**Conservation of Mass Lab Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hr \_\_\_\_\_\_\_**

The **Law of Conservation of Mass** states that mass can neither be created or nor destroyed during a chemical reaction. Thus, the total amount of matter can does not change in a reaction.

|  |
| --- |
| **In your own words, what does the law of conservation of mass mean?**  **Answers will vary.** |

**PURPOSE:**

The purpose of this lab is to show visual evidence of the law of conservation of mass during a chemical reaction.

**INTRODUCTION:**

When chemical reactions occur, people tend to believe that matter is being destroyed when in fact matter is simply changing states. The Law of Conservation of Mass states that mass is neither created nor destroyed by chemical reactions or physical transformations. **The mass of the products must equal the mass of the reactants.** According to the law of conservation of mass, if a chemical reaction occurs in a closed system, there should be no difference in mass. In this lab the students will witness a chemical reaction and record data to see how the law of conservation of mass works for different systems.

**Reaction I:** Video<https://www.youtube.com/watch?v=MUkb0qZeZCE>

|  |  |  |
| --- | --- | --- |
| **Mass BEFORE** | **Mass AFTER** | **Observations** |
| 35.0 g | 34.2 g | When mixed the substance “bubbled” and produced a gas. |

**REACTION II:**  Video<https://www.youtube.com/watch?v=ruGa1qg6ltE>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mass Before Vinegar** | **Mass Before Baking Soda** | **Total Mass**  **Before**  **(Add the two reactants)** | **Mass**  **After Reaction** | **Observations** |
| 10.0 g | 5.7 to 5.8 g | 15.7 g | 15.6 g | When mixed the substance “bubbled” and produced a gas. However, this time it was sealed in a plastic bag. |

**ANALYSIS QUESTIONS:**

1. What evidence to verify that there was a chemical reaction that occurred in both experiments?

There was a production of gas, which is one of the five verifications that a chemical reaction has taken place.

2. How did the ***before*** mass of the systems compare with the ***after*** mass of the system for each trial?

Reaction I: NOT the same. Reaction II: The same. May have lost tenth of gram

left in the graduated cylinder.

3. Did the reaction in Reaction I confirm or violate the law of conservation of mass? Explain using the data and observations.

It APPREARS TO violate the law because the mass before was more than the mass after. Mass before was 35.0 g and after the reactions (production of gas) was completed it was 34.2 g. That means it lost about 0.8 grams of product.

4. Did the reaction in Reaction II confirm or violate the law of conservation of mass? Explain using the data and observation.

It confirmed the law. The mass before was 15.7 g which is also the mass after. The loss from 15.7 to 15.6 which is a loss of 0.1 grams most likely was due to being left in the wet cylinder. Therefore, the mass didn’t change even though it produced a gas.

The reaction for both Reaction 1 and Reaction2 below would be…

Sodium Bicarbonate + Hydrogen Acetate 🡪 Sodium Acetate + Dihydrogen Monoxide + Carbon Dioxide

**NaHCO3  + HC2H302 🡪 NaC2H302 + H2O + CO2**

Looking at the above reaction and understand that they law of conservation of mass is understood to by a LAW that ALWAYS holds true.

5. Why did it appear to be violated during one video procedure of this lab? Be specific and include the product that may be contributing to this situation.

It appeared to violate due to not containing the gas in the system. The gas was lost to the air and would not be included within the mass of Reaction 1. In Reaction 2, the baggie kept the carbon dioxide gas within the system and therefore, within the mass of the products.

If you complete the lab to the end you would have determined that it APPEARED to violate…

IT IS A LAW AND WILL NOT VIOLATE!

6. Explain how you could alter the procedure to ensure the law is demonstrated in BOTH REACTIONS. Be sure to include why the new procedure would have an alternate effect on your mass if performed again. Be specific!

Any procedure that enabled the student to collect the gas produced rather than allow the gas to escape into the air.

One example could be to put the baking soda into a balloon and wrap the balloon on a flask. If the baking soda was then allowed to fall into the flask, all of the gas would remain in the inflated balloon but still part of the mass of the system.