

**Guided Notes: Limiting Reactants and Percent Yield**Limiting Reactants:

- Reactions stop when \_\_\_\_\_.
- Limiting reactant (reagent) -- \_\_\_\_\_
- Determines how much \_\_\_\_\_.
- Excess reactant (reagent) -- \_\_\_\_\_

Steps to Finding the Limiting Reactant:

1. Convert from each reactant to the other using dimensional analysis (DA).
2. Begin your calculations with initial amounts of each substance.
3. If your answer (what you need) is greater than what you have (given), that is your limiting reactant.
4. If your answer (what you need) is less than what you have (given), that is your excess reactant.

Practice:

1. What is the limiting reactant when 25.0 mole of iron (III) oxide reacts with 30.0 moles of carbon monoxide?
  
  
  
  
  
  
  
  
  
  
2. What is the limiting reactant if 3.50 grams of hydrogen reacts with 5.00 grams of nitrogen?

Amount of Product Formed:

1. Start your calculation with the amount of the limiting reactant given in the problem
2. Limiting reactants always determine the amount of product formed.

Practice:

1.  $6 \text{ CO}_2 + 6 \text{ H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{ O}_2$ 
  - a. What is the limiting reactant?
  
  
  
  
  
  
  
  - b. How many moles of glucose will be produced by this reaction?
  
  
  
  
  
  
  
2.  $\text{P}_4(\text{s}) + 5 \text{ O}_2(\text{g}) \rightarrow \text{P}_4\text{O}_{10}(\text{s})$ 
  - a. What is the limiting reactant?
  
  
  
  
  
  
  
  - b. How many grams of  $\text{P}_4\text{O}_{10}$  will be produced by this reaction?

### Percent Yield:

-- Not all chemical reactions go \_\_\_\_\_.

-- Because of this, we have a mathematical way to \_\_\_\_\_.

**Actual Yield:** \_\_\_\_\_

**Theoretical Yield:** \_\_\_\_\_

Equation:

Practice:

1. Antacids often contain aluminum hydroxide to neutralize stomach acid (HCl). If a tablet contains 14.0g of aluminum hydroxide, determine the theoretical yield of  $\text{AlCl}_3$  produced in the reaction with stomach acid.

a. If the actual yield of aluminum chloride is 22.0 g, what is the percent yield?

2. Ethanol ( $\text{C}_2\text{H}_5\text{OH}$ ) is produced from the fermentation of sucrose in the presence of enzymes. Determine the theoretical and percent yields of ethanol if 684 g of sucrose undergoes fermentation and 349 g of ethanol is obtained.

