

Concept 4.4

Life depends on the unique properties of water.

The Structure of Water:

Polar molecule - a molecule in which opposite ends have opposite electric charges.

Hydrogen bond - a weak attraction between the hydrogen atom of one molecule and slightly negative atom within another molecule.

Water's Life-Supporting Properties:

Cohesion - tendency of molecules of the same kind to stick together.

Adhesion - attraction that occurs between unlike molecules.

Temperature Moderation - when heated some of the thermal energy that is absorbed goes to break hydrogen bond.

- when cooled water forms hydrogen bonds and thus releases thermal energy in the form of heat.

Low Density of Ice - water is less dense as a solid due to hydrogen bonds.

Water's Ability to Dissolve Other Substances :

Solution - a uniform mixture of two or more substance.

Solvent - the substance that dissolves the other substance and is present in a greater amount.

Solute - the substance that is dissolved and is present in a lesser amount.

Aqueous solution - when water is used as the solvent.

Acids, Bases, and pH:

Acid - a compound that donates H⁺ ions to a solution.

Base - a compound that removes H⁺ ions from an aqueous solution.

pH Scale - describes how acidic or basic a solution is.

0 (most acidic) ----- 14 (most basic)

Each pH unit represents a tenfold change in the concentration of the H⁺ ions.

Buffers - substances that cause a solution to resist changes in pH.

A buffer works by accepting H⁺ ions when their levels rise. And donating H⁺ ions when their levels fall.