Lab-Aids Correlations for

OREGON SCIENCE STANDARDS (NGSS)

MIDDLE SCHOOL – GRADES 6-8

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This document is intended to show how the SEPUP 3rd edition materials align with the *Oregon Department of Education 2014 Oregon Science Standards (NGSS).*[1]

ABOUT OUR PROGRAMS
Lab-Aids has based 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 www.lab-aids.com and navigate to the program of interest.

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 units, each taking 3-8 weeks to complete, as listed below.

Middle Level, Grades 6-8

Grade 6	Grade 7	Grade 8
From Cells to Organisms	Chemistry of Materials	Force and Motion
Body Systems	Ecology	Solar System and Beyond
Weather and Climate	Biomedical Engineering	Fields and Interactions
Energy	Geological Processes	Evolution
Reproduction	Chemical Reactions	Earth's Resources
Land, Water, and Human Interactions	From Cells to Organisms	Waves

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[1] https://www.oregon.gov/ode/educator-resources/standards/science/Pages/Science-Standards.aspx

ABOUT THE LAB-AIDS CITATIONS

Citations included in the correlation document are as follows:	

SEPUP Unit title   *The Chemistry of Materials*
Activity Number   2, 12, 14*

* indicates where Performance Expectation is assessed

NGSS Performance Expectations	MS-PS1-2
Science and Engineering Practices	Planning and Carrying Out Investigations
Crosscutting Concepts	Structure and Function
Disciplinary Core Ideas	MS-PS1.A
Common Core English-Language Arts	RST.6-8.3
Common Core Mathematics	MP.2

GRADE 6

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
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.	*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 Communicating Information Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	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 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-LS1-2: 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.	*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	MS-LS1.A	Connections to Engineering, Technology, and Applications of Science Connections to the Nature of Science 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 Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations		Structure and Function Systems and System Models	
MS-LS1-3: Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.	*From Cells to Organisms*: 10, 14, 15	Analyzing and Interpret Data Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Using Mathematics and Computational Thinking	MS-LS1.A	Cause and Effect Connections to Engineering, Technology, and Applications of Science Connections to the Nature of Science Patterns Scale, Proportion, and Quantity	RST.6-8.2 RST.6-8.3 RST.6-8.7 RST.6-8.9 WHST.6-8.9
	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	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

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Planning and Carrying Out Investigations Using Mathematics and Computational Thinking			
MS-LS1-4: Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.	*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 6.SP.B.5
MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	*Reproduction:* 1, 7*	Asking Questions and Defining Problems Obtaining, Evaluating, and Communicating Information	MS-LS3.A MS-LS1.B	Cause and Effect Connections to the Nature of Science Structure and Function	RST.6-8.2 SL.8.1 WHST.6-8.9 6.RP.A.1 6.SP.B.5
MS-LS1-8: Gather and synthesize information that	*Body Systems:* 6, 7, 8*	Analyzing and Interpreting Data Obtaining, Evaluating, and	MS-LS1.D	Cause and Effect	RST.6-8.4 6.SP.B.4

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.		Communicating Information Planning and Carrying Out an Investigation			
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.	*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 Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	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 Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
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.	*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
MS-ESS2-5: Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.	*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	*Weather and Climate:* 2, 3, 4, 5, 6,	Analyzing and Interpreting Data Asking Questions and Defining Problems	MS-ESS2.C MS-ESS2.D	Cause and Effect Connections to Engineering, Technology, and Applications of	RST.6-8.3 RST.6-8.7 WHST.6-8.7 SL.8.1

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	7, 8, 9, 10, 11, 13, 14*	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-ESS3.D MS-LS4.C MS-PS3.B	Science Connections to the Nature of Science Energy and Matter Patterns Systems and System Models	SL.8.4 MP.2
MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	*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

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
MS-ESS3-5: Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.	*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
MS-PS3-3: Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.	*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	*Energy:* 1, 4, 6, 7, 8*	Analyzing and Interpreting Data Connections to the Nature of Science Constructing Explanations and	MS-PS3.A MS-PS3.B MS-PS3.C	Cause and Effect Energy and Matter Patterns Scale, Proportion, and Quantity	RST.6-8.3 WHST.6-8.1 WHST.6-8.9

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.		Designing Solutions Engaging in Argument from Evidence Planning and Carrying Out Investigations		Systems and System Models	EE.6.C.9 MP.2
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.	*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-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into	*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

