Lab-Aids Correlations for

2016 MISSOURI SCIENCE GRADE-LEVEL EXPECTATIONS

MIDDLE SCHOOL – GRADES 6-8

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This document is intended to show how the SEPUP 3rd edition materials align with the *2016 Missouri Department of Elementary and Secondary Education 6-12 Science Grade-Level Expectations.*[1]

ABOUT OUR PROGRAMS

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

SEPUP

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

Middle Level, Grades 6-8

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

[1] https://dese.mo.gov/sites/default/files/curr-mls-standards-sci-6-12-sboe-2016.pdf

ABOUT THE LAB-AIDS CITATIONS

The following tables are presented in a Disciplinary Core Idea arrangement – Physical Sciences (PS), Life Science (LS), Earth and Space Sciences (ESS), and Engineering, Technology and Applications of Science (ETS).

Citations included in the correlation document are as follows:

Missouri Grade-Level Expectations: 6-8.PS1.A.1

SEPUP Unit title: *The Chemistry of Materials:*

Activity Numbers 2, 12, 14*

* indicates where Performance Expectation is assessed

Physical Sciences

Concept	Grade-Level Expectation Statement	SEPUP Unit and Activity Number
PS-1 Matter and Its Interactions A - Structure and Properties of Matter	6-8.PS1.A.1 Develop models to describe the atomic composition of simple molecules and extended structures. [Clarification Statement: Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer representations showing different molecules with different types of atoms.	*Chemistry of Materials:* 2, 6, 7, 12*
	6-8.PS1.A.2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. [Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.]	*Chemical Reactions:* *1, 2, 3, 4, 5**
	6-8.PS1.A.3 Gather, analyze, and present information to describe that synthetic materials come from natural resources and how they impact society. [Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.]	*Chemistry of Materials:* 1, 2, 3, 4, 5, 11, 12, 13*
	6-8.PS1.A.4 Develop a model that describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. [Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawings and diagrams. Examples of particles could include molecules or inert atoms. Examples of pure substances could include water, carbon dioxide, and helium.]	*Chemistry of Materials:* 8, 9, 10
PS-1 Matter and Its Interactions B - Chemical Reactions	6-8.PS1.B.1 Develop and use a model to describe how the total number of atoms remains the same during a chemical reaction and thus mass is conserved. [Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms that represent atoms.]	*Chemical Reactions:* *1, 2, 3, 4, 5, 6, 7**
	6-8.PS1.B.2 Construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. [Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.]	*Chemical Reactions:* *2, 3, 5, 8, 9, 10, 11**

Concept	Grade-Level Expectation Statement	SEPUP Unit and Activity Number
PS2 - Motion and Stability: Forces and Interactions A - Forces and Motion	6-8.PS2.A.1 Apply physics principles to design a solution that minimizes the force of an object during a collision and develop an evaluation of the solution.	*Force and Motion:* 1, 10, 11, 12*
	6-8.PS2.A.2 Plan and conduct an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. [Clarification Statement: Emphasis is on balanced (Newton's First Law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton's Second Law), frame of reference, and specification of units.]	*Force and Motion:* 1, 6, 7, 8, 9, 13*
PS2 - Motion and Stability: Forces and Interactions B - Types of Interactions	6-8.PS2.B.1 Analyze diagrams and collect data to determine the factors that affect the strength of electric and magnetic forces. [Clarification Statement: Examples of devices that use electric and magnetic forces could include electromagnets, electric motors, or generators. Examples of data could include the effect of the number of turns of wire on the strength of an electromagnet, or the effect of increasing the number or strength of magnets on the speed of an electric motor.]	*Fields and Interactions:* 7, 8, 9, 12, 13*, 14
	6-8.PS2.B.2 Create and analyze a graph to use as evidence to support the claim that gravitational interactions depend on the mass of interacting objects. [Clarification Statement: Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the sun, and orbital periods of objects within the solar system.]	*Fields and Interaction:* 3, 4, 7*
	6-8.PS2.B.3 Conduct an investigation and evaluate the experimental design to provide evidence that electric and magnetic fields exist between objects exerting forces on each other even though the objects are not in contact. [Clarification Statement: Examples of this phenomenon could include the interactions of magnets, electrically-charged strips of tape, and electrically-charged pith balls. Examples of investigations could include first-hand experiences or simulations.]	*Fields and Interaction:* 5, 7, 9, 10, 12*
PS3 - Energy A - Definitions of Energy	6-8.PS3.A.1 Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. [Clarification Statement: Emphasis is on descriptive relationships between kinetic energy and mass separately from kinetic energy and speed. Examples could include riding a bicycle at different speeds, rolling different sizes of rocks downhill, and getting hit by a whiffle ball versus a tennis ball.]	*Force and Motion:* *1, 2, 3, 4, 5**
	6-8.PS3.A.2 Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. [Clarification Statement: Emphasis is on relative amounts of potential energy, not on calculations of potential energy. Examples of objects within systems interacting at varying distances could include: the Earth and either a roller coaster cart at varying positions on a hill or objects at varying heights on shelves, changing the direction/orientation of a magnet, and a balloon with static electrical charge being	*Fields and Interaction:* 3, 4, 6, 7, 10, 11*

