# Law of Conservation of Mass Labs

You are going to be making chemical and physical changes and seeing what happens to the amount of mass/matter.

## Lab 1:

***Problem*** - What will happen to the total mass of ice as it melts? (Will it increase/decrease/stay the same?)

***Prediction*** - I predict that... because...

***Materials*** - Ice, electronic balance and film canister with lid

***Procedures*** -

1. Make sure the canister is dry. Place some ice in the canister and cover with its lid.
2. Take the mass the canister with lid and ice to the nearest 0.1 gram and record in the Before Melting area of Data Table 1.
3. Allow ice to melt. Do not disturb in any way while ice is melting.
4. At the end of class, take the mass again, even if the ice isn't fully melted.
5. Take the mass again once <u>all</u> the ice is melted (probably tomorrow). Be sure the outside of the canister is dry before massing.

***Data Table 1 - Lab 1 Before & After Masses***

| **Canister #__** | **Mass (g)** |
|---|---|
| Before Melting | |
| During Melting | |
| After Melting | |

***<u>Questions</u>*** -

1. What are the chemical and physical properties of the following materials of the lab:

<u>Water</u>

Physical Property:

Chemical Property:

2. Do the following calculation (show your work):

*Before Melting - After Melting* =

3. Is melting of ice a physical or chemical change? Explain.

4. Explain why it is important to wipe the condensation (water droplets) off the outside of the bottle before finding the final mass.

5. How does Law of Conservation of Mass (Matter) apply to this lab activity? Does this definition go against your calculations from Question 2? If so, why would the Law be saying something different from what you measured? If your measurements did match the Law, tell me why you believe that happened.

## Lab 2:

***Problem*** - What will happen to the total mass of baking soda and vinegar after they are mixed together? (Will it increase/decrease/stay the same?)

***Prediction*** - I predict that... because...

***Materials*** - Erlenmeyer flask, electronic balance, baking soda, vinegar, balloon, spoon, goggles

***Procedures*** -

1. Get a 250 mL Erlenmeyer flask and fill it to about 25 mL with vinegar.
2. Get a balloon, goggles, and a container of baking soda.
3. Put a small spoonful of baking soda inside the balloon.
4. CAREFULLY put the opening of the balloon around the mouth of the flask, without letting any of the baking soda out.
5. Put the filled flask and balloon onto the electronic balance and write in initial mass in Data Table 2.
6. Have a group member securely place their hand around the place where the flask and balloon attach without pinching the balloon, to ensure no gas escapes.
7. Move the balloon upright to pour all of the baking soda into the flask. Keep hand on balloon at all times during its inflation (which should only take about 5 seconds).
8. When inflation has finished and without taking the balloon off, go back to the same electronic balance and mass all the materials together again. Record in Data Table 2.
9. Release the gas from the balloon and mass all the materials again. Record the mass in Data Table 2.
10. Clean up materials.

***Data Table 3 - Lab 3 Before & After Masses***

| **Type** | **Mass (g)** |
|---|---|
| Before Reaction | |
| After Reaction with Gas Still in Balloon | |
| After Reaction with Gas Released from Balloon | |

***Questions*** -
1. What are the chemical and physical properties of the following materials of the lab:
Baking Soda
Physical Property:
Chemical Property:

Vinegar
Physical Property:
Chemical Property:

2. Do the following calculations (show all the work):

*Before Reaction - After Reaction with Gas =*

*Before Reaction - After Reaction without Gas =*

3. Are the two numbers (from the above question) different from zero? Why do you think they are the same or why do you think they are different?

4. Is mixing baking soda and vinegar a physical or chemical change? Explain.

5. How does Law of Conservation of Mass (Matter) apply to this lab activity? Does this definition go against your calculations from Question 2? If so, why would the Law be saying something different from what you measured? (If your measurements did match the Law, tell me why you believe that happened.)

## Lab 3:

***Problem*** - What will happen to the total mass of baking soda and cream of tartar after they are mixed together? (Will it increase/decrease/stay the same?)

***Prediction*** - I predict that... because...

***Materials*** - Small plastic cup, electronic balance, baking soda, cream of tartar, ziploc bag, spoon, water, goggles

***Procedures*** -
1. Gather all materials

2. Open the ziploc bag and put in one spoonful of baking soda and one [small] spoonful of cream of tartar.
3. Fill small plastic cup about halfway with water.
4. Place entire cup into the ziploc bag WITHOUT spilling any water. Seal bag.
5. Take the mass of everything together and put into Data Table 3 in the Before Reaction area. BE CAREFUL NOT TO SPILL THE WATER!
6. Pick up bag (WITHOUT opening it) and spill the water out of the cup onto the powders. Move it around to mix everything together. Make sure everyone in the group feels the bag as there are important observations here.
7. After the reaction is finished and without opening the bag, go back to the same electronic balance and take the mass of all the materials together again. Record in Data Table 3.
8. Release gas from the bag and mass all the materials again. Record the mass in Data Table 3.
9. Clean up materials.

***Data Table 2 - Lab 2 Before & After Masses***

| **Type** | **Mass (g)** |
|---|---|
| Before Reaction | |
| After Reaction with Gas Still in Bag | |
| After Reaction with Gas Released from Bag | |

***Questions*** -
1. What are the chemical and physical properties of the following materials of the lab:
Cream of Tartar
Physical Property:
Chemical Property:

2. Do the following calculations (show all the work):

*Before Reaction - After Reaction with Gas =*
*Before Reaction - After Reaction without Gas =*

3. Is mixing baking soda and cream of tartar a physical or chemical change? Explain.

4. What happened to the temperature of the liquid when all three materials are mixed? Was it an endothermic and exothermic reaction (see definitions in your Cornell Notes)? Describe where the heat is travelling to and from when you feel the bag.

5. How does Law of Conservation of Mass (Matter) apply to this lab activity? Does this definition go against your calculations from Question 2? If so, why would the Law be saying something different from what you measured? (If your measurements did match the Law, tell me why you believe that happened.)