

# Chemistry (Math Notes)

## Module #9

### I. Key Terms/Concepts

Concentration: the number of molecules in  $H_2O$ .

Concentrated: Lots of molecules in  $H_2O$

Diluted: a small amount of molecules in  $H_2O$

Strength: Based on number of molecules that do their job  
(weak = a small amount that do their job; strong = many that do their job).

Indicator: a substance that turns one color in the presence of acids and other colors in the presence of bases

Acid: a molecule that donates  $H^+$  ions (proton donors).

Base: a molecule that accepts  $H^+$  ions (proton acceptors).

Amphiprotic: compound that can act as either an acid or a base, depending on the situation

## II. Chemical Reactions

1. Formation: a reaction that starts with 2 or more elements and produces one compound
  2. Decomposition: a reaction that changes a compound into its constituent elements
  3. Combustion: (complete) a reaction in which  $O_2$  is added to a compound containing carbon and hydrogen, producing  $CO_2$  and  $H_2O$   
Incomplete a reaction in which  $O_2$  is added to a compound containing carbon and hydrogen producing  $CO$  or  $C$  and  $H_2O$
  4. Acid-Base a reaction in which an acid reacts with a base by the neutralization of both or by forming 2 ions
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## III. Molarity & Dilution Equation:

Concentration is amount / volume. Examples of concentration units are:

$g/ml$ ,  $g/cm$ ,  $mole/ml$

In chemistry we often use molarity to measure concentration.

Molarity (M) is the number of moles / # liters of solution.

Chemists usually keep "stock" solutions, which are then diluted for use.

$$M_1 \times V_1 = M_2 \times V_2$$

$M_1$  is the molarity of the stock solution.

$V_1$  is the volume of the stock solution.

$M_2$  is the molarity of the new solution that the chemist wants.

$V_2$  is the volume of the new solution that the chemist wants.

$$(\text{molarity}) \times (\# \text{ liters}) = \# \text{ moles}$$

Remember, a typical stoichiometry problem is set up by giving the information of one substance, but asks for information of another substance.

In these problems, molarity for one substance is given, but molarity or grams of a second substance must be determined.

#### IV. Titration

What is a titration?

It is \_\_\_\_\_. You always begin with a \_\_\_\_\_  
\_\_\_\_\_.

You take a known amount of acid & add a \_\_\_\_\_ to it slowly. An \_\_\_\_\_ will change color, indicating that you have added just enough base to eat up all the acid. This is the

\_\_\_\_\_, allowing you to determine the \_\_\_\_\_ of the acid. This technique also works in reverse, adding an acid slowly to a known amount of a base.