Adventurer's MK

FIRE BUILDING

INTRODUCTION

You don't just start a fire - you build one. Firelighting is a fundamental skill and vital for survival. A fire provides warmth, a place to cook or boil water as well as being a focal point for any camp. Knowing how to build, light, extinguish and clear away afterwards will ensure you are prepared for a survival situation and leave no harmful impact on the area you camp in.

Before you even consider building a fire make you sure have plenty of water a shovel and a fire blanket close to hand, and that the area around your fire pit has no overhanging branches, nearby brush or other flammable objects.

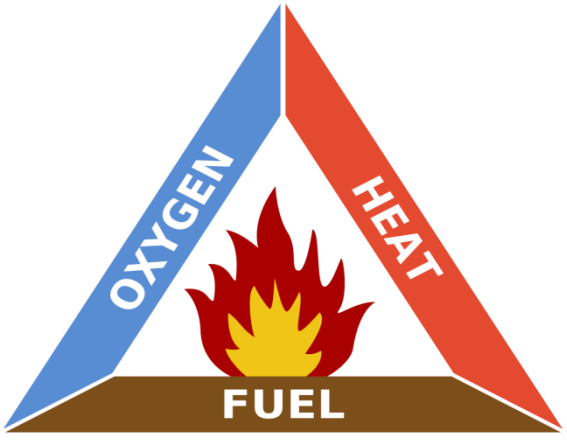
Safety

If it is not watched or properly controlled, your campfire can be dangerous to people and the natural surroundings. Fire can spread quickly and uncontrollably especially in dry conditions and a stray ember can be enough to start a forest fire. Follow the safety measures on where to build your fire to ensure your campfire is a safe and happy one.

- Don't build a fire bigger than you need.
- Never leave a fire unattended.
- Never use methylated spirits, paraffin, petrol or any other chemicals to start or rekindle your fire, as chemicals are volatile and even vapour from these can catch light.
- Don't use riverbed rocks or flint to edge your fireplace as they can sometimes explode when hot.
- Keep loose clothing tucked in and long hair tied back around a fire.

Fire Triangle

The three elements needed to light and maintain a fire are Oxygen, Heat and Fuel, known as the fire triangle. If you take away one of these elements, the fire will not light or will go out.



Preparing the ground for a fire

Clear away any loose particles (leaves and twigs) from you fire spot. If you are to build a fire in a grassy area, first use a spade to cut through the turf and outline a square where your fire will be built (store the squares away from the fire grassy side down and water them frequently to avoid them drying out as you will need to replace them once the fire has been extinguished and cleared away.

- Fires can cause damage so think carefully about where you locate it and the effect that it will have on the ground and surrounding areas.
- Light your fire well away from trees, hedgerows and anything flammable.

Fireplaces

There are many different types of safe and efficient camp fireplaces. Their construction depends on the materials at hand. If large stones are available build a wall to enclose the fire on three sides. Almost any height will do, depending on the size of the stones, but a wall of around 25 cm provides a good-sized coal and ash bed in which to cook potatoes or to place a camp oven.

As a general rule do not take rocks from a stream or river bed to make a stone fireplace. These are often highly unstable and will explode as the fire gets hot. A second method is to dig a trench and stack the soil or oblong turfs to each side. This method is widely used in outback areas where the soil is heavy and conditions are usually dry. It is virtually windproof. It works best where the soil is mostly heavy clay and the ground is absolutely dry. It is useless in damp or boggy areas.

Simple 'one-stop' camping fires can be made by laying the wood directly on the ground and using a series of constructed props and stakes to hold cooking implements.

In the absence of stones and where green wood is of no value - such as sucker growth - it can be used to make a reflector fireplace. The reflector, made by driving four stakes into the ground and stacking cut lengths of green wood up it to a height of about 50 cm, should be on the windward side of the fire. The wind, passing over the top of the reflector, draws the flames upwards and so increases the strength of the fire..

Extinguishing a campfire

Stop adding fuel and wait for the fire to burn down and turn to ash. Break down large logs by knocking them with a long stick so they will burn quicker and turn to ash. Once the fire has completely burned down, pour water on all parts of the fire and stir the ashes with a stick to make sure that all the embers are put out. Check no stray embers have escaped. Pour water over it again and carefully check that the ashes are cold to the touch.

