

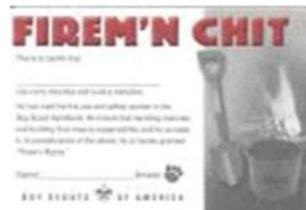
Above & Beyond

Scouting Skills Resource Guide

Fire



Earning the Award



Introduction

To earn this certification, the Scout must show his Scout leader, or someone designated by his leader, that he understands his responsibility to do the following:

- Read and understand fire use and safety rules from the Boy Scout Handbook.
- Secure necessary permits (regulations vary by locality).
- Clear all flammable vegetation at least 5 feet in all directions from fire (total 10 feet).
- Attend to fire at all times.
- Keep fire-fighting tools (water and/or shovel) readily available.
- Leave fire when it is cold out.
- Subscribe to the Outdoor Code and Leave-No-Trace

[Totin' Chip/Firem'n Chit Score Card](#)

The Scout's "Firem'n Rights" can be taken from him if he fails in his responsibility. (In most troops, they tear off a corner from the wallet card for any minor infraction. When all four corners are gone, the scout loses his fireman rights.

In Troop 780 we tear off 3 corners of the wallet card when the scout is first presented with it. This is done because an infraction can be dangerous involving fire and Troop 780 is so safety conscience, our scouts don't get a second chance and have to earn the privilege again)

Campfires have always been an important part of Scout camping. A fire can warm you, cook your meals, and dry out your clothes. Bright flames lift your spirits on a rainy morning. On a starry night, glowing embers stir your imagination. The smell of campfire smoke and the crackle of burning wood are among the best memories of adventures gone by.

A good Scout knows how to build a fire. He also knows when he should not build one. Campfires can char the ground. Fires consume dead branches, bark, and other organic material that would have provided shelter and food for animals and plants. In the days when not many people went camping there weren't enough fires to cause problems. But today, hiking and camping are popular activities. Hundreds of fires can have a serious impact on the well-being of the backcountry.

Before a campout, learn whether campfires are allowed in the area you plan to visit. Find out if there will be enough firewood. You may need permits to build fires in public parks and forests. Your Scoutmaster will help you get the permission you need.

If fires are not allowed, you can still go camping. Backpacking stoves are lightweight, easy to use, and clean. Properly handled, they are a good alternative to campfires.



Camping Stoves



Many camping stoves burn kerosene or white gas. Store these fuels in special metal bottles with lids that screw on tightly. Choose bright red bottles or mark them with colorful tape so there is no chance of mixing them up with your water bottles.

Butane and propane stoves burn gases from small cans called cartridges. Cartridges and fuel bottles should be stowed in plastic bags and carried.

When you're ready to cook, place your stove on a flat surface. A patch of bare ground or a flat rock is all you need. In winter, put your stove on a 6-inch square of plywood. The wood will hold your stove on top of the snow and prevent the cold ground from chilling the stove.

Larger kerosene and white gas stoves are too heavy to carry in a pack, but they are fine for use in camps that can be reached by road. Two or three burners give you all the room you need to cook meals for an entire patrol. Different kinds of stoves operate in different ways. Read your stove's instructions carefully and do exactly what they say. In addition, always follow these safety rules:

- Use camping stoves only where allowed and only with adult supervision.

- Never use a stove inside a tent or cabin. There is a danger of fire and poisoning by odorless gas fumes. Refuel and light stoves outdoors where there is plenty of fresh air.
 - Before lighting the burner, tighten the caps on the stove and on any fuel containers. Do not loosen the fuel cap of a hot stove.
 - Stoves sometimes flare up. Keep your head and hands to one side of the stove as you light and adjust it.
 - Don't overload a stove with a heavy pot. Instead, set up a grill over the stove to bear the weight of the pot.
 - Never leave a lighted stove unattended.
 - Let hot stoves cool before refilling fuel tanks. Refill stoves and store extra fuel well away from open flames such as other stoves, candles, and lanterns.
 - Carry home all empty fuel containers. Do not place them in or near fires. If heated, they may explode.
-

Campfires

A safe fire is one on which nothing will burn except the fuel you feed your fire. It's a spot from which flames cannot spread. Parks and Scout camps may have large metal rings, grills, or stone fireplaces. Use these existing sites whenever you can.

