

# Fire Lighting

Fire has many uses from providing heat for warmth and cooking to signalling and boosting morale.

## Principle of Fire

To light and keep a fire going you need three items :

- **Heat**
- **Fuel**
- **Oxygen**

These are commonly known as the Fire Triangle...if you remove any one of these the fire will go out.

When lighting a fire you must always make sure there is enough air getting to the base of the fire, that there is enough fuel and there is a heat source.

The more oxygen the fire gets the higher the temperature (the brighter the fire). This could be from the wind or by forcing a draught (fanning the fire). This will burn fuel more rapidly. By reducing the amount of oxygen reaching the fire the fuel will burn less rapidly and this will allow the embers to glow.

Smoke is the result of poor combustion...

### Fuel

The most common fuel used by Scouts is wood, both from 'dead falls', trees and occasionally items such as pallets.

### Heat

Heat from the smaller fuel should ignite the next size up which should be arranged around it. The best way to learn this is to practice starting fires using just *Tinder* and *Kindling*.

### Oxygen

All surfaces that are trying to burn need oxygen, make sure that the fire is kept loosely packed to allow in as much air as possible.

## Preparing your fire

Preparation is vital...take plenty of time to prepare the fire and materials before you even think of lighting the fire.

Fuel should be graduated into piles from kindling through to main fuel and logs. Tinder should be dry and as fine as you can get it.

There should be ample fuel to keep the fire going for many hours before you light the first match.

Make sure you have the right materials, that are stored neatly and dryly to hand and that you know what type of fire and method of lighting you are going to use.

## 'Fire Lighters'

- Matches
- Candle or night light
- Lighters
- Flint and Striker
- Magnesium Block
- Lens & Sunlight
- Battery & Wire Wool
- Friction Firelighting
- Other Methods

### Matches

Strike anywhere matches are often better than safety matches. They can be waterproofed by dripping wax from a candle over the heads. Be sure to carry them in a dry film cannister

If you have matches, always strike them into the wind. If the matches are damp or wet, wipe the striking end in your hair - the natural grease will help them to dry out. If matches are in short supply you can make them go further by splitting them in half lengthways.

You can even buy special matches that will light anywhere...in high winds or even underwater!

Lighting the match is important. Crouch close to the fire and strike the match (strike the match down the side of the box, head first at a narrow angle to the box...support the match with your fingers...if you strike a match by running it at right angles to the box the match may snap).

Keep the match alight in cupped hands. Most matches go out because people try to light something before the match is alight. So, hold the match in your hand in such a way that the match can catch alight. When properly alight then put the match to the shavings in the same direction as the wind is blowing so that the flame is blown into the tinder.

### Candle

If you light a match, light a candle with it. This saves you some matches. Having some cheap night lights will help you to light a fire in bad weather conditions. Simply light the night light and leave it in the centre of the tinder/kindling. This should give you more of a chance to get the fire going.

### Lighters

These can be difficult to use and hard to light in certain conditions...however they can still be used to make a spark when they run out of fuel

### Flint and Striker

This can be tried many times. When you strike the flint and steel together sparks are produced which can ignite good dry tinder.

Most often they come as a 'kit' with a flint block, and a steel saw attached by a cord. Simply draw the saw across the block whilst holding it close to the tinder so that the sparks can fall on it.

### Magnesium Block

This is very similar to a flint & steel lighter. You scrape magnesium from the block, turn the block over and run the spine of a knife down the built-in flint. The sparks will ignite the shavings.

### Lens and Sunlight

You can use a lens to focus sunlight to a point. If there is enough sunlight it should produce enough heat to ignite the tinder. A magnifying glass is the best known example for this technique but a telescope or camera lens could be used as well.

### Battery & Wire Wool

Take two wires and connect them to the battery. Connect the other ends to some fine wire wool. The wire wool should start to glow and heat up.

### Fire By Friction

Probably the most difficult method of them all. This needs a lot of practice, a correct method, the right wood and lots of hard work!

Methods include the hand drill, fire plough and bow fire.

