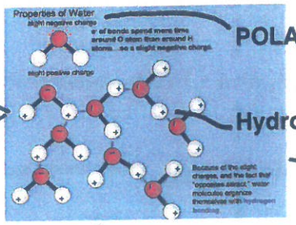
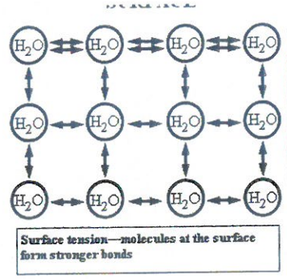
1.1 Water and inorganic ions

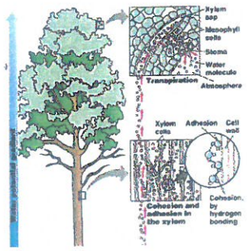


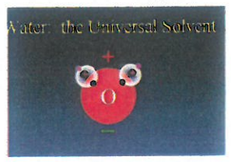
I love the specific heat capacity of water!

Because of the hydrogen bonds it takes a large amount of energy to increase the temperature of large bodies of water

The H bonds mean that water molecules tend to 'stick together' - known as **cohesion** and 'stick' to other surfaces known as **adhesion**



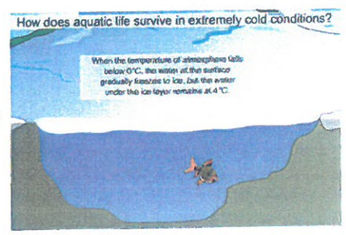




Salt dissolved in water

for ions and polar molecules, important because most chemical reactions inside cells take place in aqueous solutions. Most transport media are also largely made up of water (blood)

Below 4 degrees C the density of water decreases (the molecules are more spread out). **At 0 degrees C ice is less dense than liquid water.**



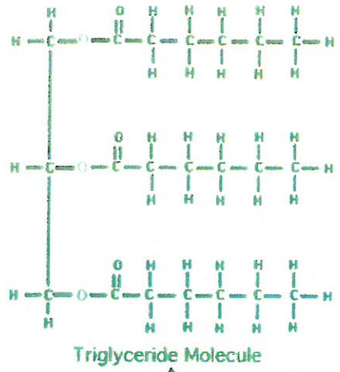
Transparent

So that aquatic plants can photosynthesise

The high number of H bonds mean that it takes a high amount of energy to change it from a liquid to a gas (**high latent heat of vaporisation**). This allows it to be used as an effective cooling mechanism by sweating or panting

Magnesium - Chlorophyll
Iron - Haemoglobin
Phosphate - nucleotides/ ATP
Calcium - bones and teeth

Add 'P' for property & 'B' for Biological Importance



Important in reducing water loss

Insect cuticle — Leaf cuticle

Waxes

See 1.3

Important in cell membranes

e.g. cholesterol

Steroids

Triglycerides

Phospholipids

Similar to triglycerides

Phosphate — 2 fatty acids

Phosphate group replaces one fatty acid

Change in orientation of molecule

Phosphate—polar = hydrophilic

But

Fatty acids are non-polar = hydrophobic

Important in the formation and functioning of cell membranes

CH_2OH — H—C—OH — CH_2OH

Glycerol + 3 fatty acids

hydrolysis

3 condensation reactions

+ 3 H_2O

Ester bond

Non-polar and so insoluble in H_2O but soluble in some organic solvents (ethanol)

C, H, and O (P)

Fats (lipids)

1.1 BIOLOGICAL MOLECULES

2 types

H H
-C-C-
H H

Carbon-Carbon Single Bond

H H
-C=C-

Carbon-Carbon Double Bond

Saturated

All carbon atoms are joined by a single bond

Animal fats

Contributory factor to heart disease

Solid fats at room temperature

Unsaturated

Have one or more double bond

Plant fats

Double bond → kink in tail

Oils at room temperature

Functions

Water proofing

Energy storage

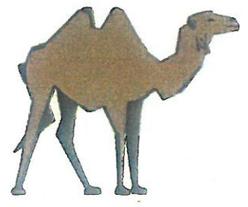
1g fat → 2x energy as 1g carbohydrate

Seeds and animals

Protection of delicate organs

Metabolic water

Camels



Insulation when stored under skin