Lab-Aids Correlations for

2020 NEW JERSEY STUDENT LEARNING STANDARDS

Grade 6 through Grade 8

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This document shows how the SEPUP Issues and Science, 3rd edition Redesigned for the NGSS curriculum aligns with the 2020 New Jersey Student Learning Standards, Grade 6 through Grade 8.

ABOUT OUR PROGRAMS

Lab-Aids has maintained its home offices and operations in Ronkonkoma, NY, since 1963. We publish over 200 kits and core curriculum programs to support science teaching and learning, grades 6-12. All core curricula support an inquiry-driven pedagogy, with support for literacy skill development and with assessment programs that clearly show what students know and are able to do as a result of program use. All programs have extensive support for technology and feature comprehensive teacher support. For more information please visit https://www.lab-aids.com/third-edition.

SEPUP

Materials from the Science Education for Public Understanding Program (SEPUP) are developed at the Lawrence Hall of Science, at the University of California, Berkeley, and distributed nationally by Lab- Aids, Inc. Since 1987, development of SEPUP materials has been supported by grants from the National Science Foundation and other public and private sources. SEPUP programs include student books, equipment kits, teacher materials, and online digital content, and are available as full year courses, or separately, as 17 units, each taking 3-8 weeks to complete, as listed below.

Middle Level Units, listed by discipline

Physical Science	**Life Science**	**Earth Science**
Fields and Interactions	Cells to Organisms	Earth's Resources
Force and Motion	Reproduction	Land, Water, and Human Interactions
Waves	Evolution	Weather and Climate
Chemistry of Materials	Ecology	Geological Processes
Chemical Reactions	Body Systems	Solar System and Beyond
Energy	Biomedical Engineering	

ABOUT THE LAB-AIDS CITATIONS

Citations included in the correlation document are as follows:

Unit title, Activity Number
The Chemistry of Materials: 14, 15*
* indicates where Performance Expectation is assessed

Disciplinary Core Ideas	MS-PS1.A
Common Core English-Language Arts	RST.6-8.3
Common Core Mathematics	MP.2

PHYSICAL SCIENCE

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
MS-PS1: Matter and Its Interactions					
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 depiction of all individual atoms in a complex molecule or extended structure.]	*Chemistry of Materials:* 2, 6, 7, 12*	Analyzing and Interpreting Data Developing and Using Models Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations	MS-PS1.A MS-PS1.B	Connections to Engineering, Technology, and Applications of Science Scale, Proportion, and Quantity Structure and Function	RST.6-8.2 RST.6-8.3 RST.6-8.7
MS-PS1-2: Analyze and interpret data on the properties of substances before and after the substances interact to	*Chemical Reactions:* 1, 2, 3, 4, 5*	Analyzing and Interpreting Data Connections to the Nature of Science Developing and Using Models	MS-PS1.A MS-PS1.B	Patterns Scale, Proportion, and Quantity Structure and Function	RST.6-8.1 RST.6-8.3 RST.6-8.4 RST.6-8.7 RST.6-8.9 SL.8.1

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
determine if a chemical reaction has occurred. [Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.] [Assessment Boundary: Assessment is limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability, and odor.]		Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations			WHST.6-8.9
	Chemistry of Materials: 4	Analyzing and Interpreting Data Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	MS-PS1.A	Scale, Proportion, and Quantity Structure and Function	7.RP.A.2
MS-PS1-3: Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. [Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.] [Assessment Boundary: Assessment is limited to qualitative information.]	*Chemistry of Materials:* 1, 2, 3, 4, 5, 11, 12, 13*	Analyzing and Interpreting Data Asking Questions and Defining Problems Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	MS-PS1.A MS-PS1.B	Connections to Engineering, Technology, and Applications of Science Scale, Proportion, and Quantity Structure and Function	RST.6-8.3 RST.6-8.7 WHST.6-8.1 WHST.6-8.9 7.RP.A.2
MS-PS1-4: Develop a model that predicts and describes changes in particle motion, temperature, and state of a	*Chemistry of Materials:* 8, 9, 10*	Constructing Explanations and Designing Solutions Developing and Using Models	MS-PS1.A MS-PS3.A	Cause and Effect	RST.6-8.3

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
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.]		Engaging in Argument from Evidence Planning and Carrying Out Investigations			
MS-PS1-5: 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. [Clarification 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.]	*Chemical Reactions:* 1, 2, 3, 4, 5, 6, 7*	Analyzing and Interpreting Data Connections to the Nature of Science Developing and Using Models Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations	MS-PS1.A MS-PS1.B	Energy and Matter Patterns Scale, Proportion, and Quantity Structure and Function Systems and System Models	RST.6-8.1 RST.6-8.3 RST.6-8.4 RST.6-8.7 RST.6-8.9 SL.8.1 WHST.6-8.9
MS-PS1-6: Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.	*Chemical Reactions:* 2, 3, 5, 8, 9, 10, 11*	Analyzing and Interpreting Data Connections to the Nature of Science Constructing Explanations and Designing Solutions	MS-ETS1.B MS-ETS1.C MS-PS1.A MS-PS1.B MS-PS3.A	Energy and Matter Patterns	RST.6-8.1 RST.6-8.3 RST.6-8.4 RST.6-8.7 SL.8.1 WHST.6-8.9

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
[Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.] [Assessment Boundary: Assessment is limited to the criteria of amount, time, and temperature of substance in testing the device.]		Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations			
MS-PS2: Motion and Stability: Forces and Interactions					
MS-PS2-1: Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects. [Clarification Statement: Examples of practical problems could include the impact of collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle.] [Assessment Boundary: Assessment is limited to vertical or horizontal interactions in one dimension.]	*Force and Motion:* 1, 10, 11, 12*	Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Developing and Using Models Obtaining, Evaluating, and Communicating Information	MS-ETS1.A MS-PS2.A MS.PS3.A MS-PS3.C	Cause and Effect Connections to Engineering, Technology, and Applications of Science Systems and System Models	RST.6-8.1 RST.6-8.3 RST.6-8.7 MP.2
MS-PS2-2: Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	*Force and Motion:* 1, 6, 7, 8, 9, 13*	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to the Nature of Science	MS-ETS1.A MS-PS2.A MS.PS3.A MS-PS3.C	Cause and Effect Connections to Engineering, Technology, and Applications of Science Scale, Proportional, and	RST.6-8.1 RST.6-8.2 RST.6-8.3 RST.6-8.7 6.RP.AP.2 6. SP.B.5

