**Ch. 9.4 Lecture Guide**

**H. Chemistry**

9.4

* **Review:**
  + Define stoichiometry.
* **Stoichiometric quantities:**
  + **Question: Why would chemists prefer to use stoichiometric quantities?**
  + **Consider the following chemical reaction:** CH4 (g) + H­2O (g) → 3H2 (g) + CO2 (g)
    - What mass of water is required to react exactly with 249 g of methane?
    - What would happen if we reacted 300 g of water with 249 g of CH4?
    - In this example, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the **limiting reactant**, or **limiting reagent**, because it limits the amount of product that will be created.
    - In chemistry, it is important to know which reactant is the limiting reactant in order to predict that amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that will form.
* **Identifying the Limiting Reagent**
  + **Consider the following problem:** Suppose 2.50 x 104 g of nitrogen gas reacts with 5.00 x 103 g of hydrogen gas to produce ammonia. Calculate the mass of ammonia produced when this reaction is run to completion. **Note: This problem is different from others that we have done because now we are mixing two specified amounts of reactants together.**
    - **Step 1:** Write the balanced equation.
    - **Step 2:** Convert the known masses of the reactants from grams to moles.
    - **Step 3:** Use mole ratios to determine which factor is limiting.
    - **Step 4:** Use moles of limiting reactant available and mole ratio to calculate the number of moles of product formed.
    - **Step 5:** Convert moles of product to grams of product.