



Fireworks

The invention of fireworks led to the invention of pyrotechnic weaponry: the Chinese used their bamboo 'sparklers' on arrow heads to fire on enemies; In 1046 a gunpowder catapult was used in China; in medieval warfare fireworks were strapped to rats to cause destruction and mayhem.

Flame tests

Most of you will have set up traditional flame tests for students to do themselves: Add some of the (dry) metal salt into a small beaker or watch glass. Using a wire hook, the students take a small amount of the metal salt and hold it in a blue Bunsen flame to see the colouration. However, this often ends with a blocked Bunsen and burned fingers.

Have a go at this demonstration of flame tests:

- Make a 50% ethanol mix with water in a spray bottle and add a little of the desired metal salt to dissolve.
- Set up the Bunsen behind a safety screen and ensure all the students are sitting away from the screen with safety glasses. Make sure you are wearing safety glasses.
- With the Bunsen flame on blue, spray the chosen dissolved metal salt through the blue flame to see the colouration.

Sparkler demonstration

- Using a blue Bunsen flame and with a safety screen in place, sprinkle a small amount of iron filings over the Bunsen flame – watch the resultant sparkles dazzle the students!

Potassium permanganate and ethanol/hydrogen peroxide:

Behind a safety screen:

- Set alight to a 50/50 mix of ethanol/hydrogen peroxide in an evaporating dish.
- Sprinkle some potassium manganate VII (KMnO_4) crystals into the burning mixture – along with purple flame you will hear the crackles and bangs often associated with fireworks – the pockets of high and low energy release as the potassium manganate burns.

Making a fuse

Behind a safety screen:

- Soak some thin strips of filter paper in saturated potassium nitrate solution and allow to dry.
- Once dry place onto some heatproof mats and light the end with a lit splint (remove the splint as soon as the 'fuse' catches alight) - the students can see how the flame creeps along the filter paper. They may also spot the purple colour of potassium if they are lucky.

[Disclaimer: These demonstrations can be dangerous if not done correctly.

Consult CLEAPSS hazcards and website and do a risk assessment and trials before they are carried out.

Timstar (WF Education) cannot be held responsible for any injuries incurred]