

Chemical Elements and Water (3.1)

Organic versus Inorganic (3.2.1)

- Organic compounds *contain carbon AND are found in living things*

Exceptions: Carbonates, oxides of carbon

Four main elements of life (3.1.1)

Remember: CHON

Carbon

Hydrogen

Oxygen

Nitrogen

State one role for each of the following elements (3.1.2 & 3.1.3)

Remember: CaFé NaPS

Ca - Calcium (*strengthens bone & teeth, mediates muscle contraction, vesicle release in neurons*)

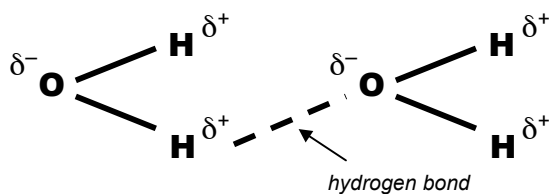
Fe - Iron (*needed to make haemoglobin and transport oxygen, needed to make chlorophyll*)

Na - Sodium (*used in neuron transmission, needed in osmoregulation, used in symport of glucose*)

P - Phosphorus (*part of phospholipids, part of nucleotides, part of some sugars - e.g. GP & TP*)

S - Sulphur (*found in two amino acids - Cys & Met, forms disulphide bonds in proteins / enzymes*)

Structure of water (3.1.4)



Must include:

- Two water molecules (*drawn correctly = H₂O*)
- Polarity (*O partially negative ; H partially positive*)
- Hydrogen bonding (*drawn as a dotted line*)

Outline the properties of water (3.1.5)

Thermal Properties: Extensive hydrogen bonding requires considerable thermal energy to break

- High specific heat capacity (*energy required to raise temperature of 1g of substance by 1°C*)

Cohesive Properties: Polarity of water molecule allows it to form hydrogen bonds with substances

- Cohesion & Adhesion (*cohesion = sticks to itself ; adhesion = sticks to charged substances*)

Solvent Properties: Polar attraction of large quantities of water can overcome intramolecular bonds

- Universal solvent (*water dissolves many organic & inorganic substances with electronegative atoms*)

Other Properties:

- Transparency & Density (*Light can pass through water ; ice is less dense than water and floats*)

Explain the relationship between the properties of water and its use (3.1.6)

Coolant:

- Evaporation of sweat (*high heat of vaporisation*) facilitates cooling

Medium for Metabolic Reactions:

- Water can dissolve substances to facilitate reactions and absorb heat (*exothermic rxns*)

Transport Medium:

- Water can dissolve substances and use adhesion to move against gravity (*transpiration*)

Surface Tension:

- Water is cohesive, allowing small insects to move along its surface