ACTIVITY 14

1. Learn why different chemicals form different crystal shapes.
2. Grow your own salt and sugar crystals.
3. Investigate how large crystals are formed.

CHEMISTRY AT HOME

CREATING CURIOUS CRYSTALS

●○○ EASY | 6-11 | 30 MINS

per activity plus a week to form crystals

ENCOURAGING TOMORROW'S CHEMISTS TODAY

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CREATING CURIOUS CRYSTALS

Safety

Take care when using scissors.

Take care with hot water.

This activity should be supervised at all times.

Crystals can be found all around us! Did you know that snowflakes, table salt, gemstones and even the microchips in your computer are made from crystals?

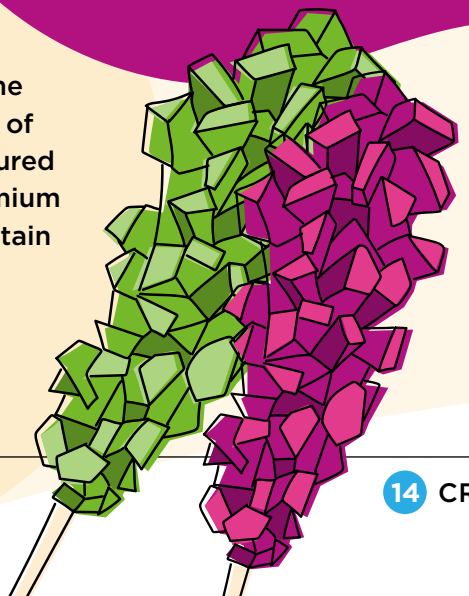
Most crystals form when water full of a dissolved chemical starts to evaporate, slowly leaving behind solid crystals. Crystals are very pure and contain atoms arranged in the perfect order for that chemical. Crystals form in different shapes because every chemical is a different shape and the chemical pieces fit together in repeating patterns, forming different 3D shapes.

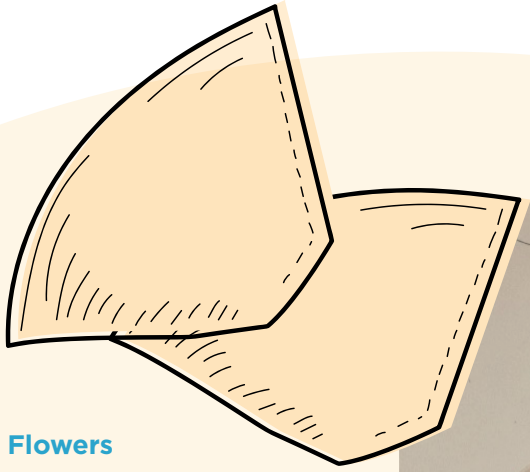
You will need

- 150g white sugar
- 500g table salt
- Teaspoon
- Measuring jug
- 2 colours of food colouring
- 3 shallow bowls or deep saucers
- 2 white coffee filter papers
- Scissors
- Sticky tape
- 2 green pipe-cleaners
- Magnifying glass
- Jam jar without lid
- Pencil

Did you know?

Rubies and sapphires are both crystals made from the same mineral (corundum) and are mainly composed of a mixture of aluminium and oxygen. Rubies are coloured red because they also contain tiny amounts of chromium impurity, whilst sapphires are blue because they contain tiny amounts of iron and titanium impurity.

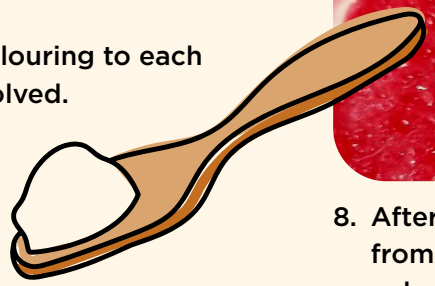




Instructions

Activity 1
Making Sugar Crystal Flowers

1. Using scissors, carefully cut a coffee filter into a circle shape. Two are needed.
2. Add 50ml of hot tap water to a measuring jug.
3. Add 10 teaspoons of sugar to the hot water and stir until dissolved. Now add more sugar, two teaspoons at a time until no more sugar will dissolve, and a few grains of undissolved sugar can be seen in the bottom.
4. Divide the sugar water equally between the 2 bowls.
5. Add 4 drops of food colouring to each bowl and stir until dissolved.



6. Check there is enough coloured sugar water in the bowl to completely cover the outline of the coffee filter paper circle – if not, cut the circle to make it slightly smaller. Lay one coffee filter paper circle on the top of each coloured sugar water bowl – they will float!

7. Leave in a warm place to evaporate for a week until dry – do not disturb the bowls.

8. After a week carefully peel the filter paper from the bowl. There should be mats of coloured crystals on the filter papers. If the underside is still damp, leave to dry on a plate.

9. Gently fold into a flower shape and tape on to the end of a pipe cleaner to make the finished flower!

Instructions

Challenge
Grow a giant salt (sodium chloride) crystal

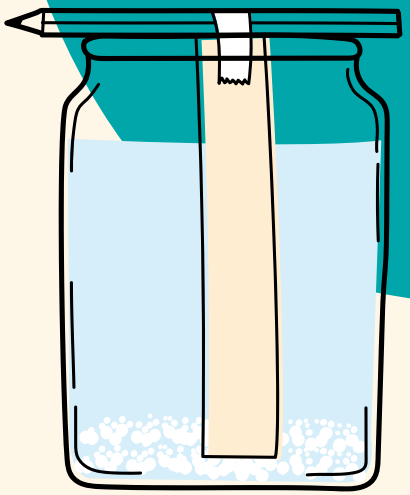
Jerome has read that a seed crystal can be used as a starter to grow a giant crystal. Try challenging your friends or family to see who can grow the largest salt crystal!

1. Add 200ml of hot tap water to a measuring jug.
2. Add salt to the hot water, a teaspoon at a time, and stir until dissolved. Keep adding salt until no more will dissolve and a few grains of undissolved salt can be seen in the bottom.
3. Pour the salty water (try to leave behind the undissolved salt in the bottom of the jug) into your jam jar until you have almost filled it.
4. Cut a long, thin strip of coffee filter and attach to the middle of the pencil with sticky tape so that the long strip sticks out at right angles to the pencil. Place the pencil over the top of the jar so the filter paper strip hangs almost to the bottom of the jar in the salty water.
5. Leave in a warm place (e.g. a window-ledge) for two weeks.
6. Take out the paper covered in crystals and leave to dry. How big was your largest crystal? Look closely at your crystals with a magnifying glass, what shape are they?

What's happening?

A saturated solution is one where no more of the solid chemical (in this case salt or sugar) will dissolve in the liquid. Hot water holds more sugar than cold water.

As the water in the sugar solution cools and evaporates over time, the sugar water becomes so concentrated that it cannot hold the sugar. Solid sugar starts to crystalise on the surface of the coffee filter. The crystals are tiny at first, but layer upon layer is added continually as the crystals grow, until all the water has evaporated. Sugar crystals are generally oblong shaped, whilst table salt crystals are usually cube shaped.



Sugar crystals

Salt crystals

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