

# Firelighting

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**Fire making**, **fire lighting** or **fire craft** is the process of starting a fire artificially. Fire was an essential tool in early human cultural development.<sup>[1]</sup> It requires completing the fire triangle, usually by initiating the combustion of a suitably flammable material.

The control of fire by early humans probably dates back to *Homo erectus* or very early *Homo sapiens*: that is, 400-200 thousand years ago based on archaeological evidence of hearths.<sup>[2]</sup> Changes in physique suggest it could go back 1.8 or even 2.3 million years, the latter of which would date to *Homo habilis*.<sup>[3]</sup> Smouldering plants and trees, or any source of hot coals from natural fires, may have been the first resources exploited by humans to control fire. Friction is the most commonly used primitive method for making fire. Ancient techniques for starting friction fires include the hand drill, the bow drill, the fire plow and the pump drill. Another ancient technique is the flint and steel method, where hot sparks are struck from a piece of steel or iron onto suitable tinder, such as tinder fungus or char cloth, and fanned into flames. These methods have been known since the Paleolithic age, and are still in common use by some indigenous peoples.

The skills required to create, control and use fire using primitive methods, often in a survival situation, have come into popular use as a component of bushcraft.



A flint, fire striker, charred cloth and piece of mushroom

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## Methods by historical era

### Primitive methods and natural occurrence

Fire occurs naturally as a result of volcanic activity, meteorites, and lightning strikes. Many animals are aware of fire and adapt their behavior to it. Plants, too, have adapted to the natural occurrence of fire (see Fire ecology). Thus, humans encountered and were aware of fire, and later its beneficial uses, long before they could make fire on demand. The first and easiest way to make a fire would have been to use the hot ashes or burning wood from a forest or grass fire, and then to keep the fire or coals going for as long as possible by adding more wood and plant materials many times each day. Natural sources of animal fats and petrochemicals that burn could have been used to keep and maintain fires that started naturally.

## Tinder bundle

When a fire needed to be carried or preserved, regardless of the method making the fire, the tinder bundle was used. This was made in the form of a cigar, made of good tinder materials, and a smouldering ember could safely be saved inside.<sup>[4][5]</sup>

## Friction

Fire can be created through friction by rapidly grinding pieces of solid burnable material (such as wood) against each other or a hard surface. Successfully creating fire by friction involves skill, fitness, knowledge, and acceptable environmental conditions. Some techniques involve crafting a system of interlocking pieces that give the practitioner an improved mechanical advantage; these techniques require more skill and knowledge but less fitness, and work in less ideal conditions.

Producing a fire by friction is not comparable to lighting a match, in which case the firelighting tool has already created a flame for you. With friction fire effort is focused into grinding dust off of soft solid burnable material such that the dust is smoldering.

While it is impossible to determine which fire-starting method is the oldest, the hand drill is the most widespread among indigenous cultures, characterized by the use of a thin, straightened wooden shaft or reed to be spun with the hands, grinding within a notch against the soft wooden base of a fire board (a wooden board with a carved notch in which to catch heated wood fibers created by friction). This repeated spinning and downward pressure causes black dust to form in the notch of the fireboard, eventually creating a hot, glowing coal. The coal is then carefully placed among dense, fine tinder, which is pressed against it as one blows directly onto the coal until the tinder begins burning and eventually catches into flame. The advantage of the hand drill technique is that it requires no rope, which can be time consuming to produce and wears down rapidly.

The bow drill uses the same principle as the hand drill (friction by rotation of wood on wood) but the spindle is shorter, wider (about the size of a human thumb) and driven by a bow, which allows longer, easier strokes and protects the palms. With a well-built bow drill and enough practice, fire can be easily created even in wet conditions.

A pump drill is a variant of the bow drill that uses a coiled rope around a cross-section of wooden stakes to produce friction on a hard surface, combusting material underneath the mechanism.<sup>[6]</sup>

Another simple fire making tool using friction is a fire plough. It consists of a stick cut to a dull point, and a long piece of wood with a groove cut down its length. The point of the first piece is rubbed quickly against the groove of the second piece in a "plowing" motion, to produce hot dust that then becomes a coal. A split is often made down the length of the grooved piece, so that oxygen can flow freely to the coal/ember. Once hot enough, the coal is introduced to the tinder, more oxygen is added by blowing and the result is ignition.

A fire-saw is a method by which a piece of wood is sawed through a notch in a second piece or pieces to generate friction. The tinder may be placed between two slats of wood with the third piece or "saw" drawn over them above the tinder so as to catch a coal, but there is more than one configuration.