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
[Clarification Statement: Emphasis is on balanced (Newton's First Law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton's Second Law), frame of reference, and specification of units.] [Assessment Boundary: Assessment is limited to forces and changes in motion in one-dimension in an inertial reference frame and to change in one variable at a time. Assessment does not include the use of trigonometry.]		Constructing Explanations and Designing Solutions Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations Using Mathematics and Computational Thinking		Quantity Stability and Change	7. EE.B.4 7.RP.A.2 MP.2
MS-PS2-3: Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. [Clarification Statement: Examples of devices that use electric and magnetic forces could include electromagnets, electric motors, or generators. Examples of data could include the effect of the number of turns of wire on the strength of an electromagnet, or the effect of increasing the number or strength of magnets on the speed of an electric motor.] [Assessment Boundary: Assessment about questions that require quantitative answers is limited to proportional reasoning and algebraic thinking.]	*Fields and Interactions:* 7, 8, 9, 12, 13*, 14	Asking Questions and Defining Problems Developing and Using Models Engaging in Argument from Evidence Connections to the Nature of Science Planning and Carrying Out Investigations	MS-PS2.B MS-ETS1.B	Cause and Effect Patterns Systems and System Models	RST.6-8.1 RST.6-8.3 WHST.6-8.7 MP.2
MS-PS2-4: Construct and present arguments using evidence to support the claim that gravitational	*Fields and*	Analyzing and Interpreting Data Asking Questions and Defining Problems	MS-PS2.B MS-PS3.A MS-PS3.C MS-ETS1.A	Connections to Nature of Science Patterns	RST.6.8.1 WHST.6-8.1 SL.8.5

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
interactions are attractive and depend on the masses of interacting objects. [Clarification Statement: Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the Sun, and orbital periods of objects within the solar system.] [Assessment Boundary: Assessment does not include Newton's Law of Gravitation or Kepler's Laws.]	*Interactions:* 3, 4, 7*	Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence	MS-ETS1.B	Systems and System Models	6.EE.C.9 MP.2
MS-PS2-5: Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. [Clarification Statement: Examples of this phenomenon could include the interactions of magnets, electrically-charged strips of tape, and electrically-charged pith balls. Examples of investigations could include first-hand experiences or simulations.] [Assessment Boundary: Assessment is limited to electric and magnetic fields and limited to qualitative evidence for the existence of fields.]	*Fields and Interactions:* 5, 7, 9, 10, 12*	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Planning and Carrying Out Investigations	MS-PS2.B MS-PS3.A MS-PS3.C MS-ETS1.B	Cause and Effect Patterns Systems and System Models	RST.6-8.3 WHST.6-8.1 WHST.6-8.7 MP.2
MS-PS3: Energy					

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
MS-PS3-1: Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. [Clarification Statement: Emphasis is on descriptive relationships between kinetic energy and mass separately from kinetic energy and speed. Examples could include riding a bicycle at different speeds, rolling different sizes of rocks downhill, and getting hit by a wiffle ball versus a tennis ball.]	*Force and Motion:* *1, 2, 3, 4, 5**	Analyzing and Interpreting Data Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations	MS-ETS1.A MS-PS2.A MS.PS3.A MS-PS3.C	Cause and Effect Connections to Engineering, Technology, and Applications of Science Energy and Matter Patterns Scale, Proportion, and Quantity	RST.6-8.7 WHST.6-8.2 6.SP.B.5 7.RP.A.2
MS-PS3-2: Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. [Clarification Statement: Emphasis is on relative amounts of potential energy, not on calculations of potential energy. Examples of objects within systems interacting at varying distances could include: the Earth and either a roller coaster cart at varying positions on a hill or objects at varying heights on shelves, changing the direction/orientation of a magnet, and a balloon with static electrical charge being brought closer to a classmate's hair. Examples of models could include	*Fields and Interactions:* 3, 4, 6, 7, 10, 11*	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence	MS-ETS1.A MS-ETS1.B MS-ETS1.C MS-PS2.B MS.PS3.A MS.PS3.C	Cause and Effect Connections to Nature of Science Scale, Proportion, and Quantity Systems and System Models	RST.6-8.1 RST.6-8.3 RST.6-8.7 SL.8.5 WHST.6-8.1 WHST.6-8.7 6.EE.C.9 MP2
	Force and Motion: 1, 3, 4, 5, 10, 14	Asking Questions and Defining Problems Obtaining, Evaluating, and	MS-ETS1.A MS-PS2.A MS-PS3.A MS-PS3.C	Cause and Effect Connections to Engineering, Technology, and Applications	RST.6-8.7

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
representations, diagrams, pictures, and written descriptions of systems.] [Assessment Boundary: Assessment is limited to two objects and electric, magnetic, and gravitational interactions.]		Communicating Information		of Science	
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.]	*Energy:* 1, 7, 8, 10, 11, 12, 13*	Analyzing and Interpreting Data Connections to the Nature of Science Constructing Explanations and Designing Solutions Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations	MS-ETS1.A MS-ETS1.B MS-PS3.A MS-PS3.B	Cause and Effect Connections to the Nature of Science Energy and Matter Patterns Scale, Proportion, and Quantity Structure and Function Systems and System Models	RST.6-8.1 RST.6-8.3 SL.8.4 WHST.6-8.9 EE.6.A.2 EE.6.C.9 MP.2
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	*Energy:* 1, 4, 6, 7, 8*	Analyzing and Interpreting Data Connections to the Nature of Science Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Planning and Carrying Out Investigations	MS-PS3.A MS-PS3.B MS-PS3.C	Cause and Effect Energy and Matter Patterns Scale, Proportion, and Quantity Systems and System Models	RST.6-8.3 WHST.6-8.1 WHST.6-8.9 EE.6.C.9 MP.2

