

# 7TH GRADE SCIENCE CURRICULUM MAP

Contents: Nature of Science, Structure and Function, Earth's Dynamic Systems,  
and Energy, Forces, and Motion

2023-2024



Wa-Nee Community Schools  
NorthWood Middle School

Scope and Sequence: 7<sup>th</sup> Grade Science

Nine Weeks	Units	Standards
1 <sup>st</sup> Nine Weeks	<p>Introduction to Science</p> <p>Life Science: Structure and Function</p>	<p>See Science and Engineering Process Standards below</p> <p>7.LS.1 Investigate and observe cells in living organisms and collect evidence showing that living things are made of cells. Compare and provide examples of prokaryotic and eukaryotic organisms. Identify the characteristics of living things.</p> <p>7.LS.2 Create a model to show how the cells in multicellular organisms repeatedly divide to make more cells for growth and repair as a result of mitosis. Explain how mitosis is related to cancer.</p> <p>7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.</p>
2 <sup>nd</sup> Nine Weeks	<p>Continue Life Science: Structure and Function</p> <p>Earth and Space Science: Earth's Dynamic Systems</p>	<p>7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.</p> <p>7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune system, circulatory system and digestive system of the human body.</p> <p>7.ESS.1 Identify and investigate the properties of minerals. Identify and classify a variety of rocks based on physical characteristics from their origin, and explain how they are related using the rock cycle. (i.e. Sedimentary, igneous, and metamorphic rocks)</p> <p>7.ESS.2 Construct a model or scale drawing (digitally or on paper), based on evidence from rock strata and fossil records, for how the geologic time scale is used to organize Earth's 4.6 billion year-old history.</p> <p>7.ESS.3 Using simulations or demonstrations, explain continental drift theory and how lithospheric (tectonic) plates have been and still are in constant motion resulting in the creation of landforms on the Earth's surface over time.</p>

		<p>7.ESS.4 Construct an explanation, based on evidence found in and around Indiana, for how large scale physical processes, such as Karst topography and glaciation, have shaped the land.</p> <p>7.ESS.5 Construct a model, diagram, or scale drawing of the interior layers of the Earth. Identify and compare the compositional (chemical) layers to the mechanical (physical) layers of the Earth’s interior including magnetic properties.</p>
<p>3<sup>rd</sup> Nine Weeks</p>	<p>Continue Earth and Space Science: Earth’s Dynamic Systems</p> <p>Physical Science: Energy, Forces, and Motion</p>	<p>7.ESS.6 Research common synthetic materials (i.e. plastics, composites, polyester, and alloys) to gain an understanding that synthetic materials do come from natural resources and have an impact on society.</p> <p>7.ESS.7 Describe the positive and negative environmental impacts of obtaining and utilizing various renewable and nonrenewable energy resources in Indiana. Determine which energy resources are the most beneficial and efficient.</p> <p>7.PS.1 Draw, construct models, or use animations to differentiate between atoms, elements, molecules, and compounds.</p> <p>7.PS.2 Describe the properties of solids, liquids, and gases. Develop models that predict and describe changes in particle motion, density, temperature, and state of a pure substance when thermal energy is added or removed.</p> <p>7.PS.3 Investigate the Law of Conservation of Mass by measuring and comparing the mass of a substance before and after a change of state.</p> <p>7.PS.8 Investigate a process in which energy is transferred from one form to another and provide evidence that the total amount of energy does not change during the transfer when the system is closed. (Law of conservation of energy)</p> <p>7.PS.9 Compare and contrast the three types of heat transfer: radiation, convection, and conduction.</p>
<p>4<sup>th</sup> Nine Weeks</p>	<p>Continue Physical Science: Energy, Forces, and Motion</p>	<p>7.PS.4 Investigate Newton’s first law of motion (Law of Inertia) and how different forces (gravity, friction, push and pull) affect the velocity of an object.</p> <p>7.PS.5 Investigate Newton’s second law of motion to show the relationship among force, mass and acceleration.</p> <p>7.PS.6 Investigate Newton’s third law of motion to show the relationship between action and reaction forces.</p> <p>7.PS.7 Construct a device that uses one or more of Newton’s laws of motion. Explain how motion, acceleration, force, and mass are affecting the device.</p>

