**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Molar Volume of a Gas Lab**

**Guiding Question**: What is the volume of a mole of gas at STP?

**Background Information:** You will react magnesium with excess hydrochloric acid to form hydrogen gas. This gas will be fixed for STP values and you will determine your own molar volume. A eudiometer will be used to measure the gas collected over water. You must remember to correct the classroom pressure with the vapor pressure of the water.

**Materials:** Magnesium, 3M Hydrochloric acid, copper thread, eudiometer, stopper with hole, beaker of water.

**Pre-Lab Questions:**

1. Write the molecular equation of hydrochloric acid reacting with magnesium metal.
2. What is the limiting reagent in the lab? Explain.
3. You are using a piece of copper wire to hold the magnesium in place as it reacts with the acid. Does the copper interfere with the reaction? Explain.
4. What happens to the magnesium chloride that is produced in the reaction?

**Procedure:**

1. Obtain and measure the length of the mg ribbon.
2. Obtain a piece of copper thread about 15 cm long. Tie the thread to the Mg with extra Cu hanging.
3. Obtain 10mL of hydrochloric acid and carefully pour it into the eudiometer.
4. Tilt the eudiometer and carefully pour water into the tube without mixing with the acid until full.
5. Lower the Mg ribbon into the tube and cap it in place with a stopper.
6. Set up a ring stand to hold the eudiometer and have a beaker of water ready.
7. With your finger over the stopper hole, lower the eudiometer into the water and clamp it to the ring stand. The top of the eudiometer should be submerged and almost touching the bottom of the beaker.
8. Let the reaction continue and take observations until the reaction stops. At that time, tap the eudiometer to dislodge stuck bubbles. Record the volume of Hydrogen produced.
9. Record the room temperature, room pressure, water vapor pressure and mass of 1m Mg.
10. Repeat for trial 2.



**Data:**

|  | **Trial one** | **Trial two** | **Average of Trials** |
| --- | --- | --- | --- |
| Length of Mg |  |  |  |
| Mass of 100cm of Mg |  |  |  |
| Volume of H2 in tube |  |  |  |
| Room Temperature |  |  |  |
| Room Pressure |  |  |  |
| (Water) Vapor pressure |  |  |  |

**Claim**: Answer the guiding question.

**Evidence**: Show relevant data and calculations that support your claim. Then explain how the data is interpreted.(Hints: be sure to use the mole of GAS in your calculations. Fix your measured values for STP values. Molar volume is reported in L/mol.)

**Reasoning**: Provide necessary scientific concepts that support your claim and evidence. Calculate your percent error with 22.4L as the accepted value. Explain how errors in the lab lead to your %.

