

Conservation of Mass Lab

In this laboratory activity, the conservation of mass will be proven. There will be two trials using the same amount of each material. The first trial is an **open system**. The students will decide if an open system confirms the Conservation of Mass, which states that matter can neither be created nor destroyed only transformed. The second trial will be using a **closed system**.

Materials: **goggles, apron**, vinegar (acetic acid, $\text{HC}_2\text{H}_3\text{O}_2$), baking soda (sodium hydrogen carbonate, NaHCO_3), ziplock bag, graduated cylinder, styrofoam cups, balance, scoopula

Procedure:

Trail 1:

1. Put on goggles & apron & **keep them on until after the lab station has been cleaned.**
2. Measure approximately 20 mL of vinegar, using a graduated cylinder. Pour into styrofoam cup.
3. Measure approximately 5 g of baking soda into a Styrofoam cup.
4. Place both cups on the balance. Record the total mass. Remove both cups from the balance.
5. Add the baking soda to the cup containing the vinegar. Record observations. Be sure to notice how long it takes for the reaction to occur.
6. Re-mass **both** Styrofoam cups together. Record the final mass.

Trail 2:

1. Measure approximately 20 mL of vinegar, using a graduated cylinder. Pour into styrofoam cup.
2. Measure approximately 5 g of baking soda and place into a Ziploc bag.
3. Determine the combined mass of the Styrofoam cup with vinegar and the plastic bag with baking soda. Write the value in your data table.
4. Pour the vinegar into the Ziploc bag containing baking soda. **QUICKLY** seal the plastic bag.
5. Record observations in the data table
6. Without opening the bag, record the mass of the contents of the plastic bag and the empty Styrofoam cup.

	Before Reaction (grams)	After Reaction (grams)	Change (grams)	Observations
Cup with baking soda & cup with vinegar Open System				
Bag with baking soda & vinegar Closed System				

Questions:

1. Why did the mass change in the open system?
2. Why did the mass remain constant (stay the same) in the closed system?
3. What is a chemical reaction?
4. What is the Law of Conservation of Mass? How does it relate to this lab?
5. The gas produced in this reaction can put out fires because it is more dense than oxygen. Can you make an educated guess of what the gas is?