

5-PS1-2 Matter and Its Interactions

Students who demonstrate understanding can:

- 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.** [Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances.] [Assessment Boundary: Assessment does not include distinguishing mass and weight.]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Using Mathematics and Computational Thinking

Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.

- Measure and graph quantities such as weight to address scientific and engineering questions and problems.

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

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

PS1.B: Chemical Reactions

- No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.)

Crosscutting Concepts

Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems.

Observable features of the student performance by the end of the grade:

1	Representation
	a Students measure and graph the given quantities using standard units, including: <ol style="list-style-type: none"> The weight of substances before they are heated, cooled, or mixed. The weight of substances, including any new substances produced by a reaction, after they are heated, cooled, or mixed.
	2 Mathematical/computational analysis
2	a Students measure and/or calculate the difference between the total weight of the substances (using standard units) before and after they are heated, cooled, and/or mixed.
	b Students describe* the changes in properties they observe during and/or after heating, cooling, or mixing substances.
	c Students use their measurements and calculations to describe* that the total weights of the substances did not change, regardless of the reaction or changes in properties that were observed.
	d Students use measurements and descriptions* of weight, as well as the assumption of consistent patterns in natural systems, to describe* evidence to address scientific questions about the conservation of the amount of matter, including the idea that the total weight of matter is conserved after heating, cooling, or mixing substances.