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
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.]					
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.]	*Energy:* 2, 3, 4, 5, 6*	Analyzing and Interpreting Data Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations	MS-PS3.A MS-PS3.B MS-PS3.C	Cause and Effect Energy and Matter Patterns Scale, Proportion, and Quantity Systems and System Models	RST.6-8.3 WHST.6-8.1 WHST.6-8.9 EE.6.C.9 MP.2
MS-PS4: Waves and Their Applications in Technologies for Information Transfer					
MS-PS4-1: Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the	*Waves:* 1, 2, 3, 7*	Analyzing and Interpreting Data Developing and Using Models Obtaining, Evaluating, and	MS-PS4.A	Connections to Engineering, Technology, and Applications of Science Patterns	RST.6-8.1 RST.6-8.3 RST.6-8.9 6.RP.A.1

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
energy in a wave. [Clarification Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.] [Assessment Boundary: Assessment does not include electromagnetic waves and is limited to standard repeating waves.]		Communicating Information Using Mathematics and Computational Thinking		Structure and Function	7.RP.A.2 MP.2 MP.4
MS-PS4-2: Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. [Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.] [Assessment Boundary: Assessment is limited to qualitative applications pertaining to light and mechanical waves.]	*Waves:* 3, 4, 8, 9, 10, 11, 12, 13*	Analyzing and Interpreting Data Connections to the Nature of Science Developing and Using Models Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	MS-PS4.A MS-PS4.B	Connections to Engineering, Technology, and Applications of Science Patterns Structure and Function	RST.6-8.1 RST.6-8.3 RST.6-8.9 MP.2
MS-PS4-3: Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals. [Clarification Statement: Emphasis is on a basic understanding that waves can be used for communication purposes.	*Waves:* 5, 6	Asking Questions and Defining Problems Connections to Engineering, Technology, and Applications of Science Structure and Function Developing and Using Models	MS-PS4.C MS-ETS1.A MS-ETS1.B MS-ETS1.C	Connections to Engineering, Technology, and Applications of Science Structure and Function	RST.6-8.1 RST.6-8.3 RST.6-8.9 WHST.6-8.9

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
Examples could include using fiber optic cable to transmit light pulses, radio wave pulses in wifi devices, and conversion of stored binary patterns to make sound or text on a computer screen.] [Assessment Boundary: Assessment does not include binary counting. Assessment does not include the specific mechanism of any given device.]		Obtaining, Evaluating, and Communicating Information			

LIFE SCIENCE

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
MS-LS1: From Molecules to Organisms: Structures and Processes					
MS-LS1-1: Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. [Clarification Statement: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living things, and understanding that living things may be made of one cell or many and varied cells.]	*From Cells to Organisms:* 1, 2, 3, 4, 9*	Analyzing and Interpreting Data Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and	MS-LS1.A MS-LS1.C MS-PS3.D	Cause and Effect Connections to Engineering, Technology, and Applications of Science Connections to the Nature of Science Energy and Matter Patterns Scale, Proportion, and Quantity	RST.6-8.3 RST.6-8.7 RST.6-8.9 WHST.6-8.2 WHST.6-8.7 WHST.6-8.9 SL.8.5

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Communicating Information Planning and Carrying Out Investigations Using Mathematics and Computational Thinking		Structure and Function Systems and System Models	
MS-LS1-2: Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function. [Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.] [Assessment Boundary: Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical function of cells or cell parts.]	*From Cells to Organisms:* 6, 7, 8*	Analyzing and Interpreting Data Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations	MS-LS1.A	Connections to Engineering, Technology, and Applications of Science Connections to the Nature of Science Scale, Proportion, and Quantity Structure and Function Systems and System Models	RST.6-8.3 RST.6-8.7 RST.6-8.9 WHST.6-8.2 WHST.6-8.7 WHST.6-8.9 SL.8.5
MS-LS1-3: Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. [Clarification Statement:	*From Cells to Organisms*: 10, 14, 15	Analyzing and Interpret Data Constructing Explanations and Designing Solutions Engaging in Argument from Evidence	MS-LS1.A	Cause and Effect Connections to Engineering, Technology, and Applications of Science Connections to the Nature of	RST.6-8.2 RST.6-8.3 RST.6-8.7 RST.6-8.9 WHST.6-8.9

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.] [Assessment Boundary: Assessment does not include the mechanism of one body system independent of others. Assessment is limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.]		Obtaining, Evaluating, and Communicating Information Using Mathematics and Computational Thinking		Science Patterns Scale, Proportion, and Quantity	
	Body Systems: 1, 2, 3, 4, 9, 10, 11, 12*	Analyzing and Interpret Data Asking Questions and Defining Problems Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	MS-LS1.A MS-PS3.D	Cause and Effect Connections to the Nature of Science Structure and Function Systems and System Models	RST.6-8.2 RST.6-8.3 RST.6-8.4 RST.6-8.7 RST.6-8.9 WHST.6-8.1 WHST.6-8.2 WHST.6-8.9 SL.8.1 6.SP.B.4
MS-LS1-4: Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized	*Reproduction:* 10*, 11*	Constructing Explanations and Designing Solutions Developing and Using Models	MS-LS1.B MS-LS3.A MS-LS3.B	Cause and Effect Patterns	RI.6.8 RST.6-8.1 RST.6-8.4 WHST.6-8.1 6.SP.A.2 6.SP.B.4

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
plant structures affect the probability of successful reproduction of animals and plants respectively. [Clarification Statement: Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds, and creating conditions for seed germination and growth. Examples of plant structures could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.]					6.SP.B.5
MS-LS1-5: Construct a scientific explanation based on evidence for how	*Reproduction:* 1, 7*	Asking Questions and Defining Problems	MS-LS3.A MS-LS1.B	Cause and Effect Connections to the Nature of	RST.6-8.2 SL.8.1 WHST.6-8.9

