Chapter 3 - Stoichiometry

Section 3.2 - THE MOLE

1. **Mole** - the number equal to the number of carbon atoms in exactly 12 grams of pure 12C.
2. **Avogadro's number** - 6.022 x 1023

Section 3.3 - Molar Mass

1. **Molar Mass** - the mass in grams of one mole of the compound. (also called molecular weight)

Section 3.4 - Percent Composition

Section 3.5 - Determining the Formula

1. **Empirical Formula** - lowest whole number ratio.
2. **Molecular Formula** - can be higher whole number ratio's, must look at the molecular mass.

There is some very good help information on p.99 in the purple tables.

Section 3.6 - Chemical Equations

1. **Chemical Reactions** - bonds being broken and new bonds being formed.
2. **Reactants** - chemicals which react together, usually found on the left of the yields arrow.
3. **Products** - chemicals which are produced in the reaction, usually found to the right of the yields arrow.

$$CH_4 + O_2 \quad \rightarrow \quad CO_2 + H_2O$$
$$\text{Reactants} \quad \rightarrow \quad \text{Products}$$
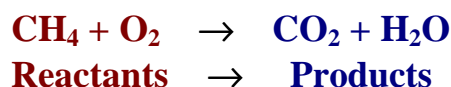
Make sure to look at Table 3.2 on p. 102.

Section 3.7 - Balancing Chemical Equations

1. Formulas of the compounds must never be changed in balancing a chemical equation.
2. Balance by inspection - **steps on p. 104.**

Section 3.8 - Stoichiometric Calculations

Section 3.9 - Limiting Reactants

1. **Limiting Reactant** - the reactant which is consumed first and which therefore limits the amounts of products that can be formed.
2. **Theoretical yield** - the amount of a product formed when the limiting reactant is completely consumed.
3. **Actual yield** - the amount of product produce from laboratory experiments.
4. **Percent yield** - (actual yield) / (theoretical yield) x 100%

Steps for solving stoichiometry problems can be found on p. 122.

Stoichiometry deals with the quantities of materials consumed and produced in chemical reactions. It is, in effect, chemical arithmetic. It is an integral part of the chemical process, and will be used throughout the semester. It is important to understand and be able to use these mathematical procedures to be successful in Chemistry.

**Notes have been derived from Zumdahl 4th ed. - All page and table references are made to this edition.