

Chemistry (Math Notes)

Module #9

I. Key Terms/Concepts

Concentration: The number of molecules in H₂O

Concentrated: Lots of molecules in H₂O

Diluted: A small amount of molecules in H₂O

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

Indicator: A substance that turns one color in the presence of acids and another in the presence of bases.

Acid: A molecule that donates H⁺ ions

Base: A molecule that receives H⁺ ions

Amphiprotic: Compound that can act as an acid or a base depending on the situation

II. Chemical Reactions

1. Formation: A reaction that starts with two or more elements and produces one compound

2. Decomposition: A reaction that starts with a compound and changes it into its constituent elements

3. Combustion: (complete) A reaction in which O₂ is combined to a compound containing carbon and hydrogen to produce CO₂ and H₂O

Incomplete A reaction in which O₂ is combined with a compound containing carbon and hydrogen to produce CO or C, and H₂O

4. Acid-Base A reaction in which an acid reacts with a base and forms 2 ions or cancels out (neutralizes)

III. Molarity & Dilution Equation:

Concentration is amount / volume. Examples of concentration units are: g/ml, g/cm cubed, 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 stoichiometry in action. You always begin with a balanced chemical equation.

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

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