Otherwise, select a spot on gravel, sand, or bare soil well away from trees, brush, dry grasses, and anything else that might burn. Look overhead for branches that sparks could ignite. Stay clear of boulders that may be blackened by smoke, or large tree roots that might be harmed by too much heat.

Clean the fire site down to bare soil, then remove all burnable material from the ground around it. Rake away pine needles, leaves, twigs and anything else that might burn. Save the ground cover so you can put it back when you are done with your fire. Keep a pot of water close by to douse the flames should they begin to spread.

Bare Ground Fire Site

When the ground is bare, haul enough mineral soil to the center of the cleared circle to make an earthen pad about two feet square and three inches thick. Kindle the fire on top of the pad, and the mineral soil will protect the ground from the heat. After you have properly extinguished the blaze and disposed of any unburned wood, crush the remaining ashes, mix them with the mineral soil, and return it to the sites from which you borrowed it.

Gather Tinder, Kindling, and Fuel wood

Patience is the key ingredient for successfully building a fire. You will also need tinder, kindling, and fuel.

	<p>Tinder catches fire easily and burns fast. Dry pine needles, grasses, shredded bark, and the fluff from some seed pods all make good tinder. So do wood shavings cut with a pocketknife from a dead stick. Gather enough tinder to fill your hat once.</p>
	<p>Dead twigs that are no thicker than a pencil are called kindling. Find enough to fill your hat twice.</p>
	<p>Fuel wood can be as thin as your finger or as thick as your wrist. Use sticks you find on the ground and gather them from a wide area rather than removing all the downed wood from one spot.</p>

Lay the Fire

There are many ways to arrange tinder, kindling, and fuel so that the heat of a single match can grow into flames of a campfire. A tepee fire lay or log cabin is a good all-around method:

1. Place a big, loose handful of tinder in the middle of your fire site.
2. Mound plenty of small kindling over the tinder
3. Arrange small and medium-sized sticks of fuel wood around the kindling as if they were the poles of a tepee. Leave an opening in the "tepee" on the side the wind is blowing against so that air can reach the middle of the fire.

4. Ease a burning match under the tinder. The flame should rise through the tinder and crackle up into the kindling and the fuel wood above.

Fuzz Sticks



Fuzz sticks can help get a fire going. Cut shavings into each stick, but leave them attached. Prop the fuzz sticks upright in among the kindling.

Fireplaces

A fireplace holds your cook pots above the flames and allows air to reach the fire.

Three-Point Fireplaces

For a single pot or pan, stick three metal tent stakes into the embers.

Wet-Weather Fire Tips

1. Before the rain begins, gather tinder and kindling for several fires and store it under your dining fly.
2. Keep a supply of dry tinder in a plastic bag.
3. Split your wet sticks and logs with an ax. The wood inside should be dry.
4. Keep matches safe from dampness by carrying them in a plastic container with a tight lid.
5. A butane lighter will give you flame in even the wettest weather. Store it away from heat.

Putting out a Campfire

Extinguish every fire when you no longer need it. Make sure it is cold out - cold enough so that you can run your hands through the ashes. Trickle, don't pour water on the embers, steam is hotter than boiling water and ash will go everywhere if you pour. Stir the wet ashes with a stick and wet them again. Repeat until you can touch every part of the fire site with your bare hands.

Cleaning a Fire Site

Clean a permanent fire site by picking out any bits of paper, foil, and unburned food. Pack them home with the rest of your trash. If you made a new fire site, erase all evidence it was ever there. Scatter any rocks, turning their blackened sides toward the

ground. Spread cold ashes over a wide area and toss away extra firewood. Replace any ground cover. When you're finished, the site should look just as it did when you found it.

