

Water is a major component of cells. It has **several important properties** that make it essential to support life.

Hydrogen bonding - the distribution of electrons in the covalent bonds of a water molecule mean that the oxygen atom has a slight overall negative charge whilst the hydrogen atoms have a slight overall positive charge. This makes water a **polar** molecule and leads to the formation hydrogen bonds which account for water's unusual properties:

- **high heat capacity** - a large amount of energy is needed to break the hydrogen bonds between water molecules and so raise the temperature of water. Aquatic environments and intracellular conditions remain relatively constant.
- **large latent heat of vaporisation** - large amount of energy needed to evaporate water so providing a cooling effect from sweating or from the surface of leaves.
- **cohesion** between water molecules help water movement through xylem in plants and is also responsible for **surface tension** where water meets air.

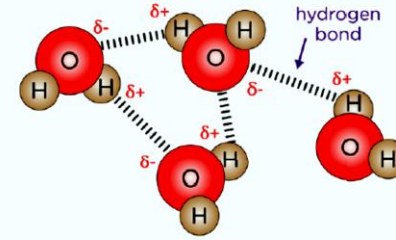
Water acts as a **metabolite** including **condensation** and **hydrolysis** reactions. Serves as a **solvent** for metabolic reactions.

Follow the link and watch this video



<http://www.bozemanscience.com/water-a-polar-molecule>

- Water molecules consist of 2 hydrogen molecules covalently to an oxygen molecule.



Property of water	Why it is useful
Liquid medium	Provides habitats for aquatic organisms, medium for chemical reactions & used for transport
Important metabolite	Used in hydrolysis & condensation reactions
High specific heat capacity	Keeps aquatic & cellular environments stable
High latent heat of vaporisation	Evaporation has a cooling effect on organisms
Cohesion of molecules	Water is drawn up the xylem
Surface tension	Allows pond-skaters to walk on the surface
Good solvent and transport medium	Dissolves ionic and polar molecules, allowing them to easily be transported
Good reaction medium	The cytoplasm in cells is an aqueous solution where many chemical reactions happen
Incompressible	Can prevent plants from wilting & act as a hydrostatic skeleton for invertebrates

