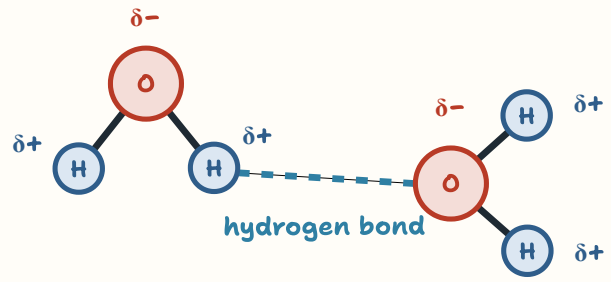
Water: Five Properties Linked to Function

Polarity and hydrogen bonds give water five properties linked to function.

WATER IS POLAR



O slightly negative, H slightly positive

FIVE PROPERTIES

1 metabolite

2 solvent

3 high heat capacity

4 large latent heat of vaporisation

5 cohesion

Key terms

polar	oxygen pulls electrons, so the oxygen end is slightly negative and the hydrogen ends slightly positive.
solvent	water's charged ends surround ions and polar molecules, so they dissolve.
high heat capacity	a lot of energy is needed to raise its temperature, so water buffers changes in temperature.
latent heat of vaporisation	a lot of energy is needed to evaporate water, so evaporation removes heat and cools the plant.
cohesion	water molecules stick to each other by hydrogen bonds, forming an unbroken column in the xylem.

I can...

- [ ] Water is a major component of cells
- [ ] Metabolite in condensation and hydrolysis
- [ ] Important solvent
- [ ] High heat capacity buffers temperature
- [ ] Large latent heat of vaporisation gives cooling with little water loss
- [ ] Strong cohesion supports water columns in plant transport tubes and produces surface tension

EXAM TRAP

Cohesion is water sticking to water. Do not call it adhesion. Evaporation removes heat; it does not give energy.

4 marks: what earns them

1. Water is a solvent, so ions / polar substances dissolve and are transported, and/or metabolic reactions occur in solution (either consequence earns the mark)
   Not: water dissolves everything
2. High heat capacity, so it buffers changes in temperature / temperature changes slowly, keeping enzymes and cells at a stable temperature
   Not: "high heat capacity" alone; water stays cold
3. Large latent heat of vaporisation, so evaporation (transpiration) removes a lot of heat and cools the plant with little water lost
   Not: evaporation gives energy
4. Strong cohesion (hydrogen bonds between water molecules), so water forms a continuous column in the xylem
   Not: adhesion for water to water

Remember

Polar water + hydrogen bonds = all five properties.

Cohesion: water to water.

Evaporation takes heat away.

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