Performance Expectations at a Glance

In this unit, students will discover and practice the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts needed to perform the following Performance Expectations.

Performance Expectations	Module: **Energy and Matter**	Module: **Classification and States of Matter**
MS-PS1-1		●
MS-PS1-4		●
MS-PS3-3	●	
MS-PS3-4	●	
MS-PS3-5	●	
MS-ETS1-1	●	
MS-ETS1-2	●	
MS-ETS1-3	●	
MS-ETS1-4	●	

Correlations by Module to the NGSS

MODULE: Energy and Matter

MS-PS3	Energy	
MS-PS3-3.	**Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.** [Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup.] [*Assessment Boundary: Assessment does not include calculating the total amount of thermal energy transferred.*]	91–98
SEP Science and Engineering Practices		
Constructing Explanations and Designing Solutions* Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. • Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process or system. (MS-PS3-3) * Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.		*84–85*, 91–98, Lab *Build Your Own Thermometer* (online)

Labs and investigations are in italics.

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DCI **Disciplinary Core Ideas**	
PS3.A: Definitions of Energy • Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present. (MS-PS3-3), (MS-PS3-4)	17–18, *21–24,* 24, 26–28, *37–39,* 42, *45*–46, 46, *47*–48, 48
PS3.B: Conservation of Energy and Energy Transfer • Energy is spontaneously transferred out of hotter regions or objects and into colder ones. (MS-PS3-3)	*58–59,* 60–61, 70
ETS1.A: Defining and Delimiting an Engineering Problem • The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions. (secondary to MS-PS3-3)	91–98
ETS1.B: Developing Possible Solutions • 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. (secondary to MS-PS3-3)	91–98
CCC **Crosscutting Concepts**	
Energy and Matter* • The transfer of energy can be tracked as energy flows through a designed or natural system. (MS-PS3-3) * Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.	59–61, *62–63,* 68, 70
CCSS ELA/Literacy Connections	
ELA RST.6–8.3	*10–11, 21–24*, *34–36, 58–59, 62–63, 64, 76–78, 79–80,* 91–98, Literacy Skill Handbook (online)
ELA WHST.6–8.7	25, 49, 87, Literacy Skill Handbook (online)

Labs and investigations are in italics.

MS-PS3	Energy	
MS-PS3-4.	**Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.** [Clarification Statement: Examples of experiments could include comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature, the temperature change of samples of different materials with the same mass as they cool or heat in the environment, or the same material with different masses when a specific amount of energy is added.] [*Assessment Boundary: Assessment does not include calculating the total amount of thermal energy transferred.*]	*76–78, 79–80, 84–85,* 91–98
SEP Science and Engineering Practices		
Planning and Carrying Out Investigations* Planning and carrying out investigations to answer questions or test solutions to problems in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or design solutions. • Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. (MS-PS3-4) * Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.		69, *84–85,* 91–98
Connections to Nature of Science **Scientific Knowledge is Based on Empirical Evidence** • Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS3-4)		*10–11, 21–24,* 27, *37–39, 84–85*
DCI Disciplinary Core Ideas		
PS3.A: Definitions of Energy • Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present. (MS-PS3-4)		17–18, *21–24,* 24, 27–28, *37–39,* 42, *45,* 46, *47,* 48, Lab *Build Your Own Thermometer* (online)
PS3.B: Conservation of Energy and Energy Transfer • The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment. (MS-PS3-4)		59, *76–78,* 78, *79–80, 81,* 82–83, 86, 88, 91–98

Labs and investigations are in italics.

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SEP Science and Engineering Practices	
Analyzing and Interpreting Data* Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. • Analyze and interpret data to determine similarities and differences in findings. (MS-ETS1-3) * Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.	*62–63*, 91–98
DCI Disciplinary Core Ideas	
ETS1.B: Developing Possible Solutions • There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-3)	91–98
• Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3)	Science and Engineering Practices Handbook (online)
ETS1.C: Optimizing the Design Solution • 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 those characteristics may be incorporated into the new design. (MS-ETS1-3)	91–98
CCSS ELA/Literacy Connections	
ELA RST.6–8.1	8–9, 15, 32–32, 56–57, 74–75, Literacy Skill Handbook (online)
ELA RST.6–8.7	*47–48*, 50, 88, Literacy Skill Handbook (online)
ELA RST.6–8.9	48, 91–98, Literacy Skill Handbook (online)
CCSS Math Connections	
Math MP.2	*19, 20, 34–36, 47–48, 76–78,* Math Skill Handbook (online)
Math 7.EE.B.3	*91–98,* Math Skill Handbook (online)

MS-ETS1	Engineering Design	
MS-ETS1-4.	**Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.**	91–98

Labs and investigations are in italics.

