

CRYSTAL CHEMISTRY

Grow your own crystals!

SNOWFLAKES

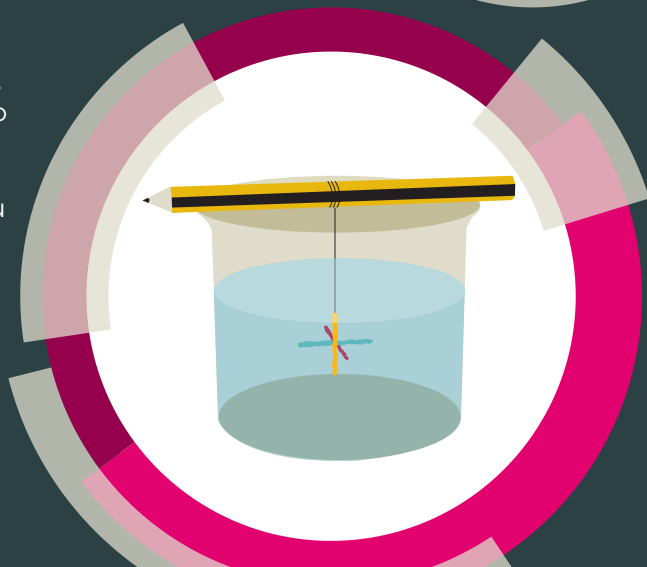
What you need:

- Pipe cleaner
- String
- Salt
- A clean jar
- Hot water

What's going on?

1. Cut the pipe cleaner into 3 pieces and twist together to make the snowflake shape.
2. Tie one end of the string to the centre of the snowflake and the other end to the pencil to a suitable length (see diagram).
3. Pour hot water into one of the jars.
4. Add a small amount of salt and stir. Keep adding salt and stirring until it stops dissolving (you will see it on the bottom of the jar).
5. Balance the pencil on the jar so the snowflake is covered but not touching the jar.
6. Leave overnight – what do you see?

Tip: You can use different colour pipe cleaners or add a small amount of food colouring to the salt solution for a more colourful decoration.



BIG crystals!

What you need:

- ½ a clean jar of hot water
- 1 more clean jar
- Alum powder
- A pencil
- Nylon fishing line (for really big crystals) or sewing thread (for smaller crystals)
- Filter paper (e.g. a coffee filter)

What you need:

1. Add a small amount of alum to the hot water and stir. Keep adding alum and stirring until it stops dissolving (you will see it at the bottom of the jar).
2. Cover the jar with filter paper and leave overnight.
3. The next day, pour the solution into the second clean jar.
4. You should see crystals at the bottom of the first jar - pick the biggest one. Tie one end the nylon line around the crystal and the other end to a pencil (see diagram).
5. Balance the pencil on top of the jar so the crystal is covered by solution but not touching the jar.
6. Cover with filter paper and leave to grow!

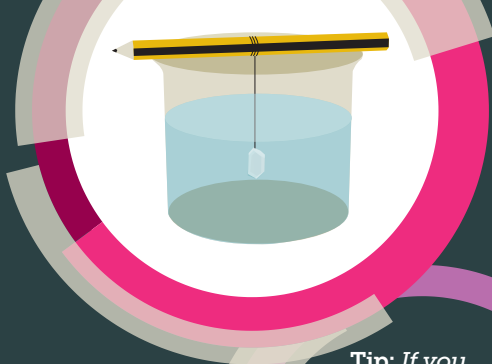
How it works:

When you add crystals to water they will keep dissolving until the water becomes saturated. This means that the water cannot "hold" any more of the crystal. When water is hot it can "hold" more crystals than when it is cold. So as the solution cools the crystal comes out as a solid. For the "crystal snowflakes" the pipe cleaner gives the crystals a support to "grow" on. For the "BIG crystals" the first crystal acts as a seed crystal for the rest of the crystal to "grow" on.

Crystals aren't just for show; they can be brilliantly useful on cold days!

Hand warmers are useful when it's cold outside, but how do they work? Inside are a salt (sodium acetate) and a metal ring. The salt's been specially cooled to below its freezing point of 54°C without forming a solid. This is like cooling water below 0°C and it not turning into ice!

When you want some heat you click the metal ring to make the sodium acetate crystallise (turn into a solid) very quickly! As it crystallises the temperature shoots up to the freezing point, 54°C , and we feel the pack warm up in our hands.



Tip: If you see small crystals growing on the sides of the jar then transfer the solution and growing crystal to a clean jar to help your crystal become as big as possible.