Fire Types, Wood Types



Figure 1 - Log Cabin Fire

Probably the most useful and easiest to light fire. Works good in high wind and rain. Used as a general campfire, ceremonies, etc. You can actually time this fire by the number of logs and their size. It is possible to make a 28 minute fire or 43 minute fire, etc... A small version of this is the best way to start a fire.



Figure 2 - Star Fire

This is basically one of the simplest fires to make.



Figure 3 - Trench Fire

This is the most commonly used Scout fire because it is easy to build. Build it so that the shallow end of the trench faces into the wind. This will make it burn very hotly because the air is directed into the heart of the fire.



Figure 4 - Gypsy Fire

This is an excellent fire for using a cooking pot. Stews cook very well on this type of fire and it is also useful for boiling bilious of water for hot drinks. .



Figure 5 - Fire in a hole

This is very much like the Gypsy Fire, but the wood will slide downwards into the heart of the fire and help reduce the need for continually monitoring it. Very useful if there are other things to do as well as cooking because it allows you to move away for short periods of time.



Figure 6 - Lumberman's Fire

Again this is very like the previous two fires, but the logs to either side act as wind shields and allow the air to be directed into the heart of the fire. Good for supporting cooking pots, or spit roasting.



Figure 7 - Alter Fire

This type of fire is ideal for long stay camps as it helps eliminate the-need for turf removal and low-level cooking. Watch the height you build to. It is much safer to have it too low than too high.



Figure 8 - Reflector Fire

The Back shielding on this type of fires reflects the heat forward. Very useful for directing heat into the bivouac.



Figure 9 - Backlog Fire

This fire again is useful for supporting cooking pots, but has no overhead support. The logs act as shields.



Figure 10 - Fuzz Stick

Sometimes there are not enough small twigs and sticks around to start a fire with. Resourceful Scouts will always be able to make themselves "fuzz sticks" which, because of their curls of wood, catch fire more easily than a solid stick. Something for whittling away those spare moments of 'nothing to do'.

The Burning Properties of Wood

Below is a list of the most common woods for burning, there are more. It is worth remembering that ALL wood will burn better if split.

There is an old saying, "before starting a fire - collect the right wood." It is worth learning which wood is best for your fires as it will make life a lot easier. A natural result of tree recognition is to learn the burning properties of their wood

Wood	Description
Alder	Poor in heat and does not last
Apple	Splendid/ It bums slowly and steadily when dry, with little flame, but good heat. The scent is pleasing.
Ash	Best burning wood; has both flame and heat, and will bum when green, though naturally not as well as when dry.
Beech	A rival to ash, though not a close one, and only fair when green. If it has a fault, it is apt to shoot embers a long way.
Birch	The heat is good but it burns quickly. The smell is pleasant.
Cedar	Good when dry. Full of crackle and snap. It gives little flame but much heat, and the scent is beautiful.
Cherry	Burns slowly, with good heat. Another wood with the advantage of scent

	Chestnut. Mediocre. Apt to shoot embers. Small flame and heating power. Douglas Fir. Poor. Little flame and heat.
Chestnut	Mediocre. Apt to shoot embers. Small flame and heating power.
Douglas Fir	Poor. Little flame or heat.
Elder	Mediocre. Very smoky. Quick burner, with not much heat.
Elm	Commonly offered for sale. To burn well it needs to be kept for two years. Even then it will smoke. Vary variable fuel.
Hazel	Good.
Holly	Good, will burn when green, but best when kept a season.
Hornbeam	Almost as good as beech.
Laburnum	Totally poisonous tree, acrid smoke, taints food and best never used.
Larch	Crackly, scented, and fairly good for heat.
Laurel	Has brilliant flame.
Lime	Poor. Burns with dull flame.
Maple	Good.
Oak	The novelist's 'blazing fire of oaken logs' is fanciful,

