**How to Figure a Titration**

**Example 1:**

How much .200 M HCl is needed to neutralize 500 mL of .100 M NaOH?

Step 1: Write and balance the equation: HCl +NaOH 🡪 H2O +NaCl

Step 2: Note the stoichiometric ratio of acid to base (in this case it is 1:1)

Step 3: Write the dimensional analysis STARTING WITH THE KNOWN MOLARITY AND VOLUME!

.500 L NaOH x (.100 mols NaOH/1 L) x (1 mol HCl/1 mol NaOH) x (1/.200 mols HCl) = .25 L or 250 mL

**DON’T FORGET to multiply all numbers! .100 is not the same as multiplying by 1!**

If you break down the dimensional analysis you will see that you are

1. Taking the Liters of the known and multiplying it by the moles present and then by the ratio of the unknown (in this case 1 unknown : 1 known)
2. You are then taking the molarity of the unknown and splitting it into mols/L. This gives you the **# of Liters of the unknown needed.**

**Example 2:**

How much 2.5 M NaOH is required to neutralize .250 L of 1.25 M H2SO4?

2NaOH + H2SO4 🡪 H2O + Na2SO4

.250 L H2SO4 x (2 mol NaOH/1 mol H2SO4) x (1.25 mols H2SO4/1 L) x (1/2.5 mols NaOH) = .25 L or 250 mL NaOH