5 FIRE

Starting a Fire without a Match

"Sticks and stones may break your bones, but they also make fire!"
—Susan Purvis

Fire-building is one of the most important skills a person needs to survive in the wilderness. It's not only critical for cooking up grub and

staying warm at night, but mastering the ability also builds an outdoorsman's confidence. Knowing how to make a fire without matches is even more rewarding.

> ! *It's important to practice all these techniques under calm, controlled conditions at home before taking them into the field. Trying them for the first time in adverse conditions is a recipe for disaster. In addition, fire can not only burn or kill humans, it can destroy habitat and all the creatures that depend on it, so use it wisely.*

When I was younger I thought starting a match-free fire meant rubbing sticks together, which, at the time, seemed like an arduous task not worth the time. Years later, however, I was inspired to try it after watching a survival show on TV. While visiting my parents, who still live in the house I grew up in on Long Island, NY, I slipped into their basement and spent nearly two hours desperately rubbing two sticks together. It worked so well on the show, I thought; surely I must be doing something wrong. I was on the verge of aborting the mission when, much to my surprise, I saw smoke. At first it was a mere puff, but that grew into a cloud of smoke, which ultimately set off the smoke detectors and freaked out the entire household. Yet there was still no fire. My mission was officially terminated.

Not only did I learn that day that aloe lotion soothes sore hands, but also that there is a difference between working hard and working smart. My technique was okay, but I was using the wrong kind of wood.

Fire has been used to cook food for nearly as long as humans have walked the earth. As you might imagine, back in the day, there were no matches or lighters. Here's your chance to learn how to start a fire like a primitive man.

There is more than one way to do it and, with a bit of practice, you can be whooping up flames at family BBQs faster than your charcoal-lighter-fluid wielding Uncle Smokey. Before getting into the details, it's important to understand that three things are necessary to start and sustain a fire: oxygen, heat, and fuel. Take any of these elements away, and starting a fire is impossible.

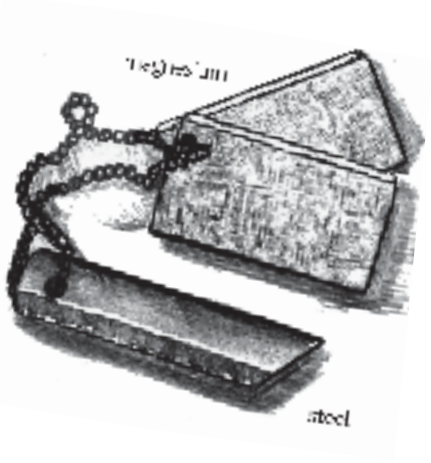
Getting Started

Tinder, such as newspaper in a fireplace, is essential to starting any fire. It's easy to find, and almost any fibrous, dry material that easily ignites should do. I've used everything from feather down to dried moss. Surprisingly, lint from my pocket worked exceptionally well.

Here are four basic ways to start a fire without matches.

Spark-Based Fire Making

Technique 1: Magnesium Steel Fire Stick



This method is so simple that using it almost feels like cheating. Anyone can master this technique the first day out. Magnesium sticks are available at local Army/Navy surplus or sporting goods stores for a few bucks and will last years. They are ideal for wet or windy conditions when matches are difficult to light. Scraping the stick creates sparks that will fall into and ignite tinder. But properly positioning the tinder is important.

STEP 1: Dig a small hole in the ground or use a flame-proof metal bowl and stack tinder in a pile, creating a "fire nest." It should contain materials as small and as delicate as you can find, things that light easily, like dry grass or leaves.

STEP 2: Grasp the magnesium stick between your thumb and forefinger, and then scrape it against the backside of a knife at a 45-degree angle, away from your body into the fire nest. Do not use the sharp blade side or it will dull your knife. Stoke the fire by blowing into the bowl where the sparks fall. Once the tinder catches, continue blowing

on it until the fire is going strong. An easy victory for sure, and no one gets kicked off the island.

Technique 2: Magnifying Glass

Use a magnifying glass to focus the sun's rays on a pile of dry leaves, grass, or tissue paper to start a fire. The more powerful the magnifying glass, the better it works. When the tinder starts glowing, blow on it to get it flaming. The finer the tinder, the better the chances are for quickly lighting a fire. (Resist the temptation to scorch innocent crawling insects with your magnifying glass, as they are a form of life and pound for pound much stronger than you. But we'll get into that in later chapters.)

