Where Did Mass Go?

Track all matter through physical and chemical changes.

SC.8.P.9.1 "Explore the Law of Conservation of Mass by demonstrating and concluding that mass is conserved when substances undergo physical and chemical changes."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each measurement of total mass. Circle words that tell whether matter stayed in the system or left it, then use these clues to decide whether mass was conserved.

Keeping Track of Matter

1. Mass is the amount of matter in an object or system. In a science class, a team placed 40.0 g of ice chips in a sealed plastic container and measured the container, ice, and lid together. The balance read 68.4 g. After the ice melted into liquid water, the closed container still measured 68.4 g. Melting changed the water's state and shape, but no matter entered or left the system. This physical change did not change the total mass.

2. For a chemical-change test, students put vinegar in a flask and baking soda in a small paper cup inside the flask. A balloon covered the opening before they tipped the cup. The flask, ingredients, and balloon had a total mass of 152.6 g. When the substances mixed, bubbles formed and the balloon inflated with carbon dioxide. The reaction made new substances, yet the flask and balloon together still had a mass of 152.6 g. The gas remained inside the system.

3. Sometimes a balance seems to show a mass decrease after a reaction. For example, if a student mixes the same materials in an open cup, carbon dioxide can move into the air. The cup and its remaining contents then weigh less, but the missing gas still has mass. To test conservation fairly, decide what belongs in the system before measuring. Keep every product, including gases, contained, then compare the total mass before and after the change. Equal totals support the Law of Conservation of Mass.

2 ANSWER WITH EVIDENCE

Use the passage

1. What physical change happened in the sealed container, and what total mass did the system have before and after the change?

2. What evidence shows that mass was conserved during the vinegar and baking soda reaction?

3. Why can an open cup seem to lose mass when a reaction produces carbon dioxide?

4. What should a student do before and after a change to test whether mass is conserved fairly?

3 YOUR TURN

Your own words

Plan a sealed-system investigation of a physical or chemical change that is different from the passage. In 3 or 4 sentences, name your materials, explain what total mass you would compare before and after, tell how you would keep all matter in the system, and predict your conclusion.

ANSWER KEY

Where Did Mass Go?

GRADE 8 · SC.8.P.9.1

PART 1 · READ AND MARK

Underline each measurement of total mass. Circle words that tell whether matter stayed in the system or left it, then use these clues to decide whether mass was conserved. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What physical change happened in the sealed container, and what total mass did the system have before and after the change?	**Ice melted into liquid water. The total mass was 68.4 g before and 68.4 g after.**
2	What evidence shows that mass was conserved during the vinegar and baking soda reaction?	**The flask, ingredients, and balloon had a total mass of 152.6 g before the reaction and 152.6 g after it.**
3	Why can an open cup seem to lose mass when a reaction produces carbon dioxide?	**Carbon dioxide can move out of the cup and into the air. The gas still has mass, but it is no longer included when the cup is weighed.**
4	What should a student do before and after a change to test whether mass is conserved fairly?	**The student should decide what belongs in the system, keep all matter and products contained, and compare the system's total mass before and after the change.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I will place salt and water in a tightly capped jar and measure the mass of the whole jar before shaking it. After the salt dissolves, I will measure the jar, cap, salt, and saltwater together so no matter can enter or leave. The total mass should be the same before and after because dissolving is a physical change and all matter stays in the system.

Accept equivalent descriptions that identify the whole closed system and correctly explain that matter, including gases, must be included. For the open task, accept a valid physical or chemical change if the student compares total mass before and after and predicts equal masses in a closed system.