FLINN SCIENTIFIC

Name_____

Laboratory Report

	Trial 1	Trial 2
Length of Mg Ribbon		
Mass of Mg		
Evidence of Chemical Reaction		
Volume of H_2 Gas		
Corrected Volume of H_2		
Temperature of Water Bath		
Barometric Pressure		

Enter the results of all calculations in the *Results Table* below.

1. Calculate the theoretical number of moles of hydrogen gas produced in Trials 1 and 2.

2. Use Table 1 in the *Background* section to find the vapor pressure of water at the temperature of the water bath in this experiment. Calculate the partial pressure of hydrogen gas produced in Trials 1 and 2.

3. Use the combined gas law to convert the measured volume of hydrogen to the volume the gas would occupy at STP for Trials 1 and 2. **Hint:** Remember the units!

4. Divide the volume of hydrogen gas at STP by the theoretical number of moles of hydrogen to calculate the molar volume of hydrogen for Trials 1 and 2.

Results Table

Number of moles of H_2 gas		
Vapor pressure of water		
Partial pressure of H_2 gas		
Calculated volume of H_2 gas at STP		
Molar volume of H_2 gas		
Average molar volume		

5. What is the average value of the molar volume of hydrogen? Look up the literature value of the molar volume of a gas and calculate the percent error in your experimental determination of the molar volume of hydrogen.

$$\text{Percent error} = \frac{|\ \text{Experimental value} - \text{Literature value}\ |}{\text{Literature value}} \times 100\%$$

6. One mole of hydrogen gas has a mass of 2.02 g. Use your value of the molar volume of hydrogen to calculate the mass of one liter of hydrogen gas at STP. This is the density of hydrogen in g/L. How does this experimental value of the density compare with the literature value? (Consult a chemistry handbook for the density of hydrogen.)

7. In setting up this experiment, a student noticed that a bubble of air leaked into the graduated cylinder when it was inverted in the water bath. What effect would this have on the measured volume of hydrogen gas? Would the calculated molar volume of hydrogen be too high or too low as a result of this error? Explain.

8. A student noticed that the magnesium ribbon appeared to be oxidized—the metal surface was black and dull rather than silver and shiny. What effect would this error have on the measured volume of hydrogen gas? Would the calculated molar volume of hydrogen be too high or too low as a result of this error? Explain.

9. *(Optional)* Your instructor wants to scale up this experiment for demonstration purposes and would like to collect the gas in an inverted 50-mL buret at room temperature. Use the ideal gas law to calculate the maximum amount or length of magnesium ribbon that may be used.