Technique 3: A Glass of Water

Believe it or not, you can use a glass of water to start a fire! The wider the glass the better and midday, summer sunshine works best. Essentially, the glass of water will be used like a magnifying glass, redirecting and concentrating sunlight onto tinder. In this case, the tinder—such as a piece of paper—must be held and maneuvered into the shifting sunrays in order to ignite. Again, blow on the sparks to rev up the flames. It's a bit more challenging than the other techniques but oddly entertaining.

Technique 4: Bow Drill

Starting a bow-drill fire separates the men from the boys. This technique, which seems to be a favorite of most old-school wilderness gurus, essentially creates coal. Considered one of the most challenging survival skills to learn, mastering the method will make you feel like a competent outdoors person.

Identifying the correct materials takes a keen eye, and using them requires precision. But experts can typically get a flame in less than a minute.

STEP 1: Find the appropriate wood.

WOOD (TINDER) SUGGESTIONS

- Balsam (or Fir)
- Yucca
- Cedar
- Cypress
- Tamarack
- Basswood
- Cottonwood

Note: I've also used the base of sagebrush bushes in Idaho and Colorado.

STEP 2: Make a Bow-Drill Fire

GEAR LIST—THE BOW-DRILL SET

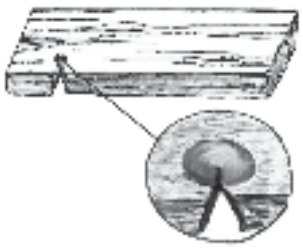
- Drill or spindle
- Bow
- String
- Fireboard
- Coal catcher
- Socket rock or smooth board
- Knife—to make notch in fireboard

MAKING BOW DRILL

1. *Drill or spindle.* Use a piece of wood resembling a pencil with sharp points on either end that can spin, creating friction and heat with another piece of wood (fireboard). It should be about the diameter of a hot dog, 12 to 15 inches long, with smooth and straight sides (without notches or cracks) to ensure consistent, uninterrupted strokes with the bow.

Note: Carve a sharper point on the end of the spindle that will drill into the fireboard. The point where the spindle meets the socket rock (used to protect your hand) should be duller to provide minimal friction.

2. *Bow.* There will be a lot of pressure on the bow, so make it from bendable yet stiff wood such as oak or pine. It helps to have a bow that has a natural curve on both ends, which keeps the bowstring away from the bow. Beginners should make a lightweight bow 1.5 to 2 feet long, as it will be easier to control and takes less strength to push back and forth.
3. *Stringing your bow.* The bowstring should be the diameter of shoestring or a little thicker. (Avoid smooth ropes made of nylon that will slip and not catch drill.) Tie the string at the end of your bow like so:



4. At the other end, wrap the string around the end four times, but do not tie it off. Remember, you are not making a bow and arrow. You will need to wrap your spindle with the string, so leave some slack in the string.
5. The block board or fireboard. Find a piece of wood that the spindle can rub against to create friction and ultimately spark coals to make a fire.

The fireboard should be uniform, smooth, dry, and large enough to be easily controlled, yet thin, about .25 inches, which will save you time in carving out the notch. The best wood will be sap-free, light, dry, and soft enough to easily dent with your thumbnail without gouging.

STEP 1: Using the spindle, create a hole in the fireboard with the tip of your knife. Make a tiny groove, just big enough for the spindle to fit into without slipping and sliding while rotating.

STEP 2: Carefully cut a narrow triangle-shaped notch into the edge of the hole with a knife. This will allow air in and coals to drop down on the tinder. The notch should be on the side of the board that faces you.

1. Coal catcher. The coal catcher is essential for catching and protecting the coals that drop through the notch on the fireboard. Use a dry leaf, sliver of wood, piece of paper, or bark.
2. Socket rock or board. A socket rock is a smooth, fairly flat rock that can serve as a hand piece that will protect the palm of your hand from heat and abrasion while you are pushing on the spindle. On my first try, I used a crushed soda can and quickly rediscovered how metal transfers heat. Ouch! Take my hot-hand advice and use a pine knot or a hard, smooth stone with which to drive you spindle. Be resourceful!

