.

Plants

Plants can provide water when no open sources are available. Look for green bamboo, vines, or coconuts for easy access to water, but be sure to positively identify the plant before consuming. You can extract water from other plants by placing them into a solar still.

Dew can be collected from plants in the early morning using a cloth or piece of clothing to soak up the water.

Only collect dew from plants you can positively identify as safe (non-toxic).

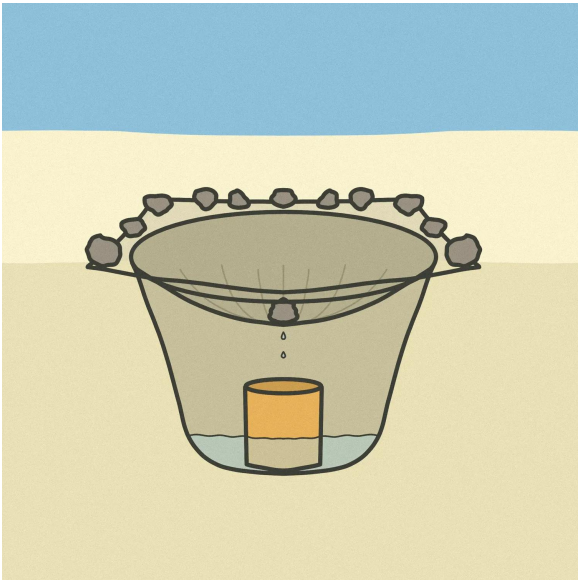
Solar stills

Solar stills produce small amounts of water and are best used as a supplement.

Below-ground solar still

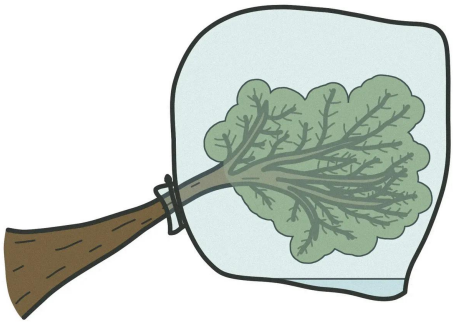
A below-ground solar still is a simple device that uses the sun's heat to draw moisture from the soil or plants. The moisture then condenses on a plastic sheet and can be collected in a container.

1. Dig a bowl-shaped hole about 3 feet (1 meter) across and 2 feet (0.6 meters) deep. Ensure it is in direct sunlight.
2. Place a container in the center of the hole. Optionally, place plants or water around the container to increase moisture (do not place them in the container). You may need to weigh down or secure the container to ensure it doesn't float if you are pouring water into the hole.
3. Place a plastic sheet over the hole, securing the edges with rocks or soil. You can use a clear bag if you don't have a sheet.
4. Place a small rock in the center of the sheet directly over the container.
5. Wait for the sun to heat the ground and evaporate moisture, which will condense on the plastic and drip into the container.



Transpiration bag

A transpiration bag is a plastic bag tied around a leafy branch of a tree you have identified as safe (non-toxic) to collect water.



1. Tie a plastic bag around a leafy branch, ensuring that the bag is airtight.
2. Wait for the sun to heat the plant, causing moisture to evaporate and condense on the bag.
3. Collect the water that has condensed inside the bag.

Making Water Safe to Drink

Always ensure the water you collect is safe to drink. Boiling is the most reliable method, but chemical purification tablets and filters are also effective. If you cannot purify the water immediately, prioritize finding and storing water until you can treat it.

Boiling

Bring water to a rolling boil for at least one minute. At higher altitudes (above 6,500 ft / 2,000 m), boil for three minutes. If you do not have a single-walled metal container that can be used for boiling, then do the following:

1. Find another container, dig a hole in the ground and line it with a waterproof material, or craft a bowl.
2. Fill the container with water.
3. Heat rocks in a fire and place them in the water to heat it. **Do not** use rocks that may contain moisture (such as river rocks), as they can explode. Use two sticks in a chopstick fashion to move the rocks.
4. Replace the rocks with hot ones to keep the water boiling.

Filtration

Use a portable water filter to remove contaminants. Some filters are rated to remove nearly all bacteria and can be used without additional purification. Custom-crafted filters are less effective and require additional purification.

A filter will have an inlet and an outlet, and it typically shows the direction of water flow with an arrow or text (inlet to outlet). Place the inlet into the dirty water and the outlet into a container, then pump to filter the water. If you are using a filter straw, the inlet goes into the water and the outlet into your mouth. Be careful never to let the outlet come into contact with unfiltered water. After filtering, you can remove the inlet from the water and pump a couple of times to push out excess water. With a straw, forcefully blow into it to clear out water.

If the manufacturer's instructions are different, be sure

to follow them instead.

Chemical treatment

Chemical water purification tablets or drops can be used to treat water. Be sure to follow the instructions, which are normally printed on the package. The most common chemical is iodine, but chlorine-based treatments are also available. Before deciding which to buy, research how effective they are against bacteria and parasites in your region. Treatment amounts and times vary by chemical type and brand. Be sure to check the expiration date (if any) before going on a trip.

If you are pregnant or have thyroid problems, don't use iodine. Always read the warnings on the packages of chemical purification solutions before buying them.

Here are some general steps (if you have the manufacturer's instructions, use them instead):

1. Fill a bottle with water. You may want to run the water through a filter or cloth to remove sediment.
2. Add the correct amount of tablets/drops and put the cap on loosely (see below for popular brands).
3. Wait 5 minutes and shake. Be sure some water leaks out of the cap and around the threads.
4. Tighten the cap and wait for the purification time (see below for popular brands).
5. Your water is now ready to drink.

Here are some instructions taken from popular brands as of 2025:

Potable Aqua (Iodine):

- 2 tablets per liter
- Purification time: 30 minutes
- Additional instructions (optional): After waiting for the purification time, add 2 neutralizer tablets

per liter, shake, and wait 3 minutes. This will help improve the taste.

Potable Aqua (Chlorine):

- 1 tablet per liter
- Purification time: 4 hours
- Additional instructions: Use an opaque container or keep the bottle in the dark.

Aquatabs (Chlorine, 49mg)

- 1 tablet per 0.75-2 liters
- Purification time: 30 minutes
- Additional instructions: Use 2 tablets if the water is dirty, cloudy, stained, or cold.

Conversions

The following conversions are approximate, but that is fine for purification.

- 1 liter = 1 quart
- 1 liter = 1000 milliliters
- 1 quart = 32 ounces
- 1 gallon = 4 quarts

Solar disinfection

As a last resort, you can use sunlight to purify water in a clear water bottle.

1. Fill a clear water bottle with water. If the water is cloudy, run it through a filter or cloth first.
2. Remove the label from the bottle and lay it on its side in direct sunlight. If you have something dark, place it underneath the bottle to increase its effectiveness.
3. If it is sunny, most germs will be killed in 6 hours. If it is cloudy, you will need to wait 2 days - so consider using a different purification method.

Hazards

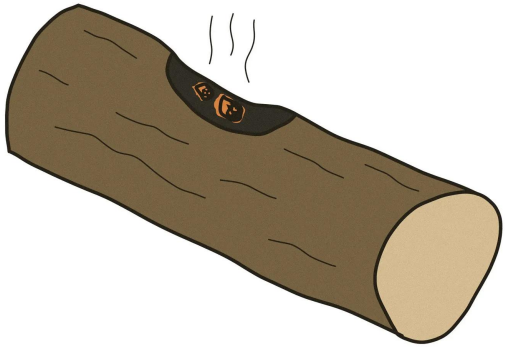
Water may contain bacteria, viruses, and parasites that can cause illness. Boiling water kills most microorganisms, but some may require additional treatment. Microorganisms are more likely to be present in stagnant water.

Water may contain chemicals from industrial or agricultural runoff. Purification methods may not remove all chemical contaminants. Avoid drinking water next to roads, farms, or other inhabited areas.

There may be terrain or wildlife hazards present at water sources; always be aware and cautious. Avoid slippery areas, loose rocks, or patches of soft ground while gathering water.

Craft: Bowl

A wooden bowl can be used to boil water using hot rocks.



Resources

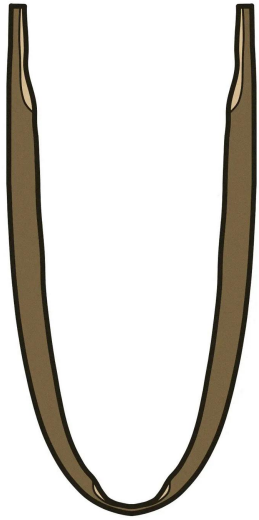
- A small log (not decayed)
- Hot coals

Instructions

1. Cut or obtain a small log.
2. Place hot coals into the log using makeshift tongs.
3. Let the coals burn out. You can speed this up by blowing gently on the point where the coal touches the log and holding it in place with a stick.
4. Scrape out the charred wood with a stick or rock.
5. Repeat the process until you have a bowl.

Craft: Tongs

You can use tongs to move around hot coals or rocks without getting burned.



Resources

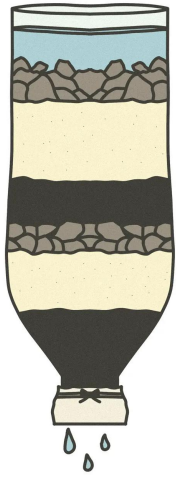
- Green (live) wood

Instructions

1. Cut a length of green wood.
2. Split the wood down the middle to create a flat surface.
3. Optionally, carve a small notch in the stick's center to allow it to bend more easily.
4. Bend the wood in half to create tongs. If the wood is not bending easily, either remove more material or heat the section you want to bend over a fire (do not burn it) and try again.

Craft: Filter

A crafted filter can be used to remove sediment from water, but it will still require additional purification.



Resources

- Small gravel or grass
- Sand
- Charcoal
- Plastic water bottle or container
- A second container
- (Optional) Cloth
- (Optional) Cordage

Instructions

1. If using a water bottle, cut off the bottom and remove the cap. You will be using the bottle upside down.
2. Tie a cloth onto the top of the bottle. If you choose

not to use a cloth, poke holes in the cap and screw it back on. If using a container like a cup, poke holes in the bottom, then add some grass or rocks to the container.

3. Add 1 inch (2.5 cm) of crushed charcoal to the container.
4. Add 1 inch (2.5 cm) of sand to the container.
5. Add 1 inch (2.5 cm) of gravel or grass to the container.
6. Repeat steps 3-5 until the materials reach about 2 inches (5 cm) from the top of the container.
7. Pour water into the filter and collect it in a second container.
8. Purify the filtered water by boiling or using chemical treatment.

Fire

Knowing how to make fire can help you stay warm, purify water, and cook food.

