Supreme Incursions

Soap Boat

Geography · History · Science · Mathematics · Health & Wellbeing · Design & Technology · STEM · Celebration · English

Independent Inquiry · 20 Minutes · Grade 2+ Science Concept = Grade 4+

The aim

- To explore **surface tension** and how soap can effect it.
- To explore materials with **hydrophobic** and **hydrophilic** properties.

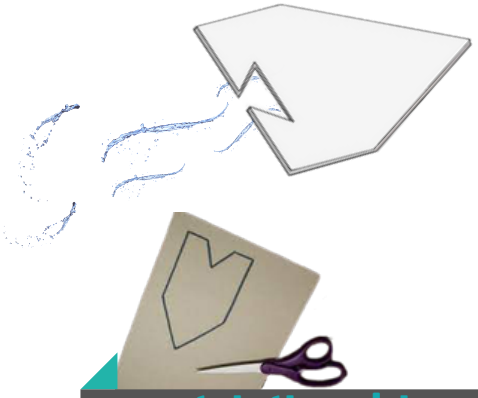
What you will need

A piece of cardboard

A large shallow container of water

Scissors

Dishwashing liquid



Watch the video

Scan the QR code to watch the instructions

Follow these steps

Step 1 Cut the cardboard into a rectangle, about 7cm long and 4cm wide.

Step 2 Cut a deep V shape at one end, roughly from the 1cm and the 3cm mark.

Step 3 Place the boat in the water and add a few drops of dishwashing liquid into the V shape space. Watch as the boat zooms ahead!

- How does soap affect the water's surface tension?
- Is the boat pulled forward or pushed forward?
- Try this with different liquids (i.e. milk, vinegar). Does the boat still move forward in different liquids?
- Try cutting out different shapes of boats. Does the shape of the boat affect its ability to move?

The Science behind it...

In a bowl of water, there are lots of **tiny water molecules** and all of these water **molecules are strongly attracted** to each other. Water molecules close to the surface are more attracted to other water molecules than the air above them. This is what causes **high surface tension**.

Detergent reduces the **high surface tension**, giving the **water molecules** something else to be attracted to. A molecule of detergent is made up of two parts – a '**head**' that is attracted to water **(hydrophilic)** and a '**tail**' that is repelled by water **(hydrophobic).** When you add detergent it reduces the surface tension in that area. The water moves away from areas of **low surface tension (the detergent)** towards areas of high surface tension **(the water).** This creates a force that **pulls** the boat around the bowl!