

# Does Gas Have Mass?

**Question:** Gas is a product of a chemical reaction between vinegar and baking soda. Does the gas produced have mass?

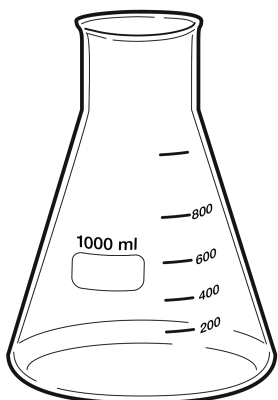


## Procedure - Part 1:

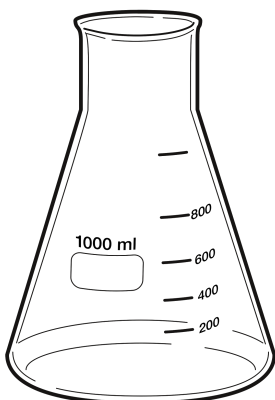
1. Using your graduated cylinder, measure *50 mL* of vinegar.
2. Using your graduated cylinder, measure *10 mL* of cabbage juice.
3. Add the vinegar and cabbage juice to your 125 mL Erlenmeyer flask.
4. Record your observations.
5. Stretch your balloon out for about a minute so that it will inflate easily.
6. Using a plastic spoon and a paper funnel, place *2 level teaspoons* of baking soda inside your balloon.
7. While keeping all the baking soda in the balloon, carefully place the mouth of the balloon over the opening of the Erlenmeyer flask to make a tight seal. The balloon will hang to the side of the flask.
8. Record/draw observations.
9. Hold the flask with one hand and secure where the balloon attaches to the flask with your fingers.
10. While the balloon is still *attached* to the flask, have your partner lift the balloon so that the baking soda falls into the flask and combines with the vinegar. This is a very quick and powerful reaction, make careful observations.
11. Swirl the flask until the chemical reaction has stopped.
12. Record/draw all observations.

Mass of Flask & Balloon Inflated	Mass of Flask & Balloon Deflated

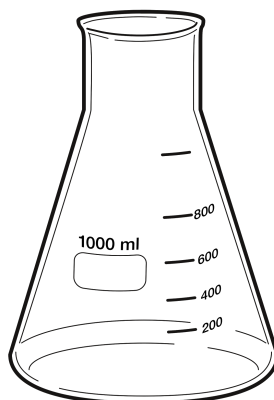
**My Observations:**



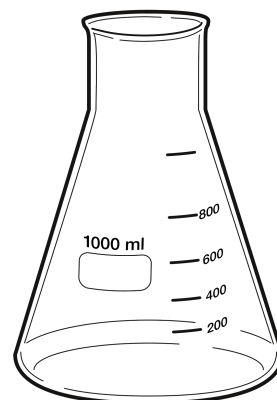
Steps 1-3



Steps 5-7



End of Part 1



End of Part 2

**Procedure - Part 2:**

1. Using your TBB, find the mass of the closed system (balloon inflated) once the chemical reaction has completed. Be sure to keep balloon attached.
2. Record the info into the data table.
3. Carefully remove the balloon and let all the gasses out into your flask, some liquids may come out of your balloon.
4. Place the deflated balloon back onto the Erlenmeyer flask.
5. Find the mass again using your TBB.
6. Record your observations and data.

**Analysis and Results:**



Baking Soda + Vinegar ----> Sodium Acetate + Water + Carbon Dioxide

1. Name the reactants.
2. Name the products.
3. Name the gas produced.
4. Were any new elements introduced into the closed system? Where did the gas come from? Explain. (Hint – look at the chemical equation)
5. Compare the masses before and after the gas was released from the balloon. After the gas was released, what happened to the mass and why?
6. Did the cabbage juice change color, why or why not? Explain.
7. Did you feel a temperature change during chemical reaction? Explain.
8. What evidence did you observe to indicate that a chemical reaction took place?

**Conclusion:** Use 3-5 sentences to explain what you learned in this experiment.