	Oak is sparse in flame and the smoke is acrid, but dry old oak is excellent for heat, burning slowly and steadily until whole log collapses into cigar-like ash.
Pear	A good heat and a good scent.
Pine	Burns with a splendid flame, but apt to spit. The resinous Weymouth pine has a lovely scent and a cheerful blue flame.
Plane	Burns pleasantly, but is apt to throw sparks if very dry. Plum. Good heat and scent.
Plum	Good heat and aromatic.
Poplar	Truly awful.
Rhododendron	The thick old stems, being very tough, burn well.
Robinia (Acacia)	Burns slowly, with good heat, but with acrid smoke.
Spruce	Burns too quickly and with too many sparks.
Sycamore	Burns with a good flame, with moderate heat. Useless green.
Thorn	Quite one of the best woods. Burns slowly, with great heat and little smoke.
Walnut	Good, and so is the

	scent. Aromatic wood.
Willow	Poor. It must be dry to use, and then it burns slowly, with little flame. Apt to spark.
Yew	Last but among the best. Burns slowly, with fierce heat, and the scent is pleasant.

Components of Fire



To have

FIRE

, you need to have Three Key Elements:

- **FUEL**
 - something to burn, such as wood, paper, grass, or clothing.
- **AIR**
 - actually oxygen is needed, but that's part of the air.
- **HEAT**
 - a catalyst to start the fuel and oxygen combustion.

In the

fire triangle

image above, a forest is the fuel, gusts of wind provide the air, and a lightning strike supplies the heat. This results in a blazing forest fire.

For our campfires, we use the exact same elements but hopefully on a much smaller scale. Sticks and branches for fuel, your breath for air, and a match for heat - Presto!



If any one of the three elements is missing (or is purposely removed) the fire will go out. For example, pouring water on a fire removes the HEAT - there is still plenty of fuel and lots of oxygen, but the water reduces the temperature so much the fire sputters out. Read about [extinguishing fires](#) later.

Common Mistakes

When building a fire, you've got to keep FUEL, AIR, & HEAT in mind at all times. The most trouble people have in getting fires started is forgetting the importance of all three working together. And, the most common problem is *not enough AIR*. This shows up in two ways:

- Big Wood - you need tiny slivers of wood to start because there is lots of air space around them. Big chunks of wood do not allow air to reach the fuel.
- Flat Fire - stacking the small sticks of wood flat instead of standing them up with air space between.

Other common blunders are not paying attention to the wind direction and burning up your wood supply too fast, but you can read more about all that on the [fire lighting](#) page. Just remember the fire triangle - if you have adequate fuel, air, and heat, you'll have a fire and by regulating any of those three elements, you control your fire.

Fire Tetrahedron

This fire triangle is also known as a fire tetrahedron, but that just doesn't roll off your tongue too well. And, for practical purposes, the 4th side of the fire tetrahedron does not pertain to campfires. It is

Chemical Reaction, that is the chemical changes that occur during combustion. As far as campfires and other wood-burning fires go, we have control over fuel, air, and heat, but not the chemical reaction - it just happens.

Alternative ways of starting a fire

Electricity makes sparks, as everyone knows. Harnessing that spark to create a fire is pretty easy and fun to see.

- Have your fine, dry tinder ready.
- Get some fine steel wool - 0000 grade left over from polishing your [pop can fire starter](#) would work great.
- Pull the steel wool into a thin length about 6 inches long and 1/2 inch wide.
- Get a 9-volt or a couple of "D", "C", or "AA" batteries.
- Touch the steel wool to both contacts of the battery and the steel wool will begin to glow and burn.
- It does not burn long, so get it into your tinder quickly.