TURNING WOOD INTO FIRE!

This part of the operation is the most crucial and has to be completed within seconds to start a fire.

STEP 1: Once you have your complete bow-drill set assembled, line up all the supplies in front of you in a wind-free and dust-free area.

STEP 2: With your right hand, grab the end of your bow where the bow string is wrapped several times around the end of the bow. Use your left hand to twist the spindle into the string so that the spindle length is perpendicular to the bow. Place the drill in the bow so that the loop is on the outside of string, away from the bow. This prevents the drill from rubbing against the bow. Move the spindle toward your right thumb to secure the spindle while preparing the remaining items. Now, take a deep breath!

STEP 3: Place the fireboard under your left foot, making sure it is flat and steady. Kneel on your right knee while bringing the spindle to the fireboard with your right hand. Then, with your left hand, put your socket rock on top of the spindle.

Now you are ready to heat things up!

STEP 4: Brace your left hand firmly against your shin bone to prevent the spindle from slipping out of the notch. Apply firm downward pressure by keeping shoulders over socket and spindle.

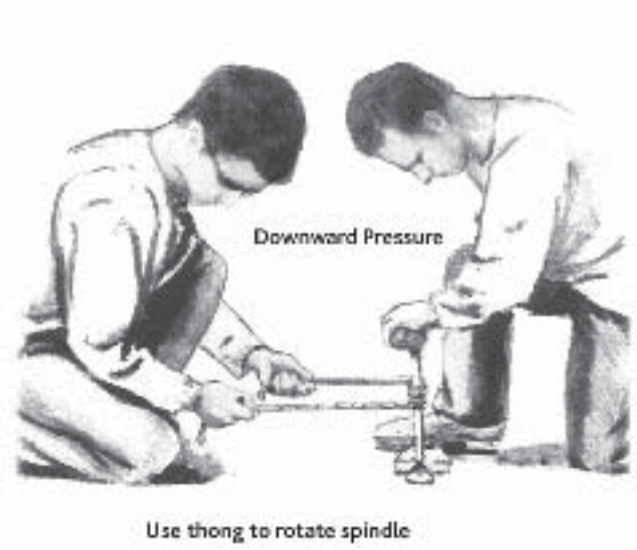
STEP 5: Make long, even strokes against the spindle, using the entire length of the bow. I like keeping my right thumb in the action by adding

or subtracting tension on the bow string. Rhythmically, move the bow perpendicular to the spindle. Use the entire length of the bow to create firm, steady strokes. Increase speed and pressure until you see smoke. Remember to breathe.

Don't stop yet! After you see smoke billow from the fireboard, continue for 20 more strokes. Phew! Carefully stop and remove your spindle from the fireboard, and take your foot off the fireboard. Expect to see black soot scattered all over; it's coal.

STEP 6: This is the motherlode. Lift the fireboard off the glowing coal. I like to use my knife blade to pick up the embers and drop them into the tinder bundle. Cup the nest in your hand, and lightly blow on it until it catches fire.

TROUBLESHOOTING: If the spindle squeaks, push it down harder while maintaining the speed of the bow!



Technique 4: Fire-Plow

Rubbing two sticks together to build a fire generally refers to using some type of a fire-plow. Since that hand-cramping day in my folks' basement, I have actually grown to love this technique. It was pretty easy to do once I had the right wood and technique.

The fire-plow is a friction method of ignition that requires rubbing a hardwood shaft against a softer wood base, such as cedar. The method

works by cutting a straight groove into the base and forcefully scraping (or plowing) the blunt-tipped hardwood shaft along the groove. Plowing releases small particles of cedar-wood fibers that ultimately ignite from the friction.

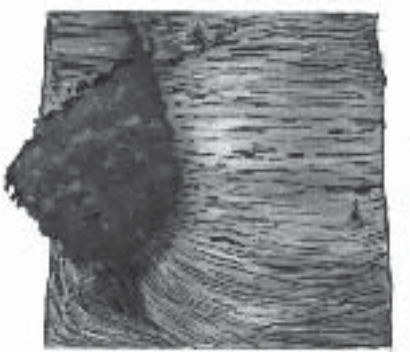
I like using cedar, ash, or walnut for the shaft because they are dense and steady. While experimenting to find your favorite wood combination, try rubbing a piece of cedar shingle and a cedar base and see what happens. You should quickly see smoke but probably no fire.