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
environmental and genetic factors influence the growth of organisms. [Clarification Statement: Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include large breed cattle and species of grass affecting growth of organisms. Examples of evidence could include drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds.] [Assessment Boundary: Assessment does not include genetic mechanisms, gene regulation, or biochemical processes.]		Obtaining, Evaluating, and Communicating Information		Science Structure and Function	 6.RP.A.1 6.SP.B.5
MS-LS1-6: Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. [Clarification Statement: Emphasis is on tracing movement of matter and flow of energy.] [Assessment Boundary: Assessment does not include the biochemical mechanisms of photosynthesis.]	*From Cells to Organisms*: 12, 13*	Constructing Explanations and Designing Solutions	MS-LS1.A MS-LS1.C MS-PS3.D	Energy and Matter Structure and Function	RST.6-8.3
MS-LS1-7: Develop a model to describe how food is	*From Cells to Organisms*:	Analyzing and Interpreting Data	MS-LS1.A MS-LS1.C	Energy and Matter	RST.6-8.2 RST.6-8.3

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. [Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.] [Assessment Boundary: Assessment does not include details of the chemical reactions for photosynthesis or respiration.]	5, 11*	Constructing Explanations and Designing Solutions Developing and Using Models Planning and Carrying Out an Investigation	MS-PS3.D		RST.6-8.9
	Body Systems: 5	Constructing Explanations and Designing Solutions Developing and Using Models	MS-LS1.A MS-LS1.C	Energy and Matter	RST.6-8.2 RST.6-8.9
MS-LS1-8: Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. [Assessment Boundary: Assessment does not include mechanisms for the transmission of this information.]	*Body Systems:* 6, 7, 8*	Analyzing and Interpreting Data Obtaining, Evaluating, and Communicating Information Planning and Carrying Out an Investigation	MS-LS1.D	Cause and Effect	RST.6-8.4 6.SP.B.4
MS-LS2: Ecosystems: Interactions, Energy, and Dynamics					
MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships	*Ecology:* 5, 6, 9*	Analyzing and Interpret Data Connections to the Nature of Science Constructing Explanations and Designing Solutions	MS-LS2.A	Cause and Effect Connections to the Nature of Science Energy and Matter Patterns Stability and Change	RST.6-8.1 RST.6-8.3 RST.6-8.7 RST.6-8.8 SL.8.4 SL.8.5 WHST.6-8.1

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]		Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations		Systems and System Models	WHST.6-8.9 6.EE.C.9 6.RP.A.1 6.RP.A.3 6.SP.B.5 MP.2 MP.4
MS-LS2-2: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. [Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.]	*Ecology:* 2, 8, 10*	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations	MS-LS2.A	Cause and Effect Connections to the Nature of Science Energy and Matter Patterns Stability and Change Systems and System Models	RST.6-8.1 RST.6-8.3 RST.6-8.8 SL.8.4 SL.8.5 WHST.6-8.9 6.RP.A.1 6.RP.A.3 MP.2 MP.4
MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	*Ecology:* 7, 8, 11, 12*	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Developing and Using Models Planning and Carrying Out	MS-LS2.B	Cause and Effect Energy and Matter Systems and System Models	RST.6-8.3 RST.6-8.7 WHST.6-8.9 6.RP.A.1 6.RP.A.3 MP.2 MP.4

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
[Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]		Investigations			
	From Cells to Organisms: 13	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations	MS-LS1.C MS-PS3.D	Energy and Matter	RST.6-8.3
MS-LS2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]	*Ecology:* 1, 2, 3, 4, 5, 6, 13, 14*	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations	MS-LS2.C	Cause and Effect Connections to the Nature of Science Energy and Matter Patterns Stability and Change Systems and System Models	RST.6-8.1 RST.6-8.3 RST.6-8.8 SL.8.5 WHST.6-8.1 WHST.6-8.9 6.EE.C.9 6.SP.B.5 MP.2
MS-LS2-5: Evaluate competing design solutions	*Ecology:*	Analyzing and Interpreting Data Asking Questions and Defining	MS-ETS1.B MS-LS2.C MS-LS4.D	Cause and Effect Connections to the Nature of	RST.6-8.1 RST.6-8.3 RST.6-8.8

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
for maintaining biodiversity and ecosystem services. [Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]	2, 4, 15*	Problems Connections to the Nature of Science Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations Using Mathematics and Computational Thinking		Science Energy and Matter Patterns Stability and Change	SL.8.5 WHST.6-8.1 WHST.6-8.9 6.SP.B.5
MS-LS3: Heredity: Inheritance and Variation of Traits					
MS-LS3-1: Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.	*Reproduction:* 1, 3, 8, 12, 13*	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models	MS-LS1.B MS-LS3.A MS-LS3.B	Cause and Effect Connections to the Nature of Science Patterns Scale, Proportion, and Quantity Structure and Function	RST.6-8.1 RST.6-8.2 RST.6-8.4 RST.6-8.7 SL.8.1 WHST.6-8.2 WHST.6-8.9 6.SP.B.5 6.RP.A.1

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
[Clarification Statement: Emphasis is on conceptual understanding that changes in genetic material may result in making different proteins.] [Assessment Boundary: Assessment does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.]		Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations			
	Evolution: 3, 4, 5*	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Using Mathematics and Computational Thinking	MS-LS2.A MS-LS3.A MS-LS3.B MS-LS4.B MS-LS4.C	Cause and Effect Patterns Structure and Function	RST.6-8.2 RST.6-8.3 SL.8.1 SL.8.4 WHST.6-8.2 WHST.6-8.9 6.SP.B.5 6.RP.A.1
MS-LS3-2: Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. [Clarification Statement: Emphasis is on using models such as Punnett squares, diagrams, and simulations to describe the cause and effect relationship of gene transmission from parent(s) to	*Reproduction:* 1, 2, 3, 4, 5, 6, 8, 9*	Asking Questions and Defining Problems Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information	MS-LS1.B MS-LS3.A MS-LS3.B	Cause and Effect Connections to the Nature of Science Patterns Scale, Proportion, and Quantity Structure and Function	RST.6-8.1 RST.6-8.2 RST.6-8.4 RST.6-8.7 RST.6-8.9 SL.8.1 WHST.6-8.2 WHST.6-8.9 6.RP.A.1 6.SP.B.5

