

Activity 7: Explaining Conservation of Mass

Guiding Question: Why is mass always conserved in chemical reactions?

Key Words: *closed system, conservation of mass, law of conservation of mass, mass, open system, products, reactants*

Get Started:

1. Read the introduction and Guiding Question to Activity 7, “Explaining Conservation of Mass,” in your Student Book.

2. A “law” in science is a description of a natural phenomenon that is supported by repeated experimental observations. In this case, the law of conservation of mass describes the phenomenon that the total mass of the reactants and the total mass of the products in a chemical reaction are the same, regardless of the specific reaction.

What are some examples of a closed system? An open system?

Do the Activity:

1. Read Procedure Steps 1-4 in your Student Book.

2. Watch the LABsent video (found here: [LABsent Chemical Reactions 7 Procedure](#)), to see the Procedure being done. Each time the video says to record, you may want to pause the video to give you ample time to complete your observations.

Data:

Procedure step 3: Use the model of the reaction and the table of masses above to answer the following in the space provided:

a. What is the total mass of the reactants?

b. What is the total mass of the products?

c. Explain how this reaction demonstrates the conservation of mass.

Name _____

Date _____

Procedure Step 4a: Use the model of the reaction and the table of masses above to answer the following in the space provided:

a. What is the total mass of the reactants?

b. What is the total mass of the products?

c. Explain how this reaction demonstrates the conservation of mass.

Procedure Step 4b: Use the model of the reaction and the table of masses above to answer the following in the space provided:

a. What is the total mass of the reactants?

b. What is the total mass of the products?

c. Explain how this reaction demonstrates the conservation of mass.

3. Was this reaction a physical change or a chemical change? What is your evidence?

Build Understanding:

1. Explain what evidence you have from this activity that supports the law of conservation of mass.

Analysis:

1. Use the reaction $\text{H}_2 + \text{Cl}_2 \rightarrow 2 \text{HCl}$ to respond to the items below:

- a. Draw a labeled diagram to explain how the law of conservation of mass applies to the reaction. In your diagram, be sure to show the individual atoms in the reactants and the products. Do not use the atomic masses of the individual atoms or molecules in your response.
- b. Use your diagram to explain how the law of conservation of mass applies to all chemical reactions.

2. A chemical reaction occurs in a test tube. The mass of the reactants and test tube is 23 g before the reaction occurs. During the reaction, a gas is formed and the reaction bubbles vigorously. The gas escapes into the air. After the reaction, the mass of the products and test tube is 22 g.

- a. What evidence do you have that a chemical reaction has occurred?
- b. Does the law of conservation of mass apply to this reaction? Explain your reasoning.

Name _____

Date _____

3. In the activity “Producing Circuit Boards,” you used a solution to etch copper. Based on what you have learned in this and previous activities, explain what happened to the copper that was removed from the copper-coated plastic. Use the law of conservation of mass to explain your reasoning.
