

Name \_\_\_\_\_ Date \_\_\_\_\_ Class \_\_\_\_\_

## Lab 26: Bags of Reaction

### Introduction:

"Plop, plop, fizz, fizz, oh, what a relief it is," claims an old television ad for a popular antacid. Just what is in the tablet that is relieving the upset stomach? What reaction is causing the fizzing? Can you write a chemical equation for this process? With a bit of investigating, you will be able to discover the answers to all these questions.

The Law of Conservation of Mass states that matter can neither be created or destroyed. During a chemical reaction, the bonds of the reactants are broken and rearranged to form new substances. Because matter must be conserved, these new substances, or products, must contain the same number and type of atoms as the reactants.

In this investigation, you will first verify the law of conservation of mass. Then in the second part, you will be given some known compounds to react. You will write and balance a chemical equation for the reaction.

### Pre-Lab Discussion:

*Read the entire lab and the relevant pages of your textbook. Then answer the questions that follow.*

1. Define *reactants*. \_\_\_\_\_
2. Define *products*. \_\_\_\_\_
3. How can you tell a chemical reaction has happened? \_\_\_\_\_
4. What is the point of using the resealable bag? \_\_\_\_\_
5. What is the density of water? \_\_\_\_\_
6. What is the common name for sodium hydrogen carbonate? \_\_\_\_\_

### Materials:

Goggles  
Lab apron  
50mL graduated cylinder  
2 sealable plastic bags  
Laboratory balance

scoopula  
calcium chloride,  $\text{CaCl}_2$   
sodium hydrogen carbonate,  $\text{NaHCO}_3$   
phenol red indicator  
antacid tablet

## Procedure:

### *Part A*

1. Put on your goggles and lab apron. Measure 25mL of tap water and place it into a resealable plastic bag. Flatten the air out of the bag and seal it. Record its mass in Data Table 1.
2. Record the mass of the antacid tablet in Data Table 1.
3. Tip the bag sideways, and while holding the bag this way, add the tablet so that the tablet and water do not mix. Do not trap any extra air in the bag. Reseal the bag.
4. Let the tablet drop into the water. Observe the reaction until it comes to a complete stop. Record your observations.
5. When the reaction is complete, record the mass of the bag and its contents in Data Table 1.

### *Part B*

6. Add two scoops of  $\text{CaCl}_2$  to the second plastic bag.
7. Add one scoop of  $\text{NaHCO}_3$  to the bag, and shake gently to mix.
8. Place a clean, dry 50mL beaker into the bag. Determine the mass of the bag and its contents in Data Table 2.
9. Measure 25mL of water in a graduated cylinder and place in the beaker. Add 5 drops of phenol red indicator.
10. Place the beaker and its contents gently into the bag, as not to mix the liquid and solids.
11. Keeping the trapped air to a minimum, reseal the bag.
12. Tip the beaker over to allow the contents to mix. Observe the reaction until it comes to a complete stop. Record your observations.
13. Record the mass of the unopened bag in Data Table 2. Clean up your work area and wash your hands before leaving the lab.

## Data and Results:

Data Table 1. Antacid Tablet and Water

Mass of bag and water		Write observations here.
Mass of tablet		
Mass of bag and reactants		
Mass of bag and products		



Data Table 2:  $\text{CaCl}_2$ ,  $\text{NaHCO}_3$ , and Water

Mass of bag and dry reactants		Write observations here.
Volume of water		
Mass of water		
Total mass of bag and reactants		
Mass of bag and products		

Calculations: Show your work, use appropriate units and significant figures.

1. Calculate the total mass of the bag and reactants in each reaction and record these values in the appropriate data table.
2. Using the density of water, calculate the mass of the water.

### Critical Thinking: Analysis and Conclusions

1. How do the values for total mass before and after each reaction demonstrate the Law of Conservation of Mass? \_\_\_\_\_

2. What were five observations you made that indicated a chemical reaction had occurred in Part A? \_\_\_\_\_

3. Write an equation in words and then in formulas for the reaction that occurred in Part B. The products are sodium chloride, calcium hydroxide, and carbonic acid.

### Critical Thinking: Applications

1. An indicator changes color when the acidity of a solution changes. What evidence is there that such a change occurred in Part B? \_\_\_\_\_

2. Carbonic acid immediately decomposes into water and carbon dioxide. Write the balanced chemical equation for this reaction. \_\_\_\_\_

3. What gas is produced in Part A? ( Hint: sodium hydrogen carbonate is an active ingredient in the antacid.) \_\_\_\_\_