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
offspring and resulting genetic variation.]		Planning and Carrying Out Investigations Using Mathematics and Computational Thinking			
MS-LS4: Biological Evolution: Unity and Diversity					
MS-LS4-1: Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. [Clarification Statement: Emphasis is on finding patterns of changes in the level of complexity of anatomical structures in organisms and the chronological order of fossil appearance in the rock layers.] [Assessment Boundary: Assessment does not include the names of individual species or geological eras in the fossil record.]	*Evolution: 7, 8, 9, 10 11**	Analyzing and Interpreting Data Connections to the Nature of Science Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information	MS-ESS1.C MS-LS3.B MS-LS4.A MS-LS4.B MS-LS4.C	Cause and Effect Connections to Engineering, Technology, and Applications of Science Connections to the Nature of Science Patterns	RST.6-8.3 RST.6-8.7 RST.6-8.9 WHST.6-8.2 6.SP.B.5
MS-LS4-2: Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms	*Evolution:* 7, 8, 9, 10 11, 12*	Analyzing and Interpreting Data Connections to the Nature of Science Constructing Explanations and Designing Solutions	MS-ESS1.C MS-LS3.B MS-LS4.A MS-LS4.B MS-LS4.C	Cause and Effect Connections to Engineering, Technology, and Applications of Science Connections to the Nature of	RST.6-8.3 RST.6-8.7 RST.6-8.9 WHST.6-8.2 6.SP.B.5

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
to infer evolutionary relationships. [Clarification Statement: Emphasis is on explanations of the evolutionary relationships among organisms in terms of similarity or differences of the gross appearance of anatomical structures.]		Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information		Science Patterns	
MS-LS4-3: Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. [Clarification Statement: Emphasis is on inferring general patterns of relatedness among embryos of different organisms by comparing the macroscopic appearance of diagrams or pictures.] [Assessment Boundary: Assessment of comparisons is limited to gross appearance of anatomical structures in embryological development.]	*Evolution:* 12, 13*	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Engaging in Argument from Evidence	MS-ESS1.C MS-LS4.A	Connections to the Nature of Science Patterns	RST.6-8.7 6.SP.B.5
MS-LS4-4: Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and	*Evolution:* 1, 2, 3, 4*	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from	MS-LS2.A MS-LS3.B MS-LS4.B MS-LS4.C	Cause and Effect Patterns	RST.6-8.2 RST.6-8.3 WHST.6-8.2 WHST.6-8.9 6.RP.A.1 6.SP.B.5

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
reproducing in a specific environment. [Clarification Statement: Emphasis is on using simple probability statements and proportional reasoning to construct explanations.]		Evidence Using Mathematics and Computational Thinking			
MS-LS4-5: Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. [Clarification Statement: Emphasis is on synthesizing information from reliable sources about the influence of humans on genetic outcomes in artificial selection (such as genetic modification, animal husbandry, gene therapy); and, on the impacts these technologies have on society as well as the technologies leading to these scientific discoveries.]	*Evolution:* 14, 15, 16*	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information	MS-ESS3.C MS-LS4.A MS-LS4.B MS-LS4.C MS-LS4.D	Cause and Effect Connections to the Nature of Science: Science Addresses Questions About the Natural and Material World Connections to the Nature of Science: Scientific Knowledge Assumes an Order and Consistency in Natural Systems Patterns	RST.6-8.1 RST.6-8.7 WHST.6-8.2 WHST.6-8.8 WHST.6-8.9
MS-LS4-6: Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. [Clarification Statement: Emphasis is on using mathematical models, probability statements, and proportional reasoning to support explanations of	*Evolution:* 1, 2, 3, 4, 5, 6*	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Using Mathematics and	MS-LS2.A MS-LS3.A MS-LS3.B MS-LS4.B MS-LS4.C	Cause and Effect Patterns Structure and Function	RST.6-8.2 RST.6-8.3 SL.8.1 SL.8.4 WHST.6-8.2 WHST.6-8.9 6.RP.A.1 6.SP.B.5

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
trends in changes to populations over time.] [Assessment Boundary: Assessment does not include Hardy Weinberg calculations.]		Computational Thinking			

EARTH AND SPACE SCIENCE

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
MS-ESS1: Earth's Place in the Universe					
MS-ESS1-1: Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. [Clarification Statement: Examples of models can be physical, graphical, or conceptual.]	*Solar System and Beyond:* 2, 3, 4, 5*, 6, 7, 8, 9*	Analyze and Interpret Data Constructing Explanations and Designing Solutions Developing and Using Models	MS-ESS1.A MS-ESS1.B	Cause and Effect Connections to Engineering, Technology, and Applications of Science Connections to Nature of Science Patterns Scale, Proportion, and Quantity Systems and System Models	RST.6-8.2 WHST.6-8.2 SL.8.5 6.RP.A.1
MS-ESS1-2: Develop and use a model to describe the role of gravity in the motions	*Solar System and Beyond:*	Analyze and Interpret Data Connections to the Nature of Science	MS-ESS1.A MS-ESS1.B	Connections to Engineering, Technology, and Applications of Science	RST.6-8.1 WHST.6-8.2 WHST.6-8.9 SL.8.4

