Acid, Base, Neutralization

$$MX + MOH \rightarrow MX + H_2O$$

Background:

Early chemists discovered that sour acids and bitter bases combine to form relatively bland-tasting (neutral) salts. (CAUTION: Never taste a chemical in the laboratory.) The general reaction can be represented by acid + base → salt + water In this reaction, the H+ ions from the acid and OH- ions from the base combine to produce water. The products of the reaction do not have the properties of an acid or a base. The reaction is, therefore, called a neutralization reaction. In part I of this experiment, you will use a neutralization reaction between a strong acid and a strong base to make a salt.

Materials:

- PPE: Lab coats, goggles and gloves (wear at all times during lab)
- 25ml Graduated cyl
- 2 50 ml beakers
- 1 250 ml beaker (for part II)
- 10 ml Unknown A (in one of the 50ml beakers)
- 10 ml Unknown B (in one of the 50 ml beakers)
- 3 strips of red litmus paper
- 3 strips of blue litmus paper
- 1 test tube
- 1 test tube holder
- 1 rubber stopper
- 1 length of copper wire
- 1 strip of magnesium

Part A - Procedure:

1. Put on PPE (Personal Protective Equipment): Goggles, Lab Coat and Gloves – Do not remove until the end of the lab! We are working with corrosive chemicals.
2. Place Unknown A in a beaker and Unknown B in a different beaker.
3. Test each solution with litmus paper, fill in chart and answer question 1 at the back of the lab.
4. Combine both Unknown A & B into 1 beaker. Test with red and blue litmus paper. Fill in chart.
5. Rinse out beakers, all contents can be rinsed down the drain.

Results:

	Unknown A	Unknown B	Unknowns A & B
Red Litmus Paper			
Blue Litmus Paper			

Part B - Procedure:

1. Take your magnesium ribbon and bend it into 3 parts. Wrap your magnesium ribbon in your copper wire (create a cage around the magnesium ribbon) - it must be able to fit in the test tube and be long enough to reach the end of the test tube, as well as stick out past the end of the test tube when you are done with it. (there is an example of how to do it on the cart, if you aren't sure).
2. Take your 250 ml beaker and fill 1/2 full with tap water.
3. Pour 15 ml of HCl into your graduated cyliner from the shared classroom beaker (be very careful it is corrosive). Then when at your station pour into the empty test tube, leaving room for the copper cage you

4. Quickly and carefully insert the copper wire cage and then slowly insert rubber stopper, being careful not to break the test tube (pinching the copper wire with the stopper). Invert the test tube and place in the beaker. What is happening?

5. While watching what is happening in step 4, light your candle and then light a wooden splint to test the gas produced, wait until the reaction stops, you should have created a test tube full of gas. This next should happen quickly - Have one partner hold the just blown out - glowing splint and the other lab partner open the test tube (keep the test tube in the same orientation it was, **be very careful of the direction you hold the test tube in the event of an unexpected reaction** and use a test tube holder to hold the test tube while doing this. From the Ca+2 lab you did, you should know what gas you produced based on what happens when you insert the glowing splint.

6. Last but not least, wash and clean all supplies very well. Uncoil the copper wire back into a straight piece, so it is reusable for the next group. Place the Mg +2 left overs in the designated waste bag.

7. You many only remove your PPE (Goggles, Lab Coats and Gloves) when the entire class is done the lab and your teacher gives you permission.

Questions:

1. From the litmus paper test what do you know about each solution?

2. What would you call the reaction where the solutions Unknown A & B were mixed, what happen?

3. What happened when we added our magnesium to the HCl acid solution? What was produced?

4. Write the equation for the magnesium ribbon and HCl reaction? What type of reaction was it?

5. What did you observe in the last reaction, did the magnesium change appearance, note any observation you thought showed a reaction was occurring.