

Make a thermometer

Discover how liquids change their volume as the temperature changes.

What you need

- Small clear bottle
- Surgical spirit
- Food colouring
- Medicine dropper
- Marker pen
- Ruler
- Clear biodegradable straw
- Modelling clay or Blu Tack
- Heatproof bowl

How does it work?

When you put the bottle into hot water, its contents gain heat energy. This means its molecules (the basic building blocks of a substance) move around more and the liquid's volume (size) increases. The bottle is sealed, which means the liquid pushes further up the straw. In icy water, the bottle loses heat energy to the surrounding water. Its contents take up less space, so the liquid level drops. Different liquids expand in different ways when heated. Repeat the experiment with a 50:50 mix of surgical spirit and water and see what happens.

TOP TIP
Make your thermometer accurate by measuring the temperatures of the hot and cold liquids with a medical thermometer and marking them on the straw.



1 Fill the bottle with spirit and add a few drops of food colouring. Suck up some liquid using the dropper.



2 Draw 5cm intervals along the length of the straw using a ruler and marker pen.



3 Soften the modelling clay by kneading it, then form it into a ball around the middle of the straw.



4 Put the straw into the bottle, so it reaches halfway to the bottom. Seal the opening to make it airtight.



5 Add liquid into the straw using the dropper. Continue until the liquid is level with one of your marks.



6 Stand the bottle in a heatproof bowl. Add hot water to the bowl. Try it again with ice water.



WARNING!
Use surgical spirit in a well-ventilated room. Dispose of it down the sink with plenty of running water.