<p>Standards Addressed Throughout the Year in many labs, activities, and projects:</p> <p>Engineering</p> <p>6-8.E.1 Identify the criteria and constraints of a design 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.</p> <p>6-8.E.2 Evaluate competing design solutions using a systematic process to identify how well they meet the criteria and constraints of the problem.</p> <p>6-8.E.3 Analyze data from investigations 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.</p> <p>6-8.E.4 Develop a prototype to generate data for repeated investigations and modify a proposed object, tool, or process such that an optimal design can be achieved.</p> <p>Science and Engineering Process Standards</p> <p>SEPS.1 Posing questions (for science) and defining problems (for engineering) A practice of science is posing and refining questions that lead to descriptions and explanations of how the natural and designed world(s) work and these questions can be scientifically tested. Engineering questions clarify problems to determine criteria for possible solutions and identify constraints to solve problems about the designed world.</p> <p>SEPS.2 Developing and using models and tools A practice of both science and engineering is to use and construct conceptual models that illustrate ideas and explanations. Models are used to develop questions, predictions and explanations; analyze and identify flaws in systems; build and revise scientific explanations and proposed engineered systems; and communicate ideas. Measurements and observations are used to revise and improve models and designs. Models include, but are not limited to: diagrams, drawings, physical replicas, mathematical representations, analogies, and other technological models. Another practice of both science and engineering is to identify and correctly use tools to construct, obtain, and evaluate questions and problems. Utilize appropriate tools while identifying their limitations. Tools include, but are not limited to: pencil and paper, models, ruler, a protractor, a calculator, laboratory equipment, safety gear, a spreadsheet, experiment data collection software, and other technological tools.</p> <p>SEPS.3 Constructing and performing investigations Scientists and engineers are constructing and performing investigations in the field or laboratory, working collaboratively as well as individually. Researching analogous problems in order to gain insight into possible solutions allows them to make conjectures about the form and meaning of the solution. A plan to a solution pathway is developed prior to constructing and performing investigations. Constructing investigations systematically encompasses identified variables and parameters generating quality data. While performing, scientists and engineers monitor and record progress. After performing, they evaluate to make changes to modify and repeat the investigation if necessary.</p> <p>SEPS.4 Analyzing and interpreting data Investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists and engineers use a range of tools to identify the significant features in the data. They identify sources of error in the investigations and calculate the degree of certainty in the results. Advances in science and engineering makes analysis of proposed solutions more efficient and effective. They analyze their results by continually asking themselves questions; possible questions may be, but are not limited to: "Does this make sense?" "Could my results be duplicated?" and/or "Does the design solve the problem with the given constraints?"</p> <p>SEPS.5 Using mathematics and computational thinking In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; solving equations exactly or approximately; and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable scientists and engineers to predict the behavior of systems and test the validity of such predictions. Scientists and engineers understand how mathematical ideas interconnect and build on one another to produce a coherent whole.</p> <p>SEPS.6 Constructing explanations (for science) and designing solutions (for engineering) Scientists and engineers use their results from the investigation in constructing descriptions and explanations, citing the interpretation of data, connecting the investigation to how the natural and designed world(s) work. They</p>		

construct or design logical coherent explanations or solutions of phenomena that incorporate their understanding of science and/or engineering or a model that represents it, and are consistent with the available evidence.

SEPS.7 Engaging in argument from evidence Scientists and engineers use reasoning and argument based on evidence to identify the best explanation for a natural phenomenon or the best solution to a design problem. Scientists and engineers use argumentation, the process by which evidence-based conclusions and solutions are reached, to listen to, compare, and evaluate competing ideas and methods based on merits. Scientists and engineers engage in argumentation when investigating a phenomenon, testing a design solution, resolving questions about measurements, building data models, and using evidence to evaluate claims.

SEPS.8 Obtaining, evaluating, and communicating information Scientists and engineers need to be communicating clearly and articulating the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity. Communicating information and ideas can be done in multiple ways: using tables, diagrams, graphs, models, and equations, as well as, orally, in writing, and through extended discussions. Scientists and engineers employ multiple sources to obtain information that is used to evaluate the merit and validity of claims, methods, and designs.

#### Literacy Standards

6-8.LST.1.1: Read and comprehend science and technical texts within a range of complexity appropriate for grades 6-8 independently and proficiently by the end of grade 8.

6-8.LST.1.2: Write routinely over a variety of time frames for a range of discipline specific tasks, purposes, and audiences.

