

THE SCIENCE OF FIRE - THE FIRE TRIANGLE

<https://scoutermom.com/17790/the-science-of-fire-the-fire-triangle/>

Fuel

The first thing to consider in the science of fire is fuel. Fuel is the part of the fire triangle which you are burning. For a campfire, this would usually be wood. The wood has cellulose (the stuff which makes up plant cells) and some moisture.

When you are starting a fire, you are heating the wood up and getting rid of the moisture. The fuel must be in contact with the heat source to ignite.

Only after you get rid of the moisture will the wood give off burnable gasses and really start to ignite.

So drier wood is better for starting a fire. This is also why you must be extra careful when using fire in dry, drought-like conditions. In this setting a fire can start quickly and rapidly become out of control.

Heat

Heat is the second part of the fire triangle. Heat is the energy that raises the temperature of the fuel to its ignition point. Heat sources can be flames, sparks, friction, or any other source that can raise the temperature of the fuel to its ignition point.

When a fire burns, a chemical reaction takes place and the energy stored in the chemical components of the fuel is released. But heat is also what starts that process. So basically, you need some heat to start the fire in order to burn off the moisture and to cause the carbon in the fuel to burn. The larger your fuel, the more heat you will need to start the reaction. This is why you need to start with paper and tinder. Holding a lit match under a log will not make it catch on fire. Holding the lit match under your paper and tinder will start the ignition process.

Oxygen

Oxygen is the third part of the fire triangle and is required for the chemical reaction. Oxygen is the air that feeds the fire and allows it to continue burning. Oxygen makes up about 21% of the air around us and is necessary for combustion to occur. If the oxygen supply is cut off, the fire will go out. More oxygen will cause the fire to burn hotter and restricting oxygen will slow the reaction down or even stop it. This can be seen when you get a little flame going and then add a big pile of fuel on top, smothering it. The excess fuel restricted the flow of oxygen to the flame and stopped the reaction.

Gently forcing air toward a fire can help it grow. But if you blow on the fire with too much force, you blow away the flammable gasses, which also puts out the fire. The simplest example of this is blowing out a candle. Safety is always a concern when blowing oxygen on a fire also. It is better to fan it with a flat object or blow through a tube rather than putting your face close to the fire.

Since oxygen is required for the reaction, removing oxygen can be a very effective way to control fire. So if you have a campfire, it is a good idea to have a shovel and some dirt or sand nearby in addition to buckets of water. Adding dirt or sand to your fire will restrict the flow of oxygen and is a very fast way to make it smaller or extinguish it all together.