**Limiting Reactant (Reagent) and % Yield Notes**

**How many grids do you need?**  1 number = 1 grid 2 numbers = 2 grids

 **Ex. 1** 2**Na(s) + Cl2(g) 🡺** 2**NaCl(s)**

A) 6.70 mol Na ? mol NaCl B) 3.2 mol Cl2 ? mol NaCl

 **Vocabulary:**

 Limiting Reactant/Reagent: *\_\_\_\_\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the amt of product;*

 ***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*** *used up in rxn –* ***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*** *amount produced*

 Excess Reactant/Reagent**:** *\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ used up in rxn –* ***\_\_\_\_\_\_\_\_\_\_\_\_\_*** *amount**produced*

**The Set Up:**

1. Convert both reactant to moles of desired product, make sure to use the mole ratio
2. Compare the amount of moles produced
3. Determine the limiting and excess reactant
4. To determine the **max amount of product produced**
	1. Convert limiting to the desired unit
5. To determine the **amount of excess left over**
	1. Convert the max amount of product produced to excess reactant = excess reactant consumed
	2. Orginial excess reactant – excess reactant consumed = excess reactant remaining

**Analogy:**

*How many grilled cheese sandwiches can be made if there is 2 slices of cheese and 15 slices of bread?*

*Which ingredient limited how many sandwiches were made?*

*Which ingredient was in excess (had extras)?*

**Now, look at example 1:**

 c. Which answer is smaller? d. Which reactant produced the smaller answer?

 d. Therefore, which reactant limits the amount of product produced? e. Which reactant is in excess?

f. What is the max amount of product produced in grams? *(step 4)*

g. How much of the excess reagent is left over in this reaction? *(step 5)*

*step5a) convert f’s answer to the excess reactant step5b) subtract 5a’s answer from the original in the question*

 **Ex. 2** If 80.00 grams of copper is reacted with 25.00 grams of sulfur, how much product can be produced in grams? Identify the limiting and excess reactants. How much of the excess reagent is left over in this reaction?

 2**Cu (s) + S (s) 🡺 Cu2S (s)**

**EX. 3** If 10.0 grams of aluminum sulfate reacts with 10.0 g of sodium hydroxide, how many grams of sodium sulfate can be produced? Identify the limiting and excess reactants. How much excess reactant is left over?

 **Al2(SO4)3 + 6NaOH 🡺 3Na2SO4 + 2Al(OH)3**

 **% Yield =** $\frac{Actual Yield}{Theoretical Yield}$ **x 100**

**Ex. 4** If 14.8 g of C3H8 reacts with 3.44 g of oxygen, how many liters of carbon dioxide gas is produced? C3H8 + 5O2 🡪 3CO2 + 4H2O

**Vocabulary:**

Theoretical Yield: *\_\_\_\_\_\_\_\_\_\_amount of product that can be produced (when applicable it’s the \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_) 🡺* ***\_\_\_\_\_\_\_\_\_\_\_\_\_\_ -\_\_\_\_\_\_\_\_\_\_\_\_\_***

 Actual Yield: *amount of product that* ***\_\_\_\_\_\_\_\_\_\_\_\_\_\_*** *produced 🡺* ***\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_***

 Percent Yield:

What is the percent yield if 1.31 L of carbon dioxide is produced in lab?