Questions:

A.If you are mixing an unknown amount of sodium bicarbonate with an excess of acid (HCl $_{(aq)}$), what quantity could you easily record to determine the amount of sodium bicarbonate you started with? *Teachers should guide students through discussion if they do not immediately know where they should begin. It may help to write the equation for part B first. The procedure has students drive off all the carbon dioxide from the resulting products. According to the Law of Conservation of Matter, the total mass of reactants used should be equal to the total mass of the products produced. Therefore, if students find the mass of the reactants before and then find the mass of the products after, they should be able to calculate the exact amount of carbon dioxide produced.*

B. What is the balanced reaction of sodium bicarbonate with HCl (aq)?

$$NaHCO_3 + HCl \rightarrow NaCl + H_2O + CO_2$$

Problem: How much sodium bicarbonate is in an antacid tablet? How would you determine this experimentally?

You will be given a portion of an antacid tablet and an excess of HCl. You are to react the two. You must predict the amount of sodium bicarbonate that is in the **full** tablet.

Data: What data is important BEFORE you do the experiment? Create an organized data table.

The organization may vary, but students should find the mass of a whole tablet (or take the data from the product label), the partial tablet that they are provided, the mass of the HCl and the mass of the container.

Calculations:
Show calculations in detail that would provide an accurate prediction of the mass of sodium bicarbonate in a full tablet. Please calculate in milligrams.

Mass of CO_2 x $\dfrac{1\ mole\ CO_2}{44.00\ g\ CO_2}$ x $\dfrac{1\ mole\ NaHCO_3}{1\ mole\ CO_2}$ x $\dfrac{84.01g\ NaHCO_3}{1\ mole\ NaHCO_3}$ = g $NaHCO_3$ in partial tablet

At this point, students should have the mass of the entire tablet. One way they

can use to calculate the mass of sodium bicarbonate in a whole table would be to use a ratio.

Experimental mass of NaHCO$_3$ in partial tablet = *mass of partial Alka-Seltzer tablet from data*

MASS of NaHCO$_3$ in whole tablet   *Given mass of whole Alka-Seltzer tablet*

Prediction:_____

Actual:_____

Your instructor will give you the mass of an entire tablet and the amount of sodium bicarbonate in the tablet at the start of the experiment. Based on your tablet amount and the experimental amount of sodium bicarbonate, find the percent yield ((final amount/initial amount) x 100).

Calculated mass of NaHCO$_3$ in whole tablet   *x 100 = Percent Yield*

  Given mass of NaHCO$_3$ in whole tablet

Percent Yield_____

What else could have be examined to verify your findings of the initial amount of sodium bicarbonate? (What else might you be able to record..even if it takes a few more steps..)