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CCC Crosscutting Concepts	
Scale, Proportion, and Quantity* • Proportional relationships (e.g., speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes. (MS-PS3-4) * Other aspects of this CCC are integrated throughout this module and are listed in the *Also Integrates* section.	17–18, 26–28, *76–78*, 78, *81*
CCSS ELA/Literacy Connections	
ELA RST.6–8.3	*10–11, 21–24*, *34–36, 58–59, 62–63, 64, 76–78, 79–80,* 91–98, Literacy Skill Handbook (online)
ELA WHST.6–8.7	25, 49, 87, Literacy Skill Handbook (online)
CCSS Math Connections	
Math MP.2	*19, 20, 34–36, 47–48, 76–78,* Math Skill Handbook (online)
Math 6.SP.B.5	*36–38,* Math Skill Handbook (online)

MS-PS3	Energy	
MS-PS3-5.	**Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.** [Clarification Statement: Examples of empirical evidence used in arguments could include an inventory or other representation of the energy before and after the transfer in the form of temperature changes or motion of object.] [*Assessment Boundary: Assessment does not include calculations of energy.*]	91–98
SEP Science and Engineering Practices		
Engaging in Argument from Evidence* Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed worlds. • Construct, use, 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. (MS-PS3-5) * Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.		24, 28, 44, 88–90, 91–98, Feature *Insulating the Home* (online)

Labs and investigations are in italics.

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Connections to Nature of Science **Scientific Knowledge is Based on Empirical Evidence** • Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS3-5)	*10–11, 21–24,* 27, *37–39, 84–85*
DCI Disciplinary Core Ideas	
PS3.B: Conservation of Energy and Energy Transfer • When the motion energy of an object changes, there is inevitably some other change in energy at the same time. (MS-PS3-5)	*13*, 14, *16*, 17, *19*, *20*, 21, 26–27, 61, 91–98
CCC Crosscutting Concepts	
Energy and Matter* • Energy may take different forms (e.g., energy in fields, thermal energy, energy of motion). (MS-PS3-5) * Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.	14, 24, 28, 42–43, *47*, 48
CCSS ELA/Literacy Connections	
ELA RST.6–8.1	8–9, 15, 32–32, 56–57, 74–75, Literacy Skill Handbook (online)
ELA WHST.6–8.1	24, 28, 44, 90, 91–98, Feature *Insulating the Home* (online), Literacy Skill Handbook (online)
CCSS Math Connections	
Math MP.2	*19, 20, 34–36, 47–48, 76–78,* Math Skill Handbook (online)
Math 6.RP.A.1	*81,* Math Skill Handbook (online)
Math 7.RP.A.2	*37–39, 76–78, 78,* Math Skill Handbook (online)
Math 8.F.A.3	*37–39, 76–78, 78,* Math Skill Handbook (online)

MS-ETS1	Engineering Design	
MS-ETS1-1.	**Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.**	91–98

Labs and investigations are in italics.

Continued from previous page.

SEP Science and Engineering Practices	
Asking Questions and Defining Problems* Asking questions and defining problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables, clarifying arguments and models. • Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. (MS-ETS1-1) * Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.	91–98
DCI Disciplinary Core Ideas	
ETS1.A: Defining and Delimiting Engineering Problems • The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1)	25, 91–98
CCC Crosscutting Concepts	
Connections to Science, Technology, Society and the Environment **Influence of Science, Engineering, and Technology on Society and the Natural World** • All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ETS1-1)	91–98
• The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (MS-ETS1-1)	25, 66, 91–98, Lab *Build Your Own Thermometer* (online)
CCSS ELA/Literacy Connections	
ELA RST.6–8.1	8–9, 15, 32–32, 56–57, 74–75, Literacy Skill Handbook (online)
ELA WHST.6–8.8	66 , Literacy Skill Handbook (online)
CCSS Math Connections	
Math MP.2	*19, 20, 34–36, 47–48, 76–78,* Math Skill Handbook (online)
Math 7.EE.B.3	*91–98,* Math Skill Handbook (online)

MS-ETS1	Engineering Design	
MS-ETS1-2.	**Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.**	91–98

Labs and investigations are in italics.

