

Chemistry Instructions

- 1) get out your notebook**
- 2) Add Percent yield to your table of contents**
- 3) add LT 7.2**

Learning Target 7.2

> 50% U

Formula for Percent Yield

$$\text{Percent yield} = \frac{\text{Actual Yield}}{\text{Theoretical Yield}} \times 100\%$$

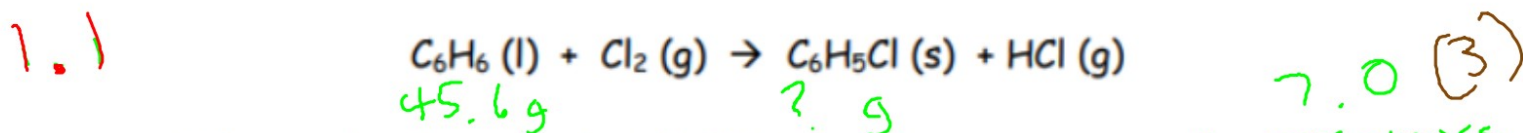
Giving the chemical reaction a grade.

Actual Yield: mass (g) of product "actually" produced while you to the Lab.

Theoretical Yield:

Amount of product can be produced based on the stoichiometry

1. Chlorobenzene, C_6H_5Cl , is used in the production of chemicals such as aspirin and dyes. One way that chlorobenzene is prepared is by reacting benzene, C_6H_6 , with chlorine gas according to the following BALANCED equation.



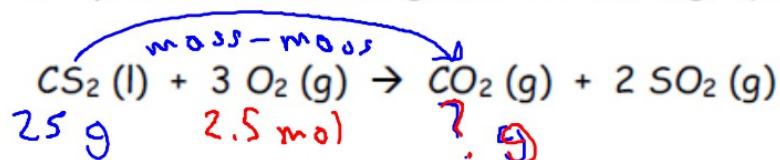
- a. What is the theoretical yield if 45.6 g of benzene react? mass-mass

$$\begin{array}{c}
 45.6 \text{ g } C_6H_6 \left| \begin{array}{l} 1 \text{ mol } C_6H_6 \\ 78 \text{ g } C_6H_6 \end{array} \right| \begin{array}{l} 1 \text{ mol } C_6H_5Cl \\ 1 \text{ mol } C_6H_6 \end{array} \left| \begin{array}{l} 112.4 \text{ g } C_6H_5Cl \\ 1 \text{ mol } C_6H_5Cl \end{array} \right. = \frac{45.6(112.4)}{78} \\
 = 65.7 \text{ g } C_6H_5Cl
 \end{array}$$

- b. If the actual yield is 63.7 g of chlorobenzene, calculate the percent yield.

$$\frac{\text{Actual}}{\text{Theo}} \times 100 = \frac{63.7 \text{ g}}{65.7 \text{ g}} = 96.9\% \text{ Yield}$$

2. When carbon disulfide burns in the presence of oxygen, sulfur dioxide and carbon dioxide are produced according to the following equation.



- a. What is the percent yield of sulfur dioxide if the burning of 25.0 g of carbon disulfide produces 40.5 g of sulfur dioxide?

$$\frac{25 \text{ g CS}_2}{76 \text{ g CS}_2} \times \frac{1 \text{ mol CS}_2}{1 \text{ mol CS}_2} \times \frac{1 \text{ mol CO}_2}{1 \text{ mol CS}_2} \times \frac{44 \text{ g CO}_2}{1 \text{ mol CO}_2} = 42.1 \text{ g}$$

$$\frac{40.5 \text{ g}}{42.1 \text{ g}} = 96\%$$

- b. What is the percent yield of carbon dioxide if 2.5 mol of oxygen react and 32.4 g of carbon dioxide are produced?

mol-mass (2)

$$\frac{32.4 \text{ g}}{36.6 \text{ g}} = 0.88$$

$$\frac{2.5 \text{ mol O}_2}{3 \text{ mol O}_2} \times \frac{1 \text{ mol CO}_2}{1 \text{ mol O}_2} \times \frac{44 \text{ g CO}_2}{1 \text{ mol CO}_2} =$$

$$88\%$$