

NGSS CORRELATIONS

CHEMICAL REACTIONS

Crosscutting Concepts		Activity number
Energy and Matter	Matter is conserved because atoms are conserved in physical and chemical processes.	4, 6, 7, 8, 12, 13
	The transfer of energy can be tracked as energy flows through a designed or natural system.	9, 10, 11
Patterns	Macroscopic patterns are related to the nature of microscopic and atomic-level structure	1, 2, 3, 5, 12, 13
Scale, Proportion, and Quantity	Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.	4, 6, 7
Structure and Function	Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.	4
Systems and System Models	Systems may interact with other systems and be a part of larger complex systems.	6, 7
Science and Engineering Practices		Activity number
Analyzing and Interpreting Data	Analyze and interpret data to determine similarities and differences in findings.	1, 2, 3, 5, 6, 7, 9, 10, 11, 12, 13
Constructing Explanations and Designing Solutions	Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints.	8, 10, 11
Developing and Using Models	Develop a model to describe unobservable mechanisms.	4, 7
Engaging in Argument from Evidence	Construct and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.	12, 13
Obtaining, Evaluating, and Communicating Information	Integrate qualitative scientific and technical information in written text with that contained in media and visual displays to clarify claims and findings.	3
Planning and Carrying Out Investigations	Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation.	2, 12, 13
Connections to the Nature of Science	Scientific knowledge is based on logical and conceptual connections between evidence and explanations.	1, 2, 3, 5
	Laws are regularities or mathematical descriptions of natural phenomena.	4, 6, 7, 8

Performance Expectations		Activity number
Matter and Its Interactions (PS1)	Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. (MS-PS1-2)	5
	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. (MS-PS1-5)	7
	Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.* (MS-PS1-6)	11
Disciplinary Core Ideas		Activity number
Developing Possible Solutions (ETS1.B)	A solution needs to be tested, and then modified on the basis of the test results in order to improve it. There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem.	8, 10, 11
	There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.	11
	Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors.	8, 10, 11
Optimizing the Design Solution (ETS1.C)	Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design.	8, 10, 11
	The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution.	10, 11
Structure and Properties of Matter (PS1.A)	Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it.	1, 2, 3, 5, 12, 13

	Disciplinary Core Ideas	Activity number
Chemical Reactions (PS1.B)	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.	1, 2, 3, 4, 5, 6, 7, 9, 11, 12, 13
	The total number of each type of atom is conserved, and thus the mass does not change.	4, 6, 7, 12
	Some chemical reactions release energy, others store energy.	2, 3, 5, 8, 9 10, 11
Definitions of Energy (PS3.A)	The term “heat” as used in everyday language refers both to thermal energy (the motion of atoms or molecules within a substance) and the transfer of that thermal energy from one object to another. In science, heat is used only for this second meaning; it refers to the energy transferred due to the temperature difference between two objects.	9, 1, 11

COMMON CORE STATE STANDARDS CORRELATIONS

CHEMICAL REACTIONS

Common Core State Standards – English Language Arts		Activity number
Reading in Science and Technical Subjects (RST)	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. (RST.6-8.1)	1, 3, 4, 5
	Follow precisely a multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks. (RST.6-8.3)	2, 4, 6, 8, 9
	Determine the meaning of symbols, Key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics. (RST.6-8.4)	3
	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). (RST.6-8.7)	3
	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (RST. 6-8.9)	1
Common Core State Standards – English Language Arts		Activity number
Speaking and Listening (SL)	Engage effectively in a range of collaborative discussions (e.g., one-on-one, in groups, teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly. (SL.8.1)	5
Writing in History/ Social Studies, Science, and Technological Subjects (WHST)	Write arguments focused on discipline-specific content. (WHST.6-8.1)	12, 13
	Draw evidence from informational texts to support analysis, reflection, and research. (WHST.6-8.9)	3