LAB-AIDS Correlations for

MASSACHUSETTS SCIENCE AND TECHNOLOGY/ENGINEERING STANDARDS

MIDDLE LEVEL, GRADE 6-8[1]

Oralia Gil, Curriculum Specialist, LAB-AIDS
Mark Koker, Ph D, Director of Curriculum &Professional Development, LAB-AIDS

This document is intended to show how our SEPUP curriculum products align with the *Massachusetts Science and Technology/Engineering Standards (2013 Draft)*[2]. It is derived from our original alignment document that shows how our SEPUP curriculum products align with the *Next Generation Science Standards*[3] and Common Core documents. SEPUP project staff provided information that was very helpful in our production of this document, but LAB-AIDS takes sole responsibility for its content and final appearance.

Based on the Massachusetts draft document, a suggested scope and sequence for implementation of our SEPUP curriculum products is provided for grades 6-8 and compiled by Rachel Porter, Sales Team Leader. This is to assist districts considering a multi-year transition plan[4] for implementation of the new standards and curriculum adjustments until standards are finalized.

ABOUT OUR PROGRAMS

LAB-AIDS Core Science Programs are developed to support current knowledge on the teaching and learning of science. All materials 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 from using the programs. All programs have extensive support for technology in the school science classrooms, 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-

[1] This document was first posted January, 2015
[2] http://www.doe.mass.edu/stem/standards/StandardsDraft.pdf
[3] http://www.nextgenscience.org/next-generation-science-standards
[4] http://www.doe.mass.edu/stem/standards/faq.html

AIDS, Inc. Development of SEPUP materials is supported by grants from the National Science Foundation. SEPUP programs are available as full year courses, or separately, as units, each taking 3-9 weeks to complete, as listed below.

Middle Level, Grades 6-8

Issues and Earth Science, Second Edition (IAES)

Unit Title	**Activity Number**
Studying Soil Scientifically	1-11
Rocks and Minerals	12-23
Erosion and Deposition	24-35
Plate Tectonics	36-49
Weather and Atmosphere	50-70
The Earth in Space	71-84
Exploring Space	85-98

Issues and Life Science, Second Edition (IALS)

Unit Title	**Activity Number**
Experimental Design: Studying People Scientifically	1-10
Body Works	11-29
Cell Biology and Disease	30-53
Genetics	54-71
Ecology	72-88
Evolution	89-101
Bioengineering	102-109

Issues and Physical Science, Second Edition (IAPS)

Unit Title	**Activity Number**
Studying Materials Scientifically	1-11
The Chemistry of Materials	12-29
Water	30-52
Energy	53-72
Force and Motion	73-88
Waves	89-99

Each of the full year programs begins with a "starter" unit sequence on the scientific method in the context of each particular discipline. For example, the Issues and Life Science (IALS) course contains a ten- activity unit called "Experimental Design: Studying People Scientifically," which uses the science behind clinical trials on human subjects, to frame the study of the life sciences. These are listed first in each course.

A Massachusetts sequence for grade six has been recommended and located on page 5.

ABOUT THE NEXT GENERATION SCIENCE STANDARDS

The National Academy of Sciences, Achieve, the American Association for the Advancement of Science, and the National Science Teachers Association have collaborated over several years to develop the *Next Generation Science Standards* (NGSS). The first step of the process was led by The National Academies of

Science, a non-governmental organization commissioned in 1863 to advise the nation on scientific and engineering issues. On July 19, 2011, the National Research Council (NRC), the functional staffing arm of the National Academy of Sciences, released the *Framework for K-12 Science Education*.

The *Framework* was a critical first step because it is grounded in the most current research on science and science learning and it identifies the science all K–12 students should know. The second step in the process was the development of standards grounded in the NRC Framework. A group of 26 lead states and writers, in a process managed by Achieve, has been working since the release of the Framework to develop K-12 *Next Generation Science Standards*. The *Standards* have undergone numerous lead states and all state reviews as well as two public comment periods, the most recent of these in January, 2013. The final release of the Standards coincided with the National Conference of the National Science Teachers Association Annual Conference in San Antonio, TX, the week of April 8, 2013.

The *Next Generation Science Standards* (NGSS) provide an important opportunity to improve not only science education but also student achievement. Based on the *Framework for K–12 Science Education*, the NGSS are intended to reflect a new vision for American science education. *The Next Generation Science Standards* are student performance expectations – NOT curriculum. Even though within each performance expectation Science and Engineering Practices (SEP) are partnered with a particular Disciplinary Core Idea (DCI) and Crosscutting Concept (CC) in the NGSS, these intersections do not predetermine how the three are linked in curriculum, units, or lessons. Performance expectations simply clarify the expectations of what students will know and be able to do be the end of the grade or grade band.

As the reader knows, the *Standards* represent content from several domains: (1) science and engineering practices; (2) cross-cutting concepts; (3) the disciplines of life, earth, and physical science, as set forth in the *Next Generation Science Framework* (NRC, 2012). The Standards themselves are written as performance indicators, and content from the Common Core (http://www.corestandards.org/) is included. The following middle level standard from the life sciences is used to show the basic structure. Standards, as performance indicators, are in the white box on top, and the relevant Practices, Disciplinary Core Ideas, and Crosscutting Concepts are listed below in the blue, orange, and green boxes, respectively. Clarification Statements, in red, list assessment boundaries or further describe the standard; statements marked with an asterisk (*) denote integration of engineering content.

MS-LS3 Heredity: Inheritance and Variation of Traits

MS-LS3 Heredity: Inheritance and Variation of Traits

Students who demonstrate understanding can:

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. [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.]

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 offspring and resulting genetic variation.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. • Develop and use a model to describe phenomena. (MS-LS3-1),(MS-LS3-2)	**LS1.B: Growth and Development of Organisms** • Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. *(secondary to MS-LS3-2)* **LS3.A: Inheritance of Traits** • Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits. (MS-LS3-1) • Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. (MS-LS3-2) **LS3.B: Variation of Traits** • In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other. (MS-LS3-2) • In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism. (MS-LS3-1)	**Cause and Effect** • Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS3-2) **Structure and Function** • Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS3-1)

Connections to other DCIs in this grade-band: **MS.LS1.A** (MS-LS3-1); **MS.LS4.A** (MS-LS3-1)

Articulation across grade-bands: **3.LS3.A** (MS-LS3-1),(MS-LS3-2); **3.LS3.B** (MS-LS3-1),(MS-LS3-2); **HS.LS1.A** (MS-LS3-1); **HS.LS1.B** (MS-LS3-1),(MS-LS3-2); **HS.LS3.A** (MS-LS3-1),(MS-LS3-2); **HS.LS3-B** (MS-LS3-1),(MS-LS3-2)

Common Core State Standards Connections:

ELA/Literacy –

Various other appendices describe other important elements of the Standards, such as DCI progressions, STS, nature of science, and more.

Massachusetts Science and Technology/Engineering Standards

Grade 6: Earth and Space Sciences

Grade 6 MS-ESS1 Earth's Place in the Universe

MS-ESS1-1a. Develop and use a model of the Earth-sun-moon system to explain the causes of lunar phases and eclipses of the sun and moon. [Clarification Statement: Examples of models can be physical, graphical, or conceptual and should emphasize relative positions and distances.]

MS-ESS1-4. Analyze and interpret rock layers and index fossils to determine the relative ages of rock formations. Explain that these sources of evidence, along with radiometric dating, are used to construct the geologic time scale of Earth's history. [Clarification Statement: Analysis includes Laws of Superposition and Crosscutting Relationships. Not all organisms are fossilized.] [Assessment Boundary: Assessment is limited to minor displacement faults that offset layers and does not include strata sequences that have been reordered or overturned. Assessment does not include recalling the names of specific periods or epochs and events within them, nor specifics of radiometric dating.]

MS-ESS1-5(MA). Use graphical displays to illustrate that the Earth and its solar system are part of the Milky Way galaxy, which is one of billions of galaxies in the universe. [Clarification Statement: Graphical displays can include maps, charts, graphs, or data tables.]

[Note: MS-ESS1-1b and MS-ESS1-2 are found in Grade 8. MS-ESS1-3 from NGSS is not included.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas
Developing and Using Models • Develop and use a model to describe phenomena. (MS-ESS1-1) • Develop a model to show the relationships among variables, including those that are not observable but predict observable phenomena. (MS-ESS1-5) **Analyzing and Interpreting Data** • Analyze and interpret data to determine similarities and differences in findings. (MS-ESS1-4)	**ESS1.A: The Universe and Its Stars** • Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models. (MS-ESS1-1) • Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. (MS-ESS1-5) **ESS1.B:Earth and the Solar System** • This model of the solar system can explain eclipses of the sun and the moon. (MS-ESS1-1) **ESS1.C: The History of Planet Earth** • The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. (MS-ESS1-4) (MS-ESS1-3)

Sample MASS/SEPUP Scope & Sequence

6th Grade (in recommended sequence)

MA Framework Concept	Sample District Scope	SEPUP Unit meets	SEPUP Unit/Guiding Issue
Matter and its Interactions	MS-PS1-7 MS-PS1-8 MS-PS1-4 (atomic energy/states of matter) MS-PS1-9(MA) (substances are made of particles)	MS-PS1-7 MS-PS1-8	*Studying Materials Scientifically* How do we safely dispose of hazardous wastes? (3 weeks)
From Molecules to Organisms: Structures and Processes	MS-LS1-1 MS-LS1-2	MS-LS1-1 MS-LS1-2	*Cell Structure and Function* How do we spread contagious disease? (2 weeks)
Biological Evolution: Unity and Diversity	MS-LS4-1 MS-LS4-2	MS-LS4-1 MS-LS4-2 MS-LS4-4 MS-LS4-5 MS-LS4-6	*Evolution* Should we bring extinct species back? (4 weeks)
Earth's Place in the Universe/ Earth's Systems	MS-ESS1-4 MS-ESS2-3	MS-ESS1-4 MS-ESS2-3 MS-ESS2-1 MS-ESS2-2	*Plate Tectonics* Is storing nuclear waste a good idea for all areas? (5 weeks)
Motion and Stability: Forces and Interactions (moved from 8th)	MS-PS2-1 MS-PS2-2 (Sum of forces)	(MS-PS2-1)	*Force and Motion* What are the costs of making safer automobiles? (7 weeks)
Earth's Place in the Universe	MS-ESS1-1 MS-ESS1-5 (Earth is part of bigger system)	MS-ESS1-1	*Earth in Space* Why is there no such thing as a perfect calendar? (5 weeks)
Engineering	MS-ETS1 MS-ETS2	Not covered	*Engineering projects can be launched from unit Issues to maintain contextual relevance.*

Not met in current (2nd) edition

7th Grade (in recommended sequence)