Parting Thoughts

In 1669, a German chemist named Henning Brand was intent on making gold. He theorized that since his urine had a golden hue, it must contain the mineral gold. Talk about a golden ego!

To prove his theory, he peed in his bathtub for a few days and let the urine stand for a few more, until it dried into a solid, pasty material (do not try this experiment at home!). I hope he was wearing nose plugs when he took this putrefied material and heated it to a high temperature. Much to his surprise and disappointment, he did not excrete gold-laced pee. Rather, his stinky, sticky specimen mutated into a white, waxy substance that glowed in the dark. He had discovered phosphorus, commonly used today in the flammable tip of matches. In Greek, *phosphorus* means "light bearer."

There Is a Fungus among Us: The Incredible Chaga Fungus



While the word *fungus* is more likely to evoke thoughts of mold or something between your toes than of fire, it's truly a fire-starting gem from Mother Nature with a fascinating history beyond its flammability.

In 1968, the wonders of the chaga fungus were brought to light by Nobel prize–winning author Aleksandr Solzhenitsyn. In *Cancer Ward*, a Russian country doctor named Sergei Maslennikov notes that cancer was nonexistent in patients in Muzhik who drank chaga tea daily. Research over the last 20 years has confirmed that chaga fungus can be used to treat numerous diseases, including uterine, breast, lung, cervical, and gastric cancers.

How to Use Fungus as a Fire Starter

Chaga fungus is commonly found on birch trees that have sustained injury to their bark. It is generally pretty easy to remove with a knife, and it dries quickly. When I first discovered chaga I was on a group canoe trip in the Adirondack Mountains in upstate New York. On our way to our lodge after a fun, exhausting day of paddling, we came across a huge, black bulge sprouting on a birch tree. I pried it off the tree with my pocket knife. The hardened black outer layer gave way to a crumbly reddish-brown clumpy material, resembling tightly packed coffee grounds. Back at camp, it lit immediately with a strike of a match.

It had a pleasant forest-like aroma as it started to glow, but after about an hour of being stoked by a strong wind, it grew and blazed like molten lava. The harder the wind blew, the more it radiated. We were drawn to the glowing fungi, but when bedtime rolled around, I couldn't extinguish it. Safety first! I turned it over, expecting it to smolder. Instead, it flared and flames shot out from the belly side. This thing was possessed! Try as we might, we were unable to douse its mighty flame. So we surrounded it with a tall pile of rocks, removed all flammable items from the area and went back to our cabins.

To this day, I have never found an organic material as flammable or as durable as the chaga fungus.

Starting a Fire with the Chaga Fungus

Talk to ten outdoors people and you will hear ten different ways to use chaga fungus. These are two of my favorites:

- Scrape the fungus with a knife to produce a powder. The powder is used as tinder to catch the spark.
- Hold the entire fungus off the edge of the flint or fire striker. Let the sparks hit the fungus.

Fungus 101

In 1991, the body of a well-preserved Neolithic man who died more than 5,000 years ago on an alpine glacier in Italy was found in the melting ice by a climber. Among the "Oetzi Iceman's" possessions was a leather pouch filled with well-preserved tinder fungus (in this case, *fomes fomentarius*), commonly found in the surrounding lowlands. From this extraordinary find, scientists speculated that fungus was used as natural tinder well before his time.

Really Alternative Campfire Fuels

I bet you did not know that, in addition to the chaga fungus, animal dung is another natural source that can be used for heat and warmth.

I once traveled on a medical expedition to Mount Everest Base Camp, where the stunning peaks were immediately visible upon beginning our trek, whetting our appetite for what lay ahead. The higher we hiked the more barren our surroundings became,

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and by the time we reached 13,000 feet there were no more trees—only shrubs growing near to the ground. Instead of camping out, we decided to stay in tea houses along the trail. The houses were, of course, warmer and more comfortable during rain or snow. What became immediately apparent at high altitude, however, was that oil was not readily available to heat these dirt-floored huts. The main fuel source was dried yak dung. Cracked and brittle, it was collected in fields and piled like bricks outside houses to dry and ultimately get loaded into a wood-burning stove like barbecue briquettes and doused with a bit of kerosene. And voilà—we had a fairly decent fire with a little extra smoke.

