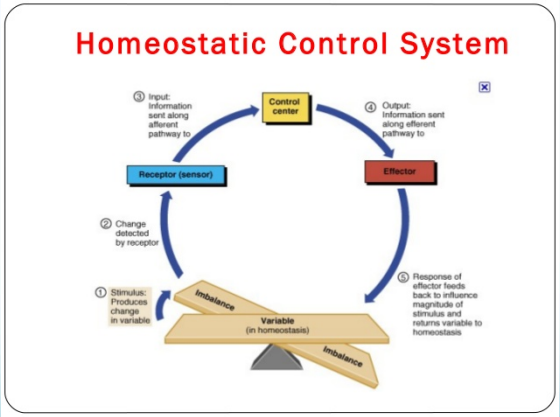
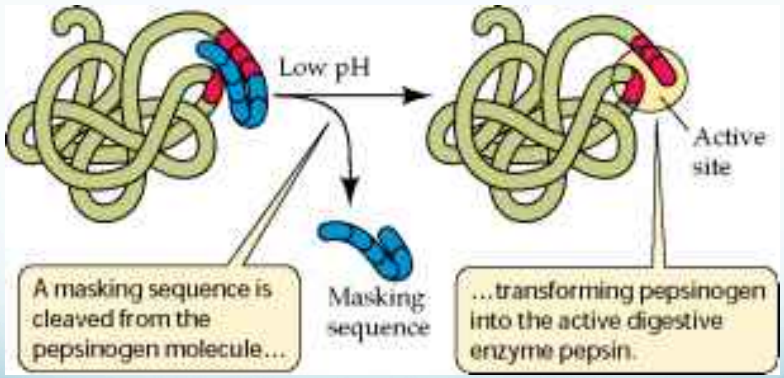
Theme: How does our body maintain homeostasis?

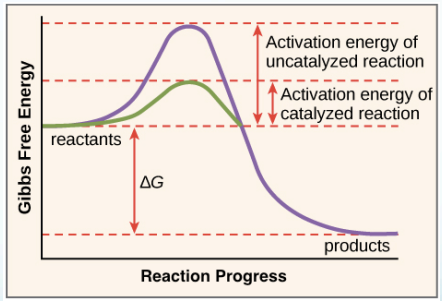


Pepsin:

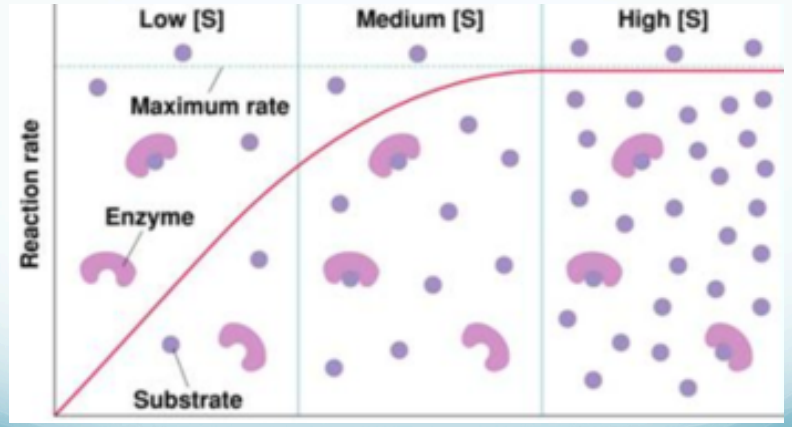


Enzymes:

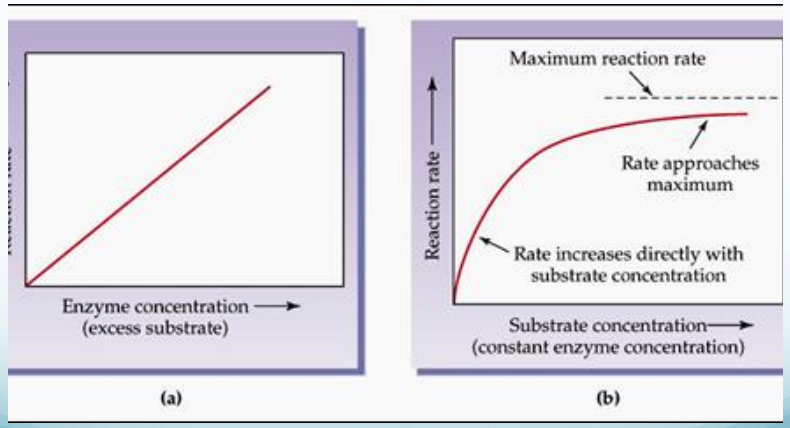
- Speed up chemical reactions by decreasing the activation energy.



