

How to Light Fires Safely

This card gives guidelines on how to safely prepare, light and extinguish fires. The following process can be split up over a number of sessions or completed as one longer session.

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1. Safety

Carry out an initial risk assessment of the site and planned activities, considering the nature of the group you plan to do the activity with. Identify any constraints that need to be understood by participants such as permissible size of fires, frequency of fires, type of soil, etc. Create a plan of how the fire lighting activity will be run and what emergency procedures need to be in place before starting the activity. Use of fires should be supervised at all times by a competent instructor.

Location

Light fires in a safe and approved fire pit area. (Refer to 'How to build a fire pit' card.)

Ensure you have permission to light fires at the site.

Safety around the fire

Loose clothing and hair tied back, tucked in.

No flammable clothing (plastic and nylons) to be worn next to the fire.

Everybody working with fire will have had appropriate information, instruction & training.

Emergency equipment - All emergency equipment in a specified location close to hand.

Emergency water - To pour over burns to cool.

Burns first aid kit - Apply dressings and cooling gels.

Fire blanket - To smother an out of control fire or person on fire.



2. How fire works

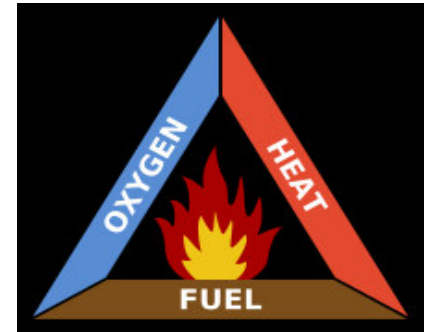
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The “**Fire triangle**” illustrates the rule that to ignite and burn, a fire requires three elements – heat, fuel and oxygen.

Heat –The energy provided by ignition from a spark, flame or friction.

Fuel – Material for burning such as wood, coal or charcoal to continue to supply energy.

Oxygen – Usually sourced naturally from the air. More oxygen is injected to feed the fire by blowing carefully in to the base of the fire.



3. Resources

Collect all of your required resources before attempting to start lighting a fire. It is helpful to lay out your materials in size order in a dry place.

Tinder: Tinder is easily flammable material used to ignite fires. Ideally tinder needs to be small/thin and dry.

Materials commonly used as tinder:

Natural tinder –Dried leaves or grass, birch bark, standing dead wood, dry or charred wood, wood shavings, a feather stick, some types of fungus, bird down, bluebell stalks, dry pine needles

Manmade/processed tinder – cloth, lint, frayed rope (if made from plant fibres and not treated), cotton wool, paper, newspaper (not colour), toilet paper, shaved magnesium



Kindling: Larger sticks than the tinder, pencil thickness to about anything you can break easily by hand.

Fuel: This is large sticks, split logs, logs, charcoal.

Ignition: Flame from matches, sparks from a flint, heat from the friction of rubbing sticks together.

Wood and twigs will ignite better when they are made up of dry/seasoned wood with as much surface area as possible, especially with edges exposed.

4. Fire lighting

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There are many different ways to light a fire. In this explanation a flat cooking fire is built in a gradual step by step process.

a.) TINDER, KINDLING AND FUEL is neatly stacked close to hand but not too close to catch alight.

b.) CREATE A DRY PLATFORM of sticks to raise your fire off the damp earth. Place a bed of dry leaves, cotton wool or a layer of birch bark on top of the platform. This will stop your tinder falling through the sticks.

c.) PLACE TINDER onto this bed. Fluff up the tinder to allow plenty of surface area and exposure to the air.

d.) IGNITE THE TINDER. Using a flame, spark or high temperature heat source. Avoid standard cigarette lighters as they can cause burns.

e.) ADD MORE TINDER swiftly and carefully as soon as the tinder has caught alight. Allow each bit to catch before adding more. Too much added at once can suffocate the flame; too little and the flame will exhaust before catching the next pieces alight. Gradually increase the size of tinder added.

f.) ADD KINDLING Once the tinder is burning, add smallest pieces of kindling laying the kindling across the tinder in one direction allowing each piece to catch. Add the next sized kindling at right angles again allowing it to catch before adding more. Continue gradually adding the kindling in this way. This close method assists the flames to catch the next pieces alight.

g.) ADD FUEL Once the kindling has caught and is burning well start to add the fuel. Once again make sure you place pieces on the fire carefully to prevent flicking embers up and possibly extinguishing your fire. Lay the logs along the fire in parallel. Ensure you are low and to the side of the fire, up wind of it, to avoid rising sparks, smoke and heat.



5. Extinguishing the fire

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Removing an element from the '**fire triangle**' will extinguish the fire. **Fuel** can be removed naturally by the fire consuming all the burnable fuel, or manually by removing the fuel with tongs. **Heat** can be removed by dousing with water; the water turns to steam, taking the heat with it (be aware that this can have an explosive effect). Separating burning fuels from each other is an effective way to reduce heat. **Oxygen** may be removed from a fire by smothering it or enclosing it. The fire will quickly use up all of the available oxygen.

a.) Extinguishing a campfire: Spread out the burning embers across the whole pit (heat removal) ideally leaving enough time for the campfire to burn out naturally (fuel removal). If you do not have enough time to wait for the fuel to burn out naturally, assist the extinguishing process by smothering the embers with an inflammable weight such as a damp log (oxygen removal). Do this carefully so as not to flick embers or burning sticks out of the fire. When dampening down embers watch out for burning embers sticking to whatever you are using. Do not dampen down with your boot as hot embers can melt the plastic and stick to the sole of your boot. If there is absolutely no potential for ground fires due to the nature of the soil or the construction of the pit go to **c.)**.