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Be Prepared

Gear

Necessities:

- Firestarter (lighter, waterproof matches, or fire steel)
  - You can carry a credit-card-sized Fresnel lens in your wallet or phone case as an emergency backup firestarter.

Optional:

- Tinder (charcloth, dryer lint, cotton balls soaked in petroleum jelly, or commercial fire starters)

Knowledge and skills

Start by learning how to do the following:

- Build a fire using multiple fire starters (matches, lighters, fire steel)
- Gather and prepare tinder, kindling, and fuel
- Maintain a fire
- Extinguish a fire
- Build a fire in wet conditions

Once you have mastered these skills, you should learn how to do the following:

- Protect a fire from wind and rain
- Construct and use a bow drill
- Make charcoal

Preparing a Fire Site

You should prepare the fire site before attempting to start a fire. Choose a flat, dry area protected from the wind that is close to your shelter and your fuel supply. If you are sheltered near a large rock, cliff, or embankment, lay out your fire so that it is on the opposite side of your shelter from the rock face. This will reflect more heat onto your shelter.

Clear the ground of flammable material and, if possible, line the area with dry rocks, dirt, or sand. Do not construct a fire under a tree with low branches or over a root system or peat. Avoid areas with dry grass, leaves, or conifer needles nearby. In snowy environments, lay down logs to prevent the fire from touching the snow. Gather all materials before trying to start the fire.

You should also be aware of local laws and regulations,

as some areas may not allow fires.

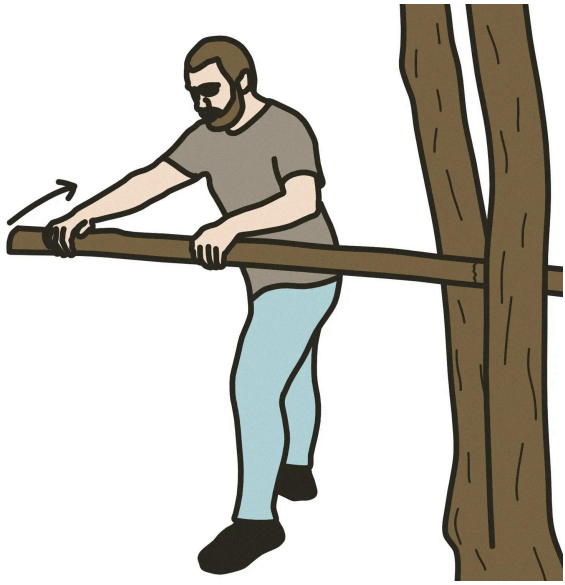
Gathering materials

You need three types of materials to start and maintain a fire: tinder, kindling, and fuel. Tinder is a dry, fine material that catches fire easily and is used to start a fire. Kindling consists of small sticks and twigs that burn easily and are used to build up the fire after lighting the tinder. Finally, fuel is used to sustain the fire and consists of larger sticks or logs. To make a fire, find about a handful of tinder, two handfuls of kindling, and a pile of fuel-double the amount you estimate you'll need.

Finding dry wood can be difficult, but look for dead branches on trees, fallen branches that aren't fully touching the ground, and sticks that break cleanly when snapped. You can dry out damp tinder by placing it near your body or in your sleeping bag, and you can dry out fuel by placing it near the fire.

- **Tinder**
  - Shredded inner bark (birch, cedar, chestnut, red elm)
  - Fine wood scrapings or shavings
  - Fatwood: resin-rich wood from pine trees, typically found at the base of dead branches
  - Dry grass, leaves, or pine needles
  - Dry powdered sap from pine trees
  - Crushed fibers from dead plants
  - Seed down (cattail, milkweed, thistle)
  - Feather sticks (wood shavings attached to a stick)
  - Commercial fire starters
  - Cotton balls (preferably soaked in petroleum jelly)
  - Lint
  - Paper
  - Tinder fungus or chaga

  - Dry rotted wood (found in dead standing trees and downed logs)
- **Kindling**
  - Sticks and twigs (pencil to finger thickness)
  - Thinly split wood
  - Plastics, such as straws or spoons (only in an emergency; these release fumes that you shouldn't breathe in)
  - Wood soaked in a flammable liquid such as bug spray or hand sanitizer (use caution)
- **Fuel**
  - Prefer fallen wood that you can break by hand over wood that requires cutting
  - To break a larger piece of wood, insert it between two live trees at the point you want to break it and push it to the side until it snaps, as seen below.

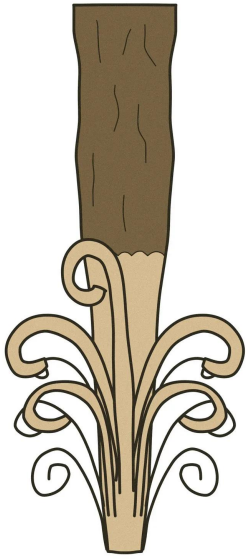


Feather sticks

A feather stick can be used as tinder and kindling to help start a fire when other tinder is hard to find.

To make a feather stick:

1. Find a straight, thick, dry stick.
2. Starting near the top, use a knife to shave a long, thin wood curl away from the stick, but try not to cut it completely off.
3. Repeat this process, but cut along the ridge created by your last cut. Be careful not to cut off the previous curls.
4. Gather any curls that fell off. You can still use them as tinder.
5. To start a fire, follow the next section using the feather stick as your tinder bundle.

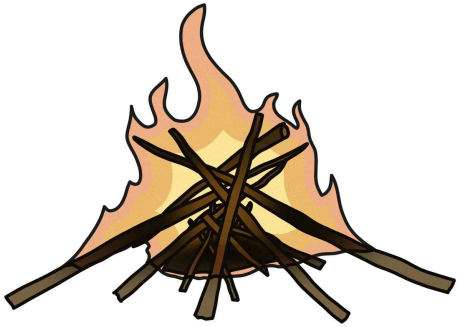


Starting a Fire

Once you have a site prepared and a sufficient supply of tinder, kindling, and fuel, you are ready to start the fire. As you build up the fire, be careful to always leave a section with open flame exposed so as not to smother it. Also, avoid adding damp or green wood until your fire is hot and you have an established bed of coals.

Here are the steps you can follow to get it going:

1. Place the tinder into a small bundle or nest on the ground.
2. Lean a few pieces of kindling against the tinder in a teepee shape.
3. Light the tinder.
4. Carefully add kindling to the fire and gently blow into the base to encourage growth. When blowing into a fire, be gentle and take breaths away from the smoke.
5. Once your fire is steady, add fuel while maintaining a teepee structure.



Nursing an ember

An ember is a small piece of tinder that is smoldering but has not formed a flame. Once you have an ember, gently blow into it and feed it more tinder until a flame appears. Sometimes, it is easier to hold the tinder containing the ember and cup your hands closer together to find the right balance of oxygen, fuel, and heat.

Lighter

A reliable lighter is the easiest way to start a fire. Use the striker to produce a flame and use your hand to shield it against any wind. Put the flame to the tinder to ignite it, and then shut off the lighter. When lighting tinder at ground level, hold the lighter horizontally and twisted so that the flame is above the striker wheel and your fingers. If it takes you more than a couple of seconds to ignite the tinder, then it is not fine or dry

enough.

Some lighters require that you add fuel before use, so be sure to try out your lighter before you need it. The fuel should last a long time-even years with moderate use. If your lighter is out of fuel, you can still use the striker wheel to generate sparks to catch very fine tinder.

A lighter generally does not work when wet, but you can dry it quickly by gently rubbing the striker wheel against your clothes in the opposite direction that you would strike it and forcefully blowing into the striker area.

You can also remove the child safety device from the striker wheel to more easily dry the lighter or use it in the cold. To do so, point it away from your eyes (the safety is spring-loaded) and use a knife or multi-tool to pry it off. **Do this at your own risk.**

There are also electric/arc lighters available, but they are less reliable and require a charge. They can be used in a similar fashion to regular lighters but typically require smaller and finer tinder.

Matches

Matches typically require a special striking surface to light, though strike-anywhere matches exist and can be lit using a rough rock. Regular matches will not work when wet or in wind, but waterproof and stormproof varieties are available.

To light a fire with matches, light the match and use your hand to shield it against any wind. Hold the lit match so that the head is slightly below the level of the matchstick to allow the flame to burn longer. Put the flame to the tinder to ignite it and carefully drop the matchstick into the flame.

Fire steel

A fire steel or ferrocerium rod is durable and works in all weather conditions. You can scrape it quickly with a sharp edge, such as the back of your knife, a dedicated scraper, or even a sharp piece of quartz or flint. You should avoid using the blade of your knife to prevent dulling it. If you are having trouble keeping the tinder in place while striking, pin the tinder between the fire steel and the ground and scrape toward the tinder. Some people also find it easier to keep the scraping edge stationary and pull the fire steel up/away from the tinder to produce sparks.

Some fire steels come with a magnesium block, which you can scrape into the tinder before striking to help catch a spark. Create a small pile of shavings, about the size of a pebble, before trying to ignite it.

Camp stove

Most camp stoves require another ignition device, such as a lighter, but some may have a built-in piezoelectric igniter. Always place the stove on a flat, stable surface that will not catch fire (such as a rock). Be sure to read the manufacturer's instructions before using it.

To use a fuel canister stove:

1. Ensure the valve is turned off (generally, turn clockwise).
2. Screw the stove head onto the canister.
3. Place the stove on a flat surface and ensure it is stable.
4. Expand the pot holders on the head if needed.
5. Open the valve slightly (turn counterclockwise).
6. Ignite the gas and adjust the valve as needed.
7. Once you're done, turn the valve completely off (turn clockwise). Wait for it to cool down before detaching the canister and storing it.

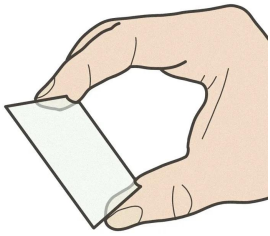
To use an alcohol or solid fuel stove:

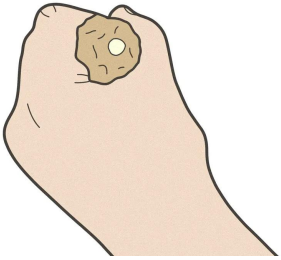
1. Place the stove on a flat surface and ensure it is stable.
2. Fill the stove with fuel.
3. Ignite the fuel.
4. Once you're done, gently place the lid on the stove (don't tighten it). Wait for it to cool before tightening the lid and storing it. If using a solid fuel stove, you may need to wait for it to burn out.

Magnifying glass/lens

Using a lens, focus sunlight into a small point on the tinder. As the tinder starts to smoke, gently blow into it and adjust the lens closer to maintain a small point. A magnifying glass, prescription glasses, a Fresnel lens, or even a clear bottle filled with water can work. This

may take a while, and direct sunlight is required.