MA Framework Concept	Sample district Scope	SEPUP Unit meets	SEPUP Unit/Guiding Issue
From Molecules to Organisms: Structures and Processes	MS-LS1-3 MS-LS1-4 (adaptive behaviors - evolution)	MS-LS1-3 MS-LS1-7	*Body Works* How do our choices affect our health? (7 weeks)
Ecosystems: Interactions, Energy, and Dynamics	MS-LS2-1 MS-LS2-2 MS-LS2-3 MS-LS2-4 MS-LS2-5 (MS-LS2-6 (MA)) (MS-LS2-7 (MA))	MS-LS2-1 MS-LS2-2 MS-LS2-3 MS-LS2-4 MS-LS2-5 MS-LS1-6 MS-LS1-7 (MS-LS2-6 (MA)) (MS-LS2-7 (MA))	*Ecology* What can the introduction of a new species do to an ecosystem? (7 weeks)
Earth's Systems	MS-ESS2-2 MS-ESS2-4 (weather8)	MS-ESS2-2	*Erosion and Deposition* Which areas of Boomtown are most safe for new construction? (5 weeks)
Earth and Human Activity	MS-ESS3-1 MS-ESS3-2 MS-ESS3-4	Not in current edition	*Not covered*
Energy	MS-PS3-1 (kinetic/mass) MS-PS3-2 MS-PS3-3 MS-PS3-4 MS-PS3-5 MS-PS3-6 (MA) MS-PS3-7 (MA)	MS-PS3-2 MS-PS3-3 MS-PS3-4 MS-PS3-5 MS-PS3-6 (MA) MS-PS3-7 (MA)	*Energy* How can I design an energy efficient home? (8 weeks)
Waves and their applications	MS-PS4-1 MS-PS4-2 MS-PS4-3 (communication)	(MS-PS4-1) (MS-PS4-2)	*Waves* How can waves damage my hearing or eyesight? (3 weeks)
Engineering	MS-ETS1-2 MS-ETS2-4(MA) MS-ETS1-7 (MA)	Not covered	*Engineering projects can be launched from unit Issues to maintain contextual relevance.*

Not met in current edition
(Partially meets)

8th Grade (in recommended sequence)

MA Framework Concept	Sample district scope	SEPUP Unit meets	SEPUP Unit/Guiding Issue
Earth's Systems	MS-ESS2-1 (plate tect6) MS-ESS2-5 MS-ESS2-6	MS-ESS2-4 MS-ESS2-5 MS-ESS2-6	*Weather and Atmosphere* How could we get better at long-term weather forecasting? (6 weeks)
Earth and Human Activity	MS-ESS3-5 (rise in global temps)	Not covered	*Not covered*
Earth's Place in the Universe	MS-ESS1-1b MS-ESS1-2	(MS-ESS1-2) MS-ESS1-3	*Exploring Space* Is manned space flight worth the cost? (5 weeks)
Matter and Its Interactions	MS-PS1-1 MS-PS1-2 MS-PS1-4 (atomic energy/states of matter) MS-PS1-5 MS-PS1-9 (MA) MS-PS1-6 (endo/exo)	MS-PS1-1 MS-PS1-2 MS-PS1-5 MS-PS1-9 (MA)	*Chemistry of Materials* Would you pay more for a "Green" computer? (8 weeks)
Motion and Stability: Forces and Interactions	MS-PS2-3 MS-PS2-4 MS-PS2-5		*Not covered* *(Electricity & Magnetism)*
Heredity: Inheritance and Variation of Traits	MS-LS3-1 MS-LS3-2 (MS-LS3-3 (MA)) (MS-LS3-4 (MA))	MS-LS1-5 MS-LS3-1 MS-LS3-2 MS-LS4-5 (MS-LS3-3 (MA)) (MS-LS3-4 (MA))	*Genetics* Should we use DNA information to establish kinship? (6 weeks)
Biological Evolution: Unity and Diversity	MS-LS4-4 (evolution6) MS-LS4-5 (evolution6)		*addressed in earlier grade*
From Molecules to Organisms: Structures and Processes	MS-LS1-5 (genetics8) MS-LS1-7 (ecology7)	MS-LS1-1 MS-LS1-2 MS-LS1-3 MS-LS1-7	*addressed in earlier grade*

Not met in current edition
(Partially meets)
Addressed in previous unit

ABOUT THE LAB-AIDS CITATIONS

The following tables are presented in an integrated arrangement as prescribed by the Mass Standards. This document is intended as a summary document to show the Massachusetts Science and Technology/Engineering Standards, NGSS and Common Core ELA/Math alignment as of January 2015, and is based on input from the SEPUP staff. As of this writing, SEPUP has plans to post more details on their own internal NGSS review and alignment process on their project website (www.sepuplhs.org) later in 2015. In addition, not all SEPUP 6-8 units listed on pages 1-2 may appear here, as some may contain science content that falls outside NGSS specifications.

Citations included in the correlation document are as follows:

Unit title, Activity Number and Description:
The Chemistry of Materials, 14 LABORATORY Physical and Chemical Properties of Materials
Students test and group 6 different materials based on their chemical and physical properties.

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

*The use of parenthesis () indicates partial coverage.

6th Grade

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Studying Materials Scientifically					
1 VIEW AND REFLECT: Handling Hazardous Materials Students learn how a HAZMAT team works with a barrel of potentially hazardous substances.		(Engaging in Argument from Evidence)			RST.6-8.9
2 INVESTIGATION: Types of Hazards Students learn about Department of Transportation hazard categories as they classify classroom chemicals.					RST.6-8.3
3 PROBLEM SOLVING: A Plan to Separate the Mixture Students design a procedure to separate unidentified substances in a mixture.	MS-PS1-8(MA)	Planning and Carrying Out Investigations		PS1.A	WHST.6-8.1; RST.6-8.3
4 ROLE PLAY: Hazardous Materials at Home Students consider ways to dispose of potentially hazardous materials.			(Cause and Effect)		WHST.6-8.7; RST.6-8.7; WHST.6-8.9; RST.6-8.9
5 LABORATORY: Separating the Mixture Students separate a mixture using physical separation techniques.	MS-PS1-8(MA)			PS1.A	RST.6-8.3
6 LABORATORY: Identifying Liquids Students identify liquids by their chemical and physical properties.		(Planning and Carrying Out Investigations) Analyzing and Interpreting Data	Cause and Effect	PS1.A	RST.6-8.3
7 LABORATORY: Identifying Solids Students identify solids by their chemical and physical properties.		(Planning and Carrying Out Investigations) Analyzing and Interpreting Data	(Cause and Effect)	PS1.A	RST.6-8.3
8 INVESTIGATION: Measuring Volume	MS-PS1-7(MA)	Analyzing and Interpreting Data			RST.6-8.3

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Studying Materials Scientifically					
Students use two methods -measurement and calculation, and water displacement to determine volume.					MATH: MP.2; MP.4; 6.SP.B.5
9 LABORATORY: Measuring Mass, Calculating Density Students measure mass and calculate density in order to identify six metal objects.	MS-PS1-7(MA)	(Planning and Carrying Out Investigations) Analyzing and Interpreting Data Using Mathematics and Computational Thinking	Scale, Proportion, and Quantity	PS1.A	RST.6-8.3 MATH: MP.2; MP.4; 6.RP.A.3; 6.SP.B.5
10 INVESTIGATION: Density of Unknown Solids Students calculate density in order to identify unknown solids.	MS-PS1-7(MA)	Planning and Carrying Out Investigations Analyzing and Interpreting Data Using Mathematics and Computational Thinking	Scale, Proportion, and Quantity	PS1.A	RST.6-8.3 MATH: MP.2; MP.4; 6.SP.B.5
11 TALKING IT OVER: Choosing a Cleaner Students evaluate product safety and effectiveness of several window-cleaning products as they consider the trade-offs of selecting a cleaner for use in a hospital setting.		Engaging in Argument from Evidence (Obtaining, Evaluating, and Communicating Information)			WHST.6-8.1

6th Grade

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Cell Structure and Function* new unit not part of 2nd edition					
1 Outbreak! Students model the spread of an infectious disease, laying a foundation for further analysis of the cause and transmission of the disease.		Developing and Using Models Analyzing and Interpreting Data	Patterns		MATH: (6.SP.B.4); (6.SP.B.5)
2 Project: The Range of Disease Students are assigned to a long-term research project. They are introduced to bubonic plague, which is used as a model for their reports.		Obtaining, Evaluating, and Communicating Information			WHST.6-8.7; WHST.6-8.8; (SL.8.5); (SL.8.4)
3 Laboratory: Observing Animal and Plant Cells Students observe slides of animal and plant cells and prepare drawings of their observations.	MS-LS1-1		Scale, Proportion, and Quantity Structure and Function	LS1.A	
4 Reading: A Closer Look at Animal and Plant Cells Students read about and compare the structures and functions of plant and animal cells. They use a computer animation to review what they have learned and make a physical model of a cell.	MS-LS1-3 MS-LS1-7		Structure and Function Systems and System Models	LS1.A LS1.C (PS3.D)	WHST.6-8.9; WHST.6-8.7; (RST.6-8.4); RST.6-8.7
5 Laboratory: Observing Single-celled Organisms Students observe prepared slides of protists and bacteria, and compare their cells to those of animals and plants.	MS-LS1-1		Scale, Proportion, and Quantity Structure and Function	LS1.A	
6 Reading: Microbes A reading about protists, bacteria, and viruses.			Structure and Function	LS1.A	RST.6-8.1; (RST.6-8.4) WHST.6-8.2; WHST.6-8.9; WHST.6-8.7; RST.6-8.7
7 Laboratory: Culturing Bacteria Students investigate the need of bacteria for a source of food.		Analyzing and Interpreting Data			

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Cell Structure and Function* new unit not part of 2nd edition					
8 Role Play: History of the Germ Theory of Disease Students role-play scientists and their contributions to the cell theory and germ theory of disease.			Scale, Proportion, and Quantity Structure and Function Cause and Effect	LS1.A	WHST.6-8.9; WHST.6-8.7; (SL.8.4); RST.6-8.7
9 Laboratory: Levels of Organization: Cells, Tissues, Organs Students observe slides that illustrate cells, tissues, and organs in order to build understanding of the levels of biological organization.	MS-LS1-1	Analyzing and Interpreting Data	Structure and Function	LS1.A	RST.6-8.1; (RST.6-8.4) WHST.6-8.2; WHST.6-8.9; WHST.6-8.7; RST.6-8.7
10 Laboratory: Cells Alive! Students are introduced to the Beaufort wind scale and its development. They work in groups to design, build, and test instruments for measuring wind speed and direction. After improving the instruments, they use them to collect wind data.	MS-LS1-7	Analyzing and Interpreting Data		LS1.A LS1.C (PS3.D)	
11 Modeling: A Cell Model Students construct a cell model to explore the structure of the cell membrane.	MS-LS1-2	Developing and Using Models Analyzing and Interpreting Data	Structure and Function	LS1.A	
12 Investigation: Disease Detectives Students further investigate the outbreak introduced in Activity 22 in order to identify the disease agent and make a recommendation for reducing its spread.		Engaging in Argument from Evidence	Cause and Effect (Patterns)		WHST.6-8.1; (SL.8.1)

Grade 6

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Evolution					
89 TALKING IT OVER: Here Today, Gone Tomorrow? After reading about extinct mammoths and modern elephants, students discuss whether efforts should be made to save endangered elephants.		Engaging in Argument from Evidence	Patterns	LS4.A	RST.6-8.1; (RST.6-8.2); WHST.6-8.2; WHST.6-8.7; (SL.8.1); RST.6-8.7
90 LABORATORY: Figuring Out Fossils Students examine eight different fossils as evidence for extinct species		Engaging in Argument from Evidence		LS4.A	
91 INVESTIGATION: Fossilized Footprints Students interpret a series of fossilized footprints, differentiating between observations and inferences		Engaging in Argument from Evidence Analyzing and Interpreting Data		LS4.A	(SL.8.1)
92 MODELING: Time for Change Students develop a geologic-style personal time scale and then construct a geologic time scale.	MS-LS4-1			LS4.A	MATH: (6.RP.A.3)
93 INVESTIGATION: Reading the Rocks Students examine simulated drill cores in order to develop a stratigraphic column.	MS-LS4-1			LS4.A	
94 ROLE PLAY: A Meeting of Minds Students role-play an imaginary meeting between Charles Darwin and Jean-Baptiste Lamarck, who present and compare their theories on how evolution occurred..			Cause and Effect	LS4.B LS4.C	WHST.6-8.7; RST.6-8.7; WHST.6-8.9; RST.6-8.9
95 MODELING: Hiding in the Background Students use colored toothpicks to model the effect of environment and predation in the process of natural selection.	MS-LS4-4 MS-LS4-6	Developing and Using Models Using Mathematics and Computational Thinking	Cause and Effect	LS4.B LS4.C	RST.6-8.9; WHST.6-8.9 MATH: (6.SP.B.5); MP.4; (6.RP.A.1); (7.RP.A.2)

