Properties of Water

CHAPTER 2

The Water Molecule

- A water molecule is neutral because the electrons balance out the protons, however, it is polar.
- A water molecule is polar because there is an uneven distribution of electrons between the Oxygen and the hydrogen atoms.
- Because of the polarity water molecules attract each other.

- Waters polarity gives it the ability to dissolve both ionic compounds and other polar molecules.
- Water is the greatest solvent on earth.

What is the difference between adhesion and cohesion?

- Cohesion is an attraction between molecules of the same substance. Example: attraction between water molecules.
- Adhesion is an attraction between molecules of different substances. Example: water tends to bead up on the hood of your freshly waxed car

Water can be found in Mixtures and suspensions…so what's the difference?

- Mixtures are composed of 2 or more elements that are physically mixed.
- Solutions are composed of 2 or more elements but they are all evenly distributed through out the solution.
- Suspension is a mixture of water and non-dissolved materials

Can you tell if it is a Mixture, suspension or solution?

- Trail mix
- Ice tea
- Italian dressing
- Salt water
- Honey Oats Cereal
- blood

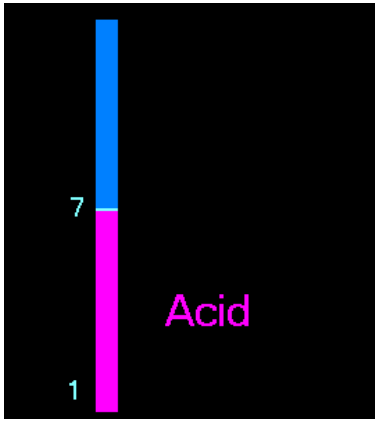
Formation of Acids and Bases

- Water can react to form ions.

$$H_2O \longleftrightarrow H^+ + OH^-$$

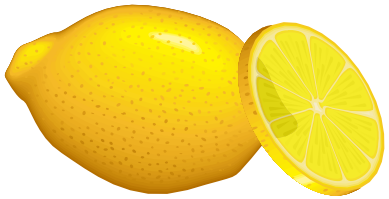
What are the properties of Acids?

- Acids are compounds that form H+ ions in a solution
- Acids taste sour, turn blue Litmus paper pink, react with metals to produce hydrogen gas and react with limestone or baking soda to produce carbon dioxide
- They have a pH value less than 7



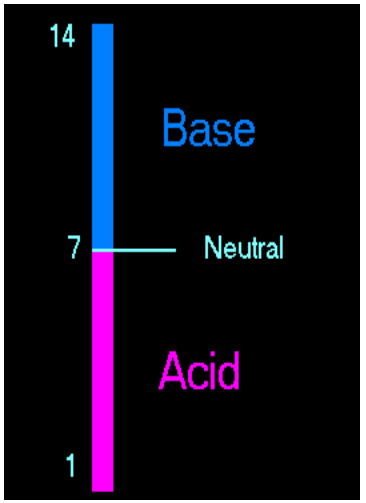
What are the uses of acids?

- We use acids to make paper, paint, detergents and fertilizers. It is also used in car batteries.
- Hydrochloric acid is used to clean pools and is also found in your stomach where it helps with digestion.
- Citric acid is found in vitamin C
- Carbonic acid and phosphoric acid are found in soft drinks



What are bases?

- A base is a compound that increases the number of hydroxide ions in solution (OH-)
- Bases are bitter, slippery and turns red litmus paper blue.
- They have a PH value higher than 7



What are the uses of bases?

- We use bases in the making of soaps and detergents.
- Calcium hydroxide is used to make cement, plaster and mortar
- Ammonia is found in many house cleaners and the production of fertilizers
- Some are used also in the production of antacids to treat heartburn.

Acids vs. Bases

Acids

- Increases the number if hydrogen ions (H+) when dissolved in water
- Tastes sour
- Maybe corrosive
- Turns blue litmus paper pink

Bases

- Increases the number of hydroxide ions (OH-) when dissolved in water
- Tastes bitter
- Feels slippery
- Can change the color of certain compounds
- Turns pink litmus paper blue.

What happens when an Acid is combined with a base?

- When this happens, the acid and the base neutralize each other and salt and water are produced in the process.

What are buffers?

- A buffer can be a weak acid or a base that can react with a strong acid or base to prevent sharp sudden changes in pH.
- Your body uses buffers in order to maintain homeostasis.

What is the pH scale?

- The pH scale indicates the concentration of H+ ions.
- It goes from 1-14
- pH of 7 is neutral (i.e. pure water)
- **Acids have a pH range less than 7**
- **Bases have a pH range above 7**