Name _____   Period   _____

Partner _____   Date   _____

**Investigating Moles and Mass in a Chemical Reaction**

Directions:

1. Find the mass of a clean 150–250 mL beaker and watch glass.

2. Add about 3.0 g of $NaHCO_3$, AKA Baking Soda and find the total mass.

3. Use a small 50 mL beaker to obtain some 3-M HCl and then add a little at a time to the larger beaker with the $NaHCO_3$ and stir. Make sure the reaction is complete before proceding.

$$NaHCO_3 + HCl ----> NaCl + H_2O + CO_2$$
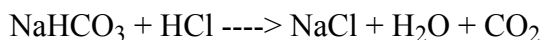
4. Place the beaker with its watchglass cover on a hot plate and heat at 50%–70% until everything is dry. Yes that too. No, really, I meant DRY as in no water at all.

Hot Plate ⬤
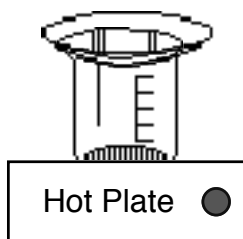
5. Find the mass of the beaker, watch glass and dry NaCl

6. Clean up.

Prelab Questions:

1. When sodium hydrogen carbonate reacts with hydrochloric acid, what three products should be produced?

2. how many moles are present in 585 g of sodium chloride?

3. What is the mass in grams of 3.4 mol of carbon dioxide?

4. How will you know when to stop adding the HCl?

Data:

Mass of beaker + Watch Glass   _____ g

Mass of beaker + $NaHCO_3$ + Watch Glass   _____ g

Mass of beaker + dry solid (after the reaction is complete) + Watch Glass _____ g

Analysis:

Calculate the masses of:
   a) sodium hydrogen carbonate used   _____ g

   b) sodium chloride produced   _____ g

Calculate the number of moles of:
   c) sodium hydrogen carbonate used   _____ mol

   d) sodium chloride produced   _____ mol

Post Lab Questions:

1. Write a balanced chemical equation for the reaction.

2. According to the equation above, what is the ratio of moles of sodium hydrogen carbonate to moles of sodium chloride?

3. How does your answer to number 2 above compare to the results of your lab in the Analysis section above?

4. Using the value that you obtained for the number of moles of sodium chloride produced, calculate the number of moles of carbon dioxide and the moles of water that would have been produced.

_____ mol carbon dioxide   _____ mol water

5. Using the value that you obtained for the number of moles of sodium chloride produced, calculate the number of moles of hydrochloric acid that would have been used up in the reaction.

_____ mol HCl

6. How much NaCl should be produced by the $NaHCO_3$ that was used?

_____ g NaCl