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
within galaxies and the solar system. [Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical (such as the analogy of distance along a football field or computer visualizations of elliptical orbits) or conceptual (such as mathematical proportions relative to the size of familiar objects such as students' school or state).] [Assessment Boundary: Assessment does not include Kepler's Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth.]	10, 11, 12, 14, 15, 16*	Developing and Using Models Using Mathematics and Computational Thinking		Connections to Nature of Science Patterns Scale, Proportion, and Quantity Systems and System Models	6.RP.A.1 6.RP.A.3 MP.2 MP.4
MS-ESS1-3: Analyze and interpret data to determine scale properties of objects in the solar system. [Clarification Statement: Emphasis is on the analysis of data from Earth-based instruments, space-based telescopes, and spacecraft to determine similarities and differences among solar system objects. Examples of scale properties include the sizes of an object's layers (such as crust and atmosphere), surface features (such as volcanoes), and orbital radius. Examples of data include statistical information, drawings and photographs, and models.] [Assessment Boundary: Assessment	*Solar System and Beyond:* 1, 10, 11, 12, 13*	Analyze and Interpret Data Developing and Using Models Using Mathematics and Computational Thinking	MS-ESS1.A MS-ESS1.B	Connections to Engineering, Technology, and Applications of Science Scale, Proportion, and Quantity Systems and System Models	WHST.6-8.2 SL.8.4 6.RP.A.1 6.RP.A.3 MP.2 MP.4

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
does not include recalling facts about properties of the planets and other solar system bodies.]					
MS-ESS1-4: Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6- billion-year-old history. [Clarification Statement: Emphasis is on how analyses of rock formations and the fossils they contain are used to establish relative ages of major events in Earth's history. Examples of Earth's major events could range from being very recent (such as the last Ice Age or the earliest fossils of homo sapiens) to very old (such as the formation of Earth or the earliest evidence of life). Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.] [Assessment Boundary: Assessment does not include recalling the names of specific periods or epochs and events within them.]	*Earth's Resources:* 9, 10, 11, 12*	Constructing Explanations and Designing Solutions Developing and Using Models Planning and Carrying Out Investigations Connections to the Nature of Science	MS-ESS1.C	Patterns Scale, Proportion, and Quantity Stability and Change	RST.6-8.3 WHST.6-8.1 WHST.6-8.9
MS-ESS2: Earth's Systems					
MS-ESS2-1: Develop a model to describe the cycling of		Analyze and Interpret Data Asking Questions and Defining Problems	MS-ESS1.C MS-ESS2.A MS-ESS2.B MS-ESS2.C MS-ESS3.A	Cause and Effect Connections to Engineering, Technology, and Applications	RST.6-8.2 RST.6-8.3 RST.6-8.4 WHST.6-8.1 WHST.6-8.2

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
Earth's materials and the flow of energy that drives this process. [Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth's materials.] [Assessment Boundary: Assessment does not include the identification and naming of minerals.]	*Geological Processes:* 2, 5, 8, 9, 10, 11, 13, 14, 15*	Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	MS-ESS3.B	of Science Connections to the Nature of Science Energy and Matter Patterns Scale, Proportion, and Quantity Stability and Change Structure and Function Systems and System Models	SL.8.1 6.RP.A.1 MP.2
MS-ESS2-2: Construct an explanation based on	*Geological Processes:*	Analyze and Interpret Data Asking Questions and Defining Problems Connections to the Nature of Science Constructing Explanations and Designing Solutions	MS-ESS1.C MS-ESS2.A MS-ESS2.B MS-ESS2.C MS-ESS3.A MS-ESS3.B	Cause and Effect Connections to Engineering, Technology, and Applications of Science Connections to the Nature of Science Energy and Matter	RST.6-8.1 RST.6-8.2 RST.6-8.3 WHST.6-8.1 WHST.6-8.2 WHST.6-8.9 SL.8.1 6.RP.A.1 6. NS.C.5 7. RP.A.2

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. [Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.]	2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13*	Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations Using Mathematics and Computational Thinking		Patterns Scale, Proportion, and Quantity Stability and Change Structure and Function Systems and System Models	MP.4
	Land, Water, and Human Interactions: *3,* 4, 6, 7, 8, 10, 11, 12, 13, 14*	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out	MS-ETS1.A MS-ETS1.B MS-ESS2.A MS-ESS2.C MS-ESS3.C MS-LS2.A MS-LS2.C	Cause and Effect Connections to Engineering, Technology, and Applications of Science Energy and Matter Patterns Scale, Proportion, and Quantity Stability and Change	RST.6-8.1 RST.6-8.3 RST.6-8.9 WHST.6-8.2 WHST.6-8.9 6.RP.A.1 6.SP.B.5 MP.2 MP.4

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Investigations			
MS-ESS2-3: Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. [Clarification Statement: Examples of data include similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches).] [Assessment Boundary: Paleomagnetic anomalies in oceanic and continental crust are not assessed.]	*Geological Processes:* 10, 11, 12, 13, 14*	Analyze and Interpret Data Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Planning and Carrying Out Investigations Obtaining, Evaluating, and Communicating Information	MS-ESS1.C MS-ESS2.A MS-ESS2.B MS-ESS3.B	Cause and Effect Connections to the Nature of Science Patterns Scale, Proportion, and Quantity Stability and Change System and System Models	RST.6-8.2 WHST.6-8.1 WHST.6-8.2 SL.8.1 6.RP.A.1 7.RP.A.2 MP.2
MS-ESS2-4: Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. [Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.] [Assessment Boundary: A quantitative understanding of the	*Land, Water, and Human Interactions:* 2, 5, 7, 8, 9*	Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Developing and Using Models Planning and Carrying Out Investigations	MS-ETS1.A MS-ESS2.A MS-ESS2.C MS-ESS3.C MS-PS2.A	Cause and Effect Connections to Engineering, Technology, and Applications of Science Energy and Matter Scale, Proportion, and Quantity Stability and Change	RST.6-8.1 RST.6-8.3 RST.6-8.9 WHST.6-8.2

