

Capillary Action and Surface Tension

What is surface tension?

Water is made up of tiny particles called atoms, and these atoms like to stick to each other. This means that they create a stretchy film on the top of water which we call surface tension. The surface tension of water lets nature do some amazing things. It's surface tension which makes water collect into droplets on a surface and lets water boatmen walk on water.



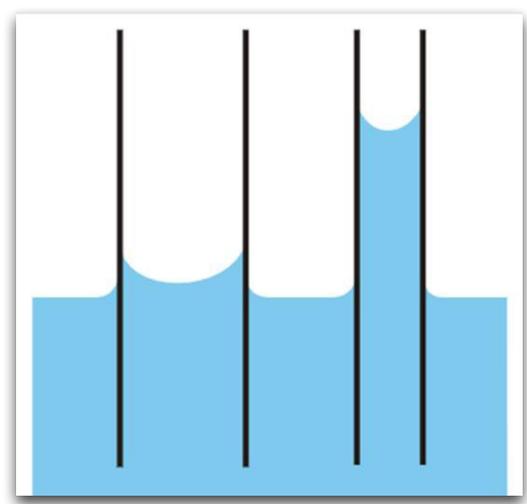
Watch our [pennies experiment video](#) to see how far water can stretch over the top of a glass!

You can try this experiment yourself! How many pennies could you get into the glass before surface tension broke and water spilled out of the glass?

What is capillary action?

Capillary action is the way water can flow through narrow tubes, even moving up hill and against the force of gravity! This is caused by the surface tension of the water. The atoms in the water don't just want to stick to each other, but also other surfaces. You can see this in a glass of water - if you look very closely at the water near the edge of a glass, you should be able to see the water curving upwards against it.

The narrower the container the more obvious this curving will be. Eventually if the container is very narrow, like a tube, then the water will keep moving along the surface and be drawn along the tube.



Capillary Action Experiment

Try this experiment to experience capillary action for yourself.

Equipment:

- Three short glasses or containers
- 2 colours of food colouring (optional)
- Paper towels or kitchen roll (Tissues work too but can get a bit soggy!)

Method

1. Fill two of the glasses with water and add food colouring (if using). If you fill the glasses almost to the top then the experiment will work much more quickly.
2. Place your two full glasses either side of an empty one
3. Fold the kitchen roll into long strips and then add them to the glasses of water with one end in the water and one in the empty glass
4. Quite quickly you should see water start to move along the kitchen roll.
5. If you leave it long enough the new glass will fill up. Some people get the food colouring mixing to make a new colour whereas others (like us) find that the food colouring gets left behind in the kitchen roll!



The water is being moved up and into the empty glass through capillary action happening inside the kitchen roll, all thanks to surface tension!

Capillary action in nature



Trees and other plants use capillary action, and the strength of surface tension, to move water from the roots all the way to the very tops of their leaves. They do this by having thousands of tiny tubes in their trunks called xylem, which act like the paper towels in our experiment, drawing the water upwards. The best thing about this is that the plants don't need to use

any energy to move the water around. As long as the tubes are small enough, the water will just flow along the xylem on its own!

