Summary of Stoichiometry Lab Calculations

Determine Molar Mass of Na_2CO_3
Determine Molar Mass of NaCl

$$Na_2CO_{3\,(aq)} + 2\,HCl_{\,(aq)} \rightarrow 2\,NaCl_{\,(aq)} + H_2O_{\,(l)} + CO_{2\,(g)}$$

Amount 6 M HCL is needed to completely react with 2.00 g Na_2CO_3

(6 M HCL means 6 moles of HCl per liter of solution … we will discuss this in the solutions unit)

$$2.00\text{ g } Na_2CO_3 \times \frac{1\text{ mole } Na_2CO_3}{105.99\text{ g}} \times \frac{2\text{ mole HCl}}{1\text{ mole } Na_2CO_3} \times \frac{1\text{ L}}{6\text{ moles HCl}} \times \frac{1000\text{ mL}}{1\text{ L}} = 6.28\text{ mL}$$

So, you should not need to use more than ~ 6.5 mL of 6 M HCl in the experiment

1. Mass of sodium carbonate sample at the beginning of the experiment (Weighing by Difference):
Mass of Evaporating Dish + Watch Glass + sodium carbonate
- Mass of Evaporating Dish + Watch Glass

Mass of your sodium carbonate

Your Theoretical Yield
(Depends on your Na_2CO_3 mass)

2. Theoretical Yield of NaCl from 2.00 grams Na_2CO_3

$$2.00\text{ g } Na_2CO_3 \times \frac{1\text{ mole } Na_2CO_3}{\text{Molar Mass } Na_2CO_3\text{ g}} \times \frac{2\text{ mole NaCl}}{1\text{ mole } Na_2CO_3} \times \frac{\text{Molar Mass NaCl g}}{1\text{ mole NaCl}} = 2.21\text{ g}$$

Your weight of Na_2CO_3 at the start of experiment gives your theoretical yield of NaCl

3. Mass of NaCl remaining (Actual Yield) at the end of the experiment (Weighing by Difference):
Mass of Evaporating Dish + Watch Glass + NaCl
- Mass of Evaporating Dish + Watch Glass

Mass of your NaCl sample remaining at end of experiment

Percent Calculation

4. Experimental Percent Yield of NaCl

$$\%\text{ Yield} = \frac{\text{Actual Yield NaCl}}{\text{Theoretical Yield NaCl}} \times 100$$

(Obtained in Experiment)
(Calculated Yield based on Stoichiometry)

5. Percent Experimental Error in NaCl Isolation

$$\%\text{ Error} = \frac{\text{Actual yield NaCl (g)} - \text{Theoretical Yield NaCl (g)}}{\text{Theoretical Yield NaCl (g)}} \times 100$$

Since Actual Yield is typically < Theoretical Yield
% Error should be a small, negative number