

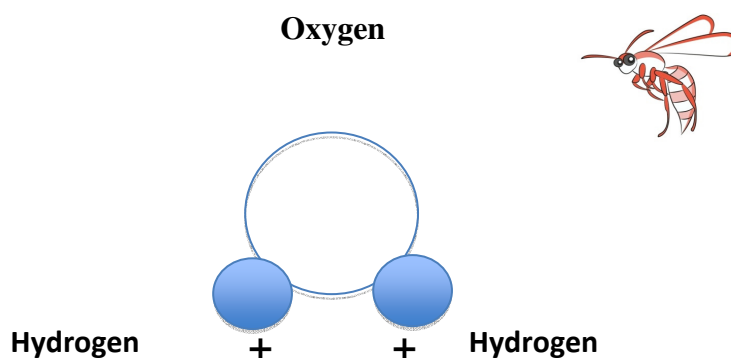
The chemistry of water controls its physical behaviour. Although knowledge of the behaviour of atoms and molecules is not usually covered until year 8, a general background will help explain why water clumps together (cohesion) or sticks to other substances (adhesion).

Water is a compound of hydrogen and oxygen (H_2O), meaning two atoms of hydrogen bond with one atom of oxygen to form one molecule of water (di-hydrogen oxide).



Cohesion or Surface Tension

The water molecule is polarised (acts like a small magnet) because oxygen pulls more negative electrons over to its side leaving the hydrogen atoms with a positive charge.



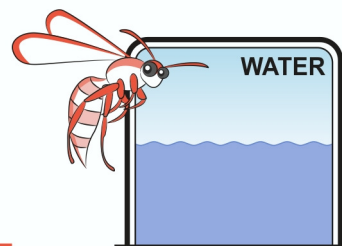
Like tiny magnets the individual water molecules are attracted to each other and form larger and larger droplets until they overcome the cohesive force. Surface tension is easily visible in the domed surface of a droplet of pure water on a clean flat surface. The bead of water is only broken when the droplet is large enough to be affected by the force of gravity or the presence of impurities decreases cohesive force.

Raindrops Water vapour is present as clouds in the atmosphere. When water vapour cools, tiny droplets of water bond together to create larger and heavier rain drops. These fall to earth under the influence of gravity.

Tides This cohesive power also allows seas to act as one body and rise and fall in response to gravitational attraction by the Moon, resulting in tides.

Waves Wind pressure on the surface of the sea or lakes causes waves to form. The individual droplets of water only move in a local circular path because of their cohesion. The wind energy is passed on from molecule to molecule across the surface of the body of water.

http://www.angelfire.com/crazy2/nur_filzah/new_page_2.htm What causes waves?



Possible sequence of activities:

1. Surface Tension (Cohesion)

- Surface Tension – Student Activities
 - Surface tension on a glass slide activity
 - Charged balloon with stream of water (demonstration)
 - Bubbles and surface tension (extension)

2. Breaking Surface Tension (Cohesion)

- Breaking Surface Tension – Student Activities
 - Plummeting pepper
 - Racing boat or fish
 - Floating needle or paperclip (extension)
 - Colour chaos (extension)

3. Adhesion (Capillarity)

- Adhesion (Capillarity) – Student Activities
 - Capillarity in glass tubes (demonstration, optional)
 - Capillarity in plant fibres
 - Twisted paper towel
 - Coloured flower (extension)
 - Stains (extension)
 - Minimise your footprint/handprint

4. Meniscus and Parallax

- Meniscus & Parallax - Student Activities

5. Revision

- Cohesion & Adhesion – Student Review
- Cohesion & Adhesion - Wordsleuth