



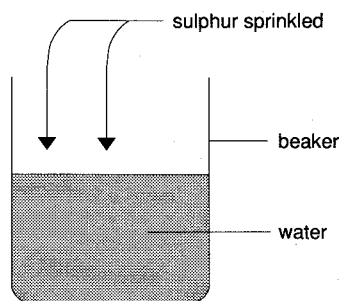
Your task

Build a boat powered by soap to carry a ten gram mass and to see how many times it will go round a clampstand.

▲ **HINT:** You will need to change the water each time you try.



Time	Anything up to an hour depending on how many "attempts" students have at the circuit.
Group size	2–3.
Equipment & materials	Eye protection. Per group A plastic washing up bowl, a clampstand (no fittings), cotton, aluminium foil, a small piece of soap, a 10 g mass, polystyrene, pins.
Safety notes	See page 11.
Curriculum links	Surface tension.
Possible approaches	<p>The students make a boat from aluminium foil and polystyrene containing a 10 g mass. A small piece of soap is pinned to the stern (back) of the boat. The boat is attached to a clampstand in the middle of a plastic washing up bowl of water by a length of cotton. Students have to see how many circuits of the bowl the boat can make before it needs refuelling.</p> <p>At least 30 laps of the bowl will be completed on one filling by an experienced "captain". Some students will do some major re-designing when they realise that in a washing up bowl the biggest boat is not the best! The students will need prompting to replace the water – rather than the soap – for another try. Count the 10 g masses before you start, they tend to get thrown away with the boats at the end of the lesson.</p> <p>The boat is able to work because of surface tension. The soap pinned to the stern of the boat slowly dissolves. The surface tension of soap solution is less than that of water, therefore the 'pull' of the water in front of the boat is greater than the 'pull' of the soap solution. The boat moves forward.</p>
Extension work	Investigate whether the type of soap makes any difference. Would the boat work in a swimming pool – where chlorine is in the water?



Excellent demo or "magic trick". Sprinkle flowers of sulphur onto water. When you touch the surface with a soapy finger the sulphur immediately falls like snow to the bottom of the beaker. VERY DRAMATIC. Set homework for students to try out herbs, flowers etc.