Unit 2: Generating and Burning Hydrogen Gas Lab

PURPOSE:

* To investigate single replacement reactions.
* To experience the law of conservation of mass.
* To identify characteristics of chemical changes.
* To practice safe lab techniques.

­MATERIALS:

* Safety googles and lab coat.
* Scale
* Medium test tube
* Large test tube
* test tube rack
* Candle
* matches
* wooden splints (match stick)
* dilute hydrochloric acid (HCl)
* Zinc metal
* Test tube clamp/holder
* Chemical waste container

PROCEDURE:

1. Put on your safety gear (lab coat, googles, hair back, scarf away etc).
2. Using the scale, weigh the empty medium test tube in the rack: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, then weigh only the rack itself.
3. Place the medium test tube in the test tube rack. Make sure the large test tube will fit over the medium test tube. Set the large test tube aside.
4. Set up a candle and light it. Have several wooden splints nearby.
5. Carefully pour the HCl into the medium test tube until the test tube is no more than 1/3 full. *Be careful not to spill. You are working with an acid.*
6. Use the scale once again, to weigh the medium test tube with HCl \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the separate piece of zinc metal \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. One partner should place 1 piece of zinc metal into the HCL. The reaction will begin slowly. Look for bubbles forming on the surface of the zinc. Have the other partner take pictures of the bubbles and set up. Make note of any colour change that occur on the surface of the zinc.
8. Using a test tube holder, hold the large test tube upside down over the mouth of the medium test tube to collect the Hydrogen gas. The gas is invisible, but you will probably have enough collected in about 30 seconds.
9. Lift the large test tube away from the medium test tube. *Keep it upside down so you don’t lose any gas.*
10. Light a wooden splint and bring the flame near the base of the large test tube until the hydrogen gas ignites. **Be prepared for a loud “pop” sound and DO NOT drop the test tube.** Observe. Take a photo.
11. Repeat the gas collection and ignition a few more time. Because oxygen is needed for burning to occur, blow into the large test tube a few times before refilling it with hydrogen gas. This will help produce a good “pop”.
12. When you are finished, use the scale to weigh the contents of the medium test tube in the same test tube rack.

Final mass of Medium test tube\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. When you are finished, pour the contents of the medium test tube into the chemical waste container.
2. **Clean** and replace all materials and complete questions. **Please make sure all of your materials are properly and completely cleaned.**

DIAGRAM OF SET UP and OBSERVATIONS (label materials AND WHAT YOU SEE)

* Instead of drawing this here, I would like you take a picture of the set up and the results. Include this in your ePortfolio.

**Please include the following observations, questions & answers on your Unit 2 page of your ePortfolio. This should be found under the heading “Generating and Burning Hydrogen Gas lab”. Include your photos (min 3). Yes, each lab partner needs to complete their own write up on their eP.**

OBSERVATIONS:

1. Describe the chemical changes that occurred to the zinc metal.
2. How do you know that there was hydrogen gas in the large test tube? Explain.

QUESTIONS / CONCLUSION:

1. Calculate the mass difference in materials after the experiment*. Ask the teacher to help you with this.* If there isn’t much difference, explain why.

1. How can the difference in mass be explained? How might we “conserve” the mass? Explain.
2. We are going to explore this reaction type a bit later in the unit. For now, please write down the chemical formula (symbol and charge) for Zinc, HCl and Hydrogen Gas.