Never just cover your fire with dirty to put it out – Embers can continue to burn for days and can re-ignite with the slightest of breeze.

Clearing away a fireplace

You should leave no trace of your time at a campsite including leaving no trace that a fire existed. Check that the fire is completely extinguished and any remaining small pieces of wood can be scattered into the surrounding foliage. Scatter fresh soil over the area then smooth it down and water it well. If a fire has been alight for a long time then make holes in the ground to allow water in to cool the ground below the surface. If you cut out the turf when you arrived, replace it now and fill any gaps with soil, grass and leaves to look as natural as possible.

Consider these rules

1. The thinner the wood, the faster and more smoke-free it will burn. Piling on wood that's too thick too soon is one of the major reasons fires fail.
2. Smoke tells you that the fire needs more oxygen. You should see "light" between every stick/log you place on the fire. If you see smoke between two sticks, move them farther apart.
3. Wood burns better when organized in roughly parallel layers. This creates a "chimney effect," which produces a better draw and hotter flame.
4. Don't overload the fire base with kindling or fuel. Instead, insert a few sticks at a time into the developing flame. Every stick/log you add draws heat from the young blaze. Add too much wood at the start, and your fire might cool and go out.

Firewood and fire in the rain

Wood picked up from damp ground after heavy rain is useless for starting a fire. Instead, pull dead branches off trees. These will be much drier and will burn relatively easily. However, if the twigs are too wet, feather sticks can be made. Select several pieces of dead wood on a shrub or tree and break them into lengths of about 25 cm. They should be about 1-2 cm thick. Cut away any damp outer wood and trim the dry wood down in 'feathers'. Three or four of these feather sticks can start a fire.

Light a fire safely

Some safety guidelines to follow are:

a. ensure you have fire safety equipment available to you before starting a fire. This equipment could be a shovel, rake, pail with sand or water, or a fire extinguisher. This equipment stays by the fire all the time. Never light a fire beside a lantern, stove or fuel container;
b. never leave your fire unattended and always ensure the fire is fully extinguished before leaving it;
c. choose a site that is already established as a fire ring/pit/mound, or select a site that is free from combustible ground cover, has no overhanging branches, and is away from buildings (3m). Think about where sparks might fly and pick a site that is appropriate – do not start a fire on a windy day;
d. ensure that you know the regulations concerning fires for the area that you are in. Some parks, conservation areas, and training areas do not allow fires at any time, or may restrict fires when the weather has been hot and dry; and
e. a small hot fire is more efficient and useful than a large bonfire. Always keep the size of your fire under control, and do not use more wood than necessary to keep it burning.
f. do not try to burn food scraps or plastic.

A friendly fire

A small campfire brings warmth and comfort to your bivouac. Except in survival situations, fires are a luxury, not a necessity. Campfires can sterilize soil to a depth of 10cm, and overeager firewood collectors can strip a bivouac site clean of all available wood – wood that would ordinarily decay and provide nutrients for plants and insects. Building an environmentally safe and friendly fire takes only a little extra preparation, and makes cleaning up and disguising the fire site after much easier.

Check your area for a sufficient supply of firewood. If there is a shortage in the vicinity, do not build a fire there – this will only add to the shortage of wood. Only collect firewood that you can break with your hands and do not take all the available wood from one place – leave some for future use. Only collect enough firewood for your use – do not stockpile. If a fire site has already been established, use it. If it is more than 30cm in diameter, remove the excess ashes and coals, distribute them thinly around the area, and reform the site to a ring no larger than 30cm.

If you are in a pristine location, you need a fire site that protects the underlying ground as well as the surrounding environment. The best way of building a safe and environmentally friendly fire is to use a fire pan – a steel pan at least 30cm across, with 10cm high sides, which you place on top of a dirt or rock platform. Build your fire in the pan and you can use the sides to hold up a grill for cooking.

Types of fire
The size and type of fire you build should depend on the materials available and the purpose of the fire. The following fire types are all common and reasonably easy to light and maintain. There main purpose is to be used as a method of cooking and boiling.

Tower

- Lay seasoned/dry logs side by side in the fire area, place a second layer on the top in the opposite direct to the first to create a hearth. On top of this hearth begin to build a tower by laying smaller sticks in a log cabin structure. Fill the squared off space with tinder and kindling. Place twigs on the top to create a roof.

