

Everyday experimenting
for secondary schools:
Supercool water!



Water is the only substance on our planet that exists naturally in all three **states of matter**. In other words, it is found as a **solid, liquid and gas**. Water freezes at 0°C but sometimes we can cheat and **supercool** it! Supercooling means bringing water below its freezing point (0°C) without it turning to solid.

What you need

- A bottle of **distilled water** (tap water or mineral water won't work as they contain impurities). You can get distilled water from your local hardware store or from a pharmacist
- A freezer!

What to do

1. Place the unopened bottle of **distilled water** into the freezer
2. Leave for 2½ hours
3. Carefully remove the bottle of water (if it has worked, the water should still be liquid – if it's frozen it hasn't worked ☹)
4. Handle with care – it will be very cold – and it might freeze if you shake or bang it
5. Now here's the fun bit – to make the water freeze instantly, bang the bottle onto a table and watch!
6. Alternatively, carefully pour the super cooled water onto an ice-cube and watch the water freeze backwards from the ice-cube to the bottle

Alternative (quick) method

1. Pour around 20ml of distilled or purified water into a very clean glass
2. Place the glass in a bowl of ice (make sure the level of the ice is higher than the level of water in the glass)
3. Sprinkle a couple of tablespoons of salt onto the ice (make sure not to get any salt in the glass of water)
4. Wait 15 minutes for the water to cool below freezing
5. You can make the water freeze instantly by pouring it over a piece of ice or by dropping a small piece of ice into the glass

What has happened?

When water freezes, ice crystals form around tiny impurities in the water. However, distilled or purified water contains few impurities so the water doesn't freeze at 0°C. When you disturb the super cooled water, it then turns solid instantly!



Watch a video:
"Supercooled water – explained" <http://url.ie/fqpb>