Flint and steel

Strike a flint rock with a carbon steel tool to create sparks and ignite very dry and delicate tinder. Stainless steel-and therefore most pocket knives-will not work. If you find yourself here, it may be best to focus on insulation and shelter to stay warm.

Drills

You can create friction by spinning a stick like a drill on a wooden base (fireboard). A hand drill is simple to construct, as it's just the drill stick, fireboard, and your hands. A bow drill is more complicated to build but is easier to use to create an ember. Both of these methods are difficult to master and require a lot of practice. If you find yourself here, it may be best to focus on insulation and shelter to stay warm.

To create a bow drill:

1. Find a small, flat stone or piece of hardwood with a small depression near the center to create the socket.
2. Create the drill by finding a straight, dry stick about 10-12 inches (25-30 cm) long and ¾ inch (2 cm) in diameter.
3. Find a flat, dry piece of softwood for the fireboard. Yucca, tamarack, aspen, balsam fir, basswood, poplar, cypress, cottonwood, alder, red cedar, and willow are preferred. Avoid resinous woods like pine.
4. Carve a slight depression about ½ to ¾ inch (1-2 cm) from the edge of the fireboard.
5. On the underside of the fireboard, make a V-shaped cut from the board's edge to the depression.
6. Find a curved stick that can be used for the bow. It should be about 12-14 inches (30-35 cm) long and ½ inch (1 cm) in diameter.
7. Attach a cord or shoelace to both ends of the bow.
8. Find the fire pan - a flat piece of bark or wood to catch the ember.
9. Wrap the drill into the bowstring so that it can roll as it moves along the string.
10. Place the fireboard on top of the fire pan so the V-shaped notch is touching it.
11. Place the drill (attached to the bow) into the depression in the fireboard.
12. Place the socket onto the top end of the drill and apply downward pressure with your non-dominant hand.
13. Place your foot on the fireboard (on the same side as your non-dominant hand) and rest the hand holding the socket on your knee.
14. With your dominant hand, move the bow side to side to cause the drill to spin. Be sure to use the full length of the bowstring. Keep a steady, fast

pace.

15. You will start to see smoke after a while. Keep going until you are sure an ember has been created.
16. The ember should be transferred onto the fire pan (it may already be there) and moved to a tinder bundle, where you can nurse it into a fire. If you have charcloth, put it in the fire pan.

If you are using a hand drill, follow the same steps as the bow drill, except don't create the bow and socket. Instead, roll the drill between your palms until you reach the bottom, then start again from the top. Use a longer stick as the drill to provide more room for your hands to spin it before resetting.

Extinguishing a Fire

You should always have a plan to quickly extinguish your fire in case it begins to spread. Thoroughly extinguish your fire by dousing it with water and/or covering it with dirt. Make sure no embers remain that could reignite or cause a wildfire. If you are on a beach, do not cover the fire with sand; it can insulate the heat and cause burns. Don't leave an active fire unattended.

Increasing Warmth

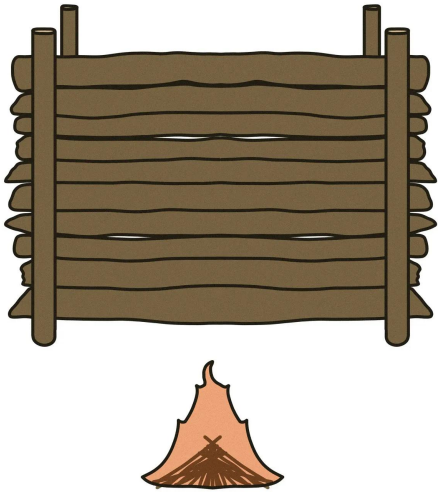
To maximize the heat from your fire, you can add more dry fuel, build a fire reflector, heat up rocks, or increase the insulation of your clothing and shelter.

Types of wood

Hardwoods (oak, maple, ash, beech, etc.) burn slow and hot, while softwoods (pine, fir, spruce, cedar, etc.) burn fast and cool (but still very hot). Once you have a hot fire going, start adding hardwoods to make it last longer and burn hotter.

Fire reflector

A fire reflector is a wall built behind the fire to reflect heat toward you and protect the fire from wind. Use rocks, logs (preferably green or waterlogged), or snow to create a barrier.



Building a second reflector behind you will help reflect even more heat. You can also use an emergency space blanket or umbrella for this reflector.

Heating rocks

You can also heat rocks **near** the fire and place them in your shelter or sleeping area, or bury them under your bedding. To avoid burns or fires, don't let the rocks get too hot; they should be warm to the touch. Be sure to check how hot the stones are before touching them. Do not use rocks found near water sources, as they can explode in a fire. Alternatively, you can heat water and place it in a container or bottle to keep warm.

Craft: Charcoal

Charcoal is made by preventing wood from completely burning. It can be used for filtering water, medicine, and as fuel for fires. You can grind charcoal into powder by placing it in a container and crushing it with a stick or rock.

Resources

- Wood
- Water or dirt

Instructions

1. Burn a fire down to coals.
2. Douse the fire with water or dirt to quickly extinguish it.
3. Wait for the coals to cool; some charcoal should be among the ashes. Charcoal is very light and entirely black.

Food

Food gives you energy but is a low priority in most survival situations since you can go weeks without it. If you haven't eaten in a while, focus on foraging for bugs, shellfish, and aggregate berries.

This chapter is for informational purposes only and does not replace professional advice; use at your own risk and ensure compliance with local laws.

Be Prepared

Gear

Necessities:

- Food (enough for the duration of your trip, plus a bit extra). Don't bring food you have never eaten before. Some good options can include:
  - Nuts
  - Seeds
  - Dried fruit
  - Jerky
  - Energy bars
  - Dehydrated meals (with extra water)
  - Canned food (with a can opener if needed)

- Knife or multitool with a knife blade
- Bear bag or canister (for overnight stays)

Optional:

- Cooking pot or container
- Utensils (a spork is a good option)
- Cooking stove and fuel

Knowledge and skills

Start by learning how to do the following:

- Plan your meals for a trip.
- Cook food by boiling or roasting over a fire.
- Use a bear bag or canister to protect your food.

Once you have mastered these skills, you should learn how to do the following:

- Identify edible plants and mushrooms.
- Find and catch insects, shellfish, crustaceans, fish, and other animals.
- Preserve food.
- Make traps.

Food Essentials

Caloric and nutritional needs

The average person needs around 2,000 calories per day. Balance carbohydrates, proteins, fats, vitamins, and minerals in your diet.

- **Carbohydrates**: Provide an immediate source of energy and are found in grains, fruits, and vegetables. Aim for 45-65% of your daily caloric intake.

- **Fats**: Provide long-term energy and are used in essential bodily functions. They are found in meats, oils, nuts, and seeds. Aim for 20-35% of your daily caloric intake.
- **Proteins**: Build and repair tissues and are found in meats, legumes, nuts, and seeds.
- **Vitamins and minerals**: Essential for overall health and are found in most foods, but a varied diet is necessary to ensure you get all the essential nutrients.

Storage

Food should be stored in airtight containers to prevent spoilage and contamination. Do not pack foods that spoil quickly or require refrigeration. If you bring zipper storage bags, you can also use them for water procurement.

Rationing

If you are in a survival situation, ration your food to make it last longer. Eat two-thirds of your food in the first half of your survival situation (about 2-3 days after your expected return date) and the remaining third in the following days. Eating food will give you the energy to construct a shelter and plan.

Starvation

Starvation occurs when the body does not receive enough nutrients to function correctly. Symptoms include loss of body fat, difficulty breathing, feeling colder, fatigue, and increased healing times. You are not likely to experience this unless you are going more than a week or two without food.

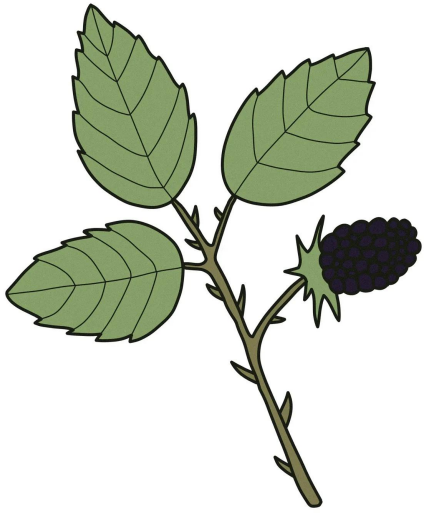
Plants and Mushrooms

Plants typically contain fewer calories than animals but can be easier to obtain if you can identify them. If you can't identify which plants are safe, just focus on bugs and shellfish. You should also avoid mushrooms unless you are experienced in foraging, since many can make you sick. Familiarize yourself with local plants and mushrooms before your trip.

Foraging

The safest plants to forage are aggregate berries, such as raspberries and blackberries, since they have a distinctive look and are generally edible. Nuts and seeds are higher in calories than leafy greens, but some nuts, such as acorns, require multiple rounds of boiling to remove bitterness. Also, just because you see an animal eating a plant doesn't mean it is safe for human consumption. Never eat a plant you aren't certain is edible; even if you are certain, only eat a small amount and be on the lookout for side effects.

Here's an example of what an aggregate berry looks like (brambles):



The following should be avoided as the risk isn't worth the calories:

- Mushrooms
- Plants that have:
  - Umbrella-shaped flowers
  - Milky sap
  - Shiny leaves
  - White, yellow, or red berries (except aggregate berries)
  - Beans, bulbs, or seeds inside pods
  - Pungent odor
  - An almond/cyanide scent in the leaves or wood
  - Bitter or soapy taste
  - Thorns, hairs, or spines
  - A three-leaved growth pattern
  - Mildew or fungus
- Plants that look like dill, carrot, parsnip, or parsley
- Spoiled plants/mushrooms/seaweed
- Anything growing alongside a road or in dirty

water

Preparation

All plants you gather should be washed and cooked. Many can be eaten raw, but if you have the means to cook them, it will be safer to avoid the risk of contamination.

Insects

Insects are a good source of protein but need to be gathered in large numbers to provide a substantial meal. If you don't want to eat insects, you can use them as bait for fishing or trapping.

Collection

Good places to find insects include rotting logs, under rocks, and in grassy fields. If you are looking for earthworms, you can use a stick to dig small holes in the ground, check the surface after rain or at night, or clear the leaf litter out of an area. At night, many flying insects can be attracted to a light source. Common edible bugs include ants, termites, locusts, grasshoppers, crickets, dragonflies, grubs, and worms.

Do not eat the following:

- Biting or stinging insects
- Hairy or brightly colored insects
- Insects with a pungent odor
- Hairy caterpillars
- Spiders
- Anything that feeds on blood, such as ticks, flies, and mosquitoes

Preparation

To prepare bugs for cooking, remove any stingers and, optionally, the legs, wings, and head before eating. You should cook all bugs before eating them to be on the safe side, but in a pinch many can be eaten raw. Worms can be placed in water for 15 minutes to purge their digestive tracts before cooking. If you can't bring yourself to eat a worm, try completely drying it in the sun or roasting it and then grinding it into a powder.

