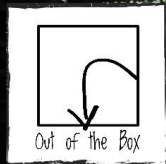


Fireworks





Fireworks

Many different cultures use fireworks during periods of celebration, such as celebrating New Year or during festivals such as Diwali. The Hindu festival of light, which is called Diwali, happens on Sunday 30th October in 2016. As always in the UK, many fireworks are set off on 'bonfire night' which is always 5th November and this date falls on a Saturday in 2016.



Origins of fireworks

Fireworks were thought to have first been made by accident in China several thousand years ago. The Chinese packed charcoal and sulphur powder into bamboo sticks and threw them into fires. When they ignited they flashed and produced smoke. Years later, a black paste was made by mixing charcoal and sulphur with saltpetre (potassium nitrate) and heating them together. The substance dried to form a black powder. It was found to be explosive when set alight. An early form of the firecracker had been invented. The firecrackers became an important part of Chinese

festivals and the loud bangs were thought to ward off evil spirits.

Firecrackers

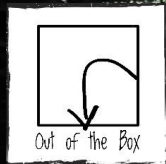
Simple firecrackers involve gunpowder (a mixture of potassium nitrate, charcoal (carbon) and sulphur) being wrapped in paper and a fuse to set it alight. The gunpowder is made from a mixture of charcoal, sulphur and potassium nitrate. When the temperature is high enough these substances react and produce a loud bang.

How are coloured fireworks made?

When some metals or metal containing compounds are heated to high temperatures some of them will burn with a coloured flame. If you place a lithium compound into a Bunsen burner flame it burns with a red flame whereas pure magnesium metal burns with a bright white flame. As different metals burn with different colour flames they can be used to make fireworks. Usually the metal will be part of a particular solid compound which is used in the firework. The compound which is used in the fireworks depends on the colour which is needed.

What colour?

Colour	Metal Element
Red	Strontium
Green	Barium
Yellow	Sodium
Silver	Magnesium and Aluminium
White	Magnesium



Fireworks

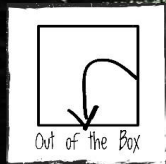
What else is needed to make a firework?

The solid metal or metal compound is chosen to produce a particular colour when the firework burns or explodes but what else is found inside a firework? A heavy paper or plastic container is needed to hold the mixture of chemicals together. Gunpowder is usually an essential ingredients in most fireworks and it acts as the fuel. An oxidiser (such as ammonium perchlorate) is included which is a substance which provides oxygen for the fuel to combust when set alight. A chlorine containing compound may also be included to make the colour stronger. In addition a binder is used to keep the mixture inside the firework held together. A fuse is added to allow a delay before the actual firework explodes.



Facts

- China is the largest manufacturer and exporter of fireworks in the world.
- Firework rockets can reach several hundred metres in the air and reach speeds of 150 mph.
- A purple coloured firework is produced by using a mixture of compounds containing strontium and copper metals.
- A simple sparkler will burn at a temperature of over 1000°C



Fireworks

Worksheet



1) Look at the map of the world above.

a) Find where China is located and label it with a 'C'.

b) What is the capital of China?

2) Research the materials and chemicals which would be needed to produce a sparkler and explain how it is made.

3) Find out the actual chemical name of a metal compound (metal salt) which could be used in fireworks to produce:

a) A red colour

b) A yellow colour

4) Make a factsheet warning people about the dangers of fireworks. Information which could be included in your factsheet:

- Why are fireworks dangerous?
- What safety precautions need to be followed when using fireworks
- How old do you need to be to buy and use fireworks?