Concept	Grade-Level Expectation Statement	SEPUP Unit and Activity Number
	brought closer to a classmate's hair. Examples of models could include representations, diagrams, pictures, and written descriptions of systems.]	
	6-8.PS3.A.3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. [Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup.]	*Energy:* 1, 7, 8, 10, 11, 12, 13*
	6-8.PS3.A.4 Plan and conduct an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the temperature of the sample. [Clarification Statement: Examples of experiments could include comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature, the temperature change of samples of different materials with the same mass as they cool or heat in the environment, or the same material with different masses when a specific amount of energy is added.]	*Energy:* 1, 4, 6, 7, 8*
PS3 - Energy B - Conservation of Energy and Energy Transfer	6-8.PS3.B.1 Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. [Clarification Statement: Examples of empirical evidence used in arguments could include an inventory or other representation of the energy before and after the transfer in the form of temperature changes or motion of object.]	*Energy:* 2, 3, 4, 5, 6*
PS3 - Energy A - Wave Properties	6-8.PS4.A.1 Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. [Clarification Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.]	*Waves:* 1, 2, 3, 7*
	6-8.PS4.A.2 Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. [Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.]	*Waves:* 3, 4, 8, 9, 10, 11, 12, 13*

Life Sciences

Concept	Grade-Level Expectation Statement	SEPUP Unit and Activity Number
LS1 - From Molecules to Organisms: Structure and Processes A - Structure and Function	6-8.LS1.A.1 Provide evidence that organisms (unicellular and multicellular) are made of cells and that a single cell must carry out all of the basic functions of life. [Clarification Statement: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living things, and understanding that living things may be made of one cell or many and varied cells.]	*From Cells to Organisms:* 1, 2, 3, 4, 9*
	6-8.LS1.A.2 Develop and use a model to describe the function of a cell as a whole and ways parts of the cells contribute to that function.[Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.]	*From Cells to Organisms:* 6, 7, 8*
	6-8.LS1.A.3 Develop an argument supported by evidence for how multicellular organisms are organized by varying levels of complexity; cells, tissue, organs, organ systems.	*Body Systems:* 2, 3, 4, 9, 10, 11, 12*
	6-8.LS1.A.4 Present evidence that body systems interact to carry out key body functions, including providing nutrients and oxygen to cells, removing carbon dioxide and waste from cells and the body, controlling body motion/activity and coordination, and protecting the body.	*Body Systems:* 1, 2, 3, 4, 5, 7, 8, 9, 10, 11
LS1 - From Molecules to Organisms: Structure and Processes B - Growth and Development	6-8.LS1.B.1 Construct an explanation for how characteristic animal behaviors as well as specialized plant structures affect the probability of successful reproduction of animals and plants respectively. [Clarification Statement: Examples of animal behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds; and, creating conditions for seed germination and growth. Examples of plant structures that affect the probability of plant reproduction could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.]	*Reproduction:* 10*, 11*
	6-8.LS1.B.2 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. [Clarification Statement: Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include large breed cattle and species of grass affecting growth of organisms. Examples of evidence could include drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds.]	*Reproduction:* 1, 7*
	6-8.LS1.C.1 Construct a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of organisms.	*From Cells to Organisms*: 12, 13*

Concept	Grade-Level Expectation Statement	SEPUP Unit and Activity Number
LS2 - Ecosystems: Interactions, Energy, and Dynamics A - Interdependent Relationships in Ecosystems	6-8.LS2.A.1 Analyze and interpret data to provide evidence for the effects of resource availability on individual organisms and populations of organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.].	*Ecology:* 5, 6, 9*
	6-8.LS2.A.2 Construct an explanation that predicts the patterns of interactions among and between the biotic and abiotic factors in a given ecosystem. [Clarification Statement: Relationships may include competition, predation, and symbiosis.]	*Ecology:* 2, 8, 10*
LS2 - Ecosystems: Interactions, Energy, and Dynamics B - Cycles of Matter and Energy Transfer in Ecosystems	6-8.LS2.B.1 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, including food chains and food webs.]	*Ecology:* 7, 8, 11, 12*
LS2 - Ecosystems: Interactions, Energy, and Dynamics C - Ecosystem Dynamics, Functioning and Resilience	6-8.LS2.C.1 Construct an argument supported by empirical evidence that explains how changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making inferences about changes in populations, defining the boundaries of the system, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]	*Ecology:* 1, 2, 3, 4, 5, 6, 13, 14*
	6-8.LS2.C.2. Evaluate benefits and limitations of differing design solutions for maintaining an ecosystem. [Clarification Statement: Examples of design solutions could include water, land, and species protection, and the prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]	*Ecology:* 2, 4, 15*

