

SOAP-POWERED BOAT



You will need:

- The boat template
- Scissors
- Washing-up liquid
- A sink or large bowl of water

You should find:

When you place your boat on the water, it floats but doesn't move much. When you drop the soap into the hole, your boat moves forward!

This happens because water molecules stick together, creating a 'skin' on the water's surface called **surface tension**. When your boat is sitting on top of the water, the surface tension is the same on all sides, so your boat doesn't move. Adding soap causes the tension of the water to decrease. Water molecules then move from this area of low surface tension to areas of higher surface tension behind the boat, pushing the boat forwards.

This is called the **Marangoni effect**.

What you do:

1. Cut around the boat shape.
2. Make sure the water in the bowl is still, then gently place the boat onto the surface.
3. Drop a small amount of washing-up liquid into the hole at the back of the boat.



THE PAPERCLIP CHALLENGE

Put some water in a bowl or cup. Give everyone a small pile of metal paperclips and challenge them to float one on the surface of the water. The chances are they will struggle!

You will need:

- Paperclips
- Cup
- Water

What you do to balance the paperclip on the water:

1. Bend one paperclip to form a small platform and carefully balance another paperclip on top.
2. When the water is completely still, use the bent paperclip to gently lower the other paperclip horizontally onto the surface of the water. You should be able to get the flat paper clip to float using the surface tension – just like pond skaters do.