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SEP Science and Engineering Practices	
Engaging in Argument from Evidence* Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world. • Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-ETS1-2) * Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.	91–98
DCI Disciplinary Core Ideas	
ETS1.B: Developing Possible Solutions • There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-2) possible solutions. (MS-ETS1-1)	91–98
CCSS ELA/Literacy Connections	
ELA RST.6–8.1	8–9, 15, 32–32, 56–57, 74–75, Literacy Skill Handbook (online)
ELA RST.6–8.9	48, 91–98, Literacy Skill Handbook (online)
ELA WHST.6–8.7	25, 49, 87, Literacy Skill Handbook (online)
ELA WHST.6–8.9	15, Literacy Skill Handbook (online)
CCSS Math Connections	
Math MP.2	*19, 20, 34–36, 47–48, 76–78,* Math Skill Handbook (online)
Math 7.EE.B.3	*91–98,* Math Skill Handbook (online)

MS-ETS1	Engineering Design	
MS-ETS1-3.	**Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.**	91–98

Labs and investigations are in italics.

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SEP Science and Engineering Practices	
Developing and Using Models* Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. • Develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs. (MS-ETS1-4) * Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.	91–98
DCI Disciplinary Core Ideas	
ETS1.B: Developing Possible Solutions • A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4)	Science and Engineering Practices Handbook (online)
• Models of all kinds are important for testing solutions. (MS-ETS1-4)	91–98
ETS1.C: Optimizing the Design Solution •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. (MS-ETS1-4)	Science and Engineering Practices Handbook (online)
CCSS ELA/Literacy Connections	
ELA SL.8.5	91–98, Literacy Skill Handbook (online)
CCSS Math Connections	
Math MP.2	*19, 20, 36–38, 47, 78,* Math Skill Handbook (online)
Math 7.SP.C.7	Math Skill Handbook (online)

ALSO INTEGRATES:	
SEP Asking Questions and Defining Problems	25, *84–85,* 87, 99
SEP Developing and Using Models	*10–11*, 14, 17, 26–27, 43, 48, 55, 60–61, *62–63,* 68, 70, 78, 91–98, PhET Interactive Simulation *Energy Forms and Change* (online)
SEP Planning and Carrying Out Investigations	*58–59, 62–63, 64,* 69, *76–78, 79–80, 84–85,* 91–98
SEP Analyzing and Interpreting Data	*34–36, 37–39, 45–46,* 51, *58–59, 64, 76–78, 79–80,* 89, 91–98
SEP Using Mathematics and Computational Thinking	*34–36, 76–78, 81*

Labs and investigations are in italics.