Shellfish and Crustaceans

Shellfish and crustaceans are good sources of protein and can be found in both freshwater and saltwater. They are relatively easy to catch, making them good survival food sources.

Collection

Search shallow waters, tide pools, and rocky areas for shellfish and crustaceans. Snails and limpets are often attached to rocks, which may be easier to access during low tide. Crayfish, lobsters, and crabs can be found under and around stones, in soft mud or sand, and may be more active at night. Crustaceans can be caught by attaching bait onto a line (no hook required; they'll grab it), baiting the shoreline and waiting for them to leave the water, or using a fish trap with bait.

Some shellfish may be poisonous. Be especially cautious of mussels in tropical waters during the summer, any shellfish within three days of a red tide, or shellfish not covered by water during high tide.

Preparation

You should cook all shellfish and crustaceans before eating. You can cook them in their shells. For crustaceans, remove the digestive tract (gray/green), gills (gray, feathery), and hard shells before eating.

Fish

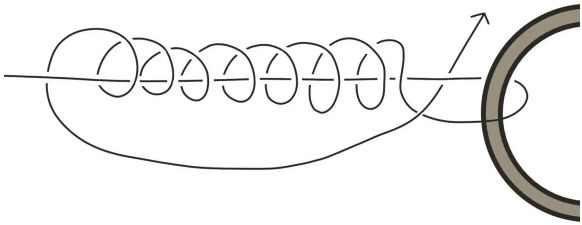
If you are in a longer-term survival situation or have access to fishing gear, fish can be a good source of protein and nutrients. Most fish are edible, but research which fish may be dangerous in your area.

Fishing

Fish are most active before a storm, near rocks or logs, and under overhanging brush. In hot weather, fish tend to be in shaded or deep water, while in cold weather, they prefer shallow and sunny areas. In rivers, look for areas where the water is slow or still. The best time of day varies by species, so you may have better luck fishing at multiple points during the day. Many fish are more active around dusk and dawn.

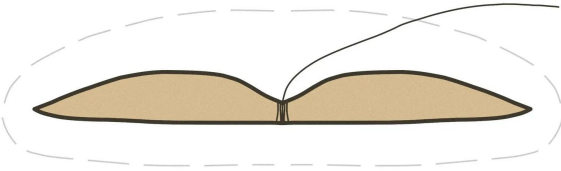
Hook and line

Fishing with a hook and line is likely your most familiar technique. You will need to secure a hook onto a line and optionally tie it to a pole. You can use the following knot to tie the hook to the line. Use a wet finger to help tighten it to the hook.



Hooks with barbs are usually more effective than barbless hooks at keeping fish on the line. For best results, bait the hooks using insects, worms, or pieces of food. Make sure that any bait on the hook is securely attached; if using a worm, thread the hook through the worm's body.

If you need to craft a hook, go with a gorge hook since it is easy to make and doesn't need to be set manually. Fish caught with a gorge hook are more likely to die if released, so it should only be considered in a true survival situation (many places ban gorge hooks). To carve a gorge hook, sharpen both sides of a small section of wood or bone and taper it at the center. Place the hook into the bait.



If you do not have fishing line, you can make it from plant fibers, inner strands of paracord (using a bend knot to join them together), or other strong cordage.

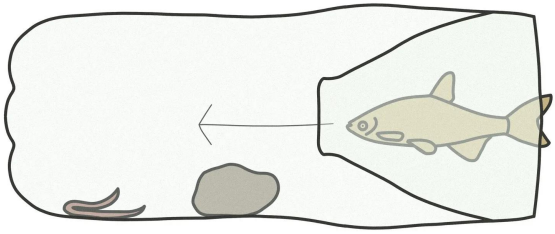
If you do not have a fishing pole, you can tie the line to both the base and tip of a sturdy stick-try to mimic what an actual fishing pole looks like. You can also wrap the line around a short stick and use it as a hand line. An easier technique may be to tie the line to a tree branch so you can do other things and check it frequently.

Traps

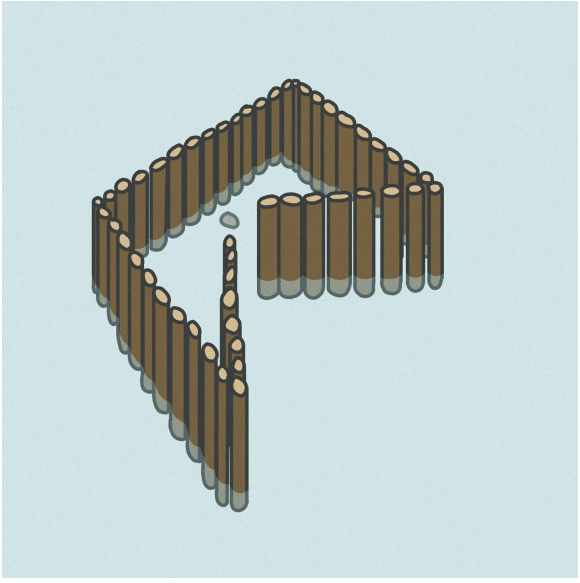
Traps are a passive way to catch small fish or crustaceans with little effort required. Be sure to check your traps every few hours.

You can construct a bottle fish trap by cutting off the cap and top quarter of a spare water bottle. Bait the trap with food and use a small rock to weigh it down. Place the top inverted into the rest of the bottle and place it in shallow water. If needed, you can tie a string to the

bottle to allow for easy access.



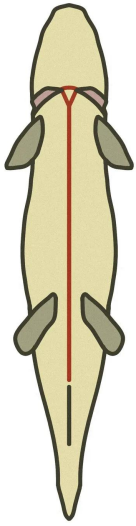
Alternatively, you can construct an M-shaped funnel trap by hammering sticks into the bottom of the stream or other shallow water to form a small entrance and walls. This can be built using the shore as a back wall to reduce effort. Small fish will swim into the trap and be unable to find their way out.



Preparation

1. Once you catch a fish, bring it away from the shoreline. Do not hold or place it near the water before killing it, as it may flop back in.
2. Stun the fish by hitting it hard on the head (top of the head, right behind the eyes) with a club or rock. Then use a knife to cut the gills or pierce the brain to ensure it is dead.
3. (Optional) Remove scales by scraping them off with a knife (tail to head).
4. Cut open the belly and remove the entrails. You can also cut off the head and tail to make this easier.
5. (Optional) Cut the fish into usable pieces or fillet it.
6. Cook the fish.

Cutting pattern to remove entrails (red line):



Other Animals

In a survival situation, it's best to focus on easier-to-catch animals like insects, shellfish, crustaceans, and fish. But if you have the means to catch other animals, they can provide a good source of protein and nutrients. Unless you are a hunter with proper gear, do not try to hunt large animals.

Hunting

Clubs

A club can be as simple as a stick with a heavy end. This can kill or stun fish or other small animals with a quick, forceful blow to the head.

Spears

A spear can be made by sharpening a stick. Unless you have experience, it's best to stab with the spear rather than throw it. To make it easier to hit your target, you can construct multiple spear points using a forked branch.

Throwing sticks and rocks

In a pinch, you can throw a heavy stick or rock to kill or stun small animals. Aim for the head to ensure a quick kill.

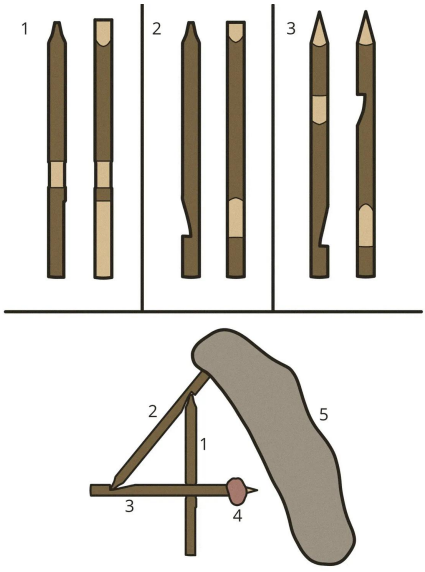
Trapping

Traps allow for the passive capture of small animals. They can be set up and left alone while you perform other tasks. Check them every few hours. Look for signs of animal activity like tracks, droppings, or chewed vegetation. Set up traps in areas where animals are likely to pass through. You can construct funnels or walls to guide animals into them. Baiting the traps can increase their effectiveness. Smoking the traps can help mask your scent.

Deadfalls

Deadfall traps work by dropping a heavy object on the animal when it triggers the trap. The trigger is released when the animal takes the bait, causing the heavy object to fall. Place one or more of these traps near your shelter to catch mice.

To avoid getting injured while setting the trap, support the rock/log using your knee or free hand until the trap is set. Be ready to quickly pull your hand away if it begins to fall.



1. Support stick (front / side)
2. Release stick (front / side)
3. Bait stick (front / side)
4. Bait
5. Rock

Birds

Birds are most easily caught at night when roosting, or you can eat eggs from nests. Use a club, throwing stick, or rock to kill or stun the bird.

To prepare a bird for cooking:

1. Pluck feathers. To make this easier, place the bird in boiling water. Optionally, you can skin the bird, but that removes some fat.
2. Cut open the body cavity and remove the entrails.
3. For larger birds, cut off the feet and separate the bird into usable pieces along the joints.
4. Cook the bird.

If you catch a seabird, skin it instead of plucking the feathers to remove the oil glands. If you catch a scavenger bird like a vulture, boil it for at least 20 minutes to kill parasites.

Reptiles and amphibians

Reptiles and amphibians are easier to catch than mammals and birds. Many can be found basking in open ground, on logs, or at the water's edge. Use a multi-pointed spear or pin them down with a stick behind the head.

Always wash your hands after handling reptiles and amphibians, as they can carry salmonella. Cook the meat thoroughly.

Do not eat the following:

- Box turtles
- Hawksbill turtles
- Brightly colored frogs
- Frogs with an X on their back
- Tree frogs
- Toads
- Salamanders
- Snakes: they are edible but may be dangerous to catch
  - If you kill a snake, cut off and bury its head before cleaning. Never touch the head with your hands; use sticks instead.

