THE STANDARD

Conservation of Mass in Reactions

Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.

ANCHORING PHENOMENON

The Sealed-Bag Reaction That Doesn't Change the Balance

A zip-top bag with baking soda in one corner and vinegar in the other. Weigh the whole thing on a balance. Tip the bag and let them mix. It fizzes. The bag swells like a pillow. Read the balance again. Same number. Then run it open in a beaker. Same reactants, same fizzing, but now the balance drops as gas escapes. Students will keep circling back to this all week.

> DRIVING QUESTION
> *"Why does the same reaction lose mass in one container and not in another?"*

INVESTIGATIVE 1

Iron Nail Turns Copper, Blue Water Turns Pale

A clean iron nail dropped into a cup of bright blue copper sulfate solution. Within minutes the nail darkens with a copper-colored coating. Over the next hour the blue fades toward pale green. Weigh the nail by itself and it gained mass. Weigh the solution by itself and it lost some. Weigh the whole cup before and after and the number doesn't move. Atoms shifted from one substance to another, but none left the system.

> DRIVING QUESTION
> *"If the nail gained mass and the solution lost color, where exactly did each atom end up?"*

INVESTIGATIVE 2

Burning a Log: Where Does All the Wood Go?

A video clip or fireplace photo. A heavy log before burning, a small pile of ash afterward. Most of the log is "missing." Same change as the anchor, only running in slow motion and in an open system the size of a room. Use this to push the atoms-leave-as-gas reasoning out into the world students actually see.

> DRIVING QUESTION
> *"If atoms can't be destroyed, where did the log go?"*