### Other Methods

There are a number of other methods of lighting fires, but many of them involve chemicals or more hazardous ways of making a spark to start the fire.

A paper cup filled with mixed wood, tinder, and wax shavings makes an excellent home-made firelighter. Place the wood and tinder in the cup and a couple of matches. Cover the entire cup

(and match heads) with molten wax. You can scrape the wax off when ready to light.

This method can also be used with a cardboard egg carton. These can be torn off and used individually or simply use the whole carton if the weather is bad!

Similar waterproofing methods include smearing cotton balls in Vaseline or using rolled up newspaper tied with string and dipped in wax.

## Fuel

*These hardwoods burn well and slowly –  
Ash, Beech, Hawthorn, Oak, and Holly;  
Softwoods flare up quickly and fine,  
Birch, Fir, Hazel, Larch and Pine;  
Elm and Willow you'll regret,  
Chestnut green and sycamore wet.*

Wood for cooking fires: Oak, Beech, Maple, Birch, Sycamore

Wood for camp fires: Ash, Fir, Apple, Hazel, Holly

Beech is very good if you need a good flame but it burns away quickly.

Oak is slow burning but is hard to light, however, when it gets going, provides an even heat and little smoke. An ideal wood for cooking on, as it is smokeless, it makes cooking on a fire pleasurable.

Holly and hawthorn are great for kindling.

### Tinder

Tinder is the first material that the flame of the match will touch, therefore its role is most important. It must burn immediately and must be absolutely dry.

Aim to get 'two big handfuls'.

Wood shavings

Birch, Cherry, Honeysuckle & Cedar bark

Dry grass

Fluff / lint (from your pockets or clothes dryer!)

Dry pine needles

Dead bracken

Clematis

Fungi

Cotton wool

Char cloth

A very common tinder is wood shavings. These can be obtained from dry sticks using a knife. While you are whittling a stick to obtain shavings you should be making a fire stick too. A fire stick is made by shaving a stick with shallow cuts to 'feather' it. This can be used as kindling and will catch light freely and quickly create a fire.

Birch & Cherry bark burn very hot but may not be the easiest to get going. Cedar bark is useful when peeled and buffed. Honeysuckle bark sheds naturally and is very thin.

Dead bracken dries easily and is good for friction firelighting.

The fluffy seed down from Clematis provides an instant flame from sparks and the 'bark' can be buffed to produce a good tinder.

Many fungi, particularly those which grow on trees, can be dried to produce excellent tinder.

Char cloth is simply Cotton or silk scorched black. This is a good tinder and was widely used in history.

Damp tinder is a common problem...it needs to be absolutely dry. There are several things you can try. Keep damp tinder in your pocket, especially useful when hiking, your body heat should dry

it. Try rubbing it hard against absorbent clothing. With soft woods or fungi try stripping off the out layer, the middle may still be dry.

### Kindling

Kindling is the small thing wood you use to start a fire. This is usually dry wood, fire sticks, bark and pine cones. The kindling should carry the flame from the tinder and give it strength so that larger fuels can be used.

The wood must be dead...if it does not snap easily the it is not dead and should not be used.

Look for wood between the size of a match up to the thickness of your fingers.

Aim to get a 'bucketful'

### Main Fuel

As the kindling burns you should aim to slowly increase the size of the fuel. Never put on fuel that is more than twice the size of the fuel that is currently burning.

The thicker the wood the longer it will take to catch fire but once burning will last longer.

A range of sizes will be required, from 'finger size' up to 'large logs'.

Pay careful attention to the types of wood, the size, grading and storing the wood.

## Wood Store

A wood store is very important. Preparation is important and you need somewhere safe and dry to store your wood. The wood store should be in between your fire area and your chopping area, but not too close to either!

Try to keep your wood in a safe, dry place, off of the floor. This could simply mean laying down a few stout pieces of wood as base or could involve building a specialist store with a roof.

Either way make sure your wood is graded. Arrange the wood into separate piles in order of size. Keep the piles separated by knocking some stout sticks in the ground or keeping them on different shelves in your wood pile (largest pieces on the top).

Fill the wood store up before you light your fire. Keep the store full. Never let it become low.

