



## Plastic - What is plastic?

### Fact

- Plastic is made from natural things that have long chains of molecules like wood, milk, cotton and coal but it's usually made from crude oil.
- The long chains of molecules are called polymers.
- Crude oil is heated and refined to make lots of products including Naphtha which you make petrol and plastic out of.

### Do you know

- The first plastic was made out of milk. This kind of plastic is called casein.
- Plastic was only invented 130 years ago.
- Thermosetting plastic is as hard as rock and can't be recycled. This kind of plastic has a triangle on the bottom with the number 4 in it.
- But thermoplastic can be re-heated and recycled and will have 1, 2 or 3 in the triangle.
- If you know when you put water that is hotter than 85 in plastic fizzy bottles they shrink and change shape permanently.

### Experiments you can do

Use chocolate buttons to experiment how plastic can be moulded.

#### What you need:

The help of an adult

A packet of cooking chocolate or chocolate melts

A wooden spoon

A teaspoon

An ice cube tray

Or the plastic tray from inside a chocolate box

Or a chocolate mould tray if you have one

#### What you do:

Get an adult to help you melt some of the chocolate following the instructions on the packet. Stir the lumps with a wooden spoon to make sure all the lumps have melted.

Use the teaspoon to put the melted chocolate into the ice cube tray or the tray from inside a chocolate box or the chocolate mould tray, and let the chocolate set.

When it's set tip the chocolate out (you may need to run the base of the tray under warm water to soften the chocolate a little). That is a bit like how plastic objects can be made. Heat, colouring and other ingredients are added to Naphtha and then the plastic is poured into the moulds to give the plastic shape.

## **Other Investigations**

Have a look at the plastic food packaging in your kitchen. The plastic items should have a triangle on the bottom with a number in it. The number tells you what process companies use to recycle the item. If there's no number it probably means that the item can't be recycled.

## **Make Casein Plastic**

### What you need:

An adult to help you  
2/3 of a cup of milk  
8 teaspoons of vinegar  
a pot  
a plate  
a stirring spoon

### What you do:

Pour the milk into the pot and get an adult to help you bring it gently to the boil. When the milk begins to steam and bubble, dribble in the vinegar, stirring the milk all the time. You will see lumps begin to form.

When the little lumps clump together to make a big solid lump get the adult to pour off the liquid and then tip your casein plastic lump onto a plate.

When it cools a little bit mould it into a shape, like a button then leave it to harden over night.

You'll end up with hard casein plastic. The first plastic that was ever invented – it's a bit different from the plastic we're used to!