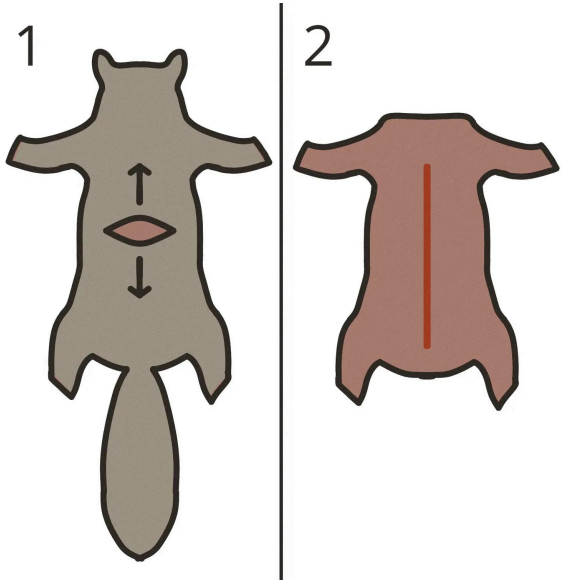
Small mammals

Small mammals can be caught using traps, clubs, throwing sticks, or rocks.

To prepare a small mammal for cooking:

1. Make a cut on the back and pull the fur and skin off. You may need to sever the head and feet.

2. Flip it over and cut open the abdominal cavity and remove the entrails. Be careful not to puncture the intestines.



This guide does not cover the preparation of large mammals, as they are challenging to catch and require a lot of energy to process.

Cooking

Do not try to preserve the food you catch; just cook and eat it. If possible, prepare, cook, and consume your food some distance downwind of your shelter to avoid attracting animals to your camp.

Boiling

Boiling preserves the most nutrients in food and is the safest cooking method. A metal container filled with water can be suspended over a fire or placed onto hot coals. Drinking the broth once it is cool enough will give you more nutrients. See the Water chapter for more information on boiling.

Roasting

Roasting is a quick and easy cooking method, but the food is less nutritious than other methods. You can roast food on a stick over a fire or place it over hot coals or on dry rocks heated by the fire.

Baking

You can wrap food in green, edible leaves or clay and place it in the coals of a fire to bake it. This method is slower than roasting but preserves more nutrients. Do not skin fish or birds packed with clay; the skin will stick to the clay and can be removed after cooking.

Utensils

If you are packing utensils, a spork is a good option. Otherwise, you can handle food with a stick or your hands. Be sure to wash your hands before and after eating.

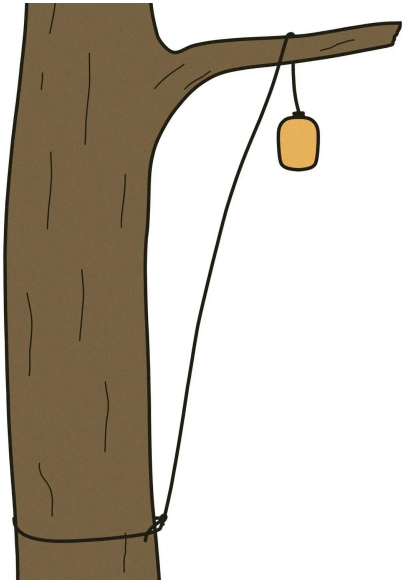
Protection

You may need to protect your food from animals. Here are some methods to keep your food safe:

Bear bags

A bear bag is a bag of food hoisted into a tree to keep it out of reach of bears and other animals. Find a tree with a branch about 20 feet (6 meters) off the ground and thick enough to support the weight of your food at about 10 feet (3 meters) from the trunk. This tree should be 20-70 yards/meters downwind from your shelter.

1. Place food in a bag.
2. Tie a rope to the bag.
3. Throw the other end of the rope over a branch. To give the line weight, attach a short stick to the end of it. Secure the stick with a clove hitch or jam knot.
4. Hoist the bag about 15 feet (4.5 meters) above the ground.
5. Tie the rope to a tree to keep the bag elevated. Use either a hitch or bowline knot.



See the Shelter chapter for details on how to tie knots.

Bear canisters

A bear canister is a rigid plastic container used to store food. It is bear-proof and can be left on the ground. Some campsites may provide a large metal bear box for storing food.

Ideally, the location where you leave this container should be 20–70 yards/meters downwind from your shelter. You may find tooth or claw marks on the canister in the morning, and it may be some distance from where you left it. Using brightly colored stickers on the outside may help you find it.

Navigation

Being able to navigate in the wilderness can help prevent you from getting lost in the first place or allow you to find your way back to safety if you go off-trail.

This chapter is for informational purposes only and does not replace professional advice; use at your own risk and ensure compliance with local laws.

Be Prepared

Gear

Necessities:

- Map
- Compass
- Flashlight/headlamp

Optional:

- GPS device

Knowledge and skills

Start by learning how to do the following:

- Navigate with a map and compass.
- Plan a route.
- Set declination on a compass.
- Determine your location on a map.
- Measure distances on a map.
- Read a topographic map.

Once you have mastered these skills, you should learn how to do the following:

- Use a GPS device for navigation.
- Utilize advanced navigation techniques, like using the sun and stars.
- Take a detour.

Route Planning

When planning a route, choose one that matches your skill and fitness levels, using a topographic map to gauge terrain difficulty. Use the map to identify landmarks, like stream or river crossings, natural formations, or trail intersections, along the way to help you stay on track. Also, be sure to identify water sources, alternative routes, and the direction to roads or towns.

Movement

Moving carefully and adapting to the terrain are important preventions you can take against injury or getting lost. In general, keep your body weight balanced over your feet, watch where you step, and take frequent breaks to rest. Stay on the designated

trails at all times and be cautious of animal trails; they may lead to resources like water but can also get you lost.

Trekking poles or a walking stick can be beneficial for some people, especially in rough terrain or if you have knee problems. You can check if you are using the correct-height pole by making sure you have a 90-degree bend at your elbow when the pole is touching the ground.

Mountains

The steep slopes of mountainous terrain can tire you out or injure your joints, so be extra vigilant about taking breaks. To make it easier to follow uphill trails, walk in a zigzag path; this pattern will increase the distance you travel, but it will be less steep. When descending, maintain a bend in your knees to protect your joints. If you are climbing a tall mountain, take your time so that you can acclimate to higher altitudes without getting sick.

Snow

It can be taxing to travel in snowy conditions, and you don't know for sure what you are stepping on; the snow may be hiding a patch of ice, a hole, or water. You can use a pole or stick to test ice and snow before stepping. Avoid walking on frozen bodies of water unless you know the ice thickness. If you have snowshoes or skis, use them to help prevent your feet from sinking into the snow.

Watch out for areas prone to avalanches. They are usually marked and typically occur on slopes between 30° and 45°.

Desert

Deserts are typically hot and dry, with potentially cold nights, so be prepared by bringing appropriate clothing and extra water. Avoid traveling during the hottest part of the day and stick to areas of shade if possible. Due to the lack of visual features, paths in a desert may appear shorter than they actually are. If you are carrying electronic devices, be sure to protect them from extreme heat and direct sunlight.

Jungle

Jungles feature dense vegetation, high humidity, and frequent precipitation. Move with the vegetation rather than against it to conserve energy, and focus on distant landmarks rather than nearby objects to maintain your direction. The dense canopy makes it harder for search parties to find you, and GPS devices may not be reliable. Always wear protective clothing to avoid insect bites and stings, and treat any wounds or scratches promptly to prevent infection.

Night

If you can avoid traveling at night, then it is best to remain where you are. If you have to travel, use a flashlight or headlamp to illuminate your path while moving slowly and carefully to avoid accidents. Use your hearing to identify helpful environmental cues like running water or distant roadways that can aid in orientation.

Rivers and streams

When crossing rivers or streams, search for the narrowest section or areas where the water splits into multiple channels. Whenever possible, use bridges, fallen trees, or rocks as crossing points, but be cautious of slippery or loose surfaces. Avoid crossing where

currents are strong or near ledges. Anytime you cross a river or stream, unbuckle your backpack and carry it in front of you to prevent being pulled underwater by its weight if you fall.

In emergency situations, following a river downstream may eventually lead to civilization, as many settlements are built near water sources.

Coastal

Coastal regions typically feature tides, cliffs, and rocky or sandy beaches. Do not walk on beaches without footwear, as there may be buried glass or other sharp objects. To avoid getting trapped during high tide, be sure to consult tide tables before your trip and keep track of the time. See the Weather chapter for help predicting tides.

Detours

If there's an obstacle in your path, you may need to take a detour. To do this, find a feature to navigate to on the other side of the obstacle, then turn 90 degrees and walk to the end of the obstacle. Once there, turn back 90 degrees to your original heading and pass the obstacle. Then, turn 90 degrees again and walk to the feature you picked out. Finally, turn 90 degrees one more time to resume following your original bearing.

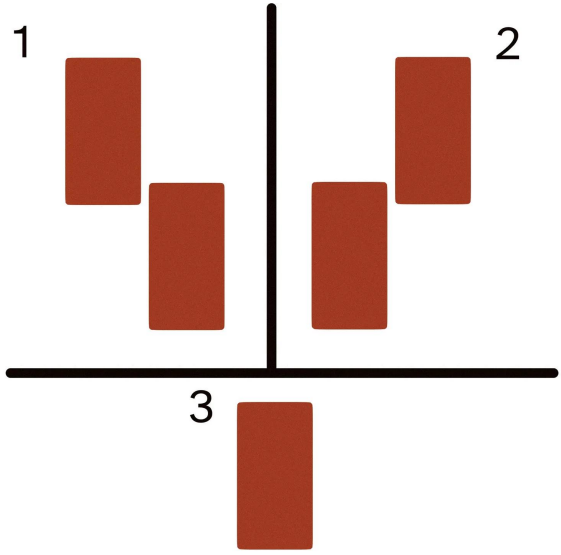
Trail Markers

Trail markers indicate where the trail is and distinguish one trail from another. Many methods are used to mark trails, and there is no universal standard.

Blazes

Blazes are painted symbols on trees or rocks. Typically, they are rectangles, squares, circles, triangles, or crosses. In most places, each trail is painted with a different color and/or shape of blaze.

Some blazes may also indicate the trail's direction, but this may not apply everywhere.



1. **Two blazes, top blaze to the left**: Continue to the left
2. **Two blazes, top blaze to the right**: Continue to the right
3. **One blaze**: Continue straight

While not always true, the color and/or shape of the blazes should match what appears on a map, except that white blazes are typically black on a map. If a trail is new, it may have small plastic strips or flags tied to a tree instead of a blaze.

Cairns

Cairns are piles of rocks, typically used in places without large trees to blaze. Cairns are usually placed on the side of the trail, and you should be able to see multiple cairns at a time. In some places, cairns may be small stacks of stones (typically 3) and can be hard to locate.

Signs

Trail signs provide information about which trail you are on, distance/direction to points of interest, or offer general information/alerts. Always read and abide by trail signs.

Blockers

In some places, downed trees or debris are intentionally placed in front of a path to indicate it should not be used.

GPS

A GPS device can help you determine your location and navigate to a specific point, but always have a backup plan in case the device fails. A dedicated hiking GPS unit is typically more durable than a smartphone, but a smartphone with a GPS or maps app is sufficient.

