

Name: _____ Period: _____ Date: _____

The Law of Conservation of Mass

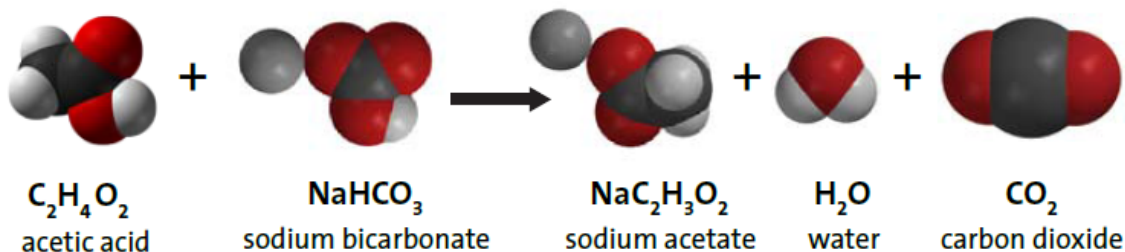
Part 1: Teacher Demonstration

- Your teacher combined a liquid (Vinegar) and a solid (Baking Soda). Record in the space below what occurred and draw a picture to help explain. List all your observations.

- Do you think a chemical reaction occurred? Explain why. _____

Part 2: Chemical Equation

- Look at the chemical equation for the reaction between vinegar and baking soda to answer the following questions.



- What are the **reactants** in the chemical reaction? _____
- What are the **products** in the chemical reaction? _____
- How many of each type of atom appears on each side of the chemical equation? Fill in the chart below.

Atom	Reactant Side	Product Side
Carbon		
Hydrogen		
Oxygen		
Sodium		

- What does the statement “Mass is conserved during a chemical reaction” mean? _____

Part 3: The Challenge

- How can you make just the right amount of foam that it rises to the top of the graduated cylinder without overflowing?

- Materials:

- o Vinegar in a cup
- o Baking soda in a cup
- o Detergent solution in a cup
- o Dropper
- o Graduated Cylinder (100 mL)
- o Measuring spoons ($\frac{1}{8}$, $\frac{1}{4}$, and $\frac{1}{2}$ teaspoon)
- o Plastic waste container

- Procedure:

- o Run the Control Test first using the measurements and procedures below
- o Decide on how much vinegar and baking soda you will use and write these amounts in the data table below.
- o Use the graduated cylinder to measure the amount of vinegar your group agreed on.
- o Pour the vinegar in a small cup and add 1 drop of detergent. Swirl gently to mix.
- o Add the amount of baking soda your group agreed on to the empty graduated cylinder.
- o Place the graduated cylinder in the plastic waste container.
- o Pour the vinegar and detergent from the cup into the graduated cylinder. Observe the level of foam in the graduated cylinder.
- o Rinse the graduated cylinder over the waste container.
- o Fill in the data table below and adjust the amount of baking soda and vinegar to create just enough foam to rise to the top of the graduated cylinder WITHOUT overflowing.

- Data Table:

	Control Test	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7
Vinegar	20 mL							
Baking Soda	1 teaspoon							
Detergent	1 squirt	1 squirt	1 squirt	1 squirt	1 squirt	1 squirt	1 squirt	
How close did the foam get to the top of the cylinder?	overflowed							

- Analysis:

- o Referring back to the chemical equation; why, on the molecular level, does changing the amount of baking soda or vinegar affect the amount of carbon dioxide gas produced? _____

- o What would you do if you wanted to make more carbon dioxide? _____

- o Could you just keep adding more and more baking soda to the same amount of vinegar to get more carbon dioxide? Why or why not? _____