One side of the [Fire Triangle](#) is

Heat

. Without heat, you're doomed to having no fire. One way to get very hot, very intense, but very short-lived heat is by creating sparks. Sparks are usually tiny bits of super-heated metal that have been forcibly scraped from a larger chunk of metal.

Flint and Steel

Probably the most widely known primitive fire starting method, flint and steel has been used in guns, lighters, and fire making kits. When flint is struck against the steel, pieces of the metal are scraped off and blaze with white light and high



temperature, but normally for less than a second. The quality of rock and metal being used make a big difference in the efficiency of the fire starter.

The flint should be large enough to hold firmly and should have a sharp edge. A clear gray or black flint piece such as is used for gunflints is a good choice. The flint is really any hard mineral around 7 or 8 on the Mohs hardness scale that can keep a sharp edge similar to an arrowhead - agate, jade, bloodstone, chert, flint, jasper, quartz can all work.

The steel needs to be a piece of tempered high-carbon steel since it is the carbon which burns in the spark. Old metal files usually work well and can be found at garage sales cheaply. Steels are normally shaped into a 'C' or 'U' so they are easy to hold and manage. But, I just use a small, broken file from my Dad's old tool box.

You need one other special item for flint and steel fire starting - that is your *char cloth*. Char cloth is 100% cotton cloth such as old T-shirts or hand towels that has been turned into charcoal. Charcoal is fuel that has been heated to high temperatures without any oxygen. This converts flammable solids into gas, but does not allow it to burn. What is left is black cloth that very readily catches and holds a spark and begins to burn as a red coal ember. It's easy to make your own char cloth.

Creating Char Cloth

Here are the simple steps to make your own supply of char cloth:

- Cut up an old T-shirt into about 2inch squares.
- Open a can of tuna fish (or cat food) and thoroughly clean, wash, and dry the can. You could use an old steel 35mm film canister or an Altoids tin.
- Poke a small 1/16 inch hole in the center of the lid.
- Start a small fire and let it turn to nice, hot coals. Or, use your gas barbeque grill.
- Fill the can with squares of cloth and firmly place the lid on. The lid needs to fit firmly. If the lid does not fit well, too much oxygen will get to the cloth and it will just burn up.
- Place the can in the hot fire and wait.
- Smoke should come out the hole in the lid as the cloth cooks.
- When the smoke stops, remove the can from the fire *and let it cool*.
- After the can is cool, open it. If you open it immediately, the cloth may flame up and it is ruined.
- The cloth should be black, but strong. If it is crumbly like ash, it was overcooked. If it is more brown than black, you need to cook it longer.

It is actually pretty fun to make charcloth and then try lighting a piece. If you don't have a tin, you can just wrap the cloth pieces in aluminum foil and seal it well, then poke a hole.

Using Flint and Steel

- Beginners

Before making your fire, make sure you have plenty of fuel and kindling prepared and ready. Once you get flame from your spark, you only have a short time to turn that small flame into fire.

- Set up some very small kindling in a teepee shape with a space under it that an egg would fit in - this is where you will place your lit tinder.
- Prepare a silver dollar size pile of fine [tinder](#) and press a small hole in the top with your finger.
- Place a square of charcloth in the depression in the tinder and set it on the dry ground or piece of dry bark.
- Hold the steel in your left hand directly over and very close to the charcloth. The closer to the char, the hotter the sparks will be when they reach the char.
- Hold the flint in your right hand.
- Strike the flint down onto the face of the steel at about a 20-30 degree angle. The idea is to use the sharp edge of the flint to peel a tiny scrape of metal off the steel. Think of it as shaving a layer of metal off.
- Aim the sparks right into the charcloth and soon a spark will catch in the cloth.
- Set down your flint and steel and pick up the tinder ball with char cloth and ember.
- Gently and steadily blow onto the char ember to grow it, forcing the heat into the tinder. If you hold the tinder ball at about eye level or higher, the smoke will not get in your eyes so much.
- When a flame erupts, quickly place the tinder into your kindling and carefully feed the flame.