The store should be kept dry. You can cover it over with an old groundsheet or similar or build a good roof from natural materials.

A supply of kindling and newspaper should be kept somewhere dry so if everything gets completely soaked there is still a chance of getting a fire going (this could be on the minibus or in a sealed container, metal is better than plastic in terms of little chewing animals). You will find you need much more kindling with wet wood as it has to dry before it burns.

If larger wood gets wet, this can be placed on top of an altar fire grill to 'steam' dry, stacked near or against the fireplace or perhaps under the metal altar fire.

## Location

You will need a site that is sheltered, especially during high winds. You will also need to take into account the layout of the rest of the camp.

Do not place your fire at the base of tree's, stumps or rocks. The heat can damage the leaves and smoke can kill any animals or birds living in the trees.

Keep the fire well away from your tents. Cooking fires need to be near the kitchen area.

Once you have chosen your site, clear the surrounding area to form a wide circle of bare earth (clear all twigs, leaves etc.) around 2m (6 ft) across.

If the ground is too wet to place the fire on directly, build a small platform from a layer of green logs covered with a layer of earth (or you could use a layer of stones. Do not use stones from a river bed/ bank. They will crack and explode when heated.)

Be especially careful if you build your fire on peat - once it catches fire it can be very hard to put out.

## Construction

How you build the fire depends on what methods you are using to light it and personal preferences.

- If the ground is damp or wet then build the fire on a platform of logs, thick sticks or flat stones.
- If it is raining hard, you may need to build a shelter over the fire but make sure that both this and the platform are made of green, and not old, dry wood.
- If there is a strong wind, shelter the fire before you try to light it.
- Make sure that you have plenty of kindling available, so that you can add more as the fire becomes established.
- For almost all fires you place your tinder in a small, loose pile in the middle of the fireplace and build the kindling around it, making sure that you do not pack it too tight, as the fire will need oxygen to burn well.
- Set fire to the tinder and gently blow on it until the kindling starts to burn
- Once the kindling starts to burn gradually add more until it burning nicely
- Gradually add the fuel into the shape that you want. Don't rush this stage and make sure that the wood you are adding is less than twice the size of that which is already alight.
- Never throw wood onto a fire, always place it carefully.

### Tepee Fire

A common method. Place a stick upright in the ground. Pack your tinder loosely around this stick. Lay some kindling against the stick at an angle to form a tepee. Light the tinder. The tepee will enable the fire to burn upward, allowing good draught. Add in the other fuel as the fire gets established.

### Criss-cross Fire

Lay your kindling in a square around and on your tinder. Place further sticks of kindling alternately in layers as if you were building a log cabin. Further kindling can be placed around the square.

### Propped Fire

Use a large stick or small log as a base. Lay your kindling propped up against the log with your tinder underneath.

## Types of Fire

### Basic Fire

A simple fire, 'hemmed' in on at least two sides with logs or bricks, with a grid across the top to place cooking items on.

### Altar Fire

This is basically a fire that is raised off the floor on a platform. These can be made from wood, but quite often metal is used, and half an old metal drum used to hold the fire.

### Reflector Fire

A lot of heat from a normal fire is lost to the surroundings. A reflector wall will reflect much of the heat back towards the fire.

### Trench Fire

Perhaps one of the simplest possible fires, the name suggests it all. Dig yourself a trench around 1m by 30cm (3 x 1 ft) and around 30 cm deep (1 ft). Place a layer of rocks on the bottom of the trench. Now build your fire on top of the rocks.

By placing the rocks on the bottom, they will absorb and hold a lot of the heat. Even once the fire has died down the rocks can be used as a 'grill'.

For general cooking you can use the pot rod holders in the camp gadget section, or a simple wire mesh across the trench with all your items on top, or even a spit placed across the trench.

### Indian Fire

Two holes are dug into the ground in line with prevailing winds with a U shaped tunnel connecting them. A fire is light in the downwind hole and a piece of wood placed in between the two holes to control the amount of wind entering the upwind hole.

