Name _____ Class _____ Date _____

Skills Lab DATASHEET B

Testing the Conservation of Mass

As matter cycles through the Earth system, the matter can undergo chemical changes that cause it to change its identity. However, although the matter may change, it is not destroyed. This is known as the *law of conservation of mass.* In this lab, you will cause two chemicals to react to form products that differ from the two reacting chemicals. Then you will determine whether the amount of mass in the system (the experiment) has changed.

OBJECTIVES

Measure the masses of reactants and products in a chemical reaction.

Describe how measuring masses of reactants and products can illustrate the law of conservation of mass.

MATERIALS

- bag, plastic sandwich, zipper-type closure
- baking soda (sodium bicarbonate)
- balance (or scale), metric
- beaker, 400 mL
- cup, clear plastic, 150 mL, 2
- graduated cylinder, 100 mL
- paper, weighing, 2 pieces
- twist tie
- vinegar (acetic acid solution)
- water

SAFETY

PROCEDURE

1. On a blank sheet of paper, prepare a table like the one shown on the next page.
2. Place a piece of weighing paper on a balance. Place 4 to 5 g of baking soda on the paper. Carefully transfer the baking soda to a plastic cup.
3. Using a graduated cylinder, measure 50 mL of vinegar. Pour the vinegar into the second plastic cup.
4. Place both cups on the balance, and determine the combined mass of the cups, baking soda, and vinegar to the nearest 0.01 g. Record the combined mass in Trial 1 of your table under “Initial Mass.”
5. Take the cups off the balance. Carefully and slowly pour the vinegar into the cup that contains the baking soda. To avoid splattering, add only a small amount of vinegar at a time. Gently swirl the cup to make sure that the reactants are well mixed.

	Initial mass (g)	Final mass (g)	Change in mass (g)
Trial 1			
Trial 2			

6. When the reaction has finished, place both cups back on the balance. Determine the combined mass to the nearest 0.01 g. Record the combined mass in Trial 1 of your table under "Final Mass."
7. Subtract final mass from initial mass, and record the difference in Trial 1 of your table under "Change in Mass."
8. Repeat step 2, but carefully transfer the baking soda into one corner of the plastic bag instead of the cup.
9. To seal the baking soda in the corner of the bag, twist the corner of the bag above the baking soda, and wrap the twist tie tightly around the twisted part of the bag.
10. Add 50 mL of vinegar to the bag. Seal the bag so that the vinegar cannot leak out and the bag is airtight.
11. Place the bag in a beaker, and measure the combined mass of the beaker, the bag, and the reactants. Record the mass in Trial 2 of your table under "Initial Mass."
12. Remove the twist tie from the bag, and mix the reactants.
13. When the reaction has finished, repeat steps 6 and 7 by using the beaker, bag, twist tie, and products. Record the final mass and change in mass in Trial 1 of your table.

ANALYSIS

1. **Analyzing Data** Compare the change in mass that you calculated for Trial 1 with the change in mass that you calculated for Trial 2. What evidence of the conservation of mass does Trial 2 show?

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2. **Analyzing Results** Was the law of conservation of mass violated in Trial 1? Explain your answer.

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3. **Drawing Conclusions** Was Trial 1 an example of a closed system or an open system? Which type of system was Trial 2? Explain your answer.

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EXTENSION

1. **Designing an Experiment** Brainstorm other ways to demonstrate the law of conservation of mass in a laboratory. List the materials that you would need, and describe any difficulties that you foresee.

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