

MAKE YOUR OWN SOAP POWERED BOAT



YOUR CHALLENGE!

Use a variety of different common household liquids to see which can power a small boat across water.

You will need:

Washing up liquid
Ice cube tray

Empty juice carton/foam takeaway container

Baking tray
Cotton buds
Scissors

SUGGESTED LIQUIDS

- Vinegar
- Milk
- Cooking oil
- Liquid hand soap
- Shampoo
- Conditioner
- Soy sauce

What to do:

STEP 1:

Put a small amount of each liquid in each section of the ice cube tray.

STEP 2:

Take the juice carton/takeaway container and cut out a piece bigger than the boat you want to make - 5cm is a good length.

STEP 3:

Draw a basic boat shape (bottom right) on it and cut it out - the gap at the bottom is important!

STEP 4:

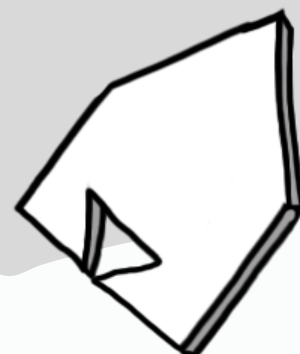
Fill the baking tray with water and place your boat on the water's surface.

STEP 5:

Dip a cotton bud in the washing up liquid and then touch it in the water in the gap at the back of your boat - what happens?

STEP 6:

You'll need to change the water in the tray when the boat no longer moves, or when you want to try one of the other liquids



NOW FOR THE SCIENCE!

Water molecules like to stick together, creating a 'skin' on its surface which allows your boat to sit on top of the water - we call this surface tension.

Soap contains something called a surfactant.

Surfactants change the structure of the water molecules and lower surface tension, breaking that 'skin' on the water's surface.

When we add our soap to the water at the back of the boat, the molecules move to join up at the front of the boat, and carry the boat itself forwards too. As the soap spreads throughout the water, it decreases the surface tension all over the water so the boat eventually stops moving.

IN THE REAL WORLD:

Soap and other detergents like washing up liquid or shampoo are all used for cleaning, because they help to break up grime and dirt, like dirty dishes or greasy hair.

One end of a molecule of surfactant is attracted to water, but the other end is attracted to dirt and grease - so the surfactant molecules help water to get hold of grease, break it up, and wash it away.

What do the liquids that make the boat/pepper move all have in common?

Why does the boat experiment stop working after a while?

Does the experiment work best with warm or cold water? Why do you think this is?

EXPLORE FURTHER

For more resources and videos search for the following:
Pepper and Water Science Trick: how do you think it works?
The Science of Soap
What is surface tension?