Concept	Grade-Level Expectation Statement	SEPUP Unit and Activity Number
LS4 - Biological Evolution; Unity and Diversity A - Evidence of Common Ancestry and Diversity	6-8.LS4.A.1 Analyze and interpret evidence from the fossil record to infer patterns of environmental change resulting in extinction and changes to life forms throughout the history of the Earth. [Clarification Statement: Examples of evidence include sets of fossils that indicate an environment, anatomical structures that indicate the function of an organism in the environment, and fossilized tracks that indicate behavior of organisms.]	*Evolution:* 7, 8, 9, 10 11*
LS4 - Biological Evolution; Unity and Diversity B - Natural Selection	6-8.LS4.B.1 Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. [Clarification Statement: Emphasis is on using simple probability statements and proportional reasoning to construct explanations.]	*Evolution:* 1, 2, 3, 4*
	6-8.LS4.B.2 Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. [Clarification Statement: Emphasis is on synthesizing information from reliable sources about the influence of humans on genetic outcomes in artificial selection (such as genetic modification, animal husbandry, and farming practices).]	*Evolution:* 14, 15, 16*
LS4 - Biological Evolution; Unity and Diversity C - Adaptation	6-8.LS4.C.1 Interpret graphical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.	*Evolution:* 1, 2, 3, 4, 5, 6*

Earth and Space Sciences

Concept	Grade-Level Expectation Statement	SEPUP Unit and Activity Number
ESS1 - Earth's Place in the Universe A - The Universe and its Stars	6-8.ESS1.A.1 Develop and use a model of the Earth-sun-moon system to explain the cyclic patterns 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.]	*Solar System and Beyond:* 2, 3, 4, 5*
	6-8.ESS1.A.2 Develop and use a model of the Earth-sun system to explain the cyclical pattern of seasons, which includes the Earth's tilt and directional angle of sunlight on different areas of Earth across the year. [Clarification Statement: Examples of models can be physical, graphical, or conceptual.]	*Solar System and Beyond:* 6, 7, 8, 9*
	6-8.ESS1.A.3 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. [Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical or conceptual.]	*Solar System and Beyond:* 10, 11, 12, 14, 15, 16*
ESS1 - Earth's Place in the Universe B - Earth and the Solar System	6-8.ESS1.B.1 Analyze and interpret data to determine scale properties of objects in the solar system. [Clarification Statement: Examples of scale properties include the sizes of an object's layers (such as crust and atmosphere), surface features (such as volcanoes), and orbital radius. Examples of data include statistical information, drawings and photographs, and models.]	*Solar System and Beyond:* 1, 10, 11, 12, 13*
ESS1 - Earth's Place in the Universe C - The History of Planet Earth	6-8.ESS1.C.1 Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's history. [Clarification Statement: Emphasis is on how analyses of rock formations and the fossils they contain are used to establish relative ages of major events in Earth's history. Examples of Earth's major events could range from being very recent (such as the last Ice Age or the earliest fossils of homo sapiens) to very old (such as the formation of Earth or the earliest evidence of life). Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.]	*Earth's Resources:* 9, 10, 11, 12*

Concept	Grade-Level Expectation Statement	SEPUP Unit and Activity Number
ESS2 - Earth's Systems A - Earth Materials and Systems	6-8.ESS2.A.1 Develop and use a model to illustrate that energy from the Earth's interior drives convection which cycles Earth's crust leading to melting, crystallization, weathering and deformation of large rock formations, including generation of ocean sea floor at ridges, submergence of ocean sea floor at trenches, mountain building and active volcanic chains. [Clarification Statement: The emphasis is on large-scale cycling resulting from plate tectonics that includes changes in rock types through erosion, heat and pressure.]	*Geological Processes:* *2, 5, 8, 9, 10, 11, 13, 14, 15**
	6-8.ESS2.A.2 Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. [Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.]	*Geological Processes:* 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13* *Land, Water, and Human Interactions:* *3,* 4, 6, 7, 8, 10, 11, 12, 13, 14*
ESS2 - Earth's Systems B - Plate Tectonics and Large-Scale Systems	6-8.ESS2.B.1 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. [Clarification Statement: Examples of data include similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches).]	*Geological Processes:* 10, 11, 12, 13, 14*
ESS2 - Earth's Systems C - The Role of Water in Earth's Surface Processes	6-8.ESS2.C.1 Design and develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. [Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.]	*Land, Water, and Human Interactions:* 2, 5, 7, 8, 9*
	6-8.ESS2.C.2 Research, collect, and analyze data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. [Clarification Statement: Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather (defined by temperature, pressure, humidity, precipitation, and wind) at a fixed location to change over time, and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within possible ranges. Examples of data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through laboratory experiments (such as with condensation).]	*Weather and Climate:* 2, 3, 7, 9, 10, 11, 12, 13*

