

Chemistry Lab: The Law of Conservation of Mass

Name: _____ Period: _____ Date: _____

Data

<i>Data Table</i>	<i>Trial 1 Mass (g)</i>	<i>Trial 2 Mass (g)</i>	<i>Trial 3 Mass (g)</i>	<i>Average Mass (g)</i>
Bottle, cap, H ₂ O, & Alka-Seltzer tablet (Mass of total system before reaction)				
Mass of total system after reaction				
Final Mass (after squeezing bottle)				

Analysis

1. What evidence did you observe that indicates that a chemical reaction took place?

Fizzing, bubbles, production of a gas

2. Compare the mass of the closed system before the reaction and the mass of the closed system after the reaction.

Describe your results. *The mass did not change. The mass before the reaction is the same as the mass after the reaction.* _____

3. Does this experiment prove the Law of Conservation of Mass? Explain? *Yes. The mass of the reactants is equal to the mass of the products. Matter was neither created or destroyed.*

4. How do you account for the difference in mass after the top was opened and water was squeezed up into the neck of the bottle? *When the water was squeezed into the neck of the bottle, it displaced the air that was in the bottle. The mass afterwards was then minus the mass of the air and gases of the reaction.* _____

5. Was this experiment conducted in a "closed" or "open" system? How would you define closed reaction system and open reaction system? *This experiment was conducted in a closed system. A closed system is one that prevents any of the product from escaping. In an open system, product, such as gases, will be able to escape into the surrounding.*

Post Lab Questions

Wax appears to disappear as a candle burns. How can the Law of Conservation of Mass apply to this reaction?

The wax reactant produces a gaseous product. Since a candle burning occurs in an open system, the products of the reaction, the gases, are able to escape into the surroundings. In order to prove the Law of Conservation of Mass, a closed system would have to be devised that would not allow the gases to escape.

When ammonium nitrate (NH₄NO₃) explodes, the products are nitrogen, oxygen, and water. When 40 grams of ammonium nitrate explode, 14 grams of nitrogen and 8 grams of oxygen form. How many grams of water form? (Show your work!)

$$40 \text{ g} - (14 \text{ g} + 8 \text{ g}) = 18 \text{ g of water}$$

Zinc metal reacts with yellow crystals of sulfur in a fiery reaction to produce a white powder of zinc sulfide. A chemist determines that 65.4 g of zinc reacts with 32.1 g of sulfur. How many grams of zinc sulfide could be produced from 20.0 g of zinc metal? (Show your work!)

$$65.4 \text{ g} + 32.1 \text{ g} = 97.5 \text{ g zinc sulfide}$$

$$\frac{65.4 \text{ g}}{97.5 \text{ g}} = \frac{20.0 \text{ g}}{x}$$

$$x = \frac{(20.0 \times 97.5)}{65.4}$$

$$65.4x = 20.0 \times 97.5$$

$$x = 29.8 \text{ g zinc sulfide}$$