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Evolution					
96 MODELING: Battling Beaks Students simulate the effect of natural selection on an imaginary species of "forkbirds."	MS-LS4-4 MS-LS4-6	Developing and Using Models Using Mathematics and Computational Thinking Analyzing and Interpreting Data	Cause and Effect	LS4.B LS4.C	MATH: (6.SP.B.4); (6.SP.B.5); MP.4; (6.RP.A.1); (7.RP.A.2); WHST.6-8.9; RST.6-8.9
97 READING: Origins of Species Students read about mutations and how they provide the genetic variation necessary for natural selection.	MS-LS4-4		Stability and Change	LS3.B (LS4.A) LS4.B LS4.C	RST.6-8.1; RST.6-8.7; WHST.6-8.2; WHST.6-8.9; WHST.6-8.7
98 INVESTIGATION: Family Histories Students draw and interpret graphs showing changes in the numbers of fossil families in the fish, reptile, and mammal classes over geological time.	MS-LS4-1 MS-LS4-6	Engaging in Argument from Evidence Analyzing and Interpreting Data Using Mathematics and Computational Thinking	Patterns	LS4.A	(SL.8.1) MATH: (6.SP.B.4)
99 INVESTIGATION: A Whale of A Tale Students investigate anatomical evidence for evolution by comparing whale skeletons.	MS-LS4-1 MS-LS4-2	Engaging in Argument from Evidence	Patterns	LS4.A	
100 INVESTIGATION: DNA:The Evidence Within Students investigate how DNA sequences can provide evidence for evolution. [For Evolution UNIT only: Includes student activity in Teacher's Guide to be done BEFORE activity]		Engaging in Argument from Evidence			
101 TALKING IT OVER: Birds of a Feather?	MS-LS4-5	Engaging in Argument from Evidence		LS4.B	RST.6-8.1; (RST.6-8.2); WHST.6-8.2; (SL.8.1)

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Evolution					
After reading about the history of the dodo bird and the common pigeon, students discuss the relationship between extinction and evolution.					

Grade 6

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Plate Tectonics					
36 TALKING IT OVER : Storing Nuclear Waste Earthquakes and volcanoes are introduced as students analyze evidence related to the storing of nuclear waste at Yucca Mountain, Nevada.		(Analyzing and Interpreting Data) Engaging in Argument from Evidence (Asking Questions and Defining Problems)	(Influence of Engineering, Technology, and Science on Society and the Natural World)	(ESS3.B)	RST.6-8.1; WHST.6-8.1
37 MODELING: Volcanic Landforms Students consider the constructive nature of volcanoes as they model the effects of two different kinds of volcanic eruptions.	MS-ESS2-2	Developing and Using Models Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations	(Systems and System Models)		(RST.6-8.9)
38 READING: Beneath the Earth's Surface Students construct diagrams describing earth's interior before and after they read about volcanoes and earth layers.	MS-ESS2-1 MS-ESS2-2	Developing and Using Models	Stability and Change Energy and Matter	(ESS2.A)	RST.6-8.7; (RST.6-8.9); (WHST.6-8.9) MATH: (7.RP.A.2)
39 INVESTI GATIO N: Earth Time Students are introduced to the age of earth as they place important events in earth's history into one of four time periods.	MS-ESS1-4 MS-ESS2-2	Constructing Explanations and Designing Solutions		(ESS1.C)	WHST.6-8.1 MATH: (7.RP.A.2)

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Plate Tectonics					
		Developing and Using Models Engaging in Argument from Evidence			
40 INVESTIGATION: The Continent Puzzle Students use puzzle pieces representing earth's continents to begin to investigate continental drift.	MS-ESS2-2 MS-ESS2-3	Developing and Using Models	(Systems and System Models) Stability and Change Scale, Proportion, and Quantity	ESS2.B	(RST.6-8.9)
41 TALKING IT OVER: Continental Drift Students consider the historical development of the idea of continental drift as they evaluate evidence about the movement of continents.	MS-ESS2-2	(Analyzing and Interpreting Data) (Asking Questions and Defining Problems)	Scale, Proportion, and Quantity Stability and Change	ESS2.B	WHST.6-8.2; (RST.6-8.9)
42 VIEW AND REFLECT: The Theory of Plate Tectonics Students watch a short video on the history of the development of the theory of plate tectonics, beginning with Wegener's idea of continental drift.	MS-ESS2-2	Constructing Explanations and Designing Solutions	Scale, Proportion, and Quantity Energy and Matter Stability and Change	(HS.ESS1.C) ESS2.B	(RST.6-8.9)
43 MODELING: Measuring Earthquakes Students model how a seismograph records earthquakes as they explore the relationship between earthquakes and plate boundaries.				(ESS2.B) (ESS3.C)	
44 PROBLEM SOLVING: Mapping Plates Students compare the sizes and shapes of continents to plates as they label major plates	MS-ESS2-2	Constructing Explanations and Designing Solutions	Patterns	(ESS3.B)	

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Plate Tectonics					
and use earthquake and volcano data to plot and draw missing plate boundaries.		Developing and Using Models	(Systems and System Models) Scale, Proportion, and Quantity		
45 READING: Understanding Plate Boundaries Students read about how plate tectonics helps explain earth quakes, volcanoes, and mountain ranges.	MS-ESS2-2	Constructing Explanations and Designing Solutions	Energy and Matter Cause and Effect Stability and Change	(HS.ESS1.C) (ESS2.B) (ESS3.B)	RST.6-8.1; RST.6-8.7; WHST.6-8.9
46 MODELING: Convection Currents Students explore the mechanism behind plate motion as they investigate convection currents.	MS-ESS2-1 MS-ESS2-2	Developing and Using Models Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations	Systems and System Models Scale, Proportion, and Quantity Energy and Matter	(ESS2.A)	
47 COMPUTER SIMULATION: Spreading Plates Students use a computer simulation to investigate what happens when earth's plates move apart over different periods of time.	MS-ESS2-2	Developing and Using Models Planning and Carrying Out Investigations	Systems and System Models Scale, Proportion, and Quantity Energy and Matter Stability and Change	(HS.ESS1.C) (ESS2.B)	

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Plate Tectonics					
			Cause and Effect		
48 COMPUTER SIMULATION: Other Types of Plate Motion Students use a computer simulation to investigate what happens when earth's plates collide as well as slide past each other.	MS-ESS2-2	Developing and Using Models Analyzing and Interpreting Data	Systems and System Models Scale, Proportion, and Quantity Stability and Change Energy and Matter	(HS.ESS1.C) (ESS2.B)	
49 TALKING IT OVER: Comparing Site Risk Students draw on their knowledge of the risk of earthquakes and volcanoes to compare storing nuclear waste at eight possible sites.		(Analyzing and Interpreting Data) Engaging in Argument from Evidence (Asking Questions and Defining Problems)	(Influence of Engineering, Technology, and Science on Society and the Natural World)	(ESS3.B)	(SL.8.5); WHST.6-8.1

Grade 6

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Force and Motion					
73 TALKING IT OVER: Choosing a Safe Vehicle Students compare the specifications of two vehicles in order to choose the one they feel is safe.		(Engaging in Argument from Evidence)	(Structure and Function) (Interdependence of Science, Engineering, and Technology)		
74 LABORATORY: Measuring Speed Students use a cart, ramp, and track to calculate speed from distance and time measurements. Then students design an investigation that examines the effect of height of the ramp on the speed of the cart.		Analyzing and Interpreting Data Asking Questions and Defining Problems Planning and Carrying Out Investigations Engaging in Argument from Evidence Using Mathematics and Computational Thinking	Scale, Proportion, and Quantity	PS2.A	RST.6-8.3 MATH: MP.2; MP.4; 6.RP.A.3; 6.SP.B.5; (6.EE.A.2); 6.RP.A.1; (6.RP.A.2); 7.RP.A.2
75 INVESTIGATION: Interpreting Motion Graphs Students construct and interpret distance vs time graphs by matching a narrative to graph segments.		Analyzing and Interpreting Data	Patterns	PS2.A	RST.6-8.7 MATH: MP.2; 6.RP.A.3; (6.SP.B.4); 6.NS.C.5; 6.RP.A.1; (6.RP.A.2); 7.RP.A.2
76 LABORATORY: Speed and Collisions		Analyzing and Interpreting Data	Cause and Effect	PS2.A PS3.C	RST.6-8.3

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Force and Motion					
To investigate the effect of vehicle speed on the severity of accidents, students use the ramp and cart to simulate vehicle collisions at different speeds.		(Engaging in Argument from Evidence) Planning and Carrying Out Investigations Using Mathematics and Computational Thinking			MATH: MP.2; 6.SP.B.5; 6.RP.A.1; (6.RP.A.2); 7.RP.A.2
77 LABORATORY: Mass and Collisions Students design and carry out investigations to discover the effect of mass on the severity of accidents.		Analyzing and Interpreting Data Asking Questions and Defining Problems	Cause and Effect	PS2.A	RST.6-8.3 MATH: MP.2; MP.4; 6.RP.A.3; 6.SP.B.5; 6.RP.A.1; (6.RP.A.2); 7.RP.A.2
78 PROBLEM SOLVING: Force, Acceleration, and Mass Students analyze data and investigate the relationship between force, mass, and acceleration.		Analyzing and Interpreting Data Using Mathematics and Computational Thinking	Cause and Effect Scale, Proportion, and Quantity Patterns	PS2.A	RST.6-8.3; (RST.6-8.9) MATH: MP.2; MP.4; (6.SP.B.4); (6.EE.A.2)
79 LABORATORY: Inertia around a Curve Students first observe a marble moving around a circular track and then predict the path taken by the marble once a section of the track is removed.		Analyzing and Interpreting Data Planning and Carrying Out Investigations	Cause and Effect	PS2.A	RST.6-8.3
80 READING: Laws of Motion Students read about Newton's discoveries of the fundamental relationships between forces, including Newton's three laws and friction.			Scale, Proportion, and Quantity	PS2.A	RST.6-8.1; (RST.6-8.9); WHST.6-8.9

