



## For Demonstration Only

### ***Make sure you have***

Beaker (250 ml)

Saturated Calcium acetate Solution

Ethanol

Spatula

Lithium salt solution spray (LiCl in water)

Copper salt solution spray (CuCl<sub>2</sub> in water)

Sodium salt solution spray (NaCl in water)

2 Heatproof mats

### ***What to Do...***

1. Add about 50 ml of the calcium acetate solution to the beaker
2. Add ethanol and stir until a solid is formed (if no solid is formed add more ethanol!)
3. Scoop out the solid and place on a heatproof mat.
4. Light the solid.
5. Spray the flame with the Lithium salt solution

**You should see a pink flame**

6. Spray with the copper salt solution

**You should see a green flame**

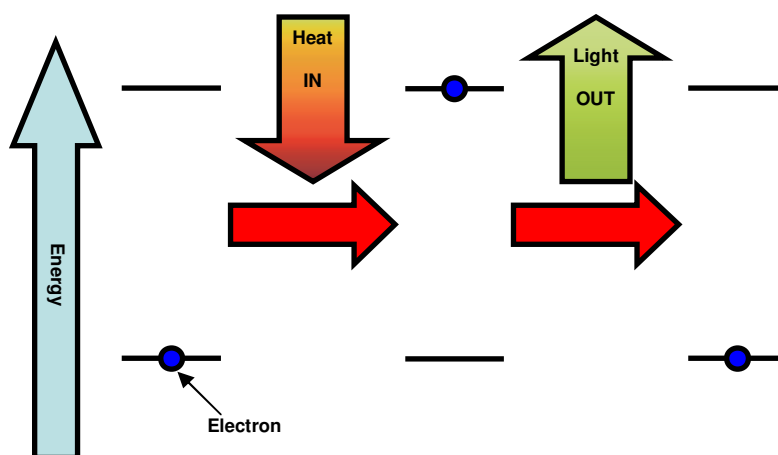
7. Spray with the sodium salt solution

**You should see an orange flame**

8. Put the flame out by placing the other mat on top of it

### What's Happening?

The solid you have made is a firelighter – similar to the white blocks that are often used to get a barbeque going on a rainy Scottish summer day! When you spray on a metal salt, the flame gives the electrons in the metal energy (**excitation**). This energy can then be lost again in the form of light (**emission**). The colour of the light depends on the metal: Lithium(I) gives a pink flame, Copper(II) gives a green flame and Sodium(I) gives a yellow flame.



This process is used extensively in Chemistry to determine what type and concentration of atoms a substance contains. Chemists basically burn the substance and measure the frequency (*i.e.* colour) of the light that's given out. This process is called "Atomic Emission Spectroscopy".

These colours are also often used in fireworks to give the different colours that amaze audiences at a firework display. The yellow colour for sodium should be particularly familiar as this is the same colour that comes from the sodium bulbs in streetlamps.