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SEP Constructing Explanations and Designing Solutions	8–9, 18, 27–28, 32–33, 41, 52, 56–57, 65, 74–75, *84–85,* 86, 91–98, 99
SEP Engaging in Argument from Evidence	24–25, 28, 44, 90, 91–98, Feature *Insulating the Home* (online)
SEP Obtaining, Evaluating, and Communicating Information	15, 87, 91–98
Connections to Nature of Science Scientific Investigations Use a Variety of Methods	69, *84–85*, 91–98
Connections to Nature of Science Scientific Knowledge is Open to Revision in Light of New Evidence	15
DCI ESS2.A: Earth’s Materials and Systems	65
DCI ESS2.C: The Roles of Water in Earth's Surface Processes	40, 67
DCI ESS2.D: Weather and Climate	82
DCI PS1.A: Structure and Properties of Matter	*10–11,* 11, *13,*14–15, *16,* 17–18, *19,* 19, *20,* 20, 25–28, *34–36,* 37, *37–39,* 40–41, *41–42,* 42–44, *45–46,* 46, *47–48,* 49–52
DCI PS2.A: Forces and Motion	12, 14, 17–18
CCC Patterns	*34–36, 37–39,* 41, *45–46, 58–59, 67, 76–78, 81,* 91–98
CCC Cause and Effect	*10–11, 21–24*
CCC Scale Proportion, and Quantity	*10–11,* 14, 17, 26–28
CCC Systems and System Models	59, 60, 61, *62–63*, 91–98
CCC Energy and Matter	14, 17, 18, 65, *67*, 67, 83, 86, 89
CCC Structure and Function	49, 87, 91–98
CCC Stability and Change	*10–11*
Connections to Science, Technology, Society, and the Environment Interdependence of Science, Engineering, and Technology	25, 87
CCSS ELA RST.6–8.2	15
CCSS ELA RST.6–8.6	91–98
CCSS ELA RST.6–8.10	15, 25, 49, 66, 87
CCSS ELA WHST.6–8.3	*84–85,* 91–98
CCSS ELA WHST.6–8.5	91–98
CCSS ELA WHST.6–8.6	66
CCSS ELA WHST.6–8.8	66

Labs and investigations are in italics.

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CCSS ELA WHST.6–8.10	91–98
CCSS ELA SL.6.4	25, 87, 91–98
CCSS ELA SL.6.5	25, 66
CCSS Math 6.NS.C.5	49

MODULE: Classification and States of Matter

MS-PS1	Matter and its Interactions	
MS-PS1-1.	**MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures.** [Clarification Statement: Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer representations showing different molecules with different types of atoms.] [*Assessment Boundary: Assessment does not include valence electrons and bonding energy, discussing the ionic nature of subunits of complex structures, or a complete description of all individual atoms in a complex molecule or extended structure is not required.*]	195–202

SEP Science and Engineering Practices	
Developing and Using Models* 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. • Develop a model to predict and/or describe phenomena. (MS–PS1–1) * Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.	*110–111, 120–121,* 124, 124, 135, 138, *139–140,* 141, *142–143,* 145, 147, 152, *165, 176–177, 182–183,* 190, 195–202, PhET Interactive Simulation *States of Matter: Basics* (online)

DCI Disciplinary Core Ideas	
PS1.A: Structure and Properties of Matter • Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1)	117–119, *120–121,* 121, 124–125, *176–177,* 177, 180–181, *182–183, 184–185,* 186, *186–187,* 187, *187–188,* 188, 190, 192, 195–202
• Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). (MS-PS1-1)	181, 183–184, 186, *186–187,* 189–190

CCC Crosscutting Concepts	
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. (MS-PS1-1)	*113,* 114–116, 135, 138, *142–143,* 145, 147, 152, *165, 176–177,* 180–181, *182–183,* 195–202, PhET Interactive Simulation *States of Matter: Basics* (online)

Labs and investigations are in italics.

CCSS ELA/Literacy Connections	
ELA RST.6–8.7	117, 123, 135, 141, 145, 150, Literacy Skill Hanbook (online)
CCSS Math Connections	
Math MP.2	114–115, *120–121,* Math Skill Handbook (online)
Math MP.4	*120–121, 158–159, 161–163,* Math Skill Handbook (online)
Math 6.RP.A.3	*120–121,* Math Skill Handbook (online)

MS-PS1	Matter and its Interactions	
MS-PS1-4.	**Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.** [Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawings and diagrams. Examples of particles could include molecules or inert atoms. Examples of pure substances could include water, carbon dioxide, and helium.]	195–202
SEP Science and Engineering Practices		
Developing and Using Models* 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. • Develop a model to predict and/or describe phenomena. (MS-PS1-4) * Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.		*110–111, 120–121,* 123, 124, 135, 138, *139–140,* 141, *142–143, 145, 147, 152,* 195–202, PhET Interactive Simulation *States of Matter: Basics* (online)
DCI Disciplinary Core Ideas		
PS1.A: Structure and Properties of Matter • Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. (MS-PS1-4)		*108–109, 110–111,* 112, 117, 119, 122, 134, 140–141, 143–147, 178, 195–202
• In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (MS-PS1-4)		*108–109, 110–111,* 112, 124–125, 140–141, 143–147, 194–202
• The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4)		144–147, 151, 195–202, PhET Interactive Simulation *States of Matter: Basics* (online), Video *Melting* (online)

Labs and investigations are in italics.