Location

A GPS uses satellites to determine your location. Ensure the device has a clear view of the sky so it can receive signals. Most GPS units display your coordinates in latitude and longitude, which can be plotted on a map.

Waypoints

A waypoint is a specific location you want to navigate to. You can enter waypoints into your GPS to guide you to your destination. Most devices allow you to enter waypoints before your trip, but you can also add them as you go. Place waypoints frequently so you can backtrack if necessary.

Battery

Your GPS device may run out of battery, so carry extra batteries or a portable charger to keep it powered.

Digital maps

If your GPS supports digital maps, download maps of your area in advance to navigate even if you lose the signal.

Compass

A compass helps you determine direction and is essential for navigation, especially with a map. Do not use the compass around metal objects, as it will cause the reading to be inaccurate. If you are using a digital compass on a smartphone, it will need to be calibrated by rotating your device in a figure-8 pattern (the pattern may vary by device).

Directions

You may see directions indicated in symbols, words, or degrees (0° to 360°). Here are some common directions you may encounter:

- North (N): 0° or 360°

- Northeast (NE): 45°
- East (E): 90°
- Southeast (SE): 135°
- South (S): 180°
- Southwest (SW): 225°
- West (W): 270°
- Northwest (NW): 315°

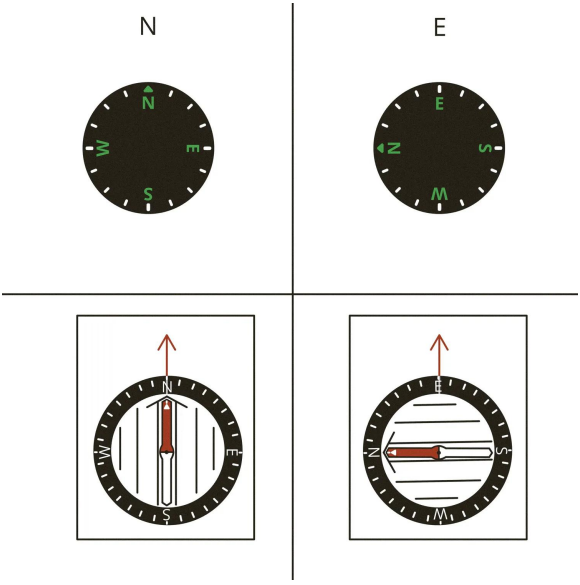
Bearings

A bearing is the direction you must travel to reach a specific point. Determining your bearing will depend on the type of compass you are using. On most compasses, either the whole dial or a needle will rotate to face north.

Dial compasses (button, dial, lensatic, digital) have a circular plate that features printed direction indicators and tick marks. Hold the compass flat and in front of you. The direction on the plate that is facing forward is your bearing.

Needle or baseplate compasses have a rotating needle, with one side normally painted red to indicate north. The directions are printed onto a bezel that you can rotate by hand, and you may see a wide arrow under the needle that rotates with this. There is usually an arrow or line on the housing that doesn't move. Hold the compass flat and in front of you with the fixed arrow pointed away from you. Rotate the bezel until the north side of the needle aligns with the wide arrow below it or north on the dial (they are the same). The direction right behind the arrow is your bearing.

You can use the image below to see how to read the direction on your compass.



If you know which direction you need to go, rotate yourself until you are facing that bearing. You can avoid having to keep your compass out by identifying a prominent feature in the distance and walking to that.

Back bearings

A back bearing is the opposite direction of your current bearing. To calculate a back bearing: if your bearing is less than 180 degrees, add 180. If it's more than 180, subtract 180. On a compass, the back bearing is directly across from the bearing.

To use a back bearing to navigate, you need to take a bearing before hiking out. Keep this bearing written down or memorized, and as long as you didn't drastically change direction, following the back bearing will lead you close to your starting location. Every time you make a turn, you should record a bearing.

Declination

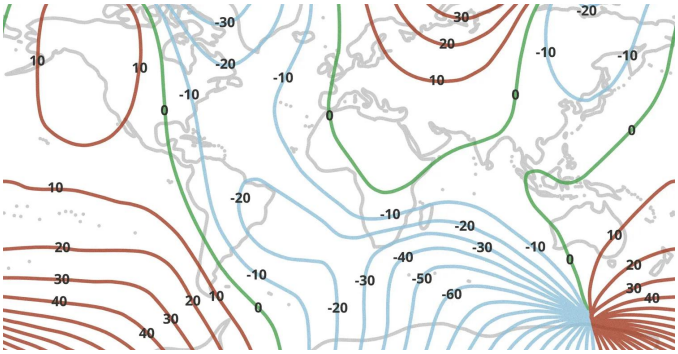
Declination is the difference between magnetic north (usually shown as MN) and true north (usually shown as TN or a star symbol) and is usually shown on the map as two arrows and a degree. Your map is likely aligned with true north. If your compass has a declination adjustment, rotate it to match the arrow and you are all set to compare bearings between the compass and the map with no additional adjustments. Otherwise, you will need to adjust for declination manually using the following techniques: To convert from a reading on your compass to a reading on the map, add the declination to your compass reading. To convert from the map to the compass, subtract the declination. If the magnetic north arrow is drawn to the left of the true north arrow, the declination amount is negative. For example, if your map lists 10° of declination:

- A compass bearing of 20° would be 30° on the map (20° + 10°).
- A map reading of 30° would be 20° on the compass (30° - 10°).

On rare occasions, a map may be oriented to grid north (GN) rather than true north. These maps list a second degree amount, which is the difference between true north and grid north. Add this amount to the declination to orient your compass to the lines on the map.

Declination changes over time, so if you are using an old map, you should look up the current declination amount for your location.

Here's a declination map for 2025:



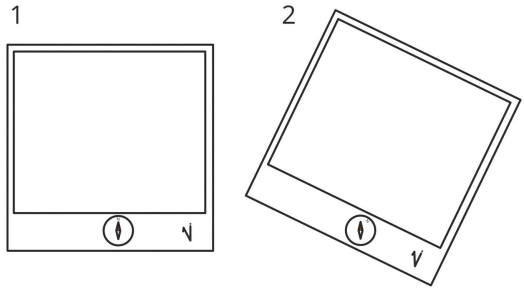
Map

A map is a key tool for navigation, especially when paired with a compass.

Orientation

You can orient a map to point north using a compass:

1. Place the compass on the map with the direction of travel arrow pointing toward the top of the map.
2. Rotate the map and compass together until the compass points north. The image below shows what the map will look like if your compass is adjusted for declination (1) or if you need to align with magnetic north instead (2).

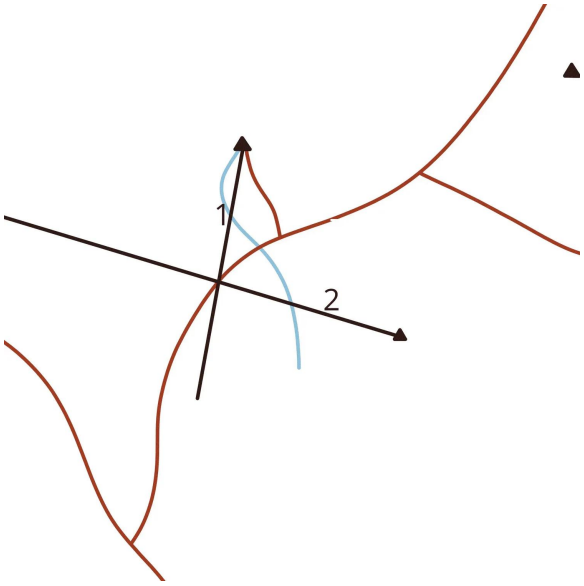


Determining location

To determine your location on a map, identify prominent features around you and match them to the map. Use a compass to determine your direction and align the map accordingly.

To triangulate your location:

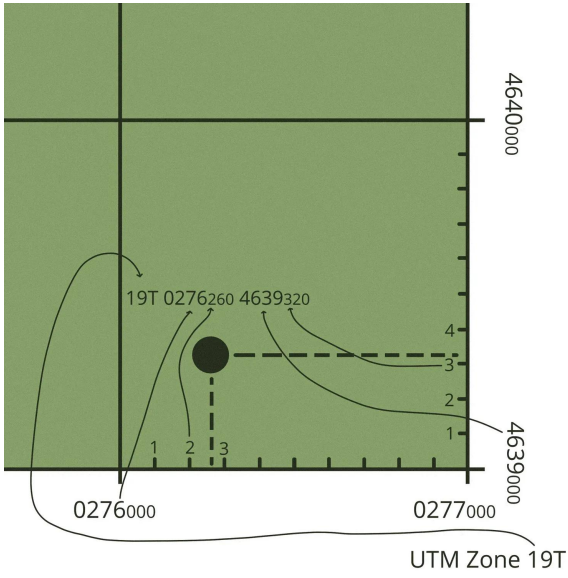
1. Orient the map to point north using your compass.
2. Identify and mark two prominent features around you on the map.
3. Measure the bearing to each feature using your compass.
4. Draw lines from each feature in the direction of the bearing on the map.
5. The point where the lines intersect is your location.



To get your GPS coordinates on a map in UTM (a very common coordinate system):

1. Find the UTM zone number, which is a one- or two-digit number followed by a letter (for example, "16T").
2. Locate the Easting and Northing values on the map's borders. They are usually marked and can have 3 to 6 or 7 digits. Add three zeros if there are only 3 digits (e.g., 123 becomes 123000). Easting will be on the top or bottom; Northing will be on the left or right.
3. Look at the grid lines on the map to identify the grid zone where your location is. These lines represent the first digits of your location (e.g., 123000E and 234000N).
4. For increased precision, divide the grid into 10 equal sections vertically and horizontally. Determine which line your location is closest to within the grid. Use a ruler for accuracy. For example, if your location is two-tenths to the right

and one-tenth up from the bottom-right corner of the grid, your new location will be 123200E and 234100N.



You can follow those steps in reverse to transfer a GPS coordinate onto your map. Just be sure to set your GPS coordinates to match the map's coordinate format.

If your map does not have UTM grid lines, you can still follow the same approach using the coordinate values on the sides of the map. Some systems may use decimal places instead.

Scale

Maps are drawn to scale, allowing you to determine distances between points. Usually, there is a bar on the map that indicates the scale, and you can use a ruler, string, or your finger to measure distances using it on your map. Maps may list the scale as text, such as 1 inch = 1 mile, which means that every inch you measure

on your map with a ruler is 1 mile on the actual terrain. You may also see a ratio listed, such as 1:10000, which means every inch on the map is 10,000 inches in the real world.

Topographic maps

Topographic maps show elevation changes and terrain features, making them helpful in navigating mountainous or hilly areas. Contour lines indicate elevation; the closer the lines are, the steeper the terrain. Elevation markers on contour lines help identify peaks and valleys.