Star Fire

- This fire is easily built and can be used to hang a kettle over or provide a stable base for resting a pot on. Lay six slender logs in a star shape that meets in the middle, these logs will help the fire to burn for a long time. Use smaller sticks and build a tripod over the centre of the star, leave one side open and place your tinder and kindling in the space. Keep adding more sticks around the outside to create a wigwam shape.

Trench Fire

- Dig a rectangular hole in the ground measuring approximately a metre long by 30cm wide and 30cm deep creating a slope of approx. 20* into the hole. The back of the fire should face into the wind to supply it with oxygen. Lay a grate across the top for cooking.

Smokeless fire
In a very restricted campsite or in a cave or other natural shelter it can' be an advantage to know how to build a fire that gives off almost no smoke and also one in which the flames are not large. Smoke is the result of incomplete combustion. By ensuring that the combustion is almost total the volume of smoke will be reduced to next to nothing. By feeding a fire continuously with small twigs it will be nearly all flame and smoke will be kept to a minimum.

Fire Reflector
Once your fire has been built, you may wish to make a reflector to direct heat back towards the fire by building a screen of wood laid on top of each other. Not only does this provide a heat reflector, but also creates a shield against prevailing winds.

Tinder, Kindling and Fuel
Tinder, kindling and fuel are three essential ingredients for firelighting. You should collect plenty of materials before starting to light your fire as you do not want to leave it unattended to gather more fuel. Lay out the materials in order of thickness so that you can feed the fire slowly and gradually, which should give the best results.

Tinder
Small, dry, highly flammable material used primarily to catch a flame. Different types of tinder are used depending on how you are at lighting fires – wood, dried grass, birch bark, leaves, string, cotton wool and even fungus such as crampballs (also known as King Alfred's cakes as they resemble burnt buns) can all be used as tinder.

- **Wood shavings** use a pencil sharpener to produce shavings from a pencil thick stick or use a knife to slice thin wood shavings which are easier to catch light than thicker sticks.
- **Feather sticks** are better than wood shavings as you can move them about in a bundle to catch a flame. Find a dry stick approximately 2-3cm in diameter. Use a knife to slice down the sides, making sure they stay attached at the bottom. They allow oxygen in and unlike shavings, can prevent moisture getting into the wood from the ground. These strips make it easier to light the stick
- **King Alfred's cake** A good natural firelighter is a fungus found on dead wood, it looks like a lump of coal but has been most associated with the cakes King Alfred burnt when hiding out in the country (849-899). The black variety is best for firelighting, and must be completely dry as fresh ones will not work. A spark is enough to ignite it and it will carry an ember for a long time.

Kindling
Consists of small sticks and splinters from the size of a match up to pencil, but no thicker than your little finger. It's bigger than the tinder but not as big as logs or large pieces of wood. Kindling needs to be dry to catch light more easily.
Be careful not to put too much kindling on your fire, or too large pieces too soon as you may smother the fire and prevent it from catching the flame from the tinder or suffocating all the oxygen from the fire itself.

Fuel
Builds up your fire and keeps it burning. For most campfires, medium sized sticks and logs are fine for fuel. Wood should ideally be dry seasoned wood, this is because fresh wood has more moisture which affects the burning quality and generates smoke.
Logs and sticks should be laid on the kindling carefully, or built as part of the construction of your fire. Be careful not to put the fire out as you add more fuel.

Firelighting
Firelighting takes practice and good quality equipment and materials to get the quickest and best results. Preparing your firelighting kit in advance will pay off on a cold, wet night when you need your fire the most.

Ferro Rod
- A ferro rod and striker is a reliable firelighter and will stand you in good stead for many camping trips. It can be used to light a range of tinder and will guarantee a spark in the wettest of conditions.

Lighters
- There are many different types of lighters available, but will prove less reliable in strong winds and rain. Although a lighter is an essential part of any fire lighting kit, they should not be relied upon as your only means of generating fire.

Waterproof matches
- Waterproof matches were originally developed for the Ministry of Defence. The flame cannot be blown out and the match will light up even when they are wet.

Battery
- Use a battery to generate a spark. Use of this method depends on the type of battery available. Attach a wire to each terminal. Touch the ends of the bare wires together next to the tinder so the sparks will ignite it.

