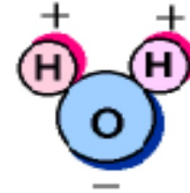


## Unit 2: The Chemical Basis for Life (2.2, 2.3, 2.4, 12.2, 13.1)

### Lesson 1: Unique Properties of Water (2.2)



I. The Water Molecule (one Oxygen bonded to two Hydrogens)

A. Polarity (Covalent Bond; shared electrons)

1. e-'s are unequally shared (stay around O)

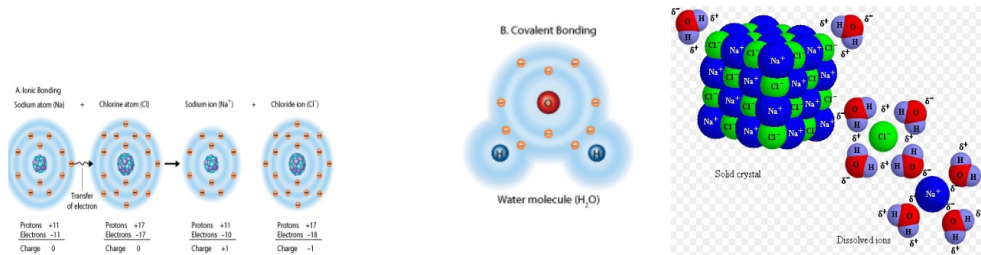
a. acts like a mini-magnet (polar molecules have a + end and a - end)

→ b. Universal Solvent: dissolves many different substances especially salts and other ionic compounds (exchange electrons). (polar)

c. Ionic compounds and other substances that dissolve in water are polar compounds. (like dissolves like)

d. lipids are non-polar compounds and do not dissolve in water

\*the cell membrane is made up of phospholipids



## 2. Hydrogen Bonding

a. Hydrogen Bond: forms between a bonded hydrogen and a (-) atom

b. Adhesion: attraction to different substances (sticks to other things)

1. capillarity: spreads through fine pores (climbs up a plant)

c. Cohesion: attraction to like substances (sticks to itself)

1. Water will form 'beads'

2. Water will heat and cool slowly (High heat capacity or Specific Heat)

a. heat of vaporization: amount of energy needed to turn a liquid to a gas

\*water has a high heat of vaporization

b. heat of fusion: amount of energy a substance needs to lose to change from a liquid to a solid. Water can lose a vast amount of heat before changing

3. gives water a high Surface Tension

3. Water is most dense at 4°C (density = mass/volume)

a. ice (0°C) is less dense than liquid water: ice floats

b. as water molecules freeze, air becomes trapped between the molecules

