

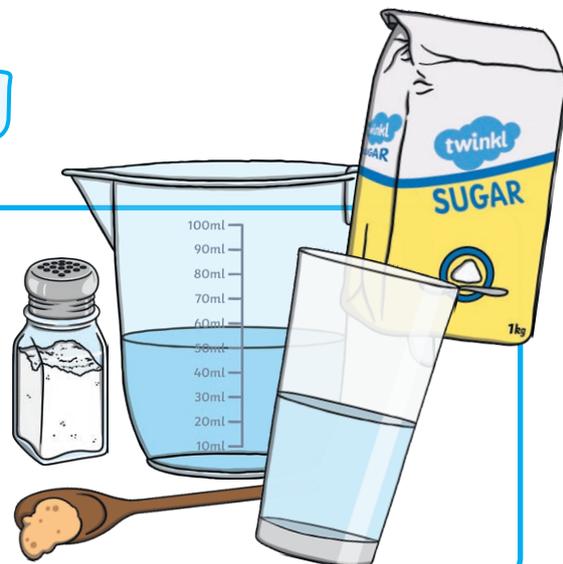
Disclaimer

We hope you find the information on our website and resources useful. The activities set out in this resource are potentially hazardous. The activities are not suitable for all learners and adult supervision may be required for some of the activities. It is your responsibility to assess whether the learners in your care are able to safely carry out the activities and whether the learners require adult supervision. You are responsible for carrying out proper risk assessments on the activities and for ensuring that activities can be carried out safely. We are not responsible for the health and safety of your group or environment so, insofar as it is possible under the law, we cannot accept liability for any loss suffered by anyone undertaking the activity or activities referred to or described in this resource. It is also your responsibility to ensure that those participating in the activity are fit enough to do so and that you or the organisation you are organising for has the relevant insurance to carry out the physical activity. If you are unsure in any way, we recommend that you take guidance from a suitably qualified professional.

Dissolving

You will need:

- transparent cups, jugs or glasses
- warm water
- teaspoons
- solid substances, such as sand, sugar, salt, instant coffee, etc.



Method

1. Half fill a transparent cup, jug or glass with warm water.
2. Add a teaspoon of the solid you are testing and stir for 1 minute.
3. Look at the solution. Is there any of the solid remaining?
4. Repeat steps 1–3 but change the solid.

Optional

Repeat all of the steps but half fill the cup, jug or glass with cold water.

- Does this make a difference?
- What do you notice happens?

The Science Bit

Solids like salt, sugar and instant coffee dissolve in water. They are soluble and usually dissolve faster and better in hot water. Ground pepper and sand are insoluble. They will not dissolve, even in hot water.

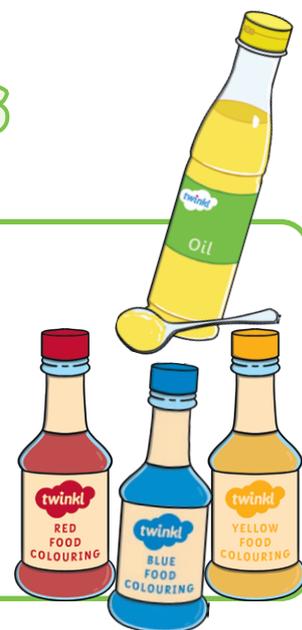
For Older Learners

Everything is made of particles, which are always moving in some way. A solution is formed when a soluble substance (solute) is mixed with a liquid it can dissolve in (solvent). This process is called dissolving. The rate of dissolving is affected by the temperature, the size of the particles of the solid and stirring.

Fireworks in a Glass

You will need:

- a tall glass or jar
- warm water
- tablespoons
- oil*
- small jug for mixing
- liquid food colouring



*Please dispose of oil responsibly.

