









2-2 Properties of Water 🛶 The Water Molecule

Polarity

However an oxygen atom, with 8 protons in its nucleus, has a much stronger attraction for electrons than does the hydrogen atom with a single proton.

Thus, there is a greater probability of finding the shared electrons near the oxygen atom than near the hydrogen atom.

2-2 Properties of Water 🔿 The Water Molecule

As a result, the oxygen end of the molecule has a slight negative charge and the hydrogen end has a slight positive charge.

A water molecule is polar because there is an uneven distribution of electrons between the oxygen and hydrogen atoms.







Hydrogen Bonds

Because of their partial positive and negative charges, polar molecules can attract each other.

2-2 Properties of Water 🔿 The Water Molecule

The attraction between the hydrogen atoms on one molecule and the oxygen atom on another water molecule is an example of a hydrogen bond.

Hydrogen bonds are not as strong as covalent or ionic bonds.









2-2 Properties of Water 🔿 The Water Molecule

Water's cohesion causes molecules on the surface of water to be drawn inward, which is why drops of water form beads on a smooth surface.

Cohesion also explains why some insects and spiders can walk on a pond's surface.

2-2 Properties of Water 🛶 The Water Molecule

Adhesion is an attraction between molecules of different substances.

The surface of water in a graduated cylinder dips in the center because adhesion between water molecules and glass molecules is stronger than cohesion between water molecules.

2-2 Properties of Water 🔿 The Water Molecule

Adhesion between water and glass causes water to rise in a narrow tube against the force of gravity.

This effect is called capillary action.

2-2 Properties of Water 🔿 The Water Molecule

Capillary action is one of the forces that draw water out of the roots of a plant and up into its stems and leaves.

Cohesion holds the column of water together as it rises.



2-2 Properties of Water 🔿 Solutions and Suspensions

Two types of mixtures can be made with water

- solutions
- suspensions









2-2 Properties of Water 🔿 Solutions and Suspensions









Suspensions

Some materials do not dissolve when placed in water but separate into pieces so small that they do not settle out.



2-2 Properties of Water 📫 Solutions and Suspensions

The movement of water molecules keeps the small particles suspended.

Such mixtures of water and nondissolved material are known as **suspensions**.

2-2 Properties of Water i Solutions and Suspensions

Some of the most important biological fluids are both solutions and suspensions.

The blood that circulates through your body is mostly water, which contains many dissolved compounds.

Blood also contains cells and other undissolved particles that remain in suspension as the blood moves through the body.







The pH scale

Chemists devised a measurement system called the ${\bf pH}$ scale to indicate the concentration of H^+ ions in solution.

The pH scale ranges from 0 to 14.

















Strong acids tend to have pH values that range from 1 to 3.

The hydrochloric acid produced by the stomach to help digest food is a strong acid.





2-2 Properties of Water 🔿 Acids, Bases, and pH

Buffers

The pH of the fluids within most cells in the human body must generally be kept between 6.5 and 7.5.

If the pH is lower or higher, it will affect the chemical reactions that take place within the cells.

2-2 Properties of Water 🔿 Acids, Bases, and pH

Controlling pH is important for maintaining homeostasis.

One of the ways that the body controls pH is through dissolved compounds called buffers.

Buffers are weak acids or bases that can react with strong acids or bases to prevent sharp, sudden changes in pH.

Cop