b.) Preventing ground fires: Once the embers have stopped glowing and most heat has been removed, pour water around the inner edge of the fire pit border (do not pour cold water onto hot rocks as this could cause them to split or explode). Gradually work your way into the centre pouring water carefully. If the water/ground/ embers sizzle at any time, repeat step **a.)**. It may be necessary to poke holes into the bottom of the fire pit to help water soak in. Check the temperature of the ground in and around the pit and repeat this process if necessary.

c.) Preventing re-ignition: Check all heat is dissipated before you leave the site.

Check: All the embers are extinguished. The ground temperature is cool around the outside of the border of the pit, on the floor of the pit and a few centimetres down into the earth. If the ground is hot to touch then the site should not be left in case a fire re-ignites. To extinguish large logs carefully scrape off the embers. Allow time to cool checking for any re-ignition. Once cool douse with water.

If you carry your kit to the site then consider using your emergency water to carry out (b). As the fire has been extinguished there are no heat sources to cause burns. This gives you a lighter container to carry back and ensures fresh emergency water is brought each time.

6. Fire lighting with groups

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- a.) WEATHER** Before the fire lighting session starts consider the weather and how this may affect the activity. (To promote success introduce the concept of fire lighting on a dry day.)
- b.) SAFETY** Check clothing and loose items. Natural materials such as wool and cotton clothing are less flammable. Split the group up into small groups.
- c.) FIRE LOCATION** Allocate each group a location to light their fires. If the fires are only going to be burning for a couple of minutes shallow scrapes where the top leaf litter is cleared to expose the soil may be appropriate but, you must check that the soil is not flammable. In a big fire pit you could fit approximately three groups in around the edge (the group must be able to understand the safety implications of working in close confines with others).
- d.) COLLECT TINDER KINDLING AND FUEL** Look at different materials and discuss their properties and whether they would make good tinder, kindling or fuel. Collect plenty and take back to pile up in size order next to the group's allocated area. A collection bag is useful for collecting kindling and tinder.
- e.) FIRE LIGHTING DEMONSTRATION** Explain clearly how big you want the fires to get. Maybe set a challenge to get the fires to burn for 3 minutes only.
- f.) GROUPS LIGHT FIRES** Groups then attempt fire lighting. Supervision is necessary at all times.
- g.) EXTINGUISH FIRES** When the session is finished check all fires are extinguished correctly.

Magnesium blocks are a challenging and interesting way to introduce fire lighting to groups. Each block has a flint and a scraper on a chain. Place the block on something hard such as a tree stump. This allows you to press down without your fingers being beneath the scraper. Use the serrated edge of the scraper to draw long strokes along the magnesium block to scrape off curly pieces of magnesium onto some bark or cotton wool. **To ignite** turn the block around so that the flint is facing upwards, Scrape down the flint in a long stroke to create a spark. Aim the spark towards the curls of magnesium.

Warning - Magnesium burns at a very high temperature.



7. Handy hints

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Spend time collecting plenty of good dry tinder and kindling before attempting to start your fire. Fire lighting is an art: the more experience you gain the easier it becomes and you may need several attempts before it works. The most common reason for unsuccessful fire lighting is wet or poor tinder, kindling and/ or fuel.

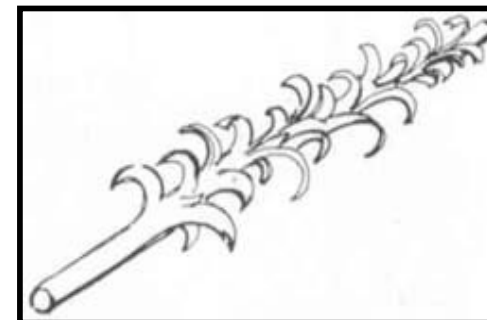
Floating embers of burned paper or leaves are easily carried off by rising hot air, and can land on other objects and potentially ignite them. Paper can be crunched up to reduce this hazard.

Adding oxygen. When lighting fires it is helpful to increase levels of oxygen available for the fire. Position yourself up-wind and try to get as level with the fire as possible, considering safety issues particularly loose clothing or hair. Relax and blow gently and constantly into the base of the fire. If you blow too hard at the tinder stage you may blow the tinder away. Too hard in the kindling and fuel stages could result in hot embers being blown up and back towards your face. Also you will run out of breath and potentially become light headed.

Standing dead wood – This consists of dead branches and twigs that have been caught up in branches and have not reached the ground yet. Wood lying on the ground absorbs moisture from the soil making it difficult to ignite, whereas standing dead wood is air-dried. To check if wood is suitable bend it a little. If it breaks with a snap, it is most likely dead and dry. If it bends it is most likely still alive and attached to the tree or recently separated and not dried out.

Feather stick – this is a useful technique to use especially after rainfall. By shaving the wood with shallow cuts with a penknife you can expose the dry inner wood and allow more surface area to be exposed to the ignition source.

Snapping sticks can cause splinters and flying splinters. Wear protective gloves to handle split wood and to snap sticks. Always snap sticks with the opening break pointing away from your face. Only split logs with appropriate tools and training.



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