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Force and Motion					
					MATH: MP.2; MP.4; 6.RP.A.3; (6.EE.A.2); 6.RP.A.1; 7.RP.A.2
81 LABORATORY: The Net Force Challenge Students use force meters to investigate the effect of more than one force on a block.	MS-PS2-2(MA)	Analyzing and Interpreting Data Planning and Carrying Out Investigations	Cause and Effect (Stability and Change)	PS2.A	RST.6-8.3; (RST.6-8.9) MATH: MP.2; (MP.4); 6.RP.A.3; 6.NS.C.5; 6.RP.A.1; 7.RP.A.2
82 LABORATORY: Braking Distance To simulate the effect of speed on braking distance, students measure the distance that carts travel after encountering a high friction surface.		Analyzing and Interpreting Data Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	Cause and Effect (Stability and Change) Scale, Proportion, and Quantity	PS2.A	RST.6-8.3 MATH: MP.2; MP.4; 6.SP.B.5
83 INVESTIGATION: Coming to a Stop Students learn about stopping distance and then investigate further by calculating and graphing data for different road and driver conditions.		Engaging in Argument from Evidence Analyzing and Interpreting Data Using Mathematics and Computational Thinking	Cause and Effect (Stability and Change) Patterns	PS2.A	RST.6-8.3 MATH: MP.2; MP.4; (6.SP.B.4); (6.EE.A.2); (7.EE.B.3)
84 READING: Decelerating Safely Students learn about vehicle safety features that decelerate the body more slowly than it would ordinarily experience in an accident.		Engaging in Argument from Evidence	(Interdependence of Science, Engineering, and Technology)	PS2.A	RST.6-8.7; RST.6-8.1; RST.6-8.2; WHST.6-8.9 MATH: MP.2; (6.EE.A.2)

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Force and Motion					
			(Cause and Effect) (Stability and Change)		
85 INVESTIGATION: Crash Testing Students design and present the specifications for a crash test dummy. They weigh the advantages and disadvantages of using different sized dummies.	(MS-PS2-1)	Constructing Explanations and Designing Solutions (Engaging in Argument from Evidence)	Structure and Function (Interdependence of Science, Engineering, and Technology) Systems and System Models	ETS1.A ETS1.C	SL.8.5
86 MODELING: Investigating Center of Mass Students compare the stability of carts with different center-of masses as they collide with a stationary barrier.		Analyzing and Interpreting Data Planning and Carrying Out Investigations	Cause and Effect (Stability and Change)		RST.6-8.3 MATH: MP.2
87 INVESTIGATION: Fatal Accidents Students investigate types of car accidents and fatality rates by analyzing actual accident data.		Analyzing and Interpreting Data			MATH: MP.2; 6.SP.B.5
88 ROLE PLAY: Safety for All Students recommend a solution to the problem of increased injuries and damage related to vehicle incompatibility during collisions		(Engaging in Argument from Evidence) Obtaining, Evaluating, and Communicating Information			(RST.6-8.1); WHST.6-8.1

Grade 6

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Earth in Space					
71 TALKING IT OVER: Sunlight and Shadows Students read about, and propose explanations for, the changing positions of the shadow from a tree over a day. They also critique a fictional student's notebook.		Constructing Explanations and Designing Solutions	Systems and System Models Cause and Effect Patterns	(ESS1.A) (ESS1.B)	
72 INVESTIGATION: Measuring Shadows, Measuring Time Students design an investigation to observe changing shadows during the day. As an extension, they observe the shadows over several weeks.	MS-ESS1-1	Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations	Patterns Systems and System Models Cause and Effect	(ESS1.B)	
73 MODELING: A Day on Earth Students propose an explanation for night and day and view a model of Earth's rotation.	MS-ESS1-1		Cause and Effect Systems and System Models	(ESS1.A) (ESS1.B)	
74 READING: As Earth Rotates Students complete a reading about Earth's rotation, day–night cycle, and time.	MS-ESS1-1		Systems and System Models Cause and Effect Interdependence of Science, Engineering, and Technology	ESS1.A (ESS1.B)	RST.6-8.7; (RST.6-8.9)
75 INVESTIGATION: Sunlight and Seasons Students graph data on the length of daylight and highest angle of the Sun for the 21st of each month and correlate changes in the Sun's position and day length with the seasons.	MS-ESS1-1	Analyzing and Interpreting Data	Patterns Systems and System Models Cause and Effect	(ESS1.A) ESS1.B	(RST.6-8.9) MATH: MP.4; MP.2

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Earth in Space					
76 COMPUTER SIMULATION: A Year Seen From Space Students use observations of Earth's position relative to the Sun over a year to develop an explanation of the basis for Earth's year and seasons.	MS-ESS1-1	Developing and Using Models Constructing Explanations and Designing Solutions	Patterns Systems and System Models Scale, Proportion, and Quantity Cause and Effect	ESS1.A ESS1.B	(RST.6-8.9)
77 MODELING: Explaining the Seasons Students explore the effects of direct and indirect sunlight on the solar energy striking Earth's surface. They learn that the directness of the Sun's rays is one of two factors that result in hotter summers.	MS-ESS1-1	Constructing Explanations and Designing Solutions	Systems and System Models Cause and Effect	(ESS1.A) ESS1.B	(RST.6-8.9)
78 READING: The Earth on the Move Students read about Earth's tilt and its effects on the light hitting Earth and on seasons.	MS-ESS1-1	Developing and Using Models	Systems and System Models Cause and Effect	ESS1.A ESS1.B	RST.6-8.7; (RST.6-8.9); WHST.6-8.9
79 FIELD STUDY: The Predictable Moon Students predict the phase of the Moon based on the lunar cycle	MS-ESS1-1	Analyzing and Interpreting Data Planning and Carrying Out Investigations	Patterns Systems and System Models Cause and Effect	(ESS1.A) (ESS1.B)	
80 MODELING: Explaining the Phases of the Moon Students investigate physical models of the phases of the Moon.	MS-ESS1-1	Developing and Using Models	Systems and System Models Patterns Cause and Effect	ESS1.A (ESS1.B)	MATH: (6.RP.A.1)
81 COMPUTER SIMULATION: Moon Phase Simulator	MS-ESS1-1	Developing and Using Models	Systems and System Models	ESS1.A (ESS1.B)	

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Earth in Space					
Students investigate a computer simulation of the Moon's phases and connect it to the previous activities.			Scale, Proportion, and Quantity Cause and Effect		
82 INVESTIGATION: Tides and the Moon Students analyze the relationship between the Moon's phase and the occurrence of extreme tides.			Patterns Systems and System Models Cause and Effect	(ESS1.A)	MATH: MP.4; MP.2
83 TALKING IT OVER: Marking Time Students decide on the best calendar for different locations based on each community's needs in relation to the solar year and lunar cycle.		(Engaging in Argument from Evidence)			(WHST.6-8.2)
84 INVESTIGATION: Planets in Motion Students model and present the day length, year length, seasons, and tides of eight fictional planets.		Analyzing and Interpreting Data	Scale, Proportion, and Quantity	(ESS1.A)	(SL.8.5) MATH: (6.RP.A.1); (7.RP.A.2); 6.NS.C.5

Grade 7

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Body Works					
11 ROLE PLAY: Traffic Stop Students perform a role play that explores alcohol affects the systems of the body.			Systems and System Models		(RST.6-8.2); WHST.6-8.2
12 INVESTIGATION: What's Happening Inside? Students learn about human body systems as they classify organs and develop a 3-dimensional model of several systems. [Includes an optional web-activity on Human Reproductive system.	MS-LS1-3		Systems and System Models	LS1.A	
13 ROLE PLAY: Living with Your Liver Students perform a role play on the function of the liver.	MS-LS1-3			LS1.A	
14 LABORATORY: Breakdown Students design an experiment to investigate the effect of mechanical breakdown on chemical breakdown during digestion.	MS-LS1-3 MS-LS1-7	Analyzing and Interpreting Data Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	Patterns Energy and Matter	LS1.A LS1.C	MATH: (6.SP.B.4)
15 READING: Digestion—An Absorbing Tale Students read about functions and structures of the human digestive system.	MS-LS1-3 MS-LS1-7		Systems and System Models Energy and Matter	LS1.A LS1.C	WHST.6-8.7; WHST.6-8.9; RST.6-8.7; RST.6-8.4
16 LABORATORY: Support System: Bones, Joints and Muscles After exploring the structure and function of bones, joints and muscles as they dissect a chicken wing, students read about different joints and how they work as levers with bones and muscles in the human body.	MS-LS1-3			LS1.A	RST.6-8.1; WHST.6-8.2; WHST.6-8.7; RST.6-8.7

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Body Works					
17 LABORATORY: Gas Exchange Students analyze the content of a fictional newspaper story that describes the alleged discovery of diamonds in a national forest.	MS-LS1-3	Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	Patterns Systems and System Models	LS1.A PS3.D	MATH: (6.SP.A.2); (6.SP.B.4)
18 MODELING: The Circulation Game Students quantitatively measure the amount of carbon dioxide in their exhaled breath by using an indicator to perform a titration. [Includes web-activity about the nervous system for those using Unit B only.]	MS-LS1-3	Developing and Using Models	Systems and System Models	LS1.A	
19 INVESTIGATION: Heart-ily Fit Students collect data on their heart rates and recovery times as a quantitative measure of physical fitness.		Analyzing and Interpreting Data Using Mathematics and Computational Thinking	Patterns	LS1.A	MATH: (6.SP.A.2); (6.SP.B.4); (MP.4)
20 ROLE PLAY: Great-Aunt Lily's Will After performing a role play, students decide on the best use of limited funds to fight heart disease and promote public health.		Engaging in Argument from Evidence			(SL.8.4); (SL.8.5)
21 LABORATORY: Inside A Pump Students explore the role of valves in the heart by using different pumps as potential models.		Developing and Using Models		LS1.A	
22 LABORATORY: The Heart–A Muscle Students investigate the strength of heart muscle as they attempt to pump water at their resting pulse rate.		Analyzing and Interpreting Data Developing and Using Models		LS1.A	
23 READING: Heart Parts Students read about the structures and functions of the human circulatory system. [An optional				LS1.A	WHST.6-8.7; WHST.6-8.9; RST.6-8.7; RST.6-8.4; RST.6-8.9

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Body Works					
sheep's heart dissection is described in the Teacher's Edition.]					
24 MODELING: Round and Round In groups, students use pumps to design a working model of the human circulatory system.		Developing and Using Models			WHST.6-8.9; (SL.8.4); (SL.8.5); RST.6-8.9
25 READING: Healing the Heart Students read about the history of heart surgery and explore challenges of past and future heart surgery.		Obtaining, Evaluating, and Communicating Information			(RST.6-8.2); WHST.6-8.2
26 INVESTIGATION: Heart Sounds After an introduction to specific heart problems, students listen to normal and abnormal heart sounds.		Obtaining, Evaluating, and Communicating Information	(Cause and Effect)		WHST.6-8.7; RST.6-8.7
27 LABORATORY: The Pressure's On Students model the effects of high blood pressure on the circulatory system using clamps on the pump simulation.		Developing and Using Models			MATH: (6.SP.B.4)
28 READING: Heart Problems Students read about the physiological causes of high blood pressure, heart disease, and heart attacks.			(Cause and Effect) Stability and Change Systems and System Models		WHST.6-8.7; WHST.6-8.9; RST.6-8.7
29 PROJECT: Helping Hearts After taking a heart risk quiz, students design a public health brochure about a risk factor for heart disease.		Engaging in Argument from Evidence			(SL.8.1); (SL.8.4); (SL.8.5)