Animal dung has been used as a heating source in just about every part of the world for millennia. You don't have to go to Nepal to find and burn dung. Any grass-eating animal's poop will suffice. Whether it comes from a camel, goat, cow (cow patties), buffalo (buffalo chips), or horse (manure), the dung needs to be dried before it is burned. Because it burns a lot cooler than wood, it maintains a steady low flame that radiates as much heat as wood, so it's best to surround the fire with rocks or metal (as in a wood-burning stove) to transfer the warmth efficiently for space heating or cooking. Thankfully, it doesn't smell as bad as you might expect; it's akin to burning grass, which it mostly is.

In Egypt, local villagers make "camel dung cake" fuel using palm fronds for initial tinder. Similarly, dry grass and twigs are used for the starter. Obviously, camel dung may not be available, but this method can be adapted to use with your local brand of poop.

FYI *Camel dung as more than fuel!*

One of the better stories that I have been told regarding animal poop had to do with an unusual use of animal dung during World War II. The British Army hid land mines in piles of camel dung because German tank drivers thought it was good luck to drive over camel

dung. Personally, I would not have wanted either job! But wait, it gets worse.

During the war dung was also used for medicinal purposes. Many German soldiers fighting in the Middle East contracted dysentery (diarrhea) from consuming bacteria-filled local food and water. Since antibiotics were not readily available in those days, finding an alternative cure was essential to keep soldiers active.

Looking to local customs, German scientists noted that the regional Arabs were not immune to the deadly bacteria, either, but at the first stomach flutter, they would do the unthinkable. They sought out the nearest pile of horse or camel droppings, scooped the poop, and ate it. Yuck! But the dysentery would be gone overnight. It was an ancient tradition passed down through generations. Imagine the first one to experiment with this technique. What was he thinking?

Initially, scientists did not understand why this worked, just that the feces needed to be fresh. After thorough examination, they found the dung was chock-full of powerful bacterial microorganisms, eventually identified as Bacillus subtilis, a super bacterium capable of cannibalizing the harmful microbes.

During the war, the Nazis produced vast amounts of Bacillus subtilis cultures for their troops in the field. It ultimately became the leading treatment for dysentery and similar intestinal illnesses throughout the world, and was sold in the United States and Mexico under the brand name Bacti-Subtil.

Windproof Candle Holder

Recyclable, resourceful, and even a little romantic!

Are you an environmental hero? In the know on what's hot and what's not? Perhaps you are looking for a low-key, bang-for-your-buck way to wow your girlfriend with a romantic candle-lit dinner on the beach. Check this out! Here is an easy (and cheap) way to make a wind-proof candleholder out of a simple plastic bottle.

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GEAR LIST

- Plastic bottle
- Scissors
- Candle
- Matches or lighter

STEP 1: Cut

Using scissors cut off the upper quarter of any plastic bottle.

STEP 2: Insert

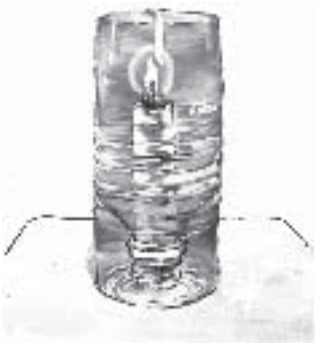
Turn the upper part of the bottle upside down and insert it into the bottom part of the bottle, pushing it all the way to the bottom

STEP 3: Create the Mood

Place a candle in the neck of the bottle, and fire it up!

If your candle is too wide, whittle it down to size with a sharp knife.

Clear bottles give off the most light, but those with contours—like a Coke bottle—refract light, creating cool designs. Try both!



Parting Thoughts

Although western culture is in its infancy when it comes to reducing waste and recycling, folks in developing countries have been crafting goods out of what we might consider "trash." Often, their "make-do" creations for essential needs—food and shelter—become works of art that inspire me toward greener ways.