Now, that is fun!

Using Flint and Steel

- Advanced

Once you've mastered the Beginner version of creating a fire, this method is more efficient and easier.

- Set up some very small kindling in a teepee shape with a space under it that an egg would fit in.
- Prepare a silver dollar size pile of fine [tinder](#) and press a small hole in the top with your finger.
- Place this tinder in the palm of your right hand.
- Fold a piece of charcloth in half and then in half the other direction. This creates a piece that has one edge smooth and folded over and the opposite edge made of 4 separate exposed layers. The exposed layers are perfect for catching sparks!
- Hold your flint in your right hand.
- Place the folded charcloth on top of your flint and hold in place with the thumb of your right hand.
- Hold the steel in your left hand.
- Strike the face of the steel down onto the upturned edge of the flint at about a 20-30 degree angle. The sharp edge of the flint will scrape metal off which will embed in the charcloth sitting on top of the flint.
- Set down your steel.
- Using both hands, drop the char cloth into the depression in the tinder and set down the flint.
- Fold the tinder around the charcloth and blow on the ember, keeping your hands cupped around the tinder to hold in the heat.
- When a flame erupts, quickly place the tinder into your kindling and carefully feed the flame.

You don't have to be bent over the ground on your knees to do it this way. It's more comfortable and you are better able to control the tinder, keeping it safe from any rain.

Magnesium and Ferrocerium Fire Starters

The 'flint' in a cigarette lighter is a perfect example of this type of spark generator. There are many products available using the same concept and most do just what they advertise. The price range is very wide, but the Coghlan brand magnesium product is around \$7.00 and does a good job.

This product includes the spark as well as its own tinder. Using a knife, you scrape shavings from the relatively soft magnesium block into a pile about the size of a nickel or quarter. Then, flip the block over to expose the edge that has an embedded sparking rod and scrape it with your knife. The resulting sparks catch in the magnesium shavings and burn a very intense, white-hot flame for a few seconds - long enough to start your additional tiny kindling burning.

If it is just a bit windy, the light magnesium shavings will be a challenge to keep in a small pile. Also, when striking down with your knife, it is easy to disturb the shavings. But, with this tool, you can get a spark and fire, even in the rain.

There are a slew of different products ranging in size from tiny to mammoth and with different bells and whistles - all of which provide a shower of sparks from a ferrocerium rod. They are all providing pretty much the same service as the flint and steel. Use them to generate spark which you will catch in charcloth or other tinder.

This one pictured is pretty standard. It consists of a rod of material and a steel striker. This is about the size of a key and should last for hundreds of fires unless you lose it or break it.

Fire by Friction

Rather than creating a spark into tinder, fire by friction causes the fuel to heat up until it reaches the combustion temperature and ignites. This is around 800 degrees Fahrenheit. Moisture is the biggest obstacle to overcome when attempting to create fire by rubbing wood. Start with extremely dry wood and keep it dry to ensure success. In areas of higher humidity, more effort is required.



Following are some of the more common methods of creating fire by friction in order of increasing complexness. All of these methods create a coal of smoldering wood dust which is then transferred to waiting tinder to be coaxed into flame. They also employ one piece of hard wood and another slightly softer wood which wears away. Neither of these woods should be too soft nor too hard. Excessive resin in the wood will also cause failure since it will cause the wood to become polished and smooth.

These are simple introductions to each method. Individual success depends on strength, practice, materials used, and troubleshooting. These methods require a lot of effort and consistency. Some woods to consider using:

- Cedar
- Willow and Redwood
- Yucca and Oak

Fire Plow

- Form a plow board of softer wood that is flat and a couple inches across and 2 feet long.
- Form a plow stick that is hardwood and has a sharpened tip.
- Cut or rub a depression about 6 or 8 inches long in the plow board. This is the trough in which you will scrape the plow stick.
- Hold the plow board firm as shown or kneel on it or sit on it if it is a longer board. The idea is to keep the board steady.
- Point the plow stick into the plow board at about a 60 degree angle and push it forward with downward pressure.
- Release the downward pressure and pull the plow stick back to the start of the trough.
- Push and pull the plow stick quickly, creating wood dust at the far end of the trough. It is important to end each stroke at the same spot so dust can accumulate there.
- Eventually, the wood dust will combust and can be pushed into waiting tinder.



