**Mini-Lab Sheet: Matter**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Directions:** Today we are going to be testing the *Law of Conservation of Matter*. Before starting this lab, make sure you have your safety goggles on, and remember the safety rules discussed in the safety contract!

**Materials**:

* 1 Erlenmeyer Flask
* 1 Funnel
* 1 Balloon
* Baking soda [1/4th tsp (2x)]
* Vinegar [50 mL (2x)]
* 1 Graduated Cylinder
* 1 Digital Scale

**Question:** Can matter be created or destroyed?

**What I know already (background research):** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Hypothesis:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Procedure:** To compare and contrast our results in order to *analyze* our data and test our *hypothesis*, we must create two systems: one open and one closed. First, we will create an open system.

**Part 1:**

1. Plug in and turn on the digital scale by holding the “On” button.
2. Place an empty plastic cup on the scale. Record the **mass** here: \_\_\_\_\_\_ g.
3. Measure out **50 mL** of vinegar in the graduated cylinder.
4. Carefully pour the vinegar into the Erlenmeyer flask.
5. Put the plastic cup with the baking soda on the scale. Record the **mass** here: \_\_\_\_\_\_ g.
6. Put the Erlenmeyer flask with the vinegar on the scale. Record the **mass** here: \_\_\_\_\_\_ g.
7. Now, without removing the E. flask from the scale, add the baking soda to the vinegar. Watch the reaction take place! What do you see happening? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ What is happening to the numbers on the scale? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. Record the final **mass** on the scale here once the reaction has stopped: \_\_\_\_\_\_\_\_ g.

**Data:** To understand what we just observed, we’re going to have to do a little math. First, subtract the mass of the cup (#2) from the mass of the cup with the baking soda (#5).

(#5) \_\_\_\_\_\_\_\_\_\_\_ **--** (#2) \_\_\_\_\_\_\_\_\_\_\_ **=** \_\_\_\_\_\_\_\_\_\_\_\_\_\_ g.

Now we know the mass of the **baking soda** that we added to the system.

Next let’s compare the mass of the system before (#6 + mass of baking soda) to the mass of the system after the reaction.

First, add (#6) \_\_\_\_\_\_\_\_ **+** (Baking soda mass) \_\_\_\_\_\_\_\_\_\_\_ **=** \_\_\_\_\_\_\_\_\_ g.

This gives us the mass of the **total system** before the reaction.

Now, what’s the difference between the before and after?

(Total system before) \_\_\_\_\_\_\_\_\_\_ **-** (#8) \_\_\_\_\_\_\_\_\_ **=** \_\_\_\_\_\_\_\_ g.

So, what do you think happened to that mass?! \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Hypothesis Check** Based on what you *observed* thus far, how would you answer the question, “Can matter be created or destroyed”? Why? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**RINSE MATERIALS BEFORE PART 2!!!**

**Part 2:** We are going to do almost the exact same thing this time, except we will be placing a balloon over the top of the Erlenmeyer flask during the reaction.

1. The balloon already has **1/4th tsp** of baking soda in it. Place it on the scale and record the mass here: \_\_\_\_\_\_\_ g. Set the balloon aside carefully so you don’t spill it.
2. Now, again measure out **50 mL** of vinegar using the graduated cylinder.
3. Pour the vinegar into the E. flask and again place it on the scale. Record the mass here: \_\_\_\_\_\_ g.
4. Take the E flask off of the scale. VERY CAREFULLY, hook the balloon around the top of the E. flask. **DO NOT TIP THE CONTENTS OF THE BALLON INTO THE FLASK YET!!!**
5. Carefully place the entire system onto the scale. Record the mass here: \_\_\_\_\_\_ g.
6. Now, tip the balloon up so that the baking soda falls into the vinegar.

Describe the reaction here (is it more, less, or the same as before?) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Notice what is happening to the number on the scale. Record your *observation* here: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Record the final mass on the scale here once the reaction has stopped: \_\_\_\_\_\_\_\_ g.

What do you think happened to the mass this time? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Conclusion:** *Answer these questions in your Science Notebook.*

1. Why was there such a difference between the final masses of the open and closed system?
2. What happened to the missing mass in the open system (Part 1)?
3. Finally, can matter be created or destroyed? Why or Why not?