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
latent heats of vaporization and fusion is not assessed.]					
MS-ESS2-5: Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. [Clarification Statement: Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather (defined by temperature, pressure, humidity, precipitation, and wind) at a fixed location to change over time, and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within probabilistic ranges. Examples of data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through laboratory experiments (such as with condensation).] [Assessment Boundary: Assessment does not include recalling the names of cloud types or weather symbols used on weather maps or the reported diagrams from weather stations.]	*Weather and Climate:* 2, 3, 7, 9, 10, 11, 12, 13*	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Planning and Carrying Out Investigations	MS-ETS1.B MS-ETS1.C MS-ESS2.C MS-ESS2.D MS-ESS3.D MS-LS4.C	Cause and Effect Connections to Engineering, Technology, and Applications of Science Connections to the Nature of Science Energy and Matter Patterns Structure and Function System and System Models	RST.6-8.3 RST.6-8.7 RST.6-8.9 WHST.6-8.7 SL.8.1 SL.8.4 MP.2
MS-ESS2-6: Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine	*Weather and*	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to the Nature of	MS-ESS2.C MS-ESS2.D MS-ESS3.D MS-LS4.C MS-PS3.B	Cause and Effect Connections to Engineering, Technology, and Applications of Science	RST.6-8.3 RST.6-8.7 WHST.6-8.7 SL.8.1 SL.8.4

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
regional climates. [Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.] [Assessment Boundary: Assessment does not include the dynamics of the Coriolis effect.]	*Climate:* 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14*	Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Planning and Carrying Out Investigations		Connections to the Nature of Science Energy and Matter Patterns Systems and System Models	MP.2
MS-ESS3: Earth and Human Activity					
MS-ESS3-1: Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience	*Geological Processes:* 2, 16*, 17*	Analyzing and Interpreting Data Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations	MS-ESS2.A MS-ESS2.C MS-ESS3.A	Cause and Effect Connections to Engineering, Technology, and Applications of Science Connections to the Nature of Science Patterns Scale, Proportion, and Quantity Structure and Function	RST.6-8.2 RST.6-8.3 WHST.6-8.1 WHST.6-8.7 SL.8.1

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
processes. [Clarification Statement: Emphasis is on how these resources are limited and typically non-renewable, and how their distributions are significantly changing as a result of removal by humans. Examples of uneven distributions of resources as a result of past processes include but are not limited to petroleum (locations of the burial of organic marine sediments and subsequent geologic traps), metal ores (locations of past volcanic and hydrothermal activity associated with subduction zones), and soil (locations of active weathering and/or deposition of rock).]				Systems and System Models	
	Earth's Resources: 1, 2, 3, 5, 7, 8, 14*	Analyzing and Interpreting Data Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information	MS-ESS3.A MS-ESS3.C	Cause and Effect Connections to Engineering, Technology, and Applications of Science Connections to the Nature of Science Scale, Proportion, and Quantity Stability and Change Structure and Function	RST.6-8.1 RST.6-8.3 WHST.6-8.1 WHST.6-8.2 WHST.6-8.9 7.RP.A.2
MS-ESS3-2: Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. [Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards can be taken from interior processes (such as earthquakes and	*Geological Processes:* 1, 3, 4, 6, 7, 8, 11, 18*	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence	MS-ESS1.C MS-ESS2.A MS-ESS2.C MS-ESS3.B	Cause and Effect Connections to Engineering, Technology, and Applications of Science Connections to the Nature of Science Patterns Scale, Proportion, and Quantity Stability and Change	RST.6-8.1 RST.6-8.2 RST.6-8.3 RST.6-8.4 WHST.6-8.1 WHST.6-8.2 WHST.6-8.9 SL.8.1 6.NS.C.5 MP.2 MP.4

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
volcanic eruptions), surface processes (such as mass wasting and tsunamis), or severe weather events (such as hurricanes, tornadoes, and floods). Examples of data can include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies can be global (such as satellite systems to monitor hurricanes or forest fires) or local (such as building basements in tornado-prone regions or reservoirs to mitigate droughts).]		Obtaining, Evaluating, and Communicating Information Using Mathematics and Computational Thinking		Structure and Function Systems and System Models	
MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. [Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).]	*Land, Water, and Human Interactions:* 1, 3, 4, 5, 6, 9, 13, 14, 15, 16*	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations	MS-ESS2.A MS-ESS2.C MS-ESS3.C MS-LS2.A MS-LS2.C	Cause and Effect Connections to Engineering, Technology, and Applications of Science Connections to the Nature of Science Energy and Matter Patterns Scale, Proportion, and Quantity Stability and Change	RST.6-8.1 RST.6-8.3 RST.6-8.9 WHST.6-8.2 WHST.6-8.9 SL.8.4 6.RP.A.1 6.SP.B.5 MP.4
MS-ESS3-4: Construct an argument supported by		Constructing Explanations and Designing Solutions	MS-ESS3.A MS-ESS3.C	Cause and Effect	RST.6-8.1 RST.6-8.3

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. [Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.]	*Earth's Resources:* 2, 4, 6, 13*	Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information		Connections to Engineering, Technology, and Applications of Science Connections to the Nature of Science Systems and System Models	WHST.6-8.1 WHST.6-8.9 6.SP.B.5 7.RP.A.2
	Evolution: 14	Analyzing and Interpreting Data Engaging in Argument from Evidence	MS-ESS3.C MS.LS4.A MS.LS4.B MS.LS4.D	Cause and Effect Connections to the Nature of Science Patterns	RST.6-8.7 WHST.6-8.9
MS-ESS3-5: Ask questions to clarify evidence of the factors that have caused climate change over the past century. [Clarification Statement: Examples of factors include human activities (such as fossil fuel combustion, cement production, and agricultural activity) and natural processes (such as changes in incoming solar radiation or volcanic activity). Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane, and the rates of human activities.	*Weather and Climate:* 1, 10, 14, 15, 16*	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to the Nature of Science Developing and Using Models Planning and Carrying Out Investigations	MS-ESS2.C MS-ESS2.D MS-ESS3.C MS-ESS3.D	Connections to the Nature of Science Energy and Matter Scale, Proportion, and Quantity Stability and Change Systems and System Models	RST.6-8.7 WHST.6-8.1 SL.8.1 MP.4

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
Emphasis is on the major role that human activities play in causing the rise in global temperatures.]					