Grade 7

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Ecology					
72 TALKING IT OVER: The Miracle Fish? Students read and discuss what happened after the Nile perch was introduced into Lake Victoria.	MS-LS2-1 MS-LS2-2 MS-LS2-4	Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information	Cause and Effect Patterns Stability and Change	LS2.A LS2.C LS4.D	WHST.6-8.1; WHST.6-8.9; (SL.8.1)
73 PROJECT: Introduced Species After learning about eight species that have been introduced into the U.S., students begin research to be presented later in the unit (see Activity 88).	MS-LS2-2	Obtaining, Evaluating, and Communicating Information	Stability and Change	LS2.A LS2.C LS4.D	WHST.6-8.7; WHST.6-8.9; WHST.6-8.8; SL.8.4
74 LABORATORY: Observing Organisms Students investigate the behavior of living organisms (blackworms).				LS2.A	
75 INVESTIGATION: Classifying Animals Students classify cards containing images and information on different animals.		Engaging in Argument from Evidence (Obtaining, Evaluating, and Communicating Information)	Stability and Change		WHST.6-8.9; RST.6-8.7; (SL.8.1)
76 INVESTIGATION: People, Birds, and Bats Students act as taxonomists as they apply characteristics of five major vertebrate classes to "mystery" organisms. [Includes an optional web-activity on the life cycles of plants and animals, with flower dissection extension.].		(Obtaining, Evaluating, and Communicating Information)		(LS2.C)	WHST.6-8.9
77 INVESTIGATION: Ups and Downs Students graph and interpret population data over time.	MS-LS2-1 MS-LS2-4	Analyzing and Interpreting Data	Cause and Effect Patterns	LS2.A LS2.C LS4.D	MATH: (6.SP.B.4); (6.SP.B.5)

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Ecology					
		Using Mathematics and Computational Thinking	Stability and Change		
78 LABORATORY: Coughing Up Clues Students gather information on owl diets and the owl's place in a food web as they dissect owl pellets.	MS-LS2-2 MS-LS2-3 MS-LS2-7(MA)		Energy and Matter	LS2.A LS2.B	
79 READING: Eating for Energy Students read about the introduction of zebra mussels in the Great Lakes highlighting energy relationships within an ecosystem.	MS-LS1-7 MS-LS2-2 MS-LS2-3 MS-LS2-7(MA)		Energy and Matter Patterns Stability and Change	LS1.C LS2.A LS2.B LS4.D PS3.D	RST.6-8.1; WHST.6-8.2; WHST.6-8.9; RST.6-8.7
80 LABORATORY: Nature's Recyclers Students investigate the role of decomposers as they isolate and examine nematodes. Extensions explore various food webs.	MS-LS2-2 MS-LS2-3 MS-LS2-7(MA)		Energy and Matter	LS2.A LS2.B	(RST.6-8.4)
81 LABORATORY: A Producer's Source of Energy After collecting evidence for plant photosynthesis, students design and conduct an experiment on the role of light in photosynthesis.	MS-LS1-6 MS-LS2-3	Planning and Carrying Out Investigations	Energy and Matter	LS1.C LS2.A PS3.D	
82 LABORATORY: The Cells of Producers Students view microscope slides of different plant structures and compare photosynthetic and non-photosynthetic cells.	MS-LS1-1 MS-LS1-6		Energy and Matter Structure and Function Systems and System Models	LS1.A LS1.C	WHST.6-8.9
83 LABORATORY: A Suitable Habitat Students design an experiment to explore blackworms' response to various substrata. They read about biomes, populations, and communities and ecosystems. A web extension explores symbiotic relationships among species.	MS-LS2-2	Asking Questions and Defining Problems (Obtaining, Evaluating, and		LS2.A LS2.C	RST.6-8.1; (RST.6-8.2); WHST.6-8.2; WHST.6-8.9

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Ecology					
		Communicating Information) Planning and Carrying Out Investigations			
84 MODELING: Clam Catch As a class, students model the interaction of a population of clams and zebra mussels.	MS-LS2-2	Analyzing and Interpreting Data Developing and Using Models Using Mathematics and Computational Thinking	Cause and Effect Patterns Stability and Change	LS2.A LS2.C	MATH: (6.SP.B.4); (6.SP.B.5)
85 READING: Is There Room for One More? Students read about the concept of carrying capacity using the example of the zebra mussel.	MS-LS2-1 MS-LS2-4	Analyzing and Interpreting Data Obtaining, Evaluating, and Communicating Information Using Mathematics and Computational Thinking	Patterns Stability and Change	LS2.A LS2.C	WHST.6-8.9
86 FIELD STUDY: Taking A Look Outside Students act as ecologists as they investigate the natural world.		Asking Questions and Defining Problems		(LS2.C)	(SL.8.4)
87 TALKING IT OVER: Too Many Mussels? After reading about different ways to address zebra mussel introduction in the U.S., students discuss the trade-offs of the recommendations	MS-LS2-1 MS-LS2-4 MS-LS2-5	Engaging in Argument from Evidence	Cause and Effect Stability and Change	LS2.A LS2.C LS4.D	(SL.8.1)

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Ecology					
88 PROJECT: Presenting the Facts Student groups present their introduced species research and discuss what, if anything, should be done about the population of their introduced species in the U.S.	MS-LS2-1 MS-LS2-4	Analyzing and Interpreting Data Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information		LS2.C LS4.D	WHST.6-8.7, (SL.8.5), (SL.8.1); (SL.8.4); WHST.6-8.8

Grade 7

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Erosion and Deposition					
24 TALKING IT OVER: Where Should We Build? Students are introduced to a scenario about fictitious Boomtown and consider the impact of construction at three potential building sites.		Analyzing and Interpreting Data	Stability and Change Influence of Engineering, Technology, and Science on Society and the Natural World		
25 INVESTIGATION: Making Topographical Maps Students construct a topographic map of a land formation in Boomtown.					(6.NS.C.5)
26 PROBLEM SOLVI NG: Boomtown's Topography Students compare topographic maps of Boomtown at the present with those from the past and identify changes in the landforms.		Analyzing and Interpreting Data	Stability and Change Influence of Engineering, Technology, and Science on Society and the Natural World		(6.NS.C.5)
27 PROBLEM SOLVING: Investigating Boomtown's Weather Students construct bar graphs of rainfall data as they consider the impact of rainfall patterns on the three possible construction sites.			Stability and Change Patterns		MATH: MP.2
28 MODELING: Cutting Canyons and Building Deltas Students use a river model to investigate how flowing water creates common landforms, such as rivers and deltas.	MS-ESS2-2	Developing and Using Models Planning and Carrying Out Investigations	Systems and System Models Energy and Matter Cause and Effect	ESS2.C	(RST.6-8.9)

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Erosion and Deposition					
29 READING: Weathering, Erosion, and Deposition Students read about weathering, erosion, and deposition and about the impact of human activity on these processes.	MS-ESS2-2	Constructing Explanations and Designing Solutions	Stability and Change (Interdependence of Science, Engineering, and Technology) Energy and Matter Cause and Effect Influence of Engineering, Technology, and Science on Society and the Natural World	ESS2.C	RST.6-8.1; RST.6-8.7; (RST.6-8.9); WHST.6-8.9
30 ROLE PLAY: Challenges of the Mississippi Delta Students relate the scenario to the broader issue of land use by learning about erosion and deposition problems along developed areas of the Mississippi.	MS-ESS2-2		Stability and Change Energy and Matter Influence of Engineering, Technology, and Science on Society and the Natural World Patterns Cause and Effect	ESS2.C (ESS3.B)	RST.6-8.1; WHST.6-8.9 MATH: (6.NS.C.5)

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Erosion and Deposition					
31 MODELING: Resistance to Erosion Students investigate the effects of erosion on different earth materials by using models of different earth materials.	MS-ESS2-2	Developing and Using Models Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations		ESS2.C	
32 INVESTIGATION: Modeling Erosion Students model the effect of ocean waves on a cliff and design an investigation using a model to determine the effects of a rock barrier on erosion of the cliff.	MS-ESS2-2	Developing and Using Models Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations	Systems and System Models Influence of Engineering, Technology, and Science on Society and the Natural World	ESS2.C	
33 READING: Earth Processes and Boomtown's Coast Students read about the effect of earth processes on coastal systems and the efforts to mitigate the impact of human activity.	MS-ESS2-2	Constructing Explanations and Designing Solutions	Stability and Change Influence of Engineering, Technology, and Science on Society	ESS2.C (ESS3.B)	RST.6-8.7

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Erosion and Deposition					
			and the Natural World		
34 PROJECT: Preparing the Geologist's Report Students use the information they have gathered throughout the unit to summarize the geology at each of the building sites in Boomtown.			Influence of Engineering, Technology, and Science on Society and the Natural World	(ESS2.C)	WHST.6-8.2
35 ROLE PLAY: Building in Boomtown Students present a building plan for one of the sites and then make their final decision about where Boomtown should build homes.		Engaging in Argument from Evidence	Influence of Engineering, Technology, and Science on Society and the Natural World	(ESS2.C)	(SL.8.5); WHST.6-8.1

Grade 7

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Energy					
53 INVESTIGATION: Home Energy Use Students collect data on six human characteristics and discuss causes of human variation.			(Influence of Engineering, Technology, and Science on Society and the Natural World)	PS3.B	MATH: MP.2
54 LABORATORY: Drive a Nail Students explore energy transfer as they drive a nail into a block. The concepts of kinetic and gravitational potential energy are introduced.	(MS-PS3-2) (MS-PS3-5)	Analyzing and Interpreting Data Planning and Carrying Out Investigations (Asking Questions and Defining Problems)	Cause and Effect Energy and Matter	PS3.A PS3.B PS3.C	RST.6-8.3; (RST.6-8.9); 6.SP.B.5 MATH: MP.2
55 ROLE PLAY: Roller Coaster Energy Students further examine energy transfer and the transformation between gravitational potential energy and kinetic energy in the context of roller coasters.	MS-PS3-5		Energy and Matter	PS3.A PS3.B	(RST.6-8.9); WHST.6-8.9 MATH: MP.2
56 INVESTIGATION: Shake the Shot Students add mechanical energy to a system and measure the temperature change that results from the energy transformation.	(MS-PS3-4) (MS-PS3-5)	Analyzing and Interpreting Data Planning and Carrying Out Investigations	Cause and Effect Energy and Matter	PS3.A PS3.B PS3.C	RST.6-8.3 MATH: MP.2; 6.SP.B.5
56A LABORATORY: Motors and Generators Students construct a simple motor from a wire coil, magnets, and batteries. They investigate ways of making the motor spin faster and observe that a magnetic field is produced around a	(MS-PS3-5)	Analyzing and Interpreting Data	Energy and Matter	PS2.B PS3.A PS3.B PS3.C	RST.6-8.3

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Energy					
current-carrying wire. Students then use a motor as a generator to light a light-emitting diode (LED).		Planning and Carrying Out Investigations Asking Questions and Defining Problems			
57 READING: Conservation of Energy Students read about the Law of the Conservation of Energy, the process of heat transfer during transformations and the principle of energy efficiency.	MS-PS3-7(MA)	Engaging in Argument from Evidence	(Interdependence of Science, Engineering, and Technology) Cause and Effect	PS3.A	RST.6-8.1; RST.6-8.2; WHST.6-8.9 MATH: MP.2; MP.4
58 INVESTIGATION: Follow the Energy Students identify different energy types as they follow energy movement in every day events.	MS-PS3-7(MA)		Energy and Matter	PS3.A PS3.B	RST.6-8.7
59 LABORATORY: Ice Melting Contest Students explore heat transfer by conduction as they design a method for melting an ice cube as quickly as possible.	MS-PS3-3 MS-PS3-6(MA)	Constructing Explanations and Designing Solutions	Cause and Effect Structure and Function (Energy and Matter)	PS3.A PS3.B	RST.6-8.3
60 MODELING: Ice-Preserving Contest Students design a container to preserve an ice-cube. They follow this up by reading about ice boxes and refrigeration.	MS-PS3-3 MS-PS3-6(MA)	Constructing Explanations and Designing Solutions	Structure and Function (Interdependence of Science, Engineering, and Technology) Cause and Effect (Energy and Matter)	PS3.A PS3.B ETS1.A ETS1.B ETS1.C	RST.6-8.7; (RST.6-8.1); (WHST.6-8.8); RST.6-8.3; (WHST.6-8.7); (WHST.6-8.9)