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	*Force and Motion*: 1, 10, 11, 13, 14, 15*	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 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 Patterns Stability and Change Systems and System Models	RST.6-8.1 RST.6-8.3 RST.6-8.7 MP.2
	*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	MS-ETS1.A MS-ETS2.A MS-ETS2.C	Connections to Engineering, Technology, and Applications of Science Energy and Matter	RST.6-8.3

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Developing and Using Models		Scale, Proportion, and Quantity Stability and Change	
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:	Constructing Explanations and Designing Solutions	MS-ESS2.C MS-ESS3.C MS-ETS1.B	Cause and Effect Connections to Nature of	WHST.6-8.2 SL.8.4

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
	12, 16*	Engaging in Argument from Evidence		Science	
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.	*Biomedical Engineering: 1, 2, 4, 5**	Analyzing and Interpreting Data Asking Questions and Defining Problems Developing and Using Models Constructing Explanations and Designing Solutions 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-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	MS-ETS1.A MS-ETS1.B MS-ETS1.C MS-PS3.A MS-PS3.C	Cause and Effect Connections to Nature of Science	RST.6-8.1 RST.6-8.7 SL8.5 WHST.6-8.9

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence	MS-PS2.B	Scale, Proportion, and Quantity Systems and System Models	MP.2
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

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
	Fields and Interactions: 1, 2, 3, 6, 11, 13*	Asking Questions and Defining Problems 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.A MS-ETS1.B MS-ETS1.C MS-PS2.B MS-PS3.A MS-PS3.B MS-PS3.C	Cause and Effect 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	RST.6-8.1 RST.6-8.7 SL8.5 MP.2

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
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.	*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 rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.	*From Cells to Organisms*: 5, 11*	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Developing and Using Models Planning and Carrying Out an Investigation	MS-LS1.A MS-LS1.C MS-PS3.D	Energy and Matter	RST.6-8.2 RST.6-8.3 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-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an	*Ecology:* 5, 6, 9*	Analyzing and Interpret Data Connections to the Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models	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.6-8.7 RST.6-8.8 SL.8.4 SL.8.5 WHST.6-8.1 WHST.6-

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
ecosystem.		Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations			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.	*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 Investigations	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
	From Cells to Organisms: 13	Analyzing and Interpreting Data Constructing Explanations and	MS-LS1.C MS-PS3.D	Energy and Matter	RST.6-8.3

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Designing Solutions Planning and Carrying Out Investigations			
MS-LS2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	*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 for maintaining biodiversity and ecosystem services.	*Ecology:* 2, 4, 15*	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to the Nature of Science Constructing Explanations and Designing Solutions Engaging in Argument from Evidence	MS-ETS1.B MS-LS2.C MS-LS4.D	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.6-8.8 SL.8.5 WHST.6-8.1 WHST.6-8.9 6.SP.B.5

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations Using Mathematics and Computational Thinking			
MS-ESS2-1: Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	*Geological Processes:* 2, 5, 8, 9, 10, 11, 13, 14, 15*	Analyze 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-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 Patterns Scale, Proportion, and Quantity Stability and Change Structure and Function Systems and System Models	RST.6-8.2 RST.6-8.3 RST.6-8.4 WHST.6-8.1 WHST.6-8.2 SL.8.1 6.RP.A.1 MP.2

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
MS-ESS2-2: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	*Geological Processes:* 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13*	Analyze 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-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 Patterns Scale, Proportion, and Quantity Stability and Change Structure and Function Systems and System Models	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 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	MS-ETS1.A MS-ETS1.B MS-ESS2.A MS-ESS2.C MS-ESS3.C MS-LS2.A	Cause and Effect Connections to Engineering, Technology, and Applications of Science Energy and Matter Patterns Scale, Proportion, and	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

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations	MS-LS2.C	Quantity Stability and Change	MP.4
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.	*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-ESS3-1: Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and	*Geological Processes:* 2, 16*, 17*	Analyzing and Interpreting Data Connections to the Nature of Science Constructing Explanations and Designing Solutions	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	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 Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
groundwater resources are the result of past and current geoscience processes.		Developing and Using Models Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations		Science Patterns Scale, Proportion, and Quantity Structure and Function 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.	*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	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	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

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Using Mathematics and Computational Thinking		Scale, Proportion, and Quantity Stability and Change Structure and Function Systems and System Models	6.NS.C.5 MP.2 MP.4
MS-PS1-1: Develop models to describe the atomic composition of simple molecules and extended structures.	*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 determine if a chemical reaction has occurred.	*Chemical Reactions:* 1, 2, 3, 4, 5*	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	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 WHST.6-8.9
	Chemistry of Materials:	Analyzing and Interpreting Data Planning and Carrying Out Investigations	MS-PS1.A	Scale, Proportion, and Quantity Structure and Function	7.RP.A.2

