### Percent Yield

\[
\frac{\text{Actual yield}}{\text{Theoretical yield}} \times 100
\]

**Actual yield** is what is determined by an experiment. How much product in moles/molecules/grams or liters is actually produced in the lab when the rxn is complete.

**Theoretical yield** is what you expected to get if all the reactants were consumed. The theoretical yield is always determined by doing a stoichiometric calculation from the balanced chemical rxn.

1. In the production of ammonia, 12 liters was expected (Theoretical yield), but only 10 liters was produced in the lab (Actual yield). What is the percent yield?

2. 32 moles of dynamite was produced (Actual yield) in the shop when 40 moles was expected (Theoretical yield). What was the percent yield?

3. 0.63 grams of nitrogen gas was expected when a sample of sodium azide decomposed. Only 0.59 grams of nitrogen was actually produced. What was the percent yield of this rxn?

For the following you must calculate the theoretical yield (what is expected) using stoichiometry and compare it to the actual in order to determine the percent yield.

4. \[ 6 \text{ CO}_2 (g) + 6 \text{ H}_2\text{O} (l) \rightarrow \text{ C}_6\text{H}_{12}\text{O}_6 (s) + 6 \text{ O}_2 (g) \]

   a) If 15 moles of CO2 is consumed, find the moles of glucose produced.

   **Given:** 15 moles CO2  
   **Find:** ?? moles C6H12O6 (Theoretical yield)

   b) If in the lab when the above rxn is complete it only created 2.0 moles of glucose (Actual yield) what was the percent yield?

5. \[ 2 \text{ NaN}_3 (s) \rightarrow 2 \text{ Na} (s) + 3 \text{ N}_2 (g) \]

   a) 32.5 grams if NaN3 react. Calculate how many liters of nitrogen should theoretically form. (Follow the 3 step process)

   **Given:** 32.5 grams  
   **Find:** ?? Liters N2

   b) If in the lab 13.2 liters of nitrogen are created (Actual yield), what is the percent yield of this rxn?