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Energy					
			(Systems and System Models)		
61 LABORATORY: Mixing Hot and Cool Water Students mix different temperatures and volumes of water in order to analyze the heat transfer that occurs.	MS-PS3-4 MS-PS3-6(MA)	Analyzing and Interpreting Data (Planning and Carrying Out Investigations)	Energy and Matter (Scale, Proportion, and Quantity)	PS3.A PS3.B	RST.6-8.7; RST.6-8.3 MATH: MP.2; MP.4; 6.SP.B.5; 6.NS.C.5; 6.RP.A.1; 7.RP.A.2
62 INVESTIGATION: Quantifying Energy Students measure temperature differences with a calorimeter and calculate the energy transferred from ice to water during melting.	MS-PS3-4	Analyzing and Interpreting Data Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	Energy and Matter (Scale, Proportion, and Quantity)	PS3.A PS3.B	RST.6-8.3 MATH: MP.2; MP.4; (6.EE.A.2)
63 LABORATORY: Measuring Calories Students use a calorimeter to measure the stored energy in a nut. They use the data to calculate the Calories in the nut.	MS-PS3-4	Analyzing and Interpreting Data Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	(Cause and Effect) Energy and Matter (Scale, Proportion, and Quantity)	PS1.B PS3.A PS3.B ETS1.C	RST.6-8.3 MATH: MP.2; MP.4; 6.RP.A.3; 6.SP.B.5; (6.EE.A.2)
64 READING: Electricity Generation Students investigate the sources of electricity in the United States. They read about renewable and non-renewable sources and discuss the		Engaging in Argument from Evidence	(Structure and Function) Interdependence of Science,	PS3.B	RST.6-8.1; RST.6-8.2; WHST.6-8.9

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Energy					
trade-offs of different electricity generation methods.			Engineering, and Technology (Influence of Engineering, Technology, and Science on Society and the Natural World) (Energy and Matter)		MATH: MP.2; MP.4; 6.RP.A.3; 6.SP.B.5; 6.RP.A.1; 7.RP.A.2
65 LABORATORY: Electrochemical Batteries Students build a wet cell to explore how different metals react to produce electrical energy. A small motor is used to detect the amount of energy the different reactions produce.		Developing and Using Models Analyzing and Interpreting Data (Planning and Carrying Out Investigations) Asking Questions and Defining Problems	(Cause and Effect) (Energy and Matter)		RST.6-8.3; WHST.6-8.9 MATH: 6.NS.C.5
65A LABORATORY: Energy and Magnetic Fields Students investigate magnetic fields using a plotting compass. They also read about some of the properties of fields and electromagnets.	(MS-PS2-5)		Energy and Matter	PS2.B	RST.6-8.3
66 INVESTIGATION: Connecting Circuits Students build simple circuits that transform electrical energy into light, sound, and mechanical energy. They test various materials for conductivity and explore series and parallel circuits.		Analyzing and Interpreting Data Planning and Carrying Out Investigations	(Energy and Matter)		RST.6-8.3 MATH: 6.NS.C.5

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Energy					
67 LABORATORY: Hot Bulbs Students calculate the efficiency of a flashlight bulb in producing light by measuring how much energy is "wasted" as thermal energy.	(MS-PS3-4)	Analyzing and Interpreting Data Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	(Cause and Effect) (Energy and Matter) Scale, Proportion, and Quantity	PS3.A PS3.B	RST.6-8.3 MATH: MP.2; MP.4; 6.RP.A.3; 6.SP.B.5; (6.EE.A.2); (7.EE.B.3); (7.EE.B.4); 6.RP.A.1; 7.RP.A.2
68 LABORATORY: Photovoltaic Cells Students experiment with photovoltaic cells as they explore the sunlight– electricity energy transformation		Analyzing and Interpreting Data (Planning and Carrying Out Investigations) Asking Questions and Defining Problems	Cause and Effect (Energy and Matter)	PS3.B	RST.6-8.3
69 LABORATORY: Solar Heating Students continue their exploration of solar energy by investigating a model solar heat collector and calculating its efficiency.	(MS-PS3-3)	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	Structure and Function Energy and Matter	PS3.B ETS1.A ETS1.B ETS1.C	RST.6-8.3 MATH: MP.2; (6.SP.B.4); (6.EE.A.2); (7.EE.B.3); (7.EE.B.4); 6.RP.A.1; 7.RP.A.2

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Energy					
70 MODELING: Collecting Solar Energy Students build and compare two boxes; one to absorb as much sunlight as possible and the other one to absorb as little sunlight as possible.	MS-PS3-3	Developing and Using Models Constructing Explanations and Designing Solutions	Structure and Function (Energy and Matter)	PS3.A ETS1.A ETS1.C	RST.6-8.3; (WHST.6-8.8); (WHST.6-8.7); (WHST.6-8.9)
71 READING: Household Energy Efficiency Students read about home energy use, ways to improve energy efficiency and methods of conserving energy.		Engaging in Argument from Evidence	Structure and Function Interdependence of Science, Engineering, and Technology	PS3.A PS3.B	(RST.6-8.1); WHST.6-8.1; WHST.6-8.9
72 INVESTIGATION: Improving Household Efficiency Students are presented with fictional scenarios of families who want to reduce their home energy cost. Using their knowledge of energy concepts, they conduct an economic analysis and make energy-saving recommendations that meet the needs of the family.		(Engaging in Argument from Evidence)	Structure and Function (Influence of Engineering, Technology, and Science on Society and the Natural World)	PS3.A PS3.B	RST.6-8.7; (WHST.6-8.8); (WHST.6-8.7); WHST.6-8.1; (WHST.6-8.9) MATH: MP.2; MP.4; (7.EE.B.3); (7.EE.B.4)

Grade 7

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Waves					
89 INVESTIGATION: It's a Noisy World This activity introduces sound intensity and the decibel scale. Students examine cards that represent the relative intensity of various sounds and learn that an increase of 10 dB is equivalent to a 10-fold increase in sound intensity.		Using Mathematics and Computational Thinking	Scale, Proportion, and Quantity		RST.6-8.3 MATH: MP.2; MP.4; 6.RP.A.3; (8.EE.A.3); 6.RP.A.1; 7.RP.A.2
90 LABORATORY: The Frequency of Sound Students make a pendulum to create a wave in yarn attached to the bottom of the pendulum. By varying the length of the pendulum, students change the frequency of the wave. They measure the wavelength associated with each frequency.	(MS-PS4-1)	Analyzing and Interpreting Data Planning and Carrying Out Investigations Using Mathematics and Computational Thinking	Scale, Proportion, and Quantity Patterns	PS4.A	(RST.6-8.9) MATH: MP.2; MP.4; 6.SP.B.5; (6.EE.A.2); 6.RP.A.1; 7.RP.A.2
91 LABORATORY: Longitudinal and Transverse Waves Using a long metal spring, students investigate transverse and longitudinal waves. They investigate such properties of the waves as wavelength and amplitude.		Planning and Carrying Out Investigations		PS4.A	RST.6-8.3; (RST.6-8.9)
92 INVESTIGATION: Noise-Induced Hearing Loss Students are introduced to the concept of noise-induced hearing loss. They analyze fictitious profiles and develop a list of strategies to reduce the risk of noise-induced hearing loss.			Cause and Effect		MATH: MP.2; MP.4; (6.SP.B.4)
93 READING: The Nature of Waves Students read about the properties of two major kinds of waves, sound and light. The nature of these waves, the role of media in their	(MS-PS4-2)		Scale, Proportion, and Quantity (Influence of Engineering,	PS4.A PS4.B	RST.6-8.7; RST.6-8.1; (RST.6-8.9); WHST.6-8.9 MATH: MP.2

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Waves					
propagation, and their speed in various media are described.			Technology, and Science on Society and the Natural World)		
94 LABORATORY: Comparing Colors Students explore of light by investigating the colors of the visible spectrum. Students first observe how a diffraction grating splits white light into its component colors. Then they investigate the frequency of the different colors of white light through the use of a phosphorescent material.		Engaging in Argument from Evidence Planning and Carrying Out Investigations		PS4.B	RST.6-8.3 MATH: MP.2; MP.4
95 LABORATORY: Selective Transmission Students learn more about the properties of light by investigating transmission, absorption, and reflection of waves outside the visible spectrum. Students investigate how three thin films, which all transmit visible light, selectively transmit waves that are not visible, such as ultraviolet.	(MS-PS4-2)	Analyzing and Interpreting Data Engaging in Argument from Evidence Planning and Carrying Out Investigations		PS4.B	RST.6-8.3 MATH: MP.2; MP.4; 6.SP.B.5
96 READING: The Electromagnetic Spectrum Students read about the kinds of electromagnetic energies emitted from the sun that are not visible. They refer to their knowledge of frequency, wavelength, and energy levels to learn about the discovery and applications of infrared energy and ultraviolet.			Scale, Proportion, and Quantity Influence of Engineering, Technology, and Science on Society and the Natural World Scale, Proportion, and Quantity	PS4.B	RST.6-8.1; WHST.6-8.9

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Waves					
			(Energy and Matter)		
97 LABORATORY: Reflection and Absorption Students compare the reflection and absorption of sunlight off a dark surface and reflective surface. Then they consider the increased health risks due to sunlight that is reflected onto the skin and eyes from sand, snow, or water.	(MS-PS4-2)	Analyzing and Interpreting Data Planning and Carrying Out Investigations	Cause and Effect	PS4.B	RST.6-8.3 MATH: MP.2; 6.SP.B.5
98 LABORATORY: Blocking Out Ultraviolet Students design an experiment that compares the effects of sunblock lotion and moisturizing lotion for their ability to transmit, reflect or absorb ultraviolet. They relate the results to the sun's effects on human health and actual use of sunscreens.		Analyzing and Interpreting Data Planning and Carrying Out Investigations			RST.6-8.3 MATH: 6.SP.B.5
99 TALKING IT OVER: Personal Protection Plan Students analyze a series of fictitious profiles to determine the relative risk of cataracts and skin cancer for each case. After analyzing these narratives, each student determines his or her own relative exposure risk from ultraviolet, and then creates a personal protection plan.		(Engaging in Argument from Evidence)	Cause and Effect		WHST.6-8.1 MATH: MP.2

Grade 8

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Weather and Atmosphere					
50 TALKING IT OVER : Weather Effects A fictional story focuses on how weather affects people's plans and activities. Students are introduced to four kinds of careers related to the science of weather. They then examine maps that show the relative level of risk of different weather disasters.	MS-ESS2-6				
51 COMPUTER INVESTIGATION: Investigating Local Weather Students record and analyze five days of daily weather data. They then record and graph local monthly weather averages. They compare daily weather conditions to the monthly weather data.		Planning and Carrying Out Investigations Analyzing and Interpreting Data	Patterns	(ESS2.C)	MATH: MP.2; (6.NS.C.5)
52 PROJECT: Local Weather History Students design and conduct a survey to learn about the history of weather disasters in the local area, and then compare the level of risk indicated by risk maps to local weather history.		Analyzing and Interpreting Data		(ESS2.C)	WHST:6-8.7 MATH: MP.2
53 PROBLEM SOLVING: Weather and Climate Students examine a climate map along with photos and descriptions of different climates. They identify their local climate as well as the climate for three different regions based on the climate graphs.	MS-ESS2-6	Constructing Explanations and Designing Solutions Analyzing and Interpreting Data	Patterns	ESS2.C (ESS3.C)	MATH: (MP.4); MP.2; 6.NS.C.5
54 PROBLEM SOLVING: The Earth's Surface Students use a gridded world map to estimate the amounts of earth's surface covered by water and land. As a class, they calculate the mean, median, and mode of their estimates to help determine an "accepted value" for the class.	MS-ESS2-6	Constructing Explanations and Designing Solutions Analyzing and Interpreting Data		(ESS2.C) (ESS2.D)	MATH: MP.2; (6.RP.A.1); (7.RP.A.2)