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
	4	Using Mathematics and Computational Thinking			
MS-PS1-3: Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.	*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 pure substance when thermal energy is added or removed.	*Chemistry of Materials:* 8, 9, 10*	Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Planning and Carrying Out Investigations	MS-PS1.A MS-PS3.A	Cause and Effect	RST.6-8.3
MS-PS1-5: Develop and use a model to describe how the total number of atoms does not change in a	*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	MS-PS1.A MS-PS1.B	Energy and Matter Patterns Scale, Proportion, and Quantity Structure and Function Systems	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-

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
chemical reaction and thus mass is conserved.		Communicating Information Planning and Carrying Out Investigations		and System Models	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 Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations	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
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.	*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 Developing and Using Models	MS-ETS1.A MS-PS2.A MS-PS3.A MS-PS3.C	Cause and Effect Connections to Engineering, Technology, and Applications of Science Patterns Stability and Change	RST.6-8.1 RST.6-8.3 RST.6-8.7 MP.2

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations		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
MS-ETS1-2: Evaluate competing design solutions using a systematic process to determine how well	*Biomedical Engineering: 4, 5, 7**	Analyzing and Interpreting Data Asking Questions and Defining Problems	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

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
they meet the criteria and constraints of the problem.		Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Using Mathematics and Computational Thinking			
	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
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	*Biomedical Engineering: 1, 2, 4, 5**	Analyzing and Interpreting Data Asking Questions and Defining Problems Developing and Using Models Constructing Explanations and	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

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
combined into a new solution to better meet the criteria for success.		Designing Solutions Using Mathematics and Computational Thinking			
	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 Engaging in Argument from Evidence	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
MS-ETS1-4: Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an	*Biomedical Engineering: 2, 4, 5, 8, 9**	Analyzing and Interpreting Data Asking Questions and Defining Problems Connections to the Nature of Science	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

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
optimal design can be achieved.		Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence Using Mathematics and Computational Thinking			
	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: 1, 2, 3, 6, 11, 13*	Asking Questions and Defining Problems 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	MS-ETS1.A MS-ETS1.B MS-ETS1.C MS-PS2.B MS-PS3.A MS-PS3.B MS-PS3.C	Cause and Effect 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	RST.6-8.1 RST.6-8.7 SL8.5 MP.2

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Engaging in Argument from Evidence			

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
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 Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations	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
	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-LS4-1: Analyze and interpret data for	*Evolution:* 7, 8, 9, 10 11*	Analyzing and Interpreting Data	MS-ESS1.C MS-LS3.B	Cause and Effect	RST.6-8.3 RST.6-8.7

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
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.		Connections to the Nature of Science Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information	MS-LS4.A MS-LS4.B MS-LS4.C	Connections to Engineering, Technology, and Applications of Science Connections to the Nature of Science Patterns	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 to infer evolutionary relationships.	*Evolution:* 7, 8, 9, 10 11, 12*	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-LS4-3: 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.	*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

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
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 reproducing in a specific environment.	*Evolution:* 1, 2, 3, 4*	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.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
MS-LS4-5: Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.	*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	*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	MS-LS2.A MS-LS3.A MS-LS3.B MS-LS4.B MS-	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

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
traits in populations over time.		Using Mathematics and Computational Thinking	LS4.C		6.RP.A.1 6.SP.B.5
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.	*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 within galaxies and the solar system.	*Solar System and Beyond:* 10, 11, 12, 14, 15, 16*	Analyze and Interpret Data Connections to the Nature of Science Developing and Using Models Using Mathematics and Computational Thinking	MS-ESS1.A MS-ESS1.B	Connections to Engineering, Technology, and Applications of Science Connections to Nature of Science Patterns Scale, Proportion, and Quantity Systems and System Models	RST.6-8.1 WHST.6-8.2 WHST.6-8.9 SL.8.4 6.RP.A.1 6.RP.A.3 MP.2 MP.4

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
MS-ESS1-3: Analyze and interpret data to determine scale properties of objects in the solar system.	*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
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.	*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-ESS3-4: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.	*Earth's Resources:* 2, 4, 6, 13*	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 Systems and System Models	RST.6-8.1 RST.6-8.3 WHST.6-8.1 WHST.6-8.9 6.SP.B.5 7.RP.A.2
	Evolution: 14	Analyzing and Interpreting Data	MS-ESS3.C MS.LS4.A	Cause and Effect Connections to the Nature of	RST.6-8.7 WHST.6-8.9

