Closed System Lab

A closed system is an experimental setup in which no _____ or

_____ can enter or escape the experiment.

Question: What happens to matter in a closed system?

Background Information: Baking Soda ($NaHCO_3$) will react with Acetic acid, commonly known as vinegar (CH_3COOH) to form Water (H_2O), Carbon dioxide (CO_2), Sodium ion (Na^+) and acetate (CH_3COO)

$$(NaHCO_3) + (CH_3COOH) \rightarrow (H_2O) + (CO_2) + (Na^+) + (CH_3COO)$$

Materials:
Plastic bag
One cup Vinegar
One cup Baking Soda
electronic balance

Safety: Goggles should be worn throughout the lab. Until all materials are wash and returned.

Procedure:

1. Get one cup of vinegar
2. Get one cup of baking soda
3. Put both cups in the plastic bag. Take care NOT to spill the contents of either cup.
4. Determine the mass of the cups and their contents, and the plastic bag. Write the values in your data table.
5. Seal the plastic bag.
6. Without opening the bag, flip the bag to mix the reactants
7. Without opening the bag, record the mass of the contents of the plastic bag. Take care not to break the seal of the plastic bag

Hypothesis:_____

_____

_____

_____

_____

Observations:

Data:

Mass of materials **before** Reaction	Mass of materials **after** Reaction	Difference in Mass between before and after

Conclusion Questions:

1. Did any chemical changes occur in your experiment? If so what evidence do you have of this?

2. Did the bag and all of its contents gain any mass during the reaction? How do you know?

3. Did the bag and all of its contents lose any mass during the reaction? How do you know?

4. If you lost or gained mass, where did it come from? If you did not, why did your mass stay the same?

5. This lab demonstrates the “Law of Conservation of Mass.” What do you think the law of conservation of mass is?