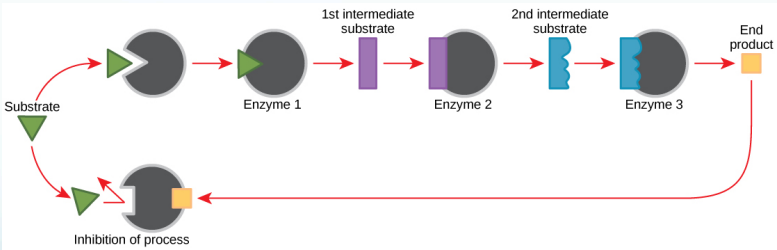
Increase Substrate Concentration



Increase enzyme concentration



What is enzyme inhibition an example of?



How does our body regulate enzymes activity? Why is regulating this activity important?

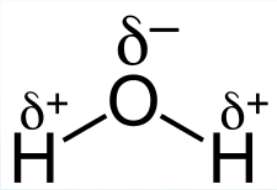
Properties of Water (H2O)

Ms. Vissers

Learning Intentions:

- Demonstrate critical thinking skills by generating a prediction for each demonstration based on previous knowledge.
- Be able to record accurate observations during demonstrations.
- Understand and recognize the properties of water molecules including hydrogen bonding, surface tension and solubility.

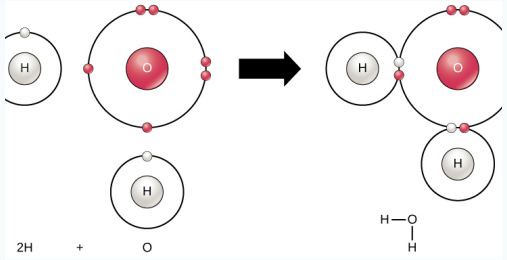
Demonstration: Polar Molecule



Solubility Demonstration:

Demonstration: Surface Tension

Properties of H2O:



- H2O molecules are made up of *covalent bonds*.

- **Covalent Bonds:** involve the sharing of electrons between atoms in a way that results in having a filled valence shell.

Properties of H2O:

- H2O have *Polar* **Covalent Bonds**

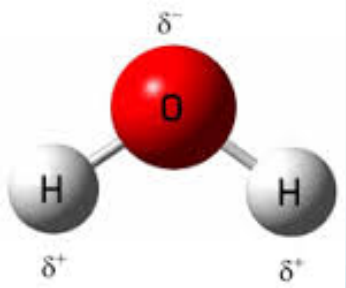
- A covalent bond between atoms that differ in **electronegativity** is called a polar covalent bond.

Video: Electronegativity

https://www.youtube.com/watch?v=09Vx5VHiMHA

Properties of H2O:

Since oxygen is more **electronegative** then hydrogen the electrons spend more time *orbiting* the oxygen creating a partial negative charge on the oxygen molecules and a partial positive charge on each hydrogen molecule.



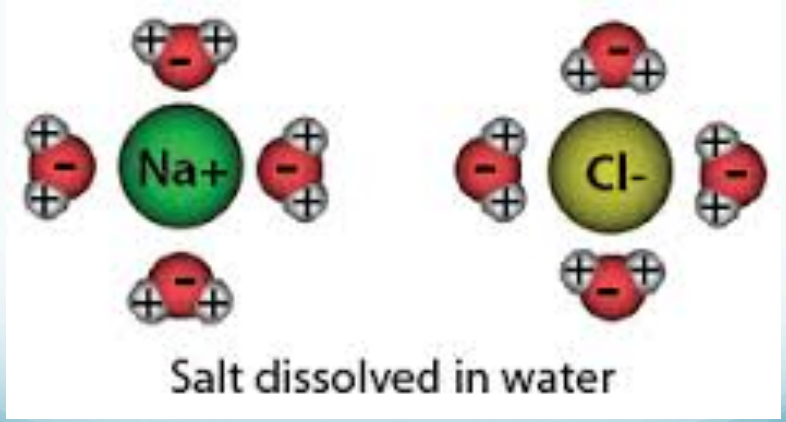
Check Point: Now that we understand partial charges...