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Engaging in Argument from Evidence	MS.LS4.B MS.LS4.D	Science Patterns	
MS-PS2-1: Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.	*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 Constructing Explanations and Designing Solutions Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	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 Quantity Stability and Change	RST.6-8.1 RST.6-8.2 RST.6-8.3 RST.6-8.7 6.RP.AP.2 6. SP.B.5 7. EE.B.4 7.RP.A.2 MP.2
MS-PS2-3: Ask questions about data to determine the	*Fields and Interactions:* 7, 8, 9, 12,	Asking Questions and Defining Problems	MS-PS2.B MS-ETS1.B	Cause and Effect Patterns	RST.6-8.1 RST.6-8.3 WHST.6-

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
factors that affect the strength of electric and magnetic forces.	13*, 14	Developing and Using Models Engaging in Argument from Evidence Connections to the Nature of Science Planning and Carrying Out Investigations		Systems and System Models	8.7 MP.2
MS-PS2-4: Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	*Fields and Interactions:* 3, 4, 7*	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-PS3.C MS-ETS1.A MS-ETS1.B	Connections to Nature of Science Patterns Systems and System Models	RST.6.8.1 WHST.6-8.1 SL.8.5 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.	*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	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

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Planning and Carrying Out Investigations			
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.	*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.	*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 of	RST.6-8.7

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
		Communicating Information		Science	
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 energy in a wave.	*Waves:* 1, 2, 3, 7*	Analyzing and Interpreting Data Developing and Using Models Obtaining, Evaluating, and Communicating Information Using Mathematics and Computational Thinking	MS-PS4.A	Connections to Engineering, Technology, and Applications of Science Patterns Structure and Function	RST.6-8.1￼ RST.6-8.3￼ RST.6-8.9￼ 6.RP.A.1￼ 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.	*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	*Waves:* 5, 6	Asking Questions and Defining Problems Connections to Engineering, Technology, and Applications of Science	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 Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
information than analog signals.		Structure and Function Developing and Using Models Obtaining, Evaluating, and Communicating Information			
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.	*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 Developing and Using Models Engaging in Argument from Evidence 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 Patterns Stability and Change Systems and System Models	RST.6-8.1 RST.6-8.3 RST.6-8.7 MP.2
	Fields and Interactions:	Analyzing and Interpreting Data	MS-ETS1.A MS-ETS1.B	Connections to Nature of Science: Influence of Science,	RST.6-8.1 RST.6-8.7

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
	2, 3, 6*	Asking Questions and Defining Problems Connections to Nature of Science Developing and Using Models Engaging in Argument from Evidence	MS-ETS1.C MS-PS3.A MS-PS2.B	Engineering, and Technology on Society and the Natural World Systems and System Models	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
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:	Analyzing and Interpreting Data	MS-PS2.B MS-PS3.A	Cause and Effect	RST.6-8.1 RST.6-8.7

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
	6, 13, 15	Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Developing and Using Models Engaging in Argument from Evidence	MS-ETS1.A MS-ETS1.B MS-ETS1.C	Connections to Nature of Science Systems and System Models	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
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.	*Biomedical Engineering: 1, 2, 4, 5**	Analyzing and Interpreting Data Asking Questions and Defining Problems Developing and Using Models Constructing Explanations and Designing Solutions 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-ETS1.B MS-ETS1.C MS-PS1.B MS-PS3.A	Energy and Matter	RST.6-8.3
	Weather and Climate:	Analyzing and Interpreting Data	MS-ETS1.B MS-ESS1.C	Connections to Engineering, Technology and Applications of	RST.6-8.3 SL.8.1

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
	12*	Developing and Using Models Engaging in Argument from Evidence Planning and Carrying Out Investigations	MS-ESS2.C	Science Structure and Function	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 Engaging in Argument from Evidence	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
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

Performance Expectation	SEPUP Unit and Activity Number	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	Common Core ELA/Math
	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: 1, 2, 3, 6, 11, 13*	Asking Questions and Defining Problems 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.A MS-ETS1.B MS-ETS1.C MS-PS2.B MS-PS3.A MS-PS3.B MS-PS3.C	Cause and Effect 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	RST.6-8.1 RST.6-8.7 SL8.5 MP.2