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Weather and Atmosphere					
		Planning and Carrying Out Investigations			
55 LABORATORY : Heating Earth Surfaces Students design an experiment to measure how the sun's energy heats land and water, as well as how quickly both of those substances cool. An Anticipation Guide reinforces the idea that differences in heating and cooling of land and water are important factors in determining climate.	MS-ESS2-6	Developing and Using Models Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations	Systems and System Models	(ESS2.C) (ESS2.D) (ESS3.C)	MATH: MP.2; 6.NS.C.5
56 PROBLEM SOLVING: Ocean Temperatures Students investigate the range of mean ocean surface temperatures around the globe. They map and discuss patterns of surface temperatures in particular regions of the oceans. The members of each small group then merge their findings and summarize global patterns.	MS-ESS2-6	Planning and Carrying Out Investigations Analyzing and Interpreting Data	Systems and System Models Energy and Matter Patterns	ESS2.C ESS2.D	MATH: (MP.4); MP.2
57 ROLE PLAY: Oceans and Climate Students learn more about how oceans affect climate. They participate in a role-play that discusses the history of the identification of the Gulf Stream and how modern technology is used to gather ocean data.	MS-ESS2-6		(Interdependence of Science, Engineering, and Technology) Energy and Matter Cause and Effect	ESS2.C ESS2.D	RST.6-8.7; WHST.6-8.9
58 READING: The Causes of Climate Students read about more factors affecting climate, including the sun's energy. A literacy strategy helps students comprehend the ideas presented in the text.	MS-ESS2-6	Constructing Explanations and Designing Solutions	Energy and Matter Cause and Effect	ESS2.C ESS2.D	RST.6-8.1; RST.6-8.7; WHST.6-8.9

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Weather and Atmosphere					
59 LABORATORY : Water as a Solvent Students compare the solubility of solids in three different solvents. The concept of water as the universal solvent is introduced, which helps students grasp the idea that most of the water on earth contains dissolved salts.	MS-ESS2-4	Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations		(ESS2.C)	
60 READING: Changing States of Water Students are introduced to the different forms of water and how they change from one to another. Teacher model changes in states of water, including demonstrations of evaporation and condensation. The class discusses the relationship between the changing states of water and the water cycle.	MS-ESS2-4	Constructing Explanations and Designing Solutions	Energy and Matter	ESS2.C	RST.6-8.1; RST.6-8.7; WHST.6-8.9
61 LABORATORY: Investigating Groundwater Students investigate the ability of water to filter through gravel and sand. The concept of groundwater is introduced.	MS-ESS2-4	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations	(Systems and System Models)	ESS2.C	
62 MODELING: Traveling on the Water Cycle Students simulate traveling with water molecules through the water cycle. After first choosing a starting point in the water cycle, students roll a number cube to determine where the water will go next. After making at least six stops, students write a story that describes traveling with their water.	MS-ESS2-4		Systems and System Models Scale, Proportion, and Quantity Energy and Matter	ESS2.C	(WHST.6-8.2)

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Weather and Atmosphere					
			(Influence of Engineering, Technology, and Science on Society and the Natural World)		
63 LABORATORY: Investigating Air Students explore the nature of air by making on air pressure and on the interaction of air and a chemical indicator. This gives them direct evidence that, although air can be invisible in their everyday experience, it is made up of gases that have distinct properties.		Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations		(ESS2.C)	
64 COMPUTER SIMULATION: Earth's Atmosphere Students use a computer simulation to sample air composition, temperature, and pressure at different altitudes above earth's surface. They take three samples within each atmospheric layer and calculate the average values. They then compare the properties of the different atmospheric layers.	MS-ESS2-5	Analyzing and Interpreting Data		(ESS2.C)	MATH: (6.RP.A.1); (7.RP.A.2)
65 INVESTIGATION: History of Earth's Atmosphere Students place in chronological order eight cards describing the history of earth's atmosphere. With these cards they examine the relative amounts of carbon dioxide and oxygen gases at different times in earth's history, and the role of living organisms in determining the composition of the atmosphere.		Analyzing and Interpreting Data Constructing Explanations and Designing Solutions	Scale, Proportion, and Quantity Stability and Change	(ESS2.C) (ESS3.D)	MATH: (6.RP.A.1); (7.RP.A.2)
66 READING: Atmosphere and Climate Students read about the relationship between earth's atmosphere and its weather and climate. A literacy strategy helps them comprehend the ideas presented in the text.	MS-ESS2-5		Energy and Matter Stability and Change	ESS2.C ESS2.D (ESS3.D)	WHST.6-8.2; RST.6-8.1; WHST.6-8.9

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Weather and Atmosphere					
67 LABORATORY: Measuring Wind Speed and Direction Students are introduced to the Beaufort wind scale and its development. They work in groups to design, build, and test instruments for measuring wind speed and direction. After improving their instruments, they use them to collect wind data.	MS-ESS2-5	Analyzing and Interpreting Data Planning and Carrying Out Investigations Constructing Explanations and Designing Solutions	(Interdependence of Science, Engineering, and Technology)		
68 COMPUTER SIMULATION: Worldwide Wind Students use a computer simulation to identify the most common wind direction in a particular location. They share their data with the class and construct a map of global wind patterns.	MS-ESS2-5	Analyzing and Interpreting Data Planning and Carrying Out Investigations	Systems and System Models Patterns Energy and Matter	ESS2.C	
69 INVESTIGATION: Forecasting Weather Students work together to interpret a weather map and construct a weather report. Each group then presents a weather report to the class. Students use this information to forecast the next day's weather.	MS-ESS2-5		Systems and System Models Interdependence of Science, Engineering, and Technology Cause and Effect Stability and Change Patterns	ESS2.D	
70 TALKING IT OVER: People and Weather Students analyze reports from a hydrologist, climatologist, atmospheric scientist, and meteorologist about the fictional town of		Analyzing and Interpreting Data	Influence of Engineering, Technology, and Science on Society	ESS2.D	(SL.8.5); RST.6-8.1; RST.6-8.7; WHST.6-8.1 MATH: MP.2

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Weather and Atmosphere					
Sunbeam City. They consider what role people play in affecting a region's weather and atmosphere.		Engaging in Argument from Evidence (Asking Questions and Defining Problems)	and the Natural World Patterns Stability and Change		

Grade 8

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Exploring Space					
85 INVESTIGATION: History of Space Exploration Students are introduced to the history of space exploration and share their knowledge of the solar system.			Patterns Influence of Engineering, Technology, and Science on Society and the Natural World		
86 INVESTI GATIO N: Observing Objects in Space Students observe photographs to help identify planets and stars. They are encouraged to make their own observations outside.				(ESS1.A)	
87 READING: Telescope Technology Students read about the development of the modern telescope. The work of famous astronomers Galileo, Hale, Leavitt, and Hubble are highlighted.			Influence of Engineering, Technology, and Science on Society and the Natural World		RST.6-8.1
88 INVESTIGATION: Classifying Space Objects Students learn to identify and classify celestial bodies based on their characteristics.		Constructing Explanations and Designing Solutions Engaging in Argument from Evidence		(ESS1.A) ESS1.B	WHST.6-8.1
89 INVESTIGATION: Where in the Solar System Am I? Students use descriptions of planets' characteristic to identify four different planets presented in a science-fiction scenario.				(ESS1.A) (ESS1.B)	(WHST.6-8.2) MATH: 6.NS.C.5

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Exploring Space					
90 MODELING: Drawing the Solar System Students use a scale to make an accurate drawing of distances to the planets. They investigate the problem of using the same scale when drawing the distance to and diameter of the planets.	MS-ESS1-3	Developing and Using Models Analyzing and Interpreting Data	Scale, Proportion, and Quantity Systems and System Models	(ESS1.A) ESS1.B	MATH: (MP.4); (6.RP.A.1); (7.RP.A.2); MP.2
91 PROJECT: How Big Are the Planets? Students determine a scale for modeling the size of the planets and then make a physical model that compares the planets.	MS-ESS1-3	Developing and Using Models Analyzing and Interpreting Data Constructing Explanations and Designing Solutions	Scale, Proportion, and Quantity Systems and System Models	ESS1.B	MATH: (MP.4); (6.RP.A.1); (7.RP.A.2); MP.2
92 READING: The Nearest Star: the Sun Students read about characteristics of the Sun such as its size, distance, composition, and its place as a star in the solar system.		Engaging in Argument from Evidence		(ESS1.A) ESS1.B	RST.6-8.1; RST.6-8.7; WHST.6-8.9; WHST.6-8.1
93 LABORATORY : Picturing Without Seeing Students use measuring probes to make a remote sensing image of an unseen planetary surface. This measuring-and mapping technique is then related to applications in space science.		Developing and Using Models Planning and Carrying Out Investigations	Systems and System Models		MATH: (6.RP.A.1); (7.RP.A.2); MP.2
94 INVESTIGATION: Remote Sensing Students apply knowledge of remote sensing and planetary characteristics to observing and comparing remote sensing images of the surface technology of three planets.		Analyzing and Interpreting Data	Interdependence of Science, Engineering, and Technology		
95 INVESTIGATION: Universal Gravitation Students analyze data of gravitational pull between space objects. Mass and distance are related to the force of gravity.	(MS-ESS1-2)	Constructing Explanations and Designing Solutions	Systems and System Models Patterns	ESS1.B	WHST.6-8.1 MATH: MP.2

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Exploring Space					
		Engaging in Argument from Evidence	Cause and Effect		
96 READING: The Effects of Gravity Students read a summary about universal gravitation and are introduced to how gravity is related to weight, weightlessness, and orbiting objects.	(MS-ESS1-2)	Constructing Explanations and Designing Solutions	Systems and System Models Cause and Effect	ESS1.B	RST.6-8.1 MATH: MP.2
97 ROLE PLAY: Exploring Outer Space Students participate in a role-play that discusses the advantages and disadvantages of piloted and unpiloted space missions.			(Interdependence of Science, Engineering, and Technology)		
98 TALKING IT OVER: Choosing a Mission Students consider the benefits and trade-offs of four different space exploration proposals and make a recommendation of which one to fund.		(Analyzing and Interpreting Data) (Asking Questions and Defining Problems)			(SL.8.5)