Fire Saw

- a softer wood stick is cracked along its length (but not completely split) and a small peg or pebble is placed in the end to hold the two halves apart about 1/4 inch. You may want to tightly wrap the end which you do not want to split before cracking.
- Tinder is stuffed in the crack.



- A sharp edged harder wood stick is sawn back and forth across the crack, perpendicular to it.
- Sawdust is worn away and drops into the tinder, eventually heating enough to develop a coal.
- Dried bamboo stalks are also used for fire saws with a notch cut across half a stock and the ember falls through the cut onto tinder under the hollow bamboo stalk.

Hand Drill

A smooth, straight shaft of wood is spun between the palms of the hands, forcing the tip of it into the hearth wood, generating an ember.

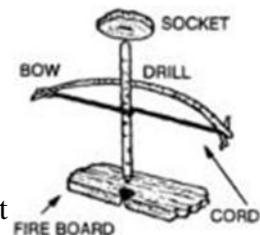


- Choose a straight stalk or stick of a harder wood for your drill. It should be about 18 to 24 inches long, 1/4 to 1/2 inch wide, with very few side branches, preferably none.
- Smooth the drill of all bumps, knobs, and roughness so it will not rip up your palms.
- Create a hearth board about 1/4 to 1/2 inch thick and 1 inch wide. Split a piece of softer wood to form a fairly flat surface.
- Cut a small depression in the top of the hearth board about 1/8 inch in from a side. This is where you will seat the drill.
- Hold the hearth board firm with a knee and position the drill in the depression.
- Spin the drill between your palms to wear out the depression and see that the drill seats well.
- Carve a notch half way in to the center of the depression from the edge. As you spin the drill, the wood dust collects in this notch so place a piece of bark under this area to catch it.
- Spin the drill, repositioning your hands at the top when they work their way to the bottom.
- Over time, the wood dust will accumulate and ignite with smoke and finally a small ember. Transfer it to tinder.

Bow Drill

The bow drill is the most common primitive fire making method demonstrated at shows and classes.

- The fire board is a flat piece of softer wood with a depression and notch like the hand drill.
- The drill is a smooth, straight stick of harder wood. The top end should be pointed and smooth. The drilling end should be rounded.
- The bow has a cord tied between the two ends and wrapped once around the drill.



- The socket holds the drill in place and provides downward pressure. It should have an indentation into which the drill end seats smoothly. Lubricate it with resin or oil from your skin.
- While pressing down on the socket, move the bow back and forth, causing the drill to burn into the fire board.
- Collect the ember and start your fire.
- The fire piston is a unique method of creating fire, using nothing but compressed air to ignite tinder.

A plunger is quickly pushed into an air-tight tube, compressing the air, raising the temperature, and igniting a bit of charcloth or other tinder set in the tip of the plunger. The key requirements for a fire piston to operate correctly is a straight, smooth bore and a plunger that seals the chamber air-tight.

- Fire pistons are commercially available with an emphasis on the artistic rather than the function. You can create your own from scratch or purchase a kit to assemble and carve.

See [Wilderness Solutions](#) for a kit.

- Move Along: [Fire from Sun](#)



Burning stuff is fun, so what better excuse to burn stuff than to do research on making fire starters?

It's also fun to make fires in primitive or interesting ways, like with the [sun](#) or [by friction](#) or with [sparking tools](#). But, for those times when you just want a good fire and you want it fast, you should have some items handy to help make that fire fast. Here's a list of some fire starters and helpers that you can find or make. Have fun!

