**Chemistry 11 Compounds, Chemical Reactions and The Mole**

This unit covers sections of McGraw-Hill Ryerson , Chapters 1,2,3,4 and Nelson Chemistry, Chapters 3, 4, and 7. Your notes on Chemical Nomenclature and Chemical Equations are extremely important for this unit.

After studying and practicing for this unit, you should be able to :

1. Explain the difference between ionic and molecular compounds (empirically and theoretically). Chaper 1.
2. GIven the formulas of ionic and molecular compounds (including acids) write their names.
3. Given the names of ionic and molecular compounds (including acids) write their formulas.

These two outcomes are extremely important to your success in chemistry. You should practice at every opportunity. The 100 names write the formulas and 100 formulas write the names is also useful as you have the answers to check your work.

4. Identify evidence of chemical reactions. pg. 29-32
5. Given an English statement of a chemical reaction, write the balanced chemical equation.
6. Given the balanced chemical equation, write the English statement. Throughout course.
7. Identify the major types of chemical reactions. ( page 32)
8. Balance chemical equations.
9. (a) Define isotope and use isotopic notation. pages 43-46
   (b) Explain the relative nature of atomic mass.
   (c) Calculat the average atomic mass given the proportions of elements that exist.
10. Define Avogadro's constant and the mole. Perform calculations with Avogadro's #. pg. 47-54
11. Determine the molar mass of pure substances. pg. 55
12. Define Molar mass and perform mole-mass conversions for pure substances.
13. Calculate the percent composition of ionic and molecular compounds. Notes
14. Identify mole ratios of reactants and products from balanced chemical equations.
15. Perform stoichiometric calculations related to chemical equations.
16. Identify various stoichiometric applications (air bag reaction)
17. Predict how the yield of a particular chemical process can be maximized.

<u>In the Lab</u>

1. Precisely measure the mass of selected elements and compounds and determine the number of moles of the substance. (Measuring mass, convert to mole activity)
2. Design a stoichiometric experiment identifying and controlling major variables. Labs 7.2 and 7.3.
3. The Formula of a Hydrate. (handout)

<u>Here are some problems to try. Good practice for a test!</u>

1. Calculate the mass of two moles of hydrogen gas.
2. Calculate how many moles are in 80.0 grams of ammonium nitrate.
3. Calculate how many molecules are in 5.0 moles of water.
4. Calculate how many grams are in $1.2 \times 10^{24}$ molecules of acetic acid (hydrogen acetate)
5. How is a mole defined? How is molar mass defined?
6. Alisha has one mole of NaCl, one mole of $K_2Cr_2O_7$ and $6.02 \times 10^{23}$ molecules or one mole of $C_6H_{12}O_6$. What aspect(s) of each sample is (are) not equal? Show your work.

**Stoichiometry Applied**

The Air Bag Inflation Reaction

$2NaN_3(s) \text{ -----> } 2Na(s) + 3N_2(g)$

Air bags are inflated by nitrogen gas which is produced by the highly toxic chemical, sodium azide. However, the sodium azide is completely consumed by this reaction. A handful (130 grams) of sodium azide will produce 67 litres of nitrogen gas, enough to inflate a normal air bag.

How do chemists know this much will be produced?

http://www.sciam.com/askexpert_question.cfm?articleID=0008ACD8-5AF8-1C72-9EB7809EC588F2D7

Balanced Chemical Equation Information : Air Bag Inflation Reaction

| Equation | $2NaN_3(s)$ -----> $2Na(s)$ + $3\ N_2(g)$ | |
|---|---|---|
| molar mass g/mol | -----> | |
| mass (g) | -----> | |
| moles | 2 -----> | 2 3 |
| total mass | -----> | |
| English Statement | 2 moles of solid sodium azide decompose to produce 2 moles of solid sodium plus 3 moles of nitrogen gas. | |

| Multiples of Moles of Air Bag Reactants and Products |
|---|
| $2NaN_3(s) \text{ -----> } 2Na(s) + 3\ N_2(g)$<br><br>2 -------> 2 + 3<br>6 -------> 6 + 9<br>10 -------> 10 + 15 |

**<u>Other Important Reactions</u>**

Cellular Respiration and Photosynthesis

Respiration: Balance the following equation and set analyse the reaction in chart form like the Air Bag reaction.

glucose solution reacts with oxygen gas to produce carbon dioxide gas and liquid water.