Grade 8

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
The Chemistry of Materials					
12 INVESTIGATION: Evaluating Materials Students compare aluminum, glass, and plastic in order to choose the best material for soft drink containers.		Analyzing and Interpreting Data Engaging in Argument from Evidence	(Structure and Function) Interdependence of Science, Engineering, and Technology Cause and Effect Patterns		(RST.6-8.1); RST.6-8.3; WHST.6-8.1 MATH: MP.2; MP.4; (6.SP.B.4)
13 READING: Product Life Cycle Students construct a life cycle diagram after reading about the life cycle of glass, metal, and plastic drink containers.	MS-PS1-3		(Structure and Function) Interdependence of Science, Engineering, and Technology Cause and Effect		RST.6-8.7; RST.6-8.1; (WHST.6-8.8); (WHST.6-8.7); (SL.8.5); (WHST.6-8.9)
14 LABORATORY: Physical and Chemical Properties of Materials Students test and group 6 different materials based on their chemical and physical properties.	MS-PS1-2	Planning and Carrying Out Investigations	(Structure and Function)	PS1.A	RST.6-8.3
15 INVESTIGATION: Families of Elements Students group elements based on chemical and physical properties and then analyze families of elements as historically defined by scientists.		(Developing and Using Models)	Patterns	PS1.A	RST.6-8.3 MATH: MP.2; (6.SP.B.4)
16 READING: Elements and the Periodic Table Students read about elements, their combination in compounds, and the historical development of the Periodic Table.	MS-PS1-9(MA)		(Scale, Proportion, and Quantity) Patterns	PS1.A	(RST.6-8.7); RST.6-8.1 MATH: 6.RP.A.3; 6.RP.A.1; 7.RP.A.2

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
The Chemistry of Materials					
17 MODELING: Modeling Molecules Students use models to explore the concepts of element, molecules, and compounds.	MS-PS1-1 MS-PS1-9(MA)	Developing and Using Models	Scale, Proportion, and Quantity (Patterns) Energy and Matter (Systems and System Models)	PS1.A	
18 LABORATORY: Properties of Plastics Students explore the properties of four common plastics to determine how these properties affect the common uses of these plastics.		(Planning and Carrying Out Investigations)	(Structure and Function)	PS1.A	RST.6-8.3; (6.SP.B.4)
19 LABORATORY: Creating New Materials Students observe and compare the properties of reactants and a product as they cross-link polyvinyl alcohol with sodium borate to produce a new polymer.	MS-PS1-2	(Analyzing and Interpreting Data)	(Structure and Function)	PS1.A PS1.B	RST.6-8.3
20 MODELING: Modeling Polymers Students study the structure and properties of polymer molecules by making different models of polymers.	MS-PS1-1 MS-PS1-9(MA)	Developing and Using Models	Scale, Proportion, and Quantity Patterns (Structure and Function) Cause and Effect (Systems and System Models)	PS1.B	RST.6-8.3; (RST.6-8.7)
21 READING: Polymer Parts Students read about synthetic polymers and the cross-linking process, which changes the chemical structure of a polymer.	(MS-PS1-3) MS-PS1-9(MA)		Scale, Proportion, and Quantity Patterns	PS1.A PS1.B	(RST.6-8.7); RST.6-8.1; RST.6-8.3; RST.6-8.2; WHST.6-8.9

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
The Chemistry of Materials					
			Structure and Function Interdependence of Science, Engineering, and Technology (Influence of Engineering, Technology, and Science on Society and the Natural World)		
22 INVESTIGATION: Environmental Impact of Computers Students consider the material composition of a computer and its environmental impact by constructing a pie chart or graph.		Analyzing and Interpreting Data	(Influence of Engineering, Technology, and Science on Society and the Natural World) Patterns		MATH: MP.2; MP.4; (6.SP.B.4); 6.SP.B.5
23 LABORATORY: Producing Circuit Boards Students simulate the etching of computer circuit boards and then read about their manufacturer and the resulting waste.			(Structure and Function) Interdependence of Science, Engineering, and Technology (Influence of Engineering, Technology, and	PS1.B	RST.6-8.1; RST.6-8.3; RST.6-8.2

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
The Chemistry of Materials					
			Science on Society and the Natural World)		
24 LABORATORY: Diluting the Problem Students explore one method of treating used copper chloride from circuit board production: dilution. They then determine the concentration of copper in the used copper chloride waste solution.		(Planning and Carrying Out Investigations)	(Scale, Proportion, and Quantity)		RST.6-8.3 MATH: MP.2; MP.4; 6.RP.A.3; 6.SP.B.5; (7.EE.B.3); 6.RP.A.1; 7.RP.A.2
25 LABORATORY: Conservation of Mass Students conduct two chemical reactions in closed containers in order to compare mass before and after a chemical reaction has taken place. They compare the change in mass to the same reactions in open containers, and use this data to support the Law of Conservation of Mass.	MS-PS1-2 MS-PS1-5	(Planning and Carrying Out Investigations) Using Mathematics and Computational Thinking	(Scale, Proportion, and Quantity) Energy and Matter	PS1.B	RST.6-8.3 MATH: MP.2; 6.SP.B.5
26 LABORATORY: Incinerating the Waste Simulated metal waste is burned, and students test the resulting smoke and ash for the presence of potential toxic metals.			(Energy and Matter)		RST.6-8.3
27 LABORATORY: Reclaiming the Metal Students investigate the use of three metal replacement reactions to extract copper from the used copper chloride solution.	MS-PS1-2	Planning and Carrying Out Investigations (Engaging in Argument from Evidence)	(Energy and Matter)	PS1.B	RST.6-8.3; (SL.8.5) MATH: MP.2; 6.RP.A.1; 7.RP.A.2
28 LABORATORY: Another Approach to Metal Reclamation Students precipitate copper compounds from used copper chloride and then decide upon a disposal method for the waste copper chloride solution.	MS-PS1-2	(Engaging in Argument from Evidence)		PS1.B	RST.6-8.3; WHST.6-8.1 MATH: MP.2

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
The Chemistry of Materials					
29 TALKING IT OVER: The Green Computer Decision From four proposals, students recommend a computer purchase based on many factors including the environmental impact of the life cycle of the computer chosen.		(Obtaining, Evaluating, and Communicating Information) (Engaging in Argument from Evidence) Using Mathematics and Computational Thinking			RST.6-8.1; WHST.6-8.1; SL.8.5 MATH: MP.2; MP.4; (7.EE.B.3)

Grade 8

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Genetics					
54 INVESTIGATION: Investigating Human Traits Students collect data on six human characteristics and discuss causes of human variation.		Analyzing and Interpreting Data	Patterns		(SL.8.1) MATH: (6.SP.A.2); (6.SP.B.4)
55 LABORATORY: Plants Have Genes, Too! Students germinate seeds and use information about the parent plants to predict offspring color.	MS-LS1-5		Cause and Effect Patterns	LS1.B LS3.A LS3.B	(RST.6-8.4)
56 VIEW AND REFLECT: Joe's Dilemma After reading a fictional story about a child who may have the Marfan syndrome, students watch a video on this genetic disease.					(RST.6-8.4); WHST.6-8.9; RST.6-8.9
57 READING: Reproduction Students read about the differences between sexual and asexual reproduction at the cellular level.	MS-LS3-2 MS-LS4-5 MS-LS3-4(MA)			LS1.B LS3.A	RST.6-8.1; (RST.6-8.2); WHST.6-8.2; WHST.6-8.9; WHST.6-8.7; (RST.6-8.4); RST.6-8.7
58 MODELING: Creature Features Students develop models to investigate the inheritance of a trait in imaginary creatures.	MS-LS3-3(MA)	Developing and Using Models Engaging in Argument from Evidence	Cause and Effect	LS1.B LS3.A LS3.B	WHST.6-8.1; WHST.6-8.9; (SL.8.1)
59 INVESTIGATION: Gene Combo Students model the inheritance of single-gene traits by collecting and analyzing data from coin tosses.	MS-LS3-2	Developing and Using Models Using Mathematics and Computational Thinking	Cause and Effect Patterns	LS1.B LS3.A LS3.B	(RST.6-8.4) MATH: MP.4; (6.RP.A.1); (7.RP.A.2)
60 READING: Mendel, First Geneticist Students read about Gregor Mendel's experiments with pea plants.	MS-LS3-3(MA)	Using Mathematics and Computational Thinking	Cause and Effect Patterns	LS1.B LS3.A LS3.B	WHST.6-8.9; WHST.6-8.7; RST.6-8.7; RST.6-8.9

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Genetics					
					MATH: MP.4; (6.RP.A.1); (7.RP.A.2)
61 PROBLEM SOLVING: Gene Squares Students use Punnett squares to predict the approximate frequencies of traits among offspring.	MS-LS3-2 MS-LS3-3(MA)	Developing and Using Models Using Mathematics and Computational Thinking	Cause and Effect	LS1.B LS3.A LS3.B	(RST.6-8.4); 7.RP.A.2 MATH: MP.4; (6.RP.A.1)
62 LABORATORY: Analyzing Genetic Data Students quantify and analyze results of the seeds germinated in Activity 55. [optional web based activity on Life Cycles of Plants and Animals, including a flower dissection.]	MS-LS1-5 MS-LS3-3(MA)	Engaging in Argument from Evidence Analyzing and Interpreting Data	Cause and Effect	LS1.B LS3.A LS3.B	(SL.8.1); WHST.6-8.9; RST.6-8.9 MATH: (6.SP.B.5); MP.4; (6.RP.A.1); (7.RP.A.2)
63 READING: Show Me the Genes! Students read about the behavior of chromosomes and the function of DNA during sexual reproduction. [optional web based activity on Human Reproduction]	MS-LS3-1 MS-LS3-2 MS-LS3-3(MA)		Cause and Effect (Stability and Change)	LS1.B LS3.A LS3.B	WHST.6-8.7; RST.6-8.7
64 LABORATORY: Nature and Nurture Students design an experiment to investigate the effect of the environment on seedling color.	MS-LS1-5	Analyzing and Interpreting Data	Cause and Effect	LS1.B LS3.B LS4.B	MATH: MP.4; (6.RP.A.1); (7.RP.A.2)
65 INVESTIGATION: Breeding Critters—More Traits Students create imaginary critter offspring to model patterns of inheritance.	(MS-LS1-5) MS-LS3-2	Developing and Using Models	Cause and Effect	LS1.B LS3.B	(RST.6-8.4) MATH: MP.4
66 PROBLEM-SOLVING: Patterns in Pedigrees Students use Punnett squares and pedigrees to analyze patterns of inheritance.	MS-LS3-2	Engaging in Argument from Evidence Analyzing and Interpreting Data	Cause and Effect Patterns	LS1.B LS3.B	(RST.6-8.4); WHST.6-8.9; (SL.8.1)

SEPUP Unit: Activity	Performance Expectation	Practices	Crosscutting Concepts	Disciplinary Core Ideas	Common Core ELA/Mathematics
Genetics					
67 TALKING IT OVER: What Would You Do? Students re-visit the Marfan scenario from Activity 56 and discuss the trade-offs of genetic testing.		Engaging in Argument from Evidence			WHST.6-8.9; (SL.8.1); (WHST.6-8.8); WHST.6-8.7 Math:(6.SP.B.5)
68 INVESTIGATION: Searching for the Lost Children After being introduced to a story about children lost during war, students apply blood group genetics to evaluating parent/child matches.			Cause and Effect	LS3.B	WHST.6-8.7; RST.6-8.7
69 MODELING: Evidence from DNA Students perform a DNA fingerprinting simulation to generate different-sized pieces of DNA.					(RST.6-8.4); (WHST.6-8.8); WHST.6-8.7
70 INVESTIGATION: Finding the Lost Children Students use DNA fingerprints to gather additional evidence about the lost children introduced in Activity 68.		Engaging in Argument from Evidence			WHST.6-8.1
71 TALKING IT OVER: Should We? Students learn about the work of Dr. Mary-Claire King, who helped families in Argentina find their lost children and explore the ethics of using genetic information.		Engaging in Argument from Evidence			(SL.8.1); (WHST.6-8.8); WHST.6-8.7