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PS3.A: Definitions of Energy • 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. (secondary to MS-PS1-4)	*113,* 116, 138
• The temperature of a system is proportional to the average internal kinetic energy and potential energy per atom or molecule (whichever is the appropriate building block for the system's material). The details of that relationship depend on the type of atom or molecule and the interactions among the atoms in the material. Temperature is not a direct measure of a system's total thermal energy. The total thermal energy (sometimes called the total internal energy) of a system depends jointly on the temperature, the total number of atoms in the system, and the state of the material. (secondary to MS-PS1-4)	*113,* 114–116, 124, 126, 144–147, 195–202, PhET Interactive Simulation *States of Matter: Basics* (online), Video *Melting* (online)
CCC Crosscutting Concepts	
Cause and Effect • Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS1-4)	135, 143, 147, 164, 169–170, 195–202
CCSS ELA/Literacy Connections	
ELA RST.6-8.7	117, 123, 135, 141, 145, 150, Literacy Skill Handbook (online)
CCSS Math Connections	
Math 6.NS.C.5	Math Skill Handbook (online)

ALSO INTEGRATES:	
SEP Asking Questions and Defining Problems	105, 203
SEP Developing and Using Models	*113,* 117, *119–120,* 125, 135, 141, 145, 193
SEP Planning and Carrying Out Investigations	*108–109, 136–137,* 203
SEP Analyzing and Interpreting Data	124, *158–159, 161–163, 178–180, 184–185*
SEP Using Mathematics and Computational Thinking	*132–133,* 164, 170
SEP Constructing Explanations and Designing Solutions	106–107, *108–109,* 112, 126, 130–131, 135, 141, 147–148, 152, 156–157, 166, 169, 174–175, *178–180, 184–185,* 195–202
SEP Engaging in Argument from Evidence	152, 181, 190

Labs and investigations are in italics.

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SEP Obtaining, Evaluating, and Communicating Information	123A–123B, 191
Connections to Nature of Science Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena	160
DCI ESS2.C: The Role of Water on Earth's Surface Processes	148
DCI PS3.A: Definitions of Energy	*113,* 114, 116, 129, *132–133,* 134–135, 145–149, 195–202, 203
CCC Patterns	*108–109,* 109, *110–111,* 112, *113,* 114–116, *122, 158–159, 161–163, 178–180, 184–185*
CCC Systems and System Models	*110–111, 113,* 138, 147, 151, 181, 190
CCC Energy and Matter	*113,* 114–116, 126, 135, 138, 145, 147–148, 166, 195–202
CCC Structure and Function	*110–111,* 112, *178–180, 184–185,* 189–191, 193
CCSS ELA SL.7.4	191
CCSS ELA SL.7.6	191
CCSS ELA SL.8.5	149, 191, 195–202
CCSS ELA RST.6–8.1	106–107, 130–131, 156–157, 174–175, 189
CCSS ELA RST.6–8.3	*108–109, 132–133, 136–137, 139–140, 142–143, 158–159, 161–163, 178–180, 184–185*
CCSS ELA RST.6–8.10	123A–123B, 149, 167, 189, 191
CCSS ELA WHST.6–8.2	167
CCSS ELA WHST.6–8.4	123A–123B, 167
CCSS ELA WHST.6–8.6	118, 123A–123B, 149, 167
CCSS ELA WHST.6–8.7	123A–123B, 149, 167
CCSS ELA WHST.6–8.9	191
CCSS Math 6.RP.A.1	*120–121*
CCSS Math 6.RP.A.2	*120–121*
CCSS Math 6.RP.A.3	*120–121*
CCSS Math 7.RP.A.2	*132–133,* 134, 141, *158–159, 161–163,* 163–164
CCSS Math 8.EE.A.3	118

Labs and investigations are in italics.