**Theoretical yield and**

**Percent yield.**

**Theoretical yield: is the amount of product that is produced (could be any of the products) based on the limiting reactant. This is calculated without making (or being given) any measurements.**

**Percent yield: is a percentage that compares the amount of actually collected product (called actual yield) to the theoretical yield.**

 **% yield = Actual yield / Theoretical yield x 100.**

 **\*\*The closer to 100 % the better (or more accurate).**

**Example: If 25g of sodium reacted with 15 ml of a .75 M Aluminum Sulfate solution to actually produce 3.5 g of Sodium Sulfate then what is the percent yield?**

**1st: Convert each reactant to moles to calculate the limiting reactant. \*\*\*Remember you need a balanced equation to do this!**

**25 g Na x 1mole Na = 1.087 Moles Na**

1. **22.99g Na**

**15 ml Al2(SO4)3 x 1 L x .75**

 **1 1000 ml 1L**

**=.01125 moles Al2(SO4)3**

**2nd : Write out and balance the chemical reaction, then divide by the coefficients.**

**6Na + Al2 (SO4)3 🡪 3Na2(SO4) + 2Al**

**3rd: Divide the reactants by their coefficients in the chemical equation.**

 **1.087 moles of Na / 6 = .181 moles of Na**

 **.01125 moles of Al2(SO4)3 / 1 = .01125 moles of Al2(SO4)3 (this is the limiting reactant)**

**4th :Use the coefficients of the limiting reactant and of the desired product (remember it depends on what the question asks) to calculate theoretical yield.**

**.01125 Moles of Al2(SO4)3  x 3 moles Na2(SO4) x 142.02 g Na2(SO4)**

 **1 1mole Al2(SO4)3  1mole Na2(SO4)**

**= 4.79 g Na2(SO4)**

**5th: Calculate the percent yield by dividing the actual yield / theoretical yield x 100.**

 **% yield = 3.55 g Na2(SO4)**

**4.79 g Na2(SO4) x 100 =**

 **74.11 % yield.**