1. Peak
2. Cliff
3. Ridge
4. Depression
5. Valley

Typical map colors include:

- **Black**: Structures
- **Red**: Roads
- **Green**: Vegetation
- **White**: Lack of vegetation
- **Brown**: Contour lines
- **Blue**: Water

Estimating Distance

When navigating, it's often important to keep track of how far you've traveled. If your GPS or phone supports distance tracking, that will be the easiest approach. If you don't have that, you can either measure distances on a map or estimate the distance using your paces or average speed.

When estimating distances, you may want to deal with a range of possible estimates rather than calculating a single value. For example, calculate your distance with a speed of 1.5 mph and 3 mph to get a lower and upper bound on the distance you traveled. You can do the same with the pace method by choosing a lower and a higher pace length than your average.

Paces

A pace is the distance you cover with every full step with the **same foot**, which can be used to estimate how far you've traveled. The length of a pace (called stride length) varies by person, terrain, and the weight of your gear, so it is important that you get a good estimate of your stride length across a variety of conditions. To estimate your stride length, do the following:

1. Measure a fixed distance with your desired terrain; 100 yards/meters is typically a good length.
2. Put on your loaded backpack if needed.
3. Walk this distance and count how many paces it takes you.
4. Divide the distance by the number of paces (for example, 100 yards / 130 paces = 0.77).
5. Repeat steps 3 and 4 several times and calculate the average pace for a better estimate.

Once you know what your pace length is, you can

estimate distance traveled by keeping count of your paces and multiplying it by the pace length (for example, 130 paces × 0.77 yards per pace = 100 yards).

If you have a smartphone with a pedometer or step counter app, you can use that to estimate distance. Typically, these apps will convert your steps to a distance.

To help you estimate, here's the distance traveled using the average stride length of 0.78 yards (0.71 m):

- 200 paces ≈ 156 yards (143 m, 0.09 mi, 0.14 km)
- 500 paces ≈ 390 yards (357 m, 0.22 mi, 0.36 km)
- 1000 paces ≈ 780 yards (713 m, 0.44 mi, 0.71 km)

You can keep track of the count by putting a small pebble in your pocket every 100 yards/meters. When you have 10 pebbles in your pocket, remove them all and place one pebble into your other pocket. The pebbles in your second pocket will represent 1,000 yards/meters and will reduce the number of pebbles you need to carry.

Your stride length will likely be shorter on difficult terrain or in bad weather.

Average speed

A simpler method of estimating how far you've traveled is to use the average hiking speed multiplied by the time spent hiking. You can calculate your hiking speed by timing how long it takes you to hike a trail of known distance and then dividing the distance by time. The average person hikes at around 2 mph (3.2 km/h) on flat terrain, but this can vary based on fitness level, terrain, and load.

To calculate the distance traveled using this method, multiply your average speed by the time spent hiking in hours. For example, if you hiked for 15 minutes and

have an average speed of 2 mph, then you would do 0.25 hours × 2 mph to get 0.5 miles.

To help you estimate, here's the distance traveled using an average speed of 2 mph (3.2 km/h):

- 15 minutes ≈ 0.5 miles (0.8 km)
- 30 minutes ≈ 1 mile (1.6 km)
- 1 hour ≈ 2 miles (3.2 km)

Advanced Direction Finding

You can use the sun or stars to determine direction without a compass. If you need this, it's best to stay where you are and signal for help with the methods mentioned in the Overview chapter.

Sun/Moon

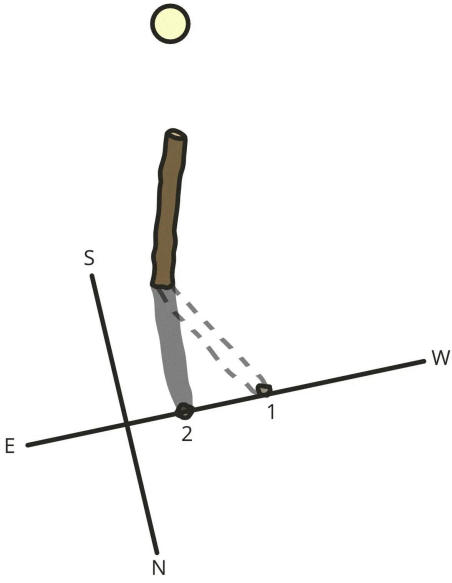
In the early morning, the sun will be close to the east, and in the late afternoon, it will be close to the west. The same applies to the moon at moonrise and moonset. During the day, the sun will be in the southern half of the sky in the Northern Hemisphere and in the northern half in the Southern Hemisphere.

Shadows

If you measure which way shadows are moving over time, you can determine direction. This is because the Sun moves east to west throughout the sky, and therefore shadows move in the opposite direction.

1. Place a stick vertically in the ground and mark the shadow tip.
2. After 15-30 minutes, mark the new position of the shadow tip.

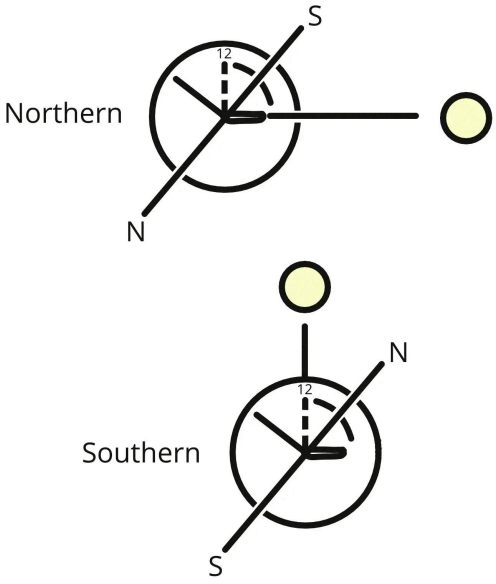
3. Draw a line between the two points for an east-west line. West will be in the direction of the first point.
4. Draw a line at a right angle to the east-west line. South (or north in the Southern Hemisphere) will point toward the sun.



Time

You can determine your direction using the position of the sun and the current time. This will be a rough approximation, but it's better than nothing. Point the hour hand of an analog watch at the sun; south is roughly halfway between the hour hand and 12 o'clock in the Northern Hemisphere. In the Southern Hemisphere, point the 12 o'clock position at the sun, and north will be roughly halfway between the 12 o'clock position and the hour hand. If on daylight saving time, use 1 o'clock instead of 12; daylight saving time is usually during the summer for the regions that

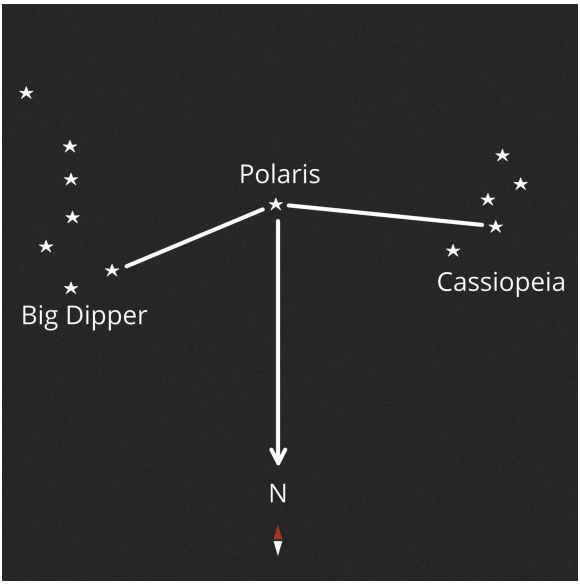
follow it, but this may vary.



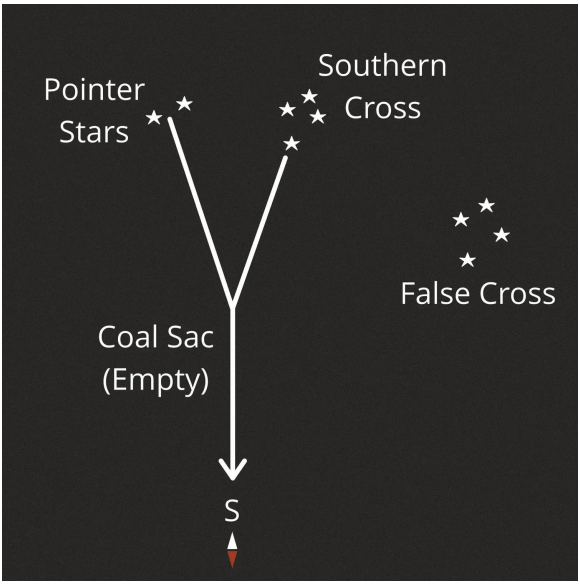
Stars

Being able to identify a handful of constellations will help you determine direction at night. The constellations may appear to be rotated in the sky depending on the time of night (they rotate around the celestial poles), so if you don't immediately spot them, try looking for a rotated version of the constellation.

In the Northern Hemisphere, identify Polaris (the North Star) using the Big Dipper and Cassiopeia as reference points. Polaris is directly to the north.

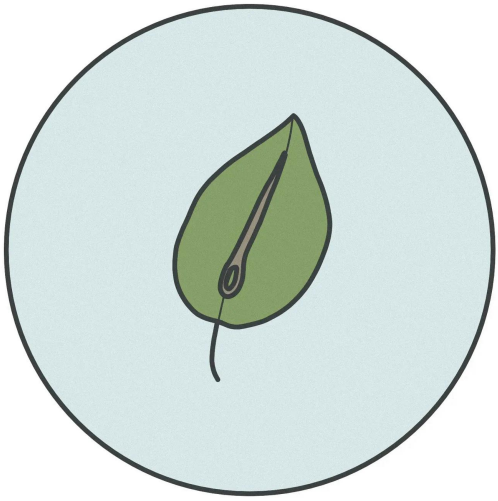


In the Southern Hemisphere, you can use the Southern Cross to determine south. Extend a line from the top and bottom stars of the Cross's long axis, continuing about 4.5 times the distance between these stars toward the horizon to approximate the South Pole. This method is more difficult than the one used in the Northern Hemisphere.



Craft: Compass

You can craft a makeshift compass by magnetizing a needle and floating it in water.



Resources

- Needle
- Knife
- Leaf or bottle cap
- Water

Instructions

1. Magnetize the needle by stroking it with the knife in one direction (to avoid dulling the blade, use the back of the knife). Stroke at least 50 times.
2. Place the needle on the leaf/cap and float it in water. The needle will slowly align to the north-south axis. Ensure no currents or wind could affect the needle.

Weather

Weather can quickly change from a nice day to a life-threatening situation. You should always be prepared for the weather in your area and keep tabs on the forecast.

This chapter is for informational purposes only and does not replace professional advice; use at your own risk and ensure compliance with local laws.

