Determination of the molecular mass of CO_2.

In this experiment we will collect the gas in a dry environment, so we will not need to correct for vapor pressure. Therefore the bottle MUST be absolutely dry. (We use glass 16 oz. Snapple Jars)
Names_____

1. Find the mass of the bottle with cap to two decimal places. _____

2. Set up your carbon dioxide generator as shown. The thistle tube should reach almost to the bottom of the flask. (generator uses marble chips, and 3 molar HCl. Try a higher molarity if the carbon dioxide is produced too slowly)

3. You MUST wear safety glasses at all times during this experiment.

4. Carefully pour your HCl solution into the flask, through the thistle tube. The amount must be sufficient to cover the bottom of the thistle tube.

5. Run the rubber tube into the bottle. Continue to run gas into the bottle for at least 10 minutes. If the solution stops bubbling, add additional HCl.

6. After at least 10 minutes of heating, light a wooden splint, and place it just at the top lip of the jar. It should go out. If it does go out, collect gas for another five minutes. If the match does NOT go out, it means your bottle is not filled with CO_2. Run gas into the bottle for another 5 minutes, and then try the match test again.

7. Cover the jar WITH THE SAME COVER YOU USED IN STEP 1!! and weigh the jar_____

8. Place a thermometer in the jar to obtain the temperature reading._____

9. Fill the jar with water, and use graduated cylinders to find the exact volume of the jar.
V= _____

10. Assume that the density of air is 1.18 g/L. Multiply the density by the volume of the jar in liters to get the mass of air in the jar._____
(Note: Students may use the internet to obtain a more precise value for the density of air at a given temperature and pressure)

11. Calculate the mass of the jar when empty_____

12. Subtract the mass of the jar when empty from the mass with CO_2 (step 7) _____
(this is the mass of CO_2 you collected)

13. Obtain a barometric reading. This is the pressure of your gas. _____

Name_____

Find the MW of CO_2 using the equation MW = gRT/PV . Remember that in order to use the value of R as 0.0821 Liter atmospheres/mole degree K, the T must be Kelvin, the g must be grams, the P must be atmospheres, and the V must be liters.

MW _____

Book value of MW _____

% error _____ .

A student performing a similar experiment with a gas OTHER than CO_2 found that the bottle weighed **less** after it was filled with the gas than it did in step 1. Explain how this could happen.