Do our results from demonstration 1 make sense?

Properties of H2O: Solubility

- Water is a *solvent*
- H2O dissolves a great number of substances.
- A solution contains dissolved substances called **solutes.**

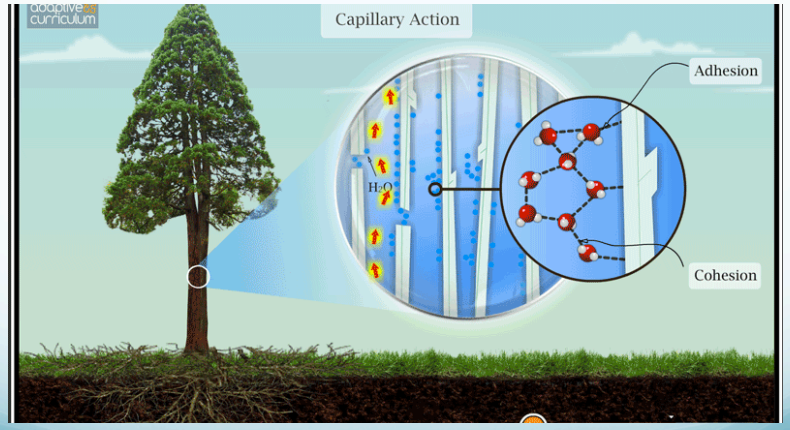
Properties of H2O: Solubility



Properties of H2O: Solubility

- Molecules that can attract water are **Hydrophilic**.
- Molecules that are non-polar and do not attract water are *Hydrophobic*. An example of a hydrophobic molecule is oil.
- Water molecules are **adhesive.**
- Water is adhesive because its positive and negative poles allow it to adhere to polar surface.

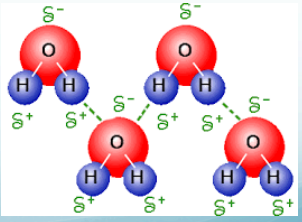
Adhesion:



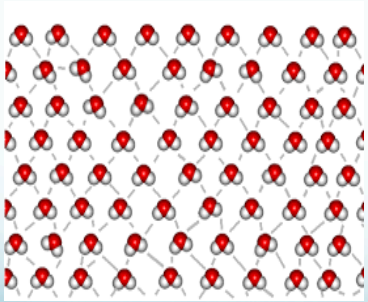
Check Point: Solubility

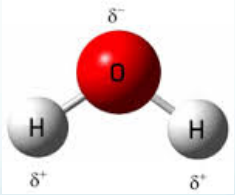
Properties of H2O

- Polarity within a water molecule causes the *hydrogen* **atoms** in one molecule to be attracted to the **oxygen atoms** in the other water molecules.



Surface Tension:





Hydrogen Bonding

- Water Molecules are *cohesive.* Water flows freely but water molecules do not separate. This is due to the hydrogen bonding.
- Water has a **high heat capacity**.
- Water has a **high heat of vaporization.**

Discussion Question:

Why is it important to understand the properties of H2O when learning about living systems? How do these properties impact living systems?

H2O and living systems:

- The polarity of water makes it a good solvent. These properties effect how molecules are transported in living things.
- Hydrogen Bonding: Allows ice to be less dense then liquid water.
- Hydrogen Bonding: Stabilizes DNA
- Hydrogen Bonding: Helps organisms maintain homeostasis
- Surface Tension: Surfactant in lungs allows for oxygen and CO2 to dissolve and diffuse between tissues.

Take Away Tasks

1. Dress ready for lab next class
2. Read Acids and Bases Article
3. Start Study Guide (based on learning intentions for each lesson)

Unit Test Scheduled Thursday November 24th

Topics: Homeostasis, Enzymes, Properties of H2O, Acids, Bases and Buffers