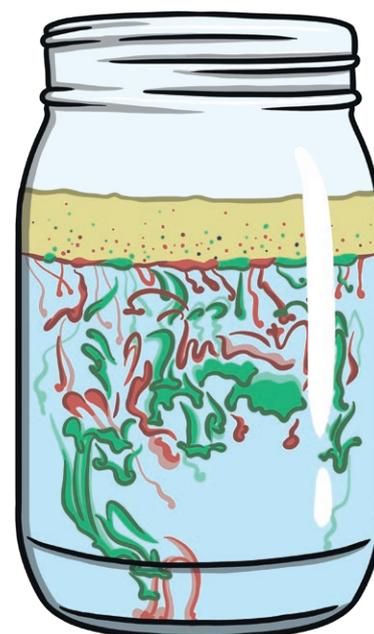
Method

1. Fill a tall glass or jar with warm water to about three-quarters.
2. Pour four tablespoons of oil into a jug.
3. Add some drops of food colouring and stir to break apart the droplets. You could add multiple colours.
4. Pour the food colouring and oil mixture into the water slowly and watch the fireworks!

The Science Bit

Oil and water don't mix. Oil is less dense than water, meaning that oil has a lower mass even if the volume (how much space is used up) is the same. It floats on top of water in a layer. Most food colourings are water-based. They are denser than oil and do not mix with it either.

The experiment involves pouring a food colouring/oil combination on top of water. The food colouring sinks through the oil into the water below. The food colouring is more dense than the water, leaving trails as the colour sinks and mixes with the water.



Fun with Density

You will need:

- measuring jugs or cups
- honey
- golden syrup
- washing-up liquid
- milk
- water
- vegetable oil*
- optional: liquid food colourings
- a large glass, jar or vase



*Please dispose of oil responsibly.

Method

1. Measure out 50ml of each of the liquids into separate jugs or cups. You may wish to add a few drops of food colourings to the water and milk.
2. Pour the honey into your glass. Make sure it goes into the middle and that you don't get any on the sides.
3. Pour the golden syrup on top slowly, followed by the washing-up liquid.
4. Then, add the milk, followed by the water.
5. Top with vegetable oil and admire your rainbow glass!

The Science Bit

Each of the liquids used has a different density. Density is a measure of mass (how much 'stuff' there is) divided by volume (how much space is taken up by a substance). These liquids have different masses of molecules squashed into the same volume (50ml each in this case). The greater the mass for the same volume, the denser the liquid. This allows one liquid to sit on top of another. The more dense a liquid, the further down the glass it will be.



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The Science Bit

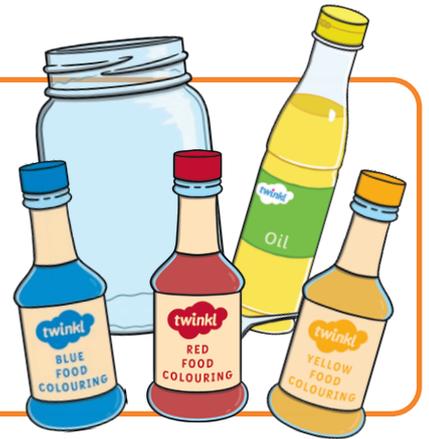
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Lava Lamp

You will need:

- a clear plastic bottle or jar
- liquid food colouring
- water
- effervescent tablet
- vegetable oil*



*Please dispose of oil responsibly.

Method

1. Fill the bottle or jar a quarter full with water.
2. Add vegetable oil to fill the rest of the bottle or jar. Leave a few centimetres of space at the top.
3. Add 6–8 drops of food colouring.
4. Wait for the two liquids to separate: water at the bottom and oil on top.
5. Add half of the effervescent tablet.
6. Watch for bubbles of coloured water to rise and fall.
7. Add the other half of the effervescent tablet.

The Science Bit

Water and oil will not mix but water and food colouring can. Water is polar and its molecules can form strong bonds with each other. Food colouring is usually polar too and can mix well with water. Oil is non-polar, however, and does not form bonds. Oil is also less dense than water, forming a layer on top of the water.

Effervescent tablets are usually made with sodium bicarbonate and citric acid. These react with the water and form carbon dioxide gas and sodium citrate. The carbon dioxide bubbles carry the coloured water to the top, creating the lava lamp effect.

