**Relationships in a Chemical Reaction**

**Objective:** Compare the mass and volume of a product in a chemical reaction with the mass and volume predicted from theory.

**Materials:** thistle tube, gas generator, hydrochloric acid, sodium carbonate, hot plate, fume hood, beaker, watch glass, electronic scale, pop bottle

**Student Design Procedure:**

The equation you will use is:

Na2CO3 (s) + 2HCl (aq) -------> 2NaCl (aq) + H2O (l) + CO2 (g)

Since one of the products is a gas (CO2) and another can be evaporated (water), it is possible to do 2 things here:

***1•***measure/capture the CO2 gas

**2•**measure/isolate the NaCl

You will measure a known amount of sodium carbonate and react it with excess hydrochloric acid. Your job is to develop a procedure to find the volume of carbon dioxide, the mass of sodium chloride produced, and explain this procedure so that someone else can reproduce your experiment. You will be provided with both reactants.

**Data and Observations:**

Record all data and observations that occur during the lab in a well-organized table. Hint: Look at your analysis questions to make sure that necessary data is included.

**Analysis:**

•Show calculations of the theoretical amount of carbon dioxide produced and sodium chloride produced.

•Show calculations that determine the amount of carbon dioxide produced and sodium chloride produced experimentally.

•Finally, calculate the percent yield in this experiment for each product.

**Conclusion:**

Claim: How did the theoretical amounts calculated compare to the experimental amounts obtained in lab.

Evidence: What evidence from laboratory observations and techniques used can you provide to explain the discrepancy (difference) between these two values.

Reasoning: What scientific principles support the evidence provided?