Concept	Grade-Level Expectation Statement	SEPUP Unit and Activity Number
	6-8.ESS2.C.3 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. [Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.]	*Weather and Climate:* 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14*
ESS3 – Earth and Human Activity A - Natural Resources	6-8.ESS3.A.1 Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes and human activity. [Clarification Statement: Emphasis is on how these resources are limited and typically non-renewable, and how their distributions are significantly changing as a result of removal by humans. Examples of uneven distributions of resources as a result of past processes include but are not limited to petroleum (locations of the burial of organic marine sediments and subsequent geologic traps), metal ores (locations of past volcanic and hydrothermal activity associated with subduction zones), and soil (locations of active weathering and/or deposition of rock).]	*Geological Processes:* 2, 16*, 17* *Earth's Resources:* 1, 2, 3, 5, 7, 8, 14*
ESS3 – Earth and Human Activity B - Natural Hazards	6-8.ESS3.B.1 Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. [Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards can be taken from interior processes (such as earthquakes and volcanic eruptions), surface processes (such as mass wasting and tsunamis), or severe weather events (such as hurricanes, tornadoes, and floods). Examples of data can include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies can be global (such as satellite systems to monitor hurricanes or forest fires) or local (such as building basements in tornado-prone regions or reservoirs to mitigate droughts).]	*Geological Processes:* 1, 3, 4, 6, 7, 8, 11, 18*
ESS3 – Earth and Human Activity C - Human Impact on Earth's Systems	6-8.ESS3.C.1 Analyze data to define the relationship for how increases in human population and per-capita consumption of natural resources impact Earth's systems. [Clarification Statement: Examples of data include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they change.]	*Earth's Resources:* 2, 4, 6, 13* *Evolution:* 14
	6-8.ESS3.C.2 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. [Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).]	*Land, Water, and Human Interactions:* 1, 3, 4, 5, 6, 9, 13, 14, 15, 16*

Concept	Grade-Level Expectation Statement	SEPUP Unit and Activity Number
ESS3 – Earth and Human Activity D - Global Climate Change	6-8.ESS3.D.1 Analyze evidence of the factors that have caused the change in global temperatures over the past century. [Clarification Statement: Examples of factors include human activities (such as fossil fuel combustion, cement production, and agricultural activity) and natural processes (such as changes in incoming solar radiation or volcanic activity). Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane, and the rates of human activities.]	*Weather and Climate:* 1, 10, 14, 15, 16*

Engineering, Technology, and Application of Science

Concept	Grade-Level Expectation Statement	SEPUP Unit and Activity Number
ETS1 – Engineering Design A - Defining and Delimiting Engineering Problems	6-8.ETS1.A.1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	*Biomedical Engineering* *1, 2, 3** *Force and Motion*: 1, 10, 11, 13, 14, 15* *Fields and Interactions:* 2, 3, 6* *Land, Water, and Human Interactions:* *7, 12**
ETS1 – Engineering Design B - Developing Possible Solutions	6-8.ETS1.B.1 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	*Biomedical Engineering* *4, 5, 7** *Fields and Interactions:* 6, 11, 13, 15* *Land, Water, and Human Interactions:* *12, 16**
	6-8.ETS1.B.2 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	*Biomedical Engineering* *1, 2, 4, 5** *Chemical Reactions*: 8, 9, 10, 11 *Weather and Climate*: 12* *Fields and Interactions:* 6, 11, 13, 15*

Concept	Grade-Level Expectation Statement	SEPUP Unit and Activity Number
	6-8.ETS1.B.3 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.	*Biomedical Engineering* *2, 4, 5, 8, 9** *Chemical Reactions*: 8, 9, 10, 11 *Weather and Climate*: 12* *Fields and Interactions:* 1, 2, 3, 6, 11, 13*