### Star Fire

A star fire is formed by making a small fire and arranging logs around the outside facing inwards to form the points of a star. The logs are fed in lengthways and be drawn apart to leave glowing embers and ash (for cooking) in the centre. To start the fire going strong again simply push the logs together again.

This type of fire is very useful for conserving fuel. It produces little flame or smoke when required and can be easily 'stoked' by sitting back and pushing one of the logs inwards occasionally.

## Using the fire

Now you have the fire alight you can use it.

A cooking fire relies on using the hot embers, not on the flames! Build up a nice fire with good wood and let it form some hot embers well before you start cooking. Don't try to light a fire and cook straight away. You may find that a cooking fire will need extra fuel as it is being used. Simply move the pots and pans to one end and place extra fuel on the other end. Wait until it breaks down into hot embers and repeat.

On a long camp you may wish to have a fire constantly on the go to heat a large water container or similar.

If you want a nice fire to sit by during the night use something like a star fire that can easily be controlled and will not use vast quantities of fuel.

Although rarely used in Scouting, a signal fire needs to be specially prepared. You need a vast quantity of fuel specially arranged so that it will light and catch almost immediately. The only time that you want to place green ferns and the like on top to deliberately produce smoke.

In all cases care should be taken and someone should always be keeping an eye on the fire. Fuel should be regularly collected and carefully added to the fire. Care must be taken that the fire does not flare up or die out.

## Useful Tips

- Always store some firewood in your shelter, this means even if it rains then you can light a fire. If you cannot find any dry wood, then split some with a hand axe or shave it with a knife, it may be dry underneath. The best form of firewood is standing deadwood.

- An easy way to light fire sticks is to raise them up slightly and put your candle under the pile. The heat from the candle is constant and will light them, when they start to burn, pull the candle out.
- Build a reflector at the back of your fire if possible, you can use this as a rack to dry your wet wood out with.
- Fires burn faster if they are force fed more air
- Carry as many strike anywhere matches as you can
- Select and dry tinder in advance where possible, collect as you travel.
- Dry damp wood near the fire.
- Bank up fires to keep them in at night (Ensure fire is totally dead before leaving camp and guard against risk of fire spreading)
- Practise primitive techniques BEFORE you need them.

'Blowing tools' :

- Bellows: not so easy to find but VERY effective
- Fanning: Clipboard or UNBREAKABLE plate.
- Hot Air Gun: Turns almost any fire into a furnace
- A piece of copper tubing with a rubber hose on the end makes an excellent tool to safely introduce oxygen into a fire. The tubing and hose should be about 50 cm each to be used safely.

Cutting Turf:

- Cut 12" squares of turf to make an area the size of your fire
- Put them somewhere shady, away from the fire. Lie them flat with the roots at the bottom
- Gently and evenly pour a bucket of water over them every morning
- At the end of camp clean out the fire place, and rake the soil over.
- Gently replace the turf, and pour over 2 more buckets of water.

## Danger Points

- Do not line the edge of your fire with rocks from a river bed or flint. These have been known to explode when they are heated and can send fragments and hot embers flying in all directions.
- Always take great care when using a fire within a shelter or similar, sparks of loose embers pose a great risk to your health.
- Have a bucket of water or fire extinguisher nearby
- Do not wear nylon clothes near the fire
- Make sure the fire is out before you leave it
- Never use flammable liquid or aerosols on a fire
- Never pick up burning wood
- Don't play with the fire or 'poke it about'

## Tidying Up

This is one of the most important steps. You need to prevent a risk of fire spreading and ensure that the environment is left in a good condition.

- Make sure you allow the fire to die down and then using a stick pile the embers up.
- Make a well in the middle.
- Pour water into this and use the stick to stir in the embers to make a slurry. Watch out for the steam!
- Your guide to the fire being out is that you should be able to pick up the embers with your hands.

If you are in a remote area you should scatter them over a wide area where they will not be seen and remove any unburnt fuel to where you found it.

On a camp site you should dispose of the embers where you are instructed to do so.

Never bury the embers, they could cause an underground fire.

- Water the ground where you have had your fire and replace any turf you may have cut.