Fire-Plow
- The fire-plow is a friction method of ignition. You rub a hardwood shaft against a softer wood base. To use this method, cut a straight groove in the base and plow the blunt tip of

the shaft up and down the groove. The plowing action of the shaft pushes out small particles of wood fibres. Then, as you apply more pressure on each stroke, the friction ignites the wood particles.

Bow and Drill

- The technique of starting a fire with a bow and drill is simple, but you must exert much effort and be persistent to produce a fire. You need the following items to use this method:
    - **Socket**. The socket is an easily grasped stone or piece of hardwood or bone with a slight depression in one side. Use it to hold the drill in place and to apply downward pressure.
    - **Drill.** The drill should be a straight, seasoned hardwood stick about 2 cm in diameter and 25 cm long. The top end is round and the low end blunt (to produce more friction).
    - **Fire board.** Its size is up to you. A seasoned softwood board about 2.5 cm thick and 10 cm wide is preferable. Cut a depression about 2 cm from the edge on one side of the board. On the underside, make a V-shaped cut from the edge of the board to the depression.
    - **Bow**. The bow is a resilient, green stick about 2.5 cm in diameter and a string. The type of wood is not important. The bowstring can be any type of cordage. You tie the bowstring from one end of the bow to the other, without any slack.

To use the bow and drill, first prepare the fire lay. Then place a bundle of tinder under the V-shaped cut in the fire board. Place one foot on the fire board. Loop the bowstring over the drill and place the drill in the precut depression on the fire board. Place the socket, held in one hand, on the top of the drill to hold it in position. Press down on the drill and saw the bow back and forth to twirl the drill. Once you have established a smooth motion, apply more downward pressure and work the bow faster. This action will grind hot black powder into the tinder, causing a spark to catch. Blow on the tinder until it ignites.

Burning Properties of woods

Excellent

- ✓ **ASH**: The best wood for burning as it provides both flame and heat and will even burn when green.
- ✓ **BEECH**: Almost as good as ash, but green wood is not suitable.
- ✓ **BLACKTHORN**: Burns slowly with good heat and little smoke.
- ✓ **HAWTHORN**: Similar to blackthorn.
- ✓ **OAK**: Very old dry seasoned oak is excellent for heat, burning slowly and steadily and producing little ash.
- ✓ **YEW**: Burns slowly with a fierce heat and scent is pleasant.

Good

- **APPLE**: Very good as it burns slowly and steadily, creating little flame but a good heat and smells nice.
- **BIRCH**: Good heat but burns away quickly.
- **CEDAR**: Snaps and crackles, gives off a good heat but little flame. Needs to be fully dried out before burning.
- **CHERRY**: Slow burner produces good heat and nice smell.
- **HAZEL**: Good
- **MAPLE**: Good.

Fair

- **ELM**: Unpredictable since dutch elm disease. Can smoke violently.

- **HOLLY**: Good only when seasoned.
- **LAUREL**: Has brilliant flame.
- **PINE**: Burns with a splendid flame, but is apt to split.
- **RHODODENDRON**: The thick old stems, being very tough, burn well.
- **WALNUT**: Good with a pleasant smell.

Poor

- **ALDER**: Poor in heat and doesn't last
- **DOUGLAS FIR**: Little flame or heat
- **ELDER**: Quick burner creates a lot of smoke but not much heat
- **HORSE CHESTNUT**: Good flame and heating power but spits a lot
- **LARCH**: Crackly, scented and fairly good for heat
- **LIME**: Burns with dull flame
- **POPLAR**: Poor to fair
- **SWEET CHESTNUT**: Burns when seasoned but spits excessively making it unsuitable for campfires.
- **SPRUCE**: Burns too quickly and with too many sparks
- **WILLOW**: Burns slowly with little flame even when seasoned, and is apt to spark

L.N.T Campfires

Every fire should abide by these **Leave No Trace** practices:

- Build a fire only in areas where wood is abundant. The fire should cause no further negative impact on land.
- The best place to build a fire is within an existing fire ring. The use of a fire pan is also a good alternative.
- Keep the fire small and burning only for the amount of time you are using it.
- The fire should not degrade the surrounding area as a result of the concentrated trampling of people who are cooking and socializing.
- After fully extinguishing a campfire with water (not dirt), grind small coals to ash between your gloved hands. Thoroughly soak the ashes with water and scatter the cold ashes over a wide area of plant-covered ground away from camp. Leave the fire site in the same condition in which you found it.