

5th Grade - Lesson 4.1

Conservation of Mass

NGSS Alignment

Performance Expectations

5-PS1-2: Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.

5-PS1-4: Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

5-PS1-1: Develop a model to describe that matter is made of particles too small to be seen.

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- No matter what reaction or change in properties occurs, the total weight of the substances does not change. (5-PS1-2)

Students observe a demonstration in which a precipitate is formed from two clear colorless liquids. Students then see that the weight of the reactants before the reaction is the same as the weight of the products after the reaction.

- The amount (weight) of matter is conserved when it changes form, even in transitions where it seems to vanish. (5-PS1-2)

Students see a demonstration that an ice cube and the water from the same ice cube melted weigh the same. Students then dissolve sugar and see that the weight of the sugar and water before dissolving is the same as after dissolving.

- Matter of any type can be subdivided into particles that are too small to see, but even then, the matter still exists and can be detected by other means. (5-PS1-1)

After seeing that the weight remains the same after a state change, after dissolving, and after a chemical reaction, students develop the understanding that the atoms involved in any of these processes merely rearranged or rebounded. No new atoms were created and none were destroyed.

- When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4)

Students watch as two clear colorless solutions are mixed and a solid white precipitate is formed. Even though a new substance is formed, the weight of the products is the same as the weight of the reactants.

Science and Engineering Practices

Developing and Using Models

- Develop a model to describe phenomena (5-PS1-1)

Students use molecular model animations to help visualize and develop an understanding that atoms are not made or destroyed in processes like state changes, dissolving, and chemical reactions.

Crosscutting Concepts

Scale, Proportion, and Quantity

- Natural objects exist from the very small to the immensely large. (5-PS1-1)

Students develop an understanding that the macroscopic observation that the weight of substances does not change in state changes, dissolving, and chemical reactions is based on atoms changing position and arrangement but not on being created or destroyed.

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

Students develop an understanding that the interactions of molecules and atoms in state changes, dissolving, and chemical reactions causes observable changes but that the total weight of the substances does not change.