

How to Grow a Rainbow

Science Experiment

Did you know that you can grow your own rainbow?

You will need a scientific process called the **capillary action**. This action happens when a liquid moves up through a hollow tube or into a spongy, solid material. It happens when three forces work together: **cohesion**, **adhesion** and **surface tension**.

Water molecules like to stick to each other - this is called **cohesion**. They also like to stick to solids in a process called **adhesion**.

In this experiment, you are going to use kitchen roll. The fibres in kitchen roll have lots of little holes. Water is **absorbed** through the kitchen roll because when the first water molecule **adheres** to it and begins to move upward, it pulls the next water molecule up with it, like a chain.



Words To Learn:

- capillary action
- adhesion
- cohesion
- absorbed

You will need:

- Kitchen roll/paper towel
- Felt-tip pens
- Two small bowls of water
- Paperclip
- Thread

What To Do:

1. Cut the kitchen roll into the shape of a rainbow.
2. At each end, use the felt-tip pens to colour a rainbow about 2cm up from the bottom. Remember the order of the colours: red, orange, yellow, green, blue, indigo, violet.
3. Attach the paperclip to the top of the rainbow and tie a piece of thread to it. This will allow you to hold your rainbow.
4. Add water to the two bowls.
5. Hold the rainbow with both ends slightly submerged into each bowl of water and watch your rainbow grow.



Fun with Density

You Will Need

- Honey
- Milk
- Water
- A Glass
- Vegetable oil*
- Food colourings
- Golden syrup
- Washing up liquid



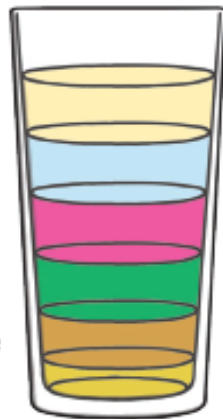
* Please dispose of oil safely and responsibly.

Density is a really tough concept to grasp. We confuse ourselves by referring to our weight all the time when we really mean our **mass**. **Mass** is effectively 'how much stuff' is there. **Density** is how much mass is in a volume (or space).

One way to illustrate density is to pour different liquids (which have different densities) on top of each other. The liquids with the greatest density sink to the bottom.

Method

- 1 Measure out the same volume of each of the liquids. Colour the water and the milk if you wish.
- 2 Starting from the bottom, pour in the honey. Make sure it goes into the middle of the glass and that you don't get any honey on the sides.
- 3 Slowly pour the golden syrup on top, followed by the washing up liquid.
- 4 Then add the milk, followed by the water.
- 5 Finally top with vegetable oil and admire your rainbow glass!



The Science Bit

Each of the liquids have a different mass of molecules or different numbers of parts squashed into the same volume of liquid, this makes them have different densities and therefore one can sit on top of the other – the more dense a liquid is the heavier it is.

Do you think you could float small objects on each of the different levels? We'd love to see a photo if you can.

Why Soap Works Experiment

You will need:

- A bowl
- Some water
- A sprinkle of black pepper (or another spice)
- Liquid hand soap
- A hand towel
- A camera (optional)

In this experiment, you are going to find out why soap works and why it is better than using just water to wash your hands.

In the experiment, the surface of the water in the bowl represents your hands. The pepper represents harmful dirt and germs that need to be washed away.

There are two tests in this experiment. They will show you what happens when you wash your hands with and without soap.



Fill the bowl with water, but not all the way to the top.



Sprinkle some black pepper on to the surface of the water. You should see the black pepper floating.



Test 1: Dip your finger into the centre of the bowl of water. Watch what happens to the pepper and record this.

Why Soap Works Experiment



Dry your hand, then dip your finger into the liquid hand soap.



Test 2: Dip your soapy finger in to the centre of the bowl of water. Watch what happens to the pepper and record this.

Top Tip

Use a camera to take photos to record what happens to the pepper each time you put your finger into the bowl.

