

Name \_\_\_\_\_

Date \_\_\_\_\_

## Conservation of Matter Lab

### Introduction/ Objective:

The Law of Conservation of Matter states that matter is neither created nor destroyed during chemical reaction. In this lab, you will conduct an investigation and develop a model to understand and demonstrate the Law of Conservation of Matter.

### Materials:

- baking soda
- vinegar
- 2 small paper cups
- 1 beaker (or large, clear plastic cup)
- 1 triple beam balance (or other tool for measuring mass)
- 1 gallon sized plastic ziploc bag
- 1 graduated cylinders
- measuring spoons

### Procedures:

#### Part 1 - Closed Container

1. Measure 1 ½ teaspoons of baking soda. Pour the contents into the plastic bag.
2. Measure 15 mL of vinegar using a graduated cylinder. Pour the contents into the paper cup.
3. Place the cup of vinegar into the plastic bag, being careful NOT to spill the vinegar!
4. Seal the plastic bag.
5. Determine the mass of the entire bag containing the baking soda, cup, and vinegar. Record this on the data table.
6. Without opening the bag, pour the vinegar into the baking soda. Observe what happens and record your observations.
7. Without opening the bag, determine the mass of the bag and contents. Record this on the data table.

#### Part 2 - Open Container

1. Measure 1 ½ teaspoons of baking soda. Pour the contents into the beaker.
2. Measure 15 mL of vinegar using a graduated cylinder. Pour the contents into the paper cup.
3. Place the cup of vinegar into the beaker, being careful NOT to spill the vinegar!
4. Determine the mass of the beaker and its contents. Record this on the data table.
5. Pour the vinegar into the baking soda. Observe what happens and record your observations.
6. Determine the mass of the contents. Record this on the data table.

Data Table:

	Initial Mass (prior to the chemical reaction) (g)	Observations	Final Mass (after the chemical reaction) (g)	Change In mass (g)
Part 1 - Closed Container				
Part 2 - Open Container				

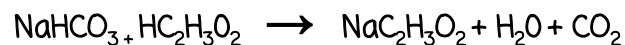
### What is happening?

Sodium bicarbonate, or baking soda, is a white powder which is commonly used as an antacid, as well as in cooking. It is also used for cleaning, as a deodorizer, and as an ingredient in toothpaste. The chemical formula for sodium bicarbonate is  $\text{NaHCO}_3$

Acetic acid, or vinegar, is a liquid used for a wide variety of purposes, including as a cooking ingredient, cleaning agent, and home health remedy. With hundreds of practical uses, it is considered one of the most versatile household products. The chemical formula for acetic acid is written as  $\text{HC}_2\text{H}_3\text{O}_2$ .

When these two substances combine, a chemical reaction takes place. The baking soda reacts vigorously with the vinegar to produce an escape of carbon dioxide gas. The reaction can be written as follows:

Sodium bicarbonate + acetic acid  $\Rightarrow$  Sodium acetate + water + carbon dioxide



Using the paper molecules given to you by your teacher, create a model to demonstrate the chemical equation above. Make sure your model demonstrates the Law of Conservation of Matter. Have your model checked by your teacher before moving on to the next section.

### Reflection:

1. Describe what happens when the vinegar is poured into the baking soda.
2. What evidence do you have to prove that a chemical reaction has taken place?
3. What are the reactants used in this investigation? What are the products?

4. Has any new matter been created or lost? How do you know?
  
5. What was the difference in the change in mass between part 1 and part 2?  
How would you explain this?
  
6. Explain how this investigation relates to the Law of Conservation of Matter.

**Extension:**

This lab demonstrated one example of the Law of Conservation of Matter. Design another experiment to demonstrate this law. Describe your experiment, including the materials and procedures, below. What results should one expect to get? Why?