These things should be kept in ziploc baggies to keep them dry and to keep the rest of your gear clean. Some of them can be messy and sitting in your backpack in your car in the sun will melt wax and other stuff.

- Birthday Candle - easy to light, little weight and space, waterproof, long burn time, use multiple times.
- 'Trick' Birthday Candle - even better, this one is great in wind and rain.
- Dryer Lint - the fuzz that wears off your cotton clothes makes great tinder. Keep some in a film canister or baggie.
- Snack Food - Just light a Cheetos cheese puff or Pringles potato chip and see what I mean!



- Vaseline - rub into cotton balls and keep in a film canister. They will start with a spark.



- Wax Sticks - commercial version of the homemade wax and woodchip starters.



- Fire Lighters - pressed wood and wax with a match tip.



- Fire Paste - looks like a tube of toothpaste, this fire starter gel smells terrible, weighs a bit, but burns great.



- Purell - The hand sanitizer evaporates quickly because it is 66% alcohol. A squirt of this on tinder ensures a quick light from any flame. Be careful because the alcohol flame can be invisible.
- Pinecones - Pick up dry ones under pine trees. The high pitch content really burns. They are natural fuzz sticks.
- Fatwood - the pitchy parts of pine knots or heartwood. Prepare this as small sticks of kindling and keep some in a pouch.
- Wax and Woodchips - make these yourself. They take up a little space and weight, but are fun to make yourself.
 - Melt wax in a double boiler. This prevents fires from overheated wax.

Pot with water in it



Second pot inside first.



Wax melting in inner pot.



- Fill dixie cups with wood shavings. I used pine guinea pig litter this time. I filled some completely and some less than an inch. There is no need to put more than an inch in each cup - that burns long enough to get your other tinder and kindling going. The two on the left are filled with rolled up cardboard and I crimped the tops to keep the cardboard from unrolling.



- Pour hot wax into chips. It works better in warmer temperatures, not on cold winter days because the wax cools too fast. Here are the finished fire starters.



- I also dipped fiber rope into the extra wax to create fire starter candles.



- Here is one of the shorter 1 inch fire starters burning. It lit immediately and then burned for over 6 minutes even though most of the wax melted and flowed away because I took it out of the cup. It was also a very windy day which caused it to burn faster. If you wrap the bottom of the cup in aluminum foil, it will burn much longer since the wax will fuel the flame.



By far more important than building a good campfire is to make sure you completely put it out! Every year, careless people destroy thousands of acres of wilderness and forest land by leaving campfires. Please be a Campfire Dude and not one of those Duds.

- Extinguish your campfire at least 1/2 hour before you plan to leave.
- By planning ahead, you should have burned down all the coals to ash. There should be very few chunks of coal left and no partially burned wood.
- If you *are* extinguishing a burning fire rather than hot ash and coals, first use a stick to stir the wood and ash. This is to extinguish the flames as much as you can.
- Sprinkle water over the coals. If they are hot, this will cause a lot of steam mixed with ash so avoid standing directly above or downwind of the fire. You may want to move your gear too.
- Once you have wetted down all the ash and coals, use a stick to stir everything together.
- Continue to sprinkle water and stir until no more steam rises and you hear no hissing steam.
- Let the fire area sit for 10 minutes. Good opportunity to get more water.
- Feel the area for hot spots - hold the back of your hand close to the ash, but not in it. Feel around for heat spots.
- If everything is cold, you done good, kid! If there is still heat, sprinkle more water and stir.
- Once you feel no heat, the ash can be disposed of:
 - Scoop all the coals, ash, and partially burned wood into a bag, cooking pot, or some other container.
 - Carry it far out into the woods and spread it around.
 - Or, carry it down the trail a 1/2 mile and then disperse it far off the trail.
- Scatter unused wood back into the surrounding woods or leave it nicely stacked if this is a high-use, established camp site.