LESSON MAKER PRO

Where Did It Go?

Test mass conservation with measurements and percent error.

HIGH SCHOOL · CHE.6.5

CHE.6.5 "Plan and conduct a controlled scientific investigation to produce mathematical evidence that mass is conserved. Use percent error to analyze the accuracy of results."

NAME _____ DATE _____

MASS AND MEASUREMENT

In a sealed system, the total mass of the container and its contents should be the same before and after a reaction. Use the before mass as the expected mass: percent error = |after mass - before mass| / before mass × 100%. For a fair repeat, keep the materials and measuring method the same.

WORKED EXAMPLE

A sealed reaction bag is weighed before and after a reaction. Find the percent error.

BAG AND CONTENTS

Before (g)	After (g)
80	78

1. Expected mass = 80 g.
2. Difference = |78 - 80| = 2 g.
3. Percent error = 2/80 × 100% = 2.5%.

Answer: 2.5%

PRACTICE 4 problems

1 A sealed jar weighs 50 g before a reaction and 49 g after. Find the percent error.

ANSWER _____

2 A closed flask weighs 40 g before a reaction and 38 g after. Find the percent error.

ANSWER _____

3 A sealed container weighs 16 g, and its reactants weigh 24 g. What should the total mass be after the reaction?

ANSWER _____

4 A sealed bag weighs 75 g before a reaction and 72 g after. Find the percent error. Name one thing to keep the same in a repeat trial.

ANSWER _____

APPLY IT Show your work

1 At a school fair, you test a fizzy drink reaction in a sealed bottle. Bottle and contents weigh 100 g before and 98 g after. Find the percent error. How could you check the measurement?

WORK SPACE

ANSWER _____

2 Your team tests two antacid brands in identical sealed jars. Use the table to find each percent error. Which result is closer to the expected mass?

JAR AND CONTENTS

Brand	Before (g)	After (g)
A	200	198
B	200	196

ANSWER _____

CHALLENGE One step up

A lab partner opens a reaction bag between weighings. It weighs 125 g before and 120 g after. Find the percent error. Explain why this does not test conservation in a closed system, and change the plan.

WORK SPACE AND ANSWER

Where Did It Go?

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A sealed jar weighs 50 g before a reaction and 49 g after. Find the percent error.	**2%**
2	A closed flask weighs 40 g before a reaction and 38 g after. Find the percent error.	**5%**
3	A sealed container weighs 16 g, and its reactants weigh 24 g. What should the total mass be after the reaction?	**40 g**
4	A sealed bag weighs 75 g before a reaction and 72 g after. Find the percent error. Name one thing to keep the same in a repeat trial.	**4%; use the same balance.**

PART 2 · APPLY IT

1. **2%; weigh the sealed bottle again on the same balance.** The mass difference is 2 g, so percent error is 2/100 × 100% = 2%. Reweighing checks whether the reading is repeatable.
2. **A: 1%; B: 2%. A is closer.** A differs by 2/200 × 100% = 1%; B differs by 4/200 × 100% = 2%. A has the smaller percent error.

CHALLENGE

4%. Opening the bag lets material escape, so the system is not closed. Keep the bag sealed for both weighings.

For repeat trials, accept a specific control such as using the same balance, container, or amounts of reactants. The challenge must identify the open bag as the problem, not claim that mass was destroyed.