Be Prepared

Gear

Necessities:

- 7-day weather forecast
- Appropriate clothing and shelter for the weather (see the Shelter chapter)
- Poncho
- Sunglasses

Optional:

- Barometer
  - Many smartphones have barometers but require an app to use them

- Thermometer

Knowledge and skills

Start by learning how to do the following:

- Read a weather forecast.
- Deal with different types of weather.
- Identify signs of worsening weather.

Once you have mastered these skills, you should learn how to do the following:

- Identify signs of improving weather.
- Forecast weather based on observations.
- Understand your region's climate.
- Predict tides.

Weather

Weather conditions can change rapidly and significantly impact your outdoor activities. In mountainous regions, take extra precautions when above the tree line, as weather can be more severe and you are more exposed to the elements.

Precipitation

You can generally continue outdoor activities in light precipitation. However, if it starts precipitating heavily, seek shelter. During heavy rain, rivers and streams can rise rapidly, and flash floods are possible. Precipitation can also lead to hypothermia, so be aware of the risks and take steps to stay warm and dry.

Blizzards can lead to whiteout conditions, severely reducing visibility. If caught in a blizzard, seek shelter immediately and stay warm and dry.

Temperature and humidity

In cold weather, dress in layers and wear a hat and gloves to prevent heat loss. Stay dry, as wet clothing can cause you to lose body heat more quickly.

In hot weather, stay hydrated and take breaks in the shade. Wear sunscreen and sun-protective clothing to protect yourself from sun exposure. High humidity can make it feel hotter and make cooling off more difficult.

Temperature decreases by about 3.5°F (2°C) for every 1,000 feet (305 meters) of elevation gain. If you are hiking in a mountainous region, it may be warm at the bottom, but be prepared for cold, windy temperatures at the top.

Wind

Wind can make cold conditions feel even colder, increasing the risk of hypothermia and frostbite. Dress in layers and wear a hat and gloves to protect yourself from the wind. During windstorms, unstable trees and branches can become hazardous. You should be extra cautious when the wind speed is above 20 mph (32 km/h). Wind can cause sandstorms in desert environments, reducing visibility and making breathing difficult. Seek shelter during a sandstorm and protect your eyes and mouth with a bandana or cloth. In coastal environments, winds can lead to dangerous surf conditions such as high waves or rip currents.

Prevailing winds are winds that blow consistently in one direction over time. While local geography and bodies of water can affect wind patterns, general patterns for the following latitudes are as follows:

- 60° N to 90° N: Winds generally blow from the east.
- 30° N to 60° N: Winds generally blow from the west.

- 0° to 30° N: Winds generally blow from the northeast.
- 0° to 30° S: Winds generally blow from the southeast.
- 30° S to 60° S: Winds generally blow from the west.
- 60° S to 90° S: Winds generally blow from the east.

These directions also indicate where the weather will most likely come from. For example, if you are at a latitude of 40° N and see a thunderstorm to the west, it will likely arrive at your location soon.

Fog

Fog reduces visibility, making navigation difficult. If hiking in fog, stay on marked trails and use a map, compass, or GPS to navigate. Watch your footing carefully, as the fog can lead to slippery conditions.

Lightning

If caught outdoors during a thunderstorm, seek shelter immediately. Avoid staying in or near open fields, peaks, ridges, tall trees, water, cave entrances, and fences or poles. If you are in a forest, stay near lower trees. Tents do not protect you from lightning. If you're in an open area and can't take shelter, stand, crouch, or sit on your pack or sleeping pad with your feet together.

If you feel your hair stand on end or hear a crackling noise, you are in imminent danger of being struck by lightning.

You can estimate how far away a thunderstorm is by counting the seconds between a flash of lightning and the sound of thunder. Divide the number of seconds by 5 to get the distance in miles. One mile is about 1.6 kilometers. Any storm within 6 miles (10 kilometers) is a threat.

Sun

Wear sunscreen, sun-protective clothing, and sunglasses on days with a high UV index. In hot climates, stay hydrated and take breaks in the shade. If there is snow on the ground or you are on the water, wear sunglasses to prevent snow blindness.

Smoke

Wildfires can cause smoke to travel long distances, appearing as a haze. If possible, avoid outdoor activities on days with poor air quality.

Climate

The climate of a region refers to its average weather conditions over time. You should look up the average daily high and low temperatures, how often it rains or snows, what the humidity normally is, and where the prevailing wind blows from. You should prepare for conditions to return to the climate normals in a longer-term scenario, so if it is unusually warm during your hike but the average low is below freezing, bring cold-weather gear with you. During a dry season, you should be extra cautious about starting a fire and plan for scarce natural water sources.

Forecasting

You can learn to forecast weather by observing the signs around you. The more signs you notice, the more accurate your forecast will be.

Signs of worsening weather

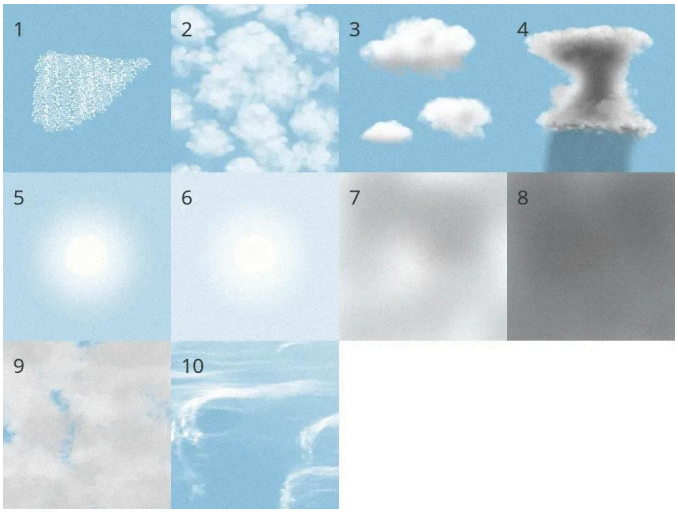
- Cloud cover increases
- Clouds start growing vertically (into an anvil shape)
  - This indicates a thunderstorm
- Clouds darken
- Clouds move quickly
- Clouds lower
- Wind speed increases
- Temperature suddenly drops
- Barometric pressure drops
  - Faster drops may indicate more severe weather
- Wind direction changes to be opposite the prevailing wind
- Animals become quiet
- Humidity increases
- You see lightning or hear thunder
- You smell rain

Signs of improving weather

- Cloud cover decreases
- Wind speed decreases
- Temperature rises
- Barometric pressure rises
- Wind direction changes to match the prevailing wind
- Animals become active
- Humidity decreases

Clouds

Identifying the cloud type can improve your ability to forecast weather.



1. **Cirrocumulus**: High-level clouds that form a wavy sheet. The sheet is composed of small dots that almost look two-dimensional. They may indicate precipitation in the next 8 to 12 hours.
2. **Altocumulus**: Mid-level puffy clouds that look like cotton balls. They are typically white with darker patches below and can be spaced out or sheet-like. They may indicate precipitation or a thunderstorm in the next 12 hours.
3. **Cumulus**: Low puffy clouds that look like cotton balls. They are spaced out and are typically white with darker patches below. Usually they indicate fair weather, but if they are growing taller, then precipitation or a thunderstorm could be possible in the next few hours.
4. **Cumulonimbus**: Low puffy clouds that are very tall. They typically have an anvil shape and are dark. They may indicate a thunderstorm in a few minutes.
5. **Cirrostratus**: A high cloud that covers the sky. It is transparent and typically causes a halo to form around the sun. It may indicate precipitation in

the next 10 to 15 hours.

6. **Altostratus**: A mid-level cloud that covers the sky. The sun can barely be seen as a bright patch. It may indicate precipitation in the next 8 hours.
7. **Stratus**: A low cloud that covers the sky. Objects don't cast shadows, and it may be foggy. It may indicate fair weather for the next few hours if it is foggy; otherwise, it may indicate precipitation soon.
8. **Nimbostratus**: A mid-level cloud that is dark gray and covers the sky. If it is not raining, it may be a stratus cloud. It may produce precipitation for the next few hours.
9. **Stratocumulus**: Low clouds that look like a sheet of cotton balls with small gaps. The color ranges from white to dark gray. They may indicate fair weather for the next few hours.
10. **Cirrus**: High wispy clouds that look like tufts of white hair. They may indicate precipitation in the next 12 to 24 hours.

Tides

Tides can affect outdoor activities near the coast. Check the tide tables before heading to the coast. Tide tables can be found online or in local newspapers.

This map shows the tide types around the world. Green is semidiurnal, blue is mixed, and orange is diurnal.

Semidiurnal tides

Semidiurnal tides have two high tides and two low tides each day. If you know the time of high tide, the next low tide will be about 6 hours later, and the following high tide will be about 6 hours after that.

Mixed tides

Mixed tides are a type of semidiurnal tide, but the heights of the high and/or low tides vary throughout the day.

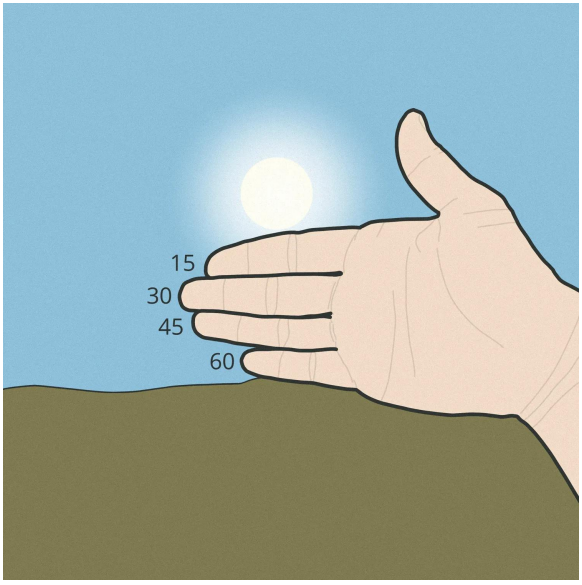
Diurnal tides

Diurnal tides have one high tide and one low tide each day. If you know the time of high tide, the next low tide will be about 12 hours later, and the next high tide will be about 12 hours after that.

Night

You can estimate the time until sunset by holding your hand horizontally with your fingers together and counting the number of finger widths between the sun

and the horizon. Each finger width represents roughly 15 minutes.



Navigating in the dark is not recommended; if necessary, use a flashlight or headlamp to light your way. On nights with a nearly full moon, you can use the moonlight to help navigate.

If you are in a mountainous region, it may get dark sooner if you are on the eastern side of the range.

Conclusion

If you practice survival skills before you are in a survival situation, you can increase your chances of returning safely and feel more comfortable going on adventures. Being in a survival situation is rare, especially if you take precautions and avoid making risky decisions.

Thank you for reading through this guide. I wish you the best of luck on your adventures.