



**Grades 6–8**

**3.2.6-8.E Physical Science:** Chemical Reactions

**Students who demonstrate understanding can** *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.*

**Clarifying Statement:** Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.

**Assessment Boundary:** Assessment does not include the use of atomic masses, balancing symbolic equations, or intermolecular forces.

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)
<p><b>Developing and Using Models</b></p> <p>Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems.</p> <ul style="list-style-type: none"> <li>Develop a model to describe unobservable mechanisms.</li> </ul> <hr/> <p style="text-align: center;"><i>Connections to Nature of Science</i></p> <p><b>Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena</b></p> <ul style="list-style-type: none"> <li>Laws are regularities or mathematical descriptions of natural phenomena.</li> </ul>	<p><b>PS1.B: Chemical Reactions</b></p> <ul style="list-style-type: none"> <li>Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants.</li> <li>The total number of each type of atom is conserved, and thus the mass does not change.</li> </ul>	<p><b>Energy and Matter</b></p> <ul style="list-style-type: none"> <li>Matter is conserved because atoms are conserved in physical and chemical processes.</li> </ul>

**Pennsylvania Context:** N/A

**PA Career Ready Skills:** Interact with others demonstrating respect, cooperation, and acceptance.

**Connections to Other Standards Content and Practices**

Standard Source	Possible Connections to Other Standard(s) or Practice(s)
Agriculture (AFNR)	CS.06.01.01.a: Research and explain the foundational cycles in AFNR (e.g., water cycle, nutrient cycle, carbon cycle, etc.).
Science, Environmental Literacy and Sustainability (NAEE)	5-8 Strand 2.1.A. Earth's physical systems: Learners describe the physical processes that shape Earth, including weather, climate, plate tectonics, and the hydrologic cycle. They explain how matter cycles and energy flows among the abiotic and biotic components of the environment. They describe how humans affect and are affected by Earth's physical systems.



Standard Source	Possible Connections to Other Standard(s) or Practice(s)
<b>PA Core Standards: ELA</b>	CC.3.5.6-8.G: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
<b>PA Core Standards and Practices: Math</b>	MP.2: Reason abstractly and quantitatively. MP.4: Model with mathematics. CC.2.1.6.D.1: Understand ratio concepts and use ratio reasoning to solve problems.
<b>PA Standards: Social Studies</b>	N/A
<b>Educational Technology (ISTE)</b>	1.6. Creative Communicator: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.
<b>Technology and Engineering (ITEEA)</b>	STEL-1K: Compare and contrast the contributions of science, engineering, mathematics, and technology in the development of technological systems.