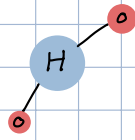


Chemistry - of - Life

Properties of water

- Life on Earth cannot survive without water
- All life occurs in water
 - Inside/outside the cell



Chemistry of water

- H₂O molecules form H bonds with each other
 - +H attracted to -O
 - Creates a sticky molecule



Elixir of Life

- Special properties
 - Cohesion & Adhesion
 - Good Solvent
 - Lower density as a solid
 - High specific heat
 - High heat of vaporization

Ice

- Ice is less dense than H₂O
 - Almost all substances get more dense as solids
- Ice floats
 - H bonds form a crystal



Why "Ice floats" is important

- Oceans/lakes don't freeze solid
 - Surface ice insulates water below
 - Allows life to survive in winter
- If ice sank
 - Ponds, lakes and oceans would freeze solid

Cohesion & Adhesion

Cohesion

- H bonding between H₂O molecules
- Water is "sticky"
- Creates surface tension
- Drinking Straw

Adhesion

- H bonding with H₂O and other substances
- Capillary Action

Heat of vaporization

- Amount of energy to change from a liquid to a gas
- Organisms use this to survive heat
 - Sweating (evaporative cooling)
 - Panting in dogs/cats

Transpiration

- Built on cohesion and adhesion

Water is the solvent of life

- Polarity makes H₂O a good solvent
 - Polar H₂O molecules surround + & - ions
 - Solvents dissolve solutes creating solutions
- Hydrophilic
 - Substances are attracted to H₂O
 - Polar
- Anything that is polar is attracted to H₂O
- Hydrophobic
 - Substances don't attract to H₂O
 - Non-Polar
- Phospho lipids
 - Amphipatic (head that is polar and tail that is non-polar)
 - Arranges in double layer membrane (heads can face water and tails can face inward)

Specific Heat

- Water has a very high specific heat
 - Can withstand change in temp
- Amount of heat needed to heat 1 gram of substance is 1° celsius
- Takes a lot of energy to heat and cool water
- Water moderates temp on earth
 - Why deserts are extremely hot during day and extremely cold at night



Acids

Pure water

Bases

PH Scale

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14