ENGINEERING, TECHNOLOGY, AND APPLICATIONS OF SCIENCE

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
MS-ETS1: Engineering Design					
	Biomedical Engineering: 1, 2, 3*	Asking Questions and Defining Problems	MS-ETS1.A MS-ETS1.B MS-ETS1.C	Structure and Function Interdependence of Science, Engineering, and Technology Influence of Science, Engineering, and Technology on Society and the Natural World	RST.6-8.1 RST.6-8.2 RST.6-8.9
	Force and Motion: 1, 10, 11, 13, 14, 15*	Analyzing and Interpreting Data Asking Questions and Defining Problems Constructing Explanations and Designing Solutions	MS-ETS1.A MS-PS2.A MS-PS3.A MS-PS3.C	Cause and Effect Connections to Engineering, Technology, and Applications of Science Patterns	RST.6-8.1 RST.6-8.3 RST.6-8.7 MP.2

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
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.		Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations		Stability and Change Systems and System Models	
	*Fields and Interactions: 2, 3, 6**	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to Nature of Science Developing and Using Models Engaging in Argument from Evidence	MS-ETS1.A MS-ETS1.B MS-ETS1.C MS-PS3.A MS-PS2.B	Connections to Nature of Science: Influence of Science, Engineering, and Technology on Society and the Natural World Systems and System Models	RST.6-8.1 RST.6-8.7 SL8.5 MP.2
	Land, Water, and Human Interactions: 7, 12*	Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Developing and Using Models	MS-ETS1.A MS-ETS2.A MS-ETS2.C	Connections to Engineering, Technology, and Applications of Science Energy and Matter Scale, Proportion, and Quantity Stability and Change	RST.6-8.3

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
MS-ETS1-2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	*Biomedical Engineering:* 4, 5, 7*	Analyzing and Interpreting Data Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Using Mathematics and Computational Thinking	MS-ETS1.B MS-ETS1.C MS-LS1.A	Connections to Engineering, Technology, and Applications of Science Structure and Function	SL.8.4 6.RP.A.1 6.RP.A.3 MP.2
	Fields and Interactions: 6, 13, 15	Analyzing and Interpreting Data Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence	MS-PS2.B MS-PS3.A MS-ETS1.A MS-ETS1.B MS-ETS1.C	Cause and Effect Connections to Nature of Science Systems and System Models	RST.6-8.1 RST.6-8.7 SL.8.5 WHST.6-8.9 MP.2
	*Land, Water, and Human Interactions: 12, 16**	Constructing Explanations and Designing Solutions Engaging in Argument from Evidence	MS-ESS2.C MS-ESS3.C MS-ETS1.B	Cause and Effect Connections to Nature of Science	WHST.6-8.2 SL.8.4
	Biomedical Engineering:	Analyzing and Interpreting Data	MS-ETS1.A MS-ETS1.B	Connections to Engineering, Technology, and Applications	SL.8.4

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
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.	*1, 2, 4, 5**	Asking Questions and Defining Problems Developing and Using Models Constructing Explanations and Designing Solutions Using Mathematics and Computational Thinking	MS-ETS1.C MS-LS1.A	of Science Structure and Function	6.RP.A.1 6.RP.A.3 MP.2
	Chemical Reactions: 8, 9, 10, 11	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions	MS-ETS1.B MS-ETS1.C MS-PS1.B MS-PS3.A	Energy and Matter	RST.6-8.3
	*Weather and Climate: 12**	Analyzing and Interpreting Data Developing and Using Models Engaging in Argument from Evidence Planning and Carrying Out Investigations	MS-ETS1.B MS-ESS1.C MS-ESS2.C	Connections to Engineering, Technology and Applications of Science Structure and Function	RST.6-8.3 SL.8.1 SL.8.4
	*Fields and Interactions: 6, 11, 13, 15**	Analyzing and Interpreting Data Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Developing and Using Models	MS-ETS1.A MS-ETS1.B MS-ETS1.C MS-PS3.A MS-PS3.C MS-PS2.B	Cause and Effect Connections to Nature of Science Scale, Proportion, and Quantity Systems and System Models	RST.6-8.1 RST.6-8.7 SL8.5 WHST.6-8.9 MP.2

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Engaging in Argument from Evidence			
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.	*Biomedical Engineering:* 2, 4, 5, 8, 9*	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Using Mathematics and Computational Thinking	MS-ETS1.A MS-ETS1.B MS-ETS1.C MS-LS1.A	Connections to Engineering, Technology, and Applications of Science Structure and Function	SL.8.4 6.RP.A.1 6.RP.A.3 MP.2
	Chemical Reactions: 8, 9, 10, 11	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions	MS-PS1.B MS-PS3.A MS-ETS1.B MS-ETS1.C	Energy and Matter	RST.6-8.3
	Weather and Climate: 12*	Developing and Using Models Engaging in Argument from Evidence Planning and Conducting Investigations	MS-ETS1.B MS-ESS1.C MS-ESS2.C	Connections to Engineering, Technology and Applications of Science Structure and Function	RST.6-8.3 SL.8.1 SL.8.4
	Fields and Interactions:	Asking Questions and Defining Problems	MS-ETS1.A MS-ETS1.B	Cause and Effect	RST.6-8.1 RST.6-8.7

Performance Expectation	SEPUP Unit and Activity	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
	1, 2, 3, 6, 11, 13*	Analyzing and Interpreting Data Connections to Nature of Science: Scientific Knowledge Is Based on Empirical Evidence Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence	MS-ETS1.C MS-PS2.B MS-PS3.A MS-PS3.B MS-PS3.C	Connections to Nature of Science: Influence of Science, Engineering, and Technology on Society and the Natural World Scale, Proportion, and Quantity Systems and System Models	SL8.5 MP.2