The Rudiger Roll friction fire method. Also known as "Fire Roll" method, little is known about this method of friction fire or its origins. It's believed to have been invented sometime during WWII. A German survival expert named Rüdiger Nehberg wrote about this method in one of his books. A small amount of wood ash is rolled up inside of cotton like a cigar. The cotton is then placed between two boards and rolled back and forth. Pressure and speed are both gradually increased. With proper technique ignition can occur in seconds.

## Percussion

Steel and iron produce hot sparks when struck against any glassy stone such as quartz, jasper, agate or flint. A flint alone does not produce incandescent embers; it is the flint's ability to violently release small particles of iron, exposing them to oxygen, that starts the burning.

To produce sparks, one may strike a hard stone (for example flint or quartz) onto steel or another stone containing iron (such as pyrite or marcasite). Sparks struck by this method must make immediate contact with tinder, black charcloth, or steel wool, which will smoulder from the spark. The material used to hold the spark is held above the flint or quartz, tight against the stone. The striker is then brought against the stone in a quick, straight downward motion. The stone pulls iron flakes off the striker, which become hot, molten sparks. The use of flint in particular became the most common method of producing flames in pre-industrial societies (see also fire striker). Travelers up to the late 19th century would often use self-contained kits known as tinderboxes to start fires.<sup>[7]</sup>

## Other methods

A less labor-intensive method of creating fire is to use a lens or condensing reflector (such as a burning glass) to focus the energy from the sun onto tinder.

A concave mirror, such as a polished soda can bottom, can be used as well to focus the sun's rays onto tinder.

An unusual method of making fire is with a device called a fire piston. Commonly constructed from wood, horn, or plastic, it has a hollow tube with one sealed end and a piston that fits snugly into the tube. At the end of the piston is a depression where tinder is held during compression. The tinder is inserted into the depression, and the piston is quickly pushed into the tube. This compresses the air, raising the temperature in the tube, just as a diesel engine fires, until the tinder ignites and forms an ember. This was observed in the jungle by Laurens van der Post.

## Modern methods



- first second after strike

Matches are small wooden sticks or stiff paper with a coating that can be easily ignited by friction.

Lighters, such as those for cigarettes or grills, use a ferrocium "flint" for the spark, and gas fuels such as butane, or a liquid naphtha/gasoline-impregnated wick as the tinder and fuel. These are simple to light, often using a wheel mechanism that when spun with the thumb creates friction on the internal rod of ferrocium "flint" and throws a shower of white-hot sparks into the tinder. Other lighters, particularly long-reach lighters used to light grills, typically require only the push of a button to generate high-voltage piezoelectricity for sparking their butane fuel.

Electric firemaking involves the contact of an electrically conductive object with tinder. A current is run through the object until it is red hot, like the burners on an electric stove, and it is brought into contact with the tinder, lighting it. Also, a low electric voltage, such as a flashlight battery coming into contact with a thin wire mesh (such as steel wool) will produce enough heat to ignite charcloth or other tinder.

Some fire-starting systems use a large ferrocerium rod and a hard scraper to create hot sparks by manually scratching the ferro rod with a knife or sharp object to ignite man-made or natural tinder. Ferrorod fire starters are popular with bushcraft hobbyists and survivalists. Similar sparking devices have a built-in striking blade which provides an easy method for sparking with one hand. Another common type has the ferrorod attached to a magnesium bar that can be scraped with a knife to make a powdered tinder that will burn for a few seconds. An easy-igniting, moisture-resistant homemade tinder that is popular with bushcrafters and campers is made from cotton balls lightly impregnated with petroleum jelly.

## See also

- Batoning
- Bushcraft
- List of firelighting topics
- Pyromania
- Quest for Fire (film)
- Survival skills



Wikimedia Commons has media related to ***Fire-starting***.

## References

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3. <http://news.harvard.edu/gazette/story/2009/06/invention-of-cooking-drove-evolution-of-the-human-species-new-book-argues>
4. <http://www.marini.com/article/NO/20160716/NEWS/1607>
5. Wescott, David (1999). *Primitive Technology: A Book of Earth Skills*. Society of Primitive Technology Gibbs Smith.
6. "The Iroquois are unique in America and perhaps in the world in making fire with the pump drill." Fire-making Apparatus in the United States National Museum; Walter Hough, 1890.
7. Walter Hough. *Fire-Making Apparatus in the United States National Museum*. Government Printing Office, 1890

## External links

- Home in the Wilderness: Fire (<http://www.motherearthnews.com/Nature-and-Environment/1982-01-01/A-Home-In-the-Wilderness-Part-III-Fire.aspx>)
- Methods of making fire (<http://www.prm.ox.ac.uk/fire.html>)

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