Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Partner #1’s Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block: \_\_\_\_\_\_

Partner #2’s Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Lab: Meet Oxygen and Hydrogen**

**BACKGROUND**

* Oxygen and hydrogen are two different elements that exist in many different forms. Alone, they form gases that we breathe every day. Combined, they may form compounds such as water (H2O) or hydrogen peroxide (H2O2). We drink water to survive and we use hydrogen peroxide to clean cuts. Hydrogen gas is *very flammable* and will produce a loud "pop" sound near a flame. Oxygen gas is required for wood to burn, and a glowing orange wood splint will re-light in the presence of oxygen.

**PURPOSE**

* To generate hydrogen and oxygen gas and distinguishing between them using the "pop" test.

**MATERIALS**

**Experiment #1 Experiment #2**

* Ring stand & clamp
* Small test tube
* Funnel
* 250 mL Erlenmeyer flask
* HCl acid solution
* Zinc pellets
* 500 mL beaker
* 250 mL Erlenmeyer flask
* Medium test tube
* Rubber stopper and gas collection tube
* H2O2 solution (hydrogen peroxide)
* Yeast
* 1 x 50 mL beaker
* Matches & candle
* Scoopula
* Wooden splint

**PROCEDURE #1**

1. Draw and label a diagram of the experiment set-up:
2. Set up your lab equipment as per your diagram.
3. Drop a small amount of zinc pellets into the Erlenmeyer flask.
4. Squirt enough acid into the Erlenmeyer flask to cover the zinc pellets. You should see a chemical reaction happening.
5. Lower the test tube down until it is just inside the funnel to collect the hydrogen gas.
6. Wait 30 seconds and raise the test tube to the top of the ring stand.
7. Light a match and place it below the test tube. Be prepared for a loud pop! Repeat the collection process to hear another pop.
8. Observe and record your results.
9. Clean up all equipment and return to where it came from.

**PROCEDURE #2**

1. Draw and label a diagram of the experiment set-up:
2. Set up your lab equipment as per your diagram.
3. Fill the beaker and test tube with tap water.
4. Submerge the tubing into the water.
5. Pour about 1 cm of hydrogen peroxide into the Erlenmeyer flask.
6. Add a half pea size amount of yeast into the flask and seal it with the rubber stopper tightly. BE CAREFUL NOT TO TWIST THE GLASS!!
7. You should see bubbles coming from the submerged tube. If not, make sure the rubber stopper it tightly sealed and you can see bubbles from the reaction in the flask.
8. Carefully place the tubing inside the water filled test tube to collect the gas.
9. Once the water is replaced with gas (the test tube will look empty), light a wooden splint and blow it out so that it is glowing orange.
10. Lift the test tube out of the water and hold the glowing splint inside the test tube. It should re-light.
11. Observe and record your results.
12. Clean up all equipment and return to where it came from.

**EXPERIMENT #1 OBSERVATIONS**

Zinc metal pellets mixed with HCl acid.

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**EXPERIMENT #2 OBSERVATIONS**

 Hydrogen peroxide mixed with yeast

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**QUESTIONS - You MUST write in COMPLETE sentences!**

Experiment #1

1. How does the appearance of the zinc metal change as it reacts with the acid?
2. Predict what will happen to the zinc if it were left in the acid for a long time.
3. Based on your observations, was oxygen or hydrogen gas produced in this experiment? How could you tell?

Experiment #2

1. How does the appearance of the yeast change as it reacts with the hydrogen peroxide?
2. Based on your observations, was oxygen or hydrogen gas produced in this experiment? How could you tell?

**CONCLUDE and APPLY**

The *Hindenburg* disaster occurred on May 6, 1937, as the German passenger airship LZ 129 *Hindenburg* caught fire and was destroyed during its attempt to dock with its mooring mast at Naval Air Station in New Jersey, United States. Of the 97 people on board (36 passengers and 61 crewmen), there were 35 fatalities (13 passengers and 22 crewmen). One worker on the ground was also killed, making a total of 36 fatalities.

Which very light gas do you think the *Hindenburg* had been filled with?