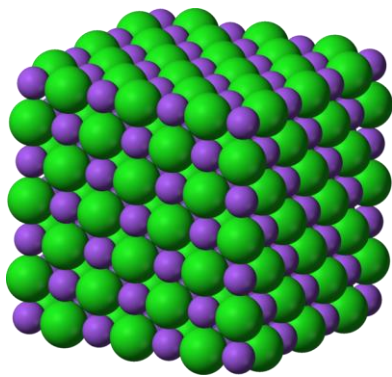


Growing Crystals

We Are Investigating...

- *How do crystals grow?*

Everything in the universe is formed of tiny atoms and these atoms are arranged differently in each material. Some materials have atoms arranged in neat, repeating patterns and if these patterns are large enough, they can form crystals.



sodium and chlorine atoms arranged in a pattern like this form salt crystals

Crystals are found in all sorts of shapes, sizes and colours. Think of colourful gemstones like diamonds, red rubies or purple amethysts and the unique patterns of tiny snowflakes. With this activity, you'll be able to grow your own beautiful crystals at home!



There are hundreds of wonderful crystals like these in the Amgueddfa Cymru collection

Growing Crystals

- You will need:**
- Warm tap water
 - Clean, empty jars
 - Epsom Salts
 - Kitchen scales
 - Measuring jug
 - A spoon
 - Food colouring
 - A pebble or some sand
 - Magnifying glass (optional)

Before We Begin!



- This activity could get messy so make sure you have plenty of space to work!
- Always ask an adult for help

Instructions:

1. Measure 200g of Epsom salt using your scales and place it into the empty jar (you can use more or less, depending on the size of your jar).
2. Run the hot tap until the water is very warm. You will need to use a 1:1 ratio of salt to water. For example, if you measured 200g of Epsom salt, use 200ml of water. Use the measuring jug to measure the amount of warm water you need based on step 1.
3. Add some food colouring to the water and stir.
4. Add the colourful, warm water to the salt and stir for 2 minutes until dissolved, but don't worry if the salt doesn't dissolve completely. This is tiring so ask for help!
5. Drop the pebble or grains of sand into the jar and place the jar in the fridge overnight, or as long as you like (the longer the better!)
6. When you decide to check on your crystals, carefully pour away any excess water from the jars to reveal your unique crystal patterns. Use a magnifying glass to take a closer look!

What's Happening?

Materials such as salt will dissolve in water. However, salt won't keep dissolving and it will eventually become impossible to dissolve any more salt into the water. The water is now "saturated" with salt.

More salt can be dissolved into hot water than cold water. Once you place your jar of saturated water into the fridge, the temperature drops and the dissolved salt starts to reappear. The liquid water is also gradually evaporating, meaning less liquid water is available for the salt to dissolve into, allowing the salt crystals to reappear.

Crystals will grow around insoluble impurities in water – this is why we added something small and rough like a pebble. The salt molecules attach to the impurity and arrange themselves in patterns outward from that point.

Liquids that cool over a long time usually produce larger crystals. Amgueddfa Cymru has crystals formed billions of years ago in the hot centre of the Earth. They cooled over millions of years to produce enormous, beautiful crystals!