6-8.LST.2.1: Cite specific textual evidence to support analysis of science and technical texts.

6-8.LST.2.2: Determine the central ideas or conclusions of a text; provide an accurate, objective summary of the text.

6-8.LST.2.3: Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

6-8.LST.3.1: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

6-8.LST.3.2: Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

6-8.LST.3.3: Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.

6-8.LST.4.1: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

6-8.LST.4.2: Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

6-8.LST.4.3: Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

6-8.LST.5.1: Write arguments focused on discipline-specific content.

6-8.LST.5.2: Write informative texts, including scientific procedures/experiments or technical processes that include precise descriptions and conclusions drawn from data and research.

6-8.LST.6.1: Plan and develop; draft; revise using appropriate reference materials; rewrite; try a new approach; and edit to produce and strengthen writing that is clear and coherent, with some guidance and support from peers and adults.

6-8.LST.6.2: Use technology to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

# Unit: Nature of Science

<b>Lesson 1: The Scientific Method</b>			<b>Unit: Nature of Science</b>	
<b>Essential Question(s): What is the scientific method and how does it help us?</b>				
<b>Key Terms: hypothesis, analyze, conclusion, data</b>				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
1.1 What is Science?	SEPS.1 Posing questions (for science) and defining problems (for engineering)	Understand what science is and why we explore it.  Develop common scientific terminology.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	www.sciencespot.net
1.2 Science KWL	SEPS.1 Posing questions (for science) and defining problems (for engineering)	Understand what science is and why we explore it.  Develop common scientific terminology.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	www.sciencespot.net
1.3 Scientific Method Chart	SEPS.1 Posing questions (for science) and defining problems (for engineering)	Understand what science is and why we explore it.  Develop common scientific terminology.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	www.sciencespot.net
<b>Assessment(s):</b>				

Lesson 2:		Unit: Nature of Science		
Essential Question(s): What is the scientific method and how does it help us?				
Key Terms: hypothesis, analyze, conclusion, data				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
2.1 Experiments	SEPS.1 Posing questions (for science) and defining problems (for engineering) SEPS.7 Engaging in argument from evidence	Understand what science is and why we explore it.  Develop common scientific terminology.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	www.sciencespot.net OR Science Chat NOS Review Stations
2.2 Controls and Variables	SEPS.1 Posing questions (for science) and defining problems (for engineering)	Understand what science is and why we explore it.  Develop common scientific terminology.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	www.sciencespot.net OR Controls and Variables Scavenger Hunt
2.3 Olympics	SEPS.1 Posing questions (for science) and defining problems (for engineering)	Understand what science is and why we explore it.  Develop common scientific terminology.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	www.sciencespot.net
2.4 Safety	SEPS.1 Posing questions (for science) and defining problems (for engineering) SEPS.6 Constructing explanations (for science) and	Understand what science is and why we explore it.  Develop common scientific terminology.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	www.sciencespot.net

<b>Lesson 2:</b>		<b>Unit: Nature of Science</b>		
<b>Essential Question(s): What is the scientific method and how does it help us?</b>				
<b>Key Terms: hypothesis, analyze, conclusion, data</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
	designing solutions (for engineering) SEPS.7 Engaging in argument from evidence			
<b>Assessment(s):</b>				

<b>Lesson 3:</b>		<b>Unit: Nature of Science</b>		
<b>Essential Question(s): What is the scientific method and how does it help us?</b>				
<b>Key Terms: hypothesis, analyze, conclusion, data</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
3.1 Metric System	SEPS.2 Developing and using models and tools SEPS.3 Constructing and performing investigations SEPS.4 Analyzing and interpreting data	Understand what science is and why we explore it.  Develop common scientific terminology.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	www.sciencespot.net
3.2 Area and Mass Lab	SEPS.5 Using mathematics and computational thinking SEPS.6 Constructing	Understand what science is and why we explore it.  Develop common scientific terminology.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	www.sciencespot.net



Lesson 3:		Unit: Nature of Science		
Essential Question(s): What is the scientific method and how does it help us?				
Key Terms: hypothesis, analyze, conclusion, data				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
	explanations (for science) and designing solutions (for engineering) SEPS.7 Engaging in argument from evidence			
3.3 Volume Lab	SEPS.5 Using mathematics and computational thinking SEPS.6 Constructing explanations (for science) and designing solutions (for engineering) SEPS.7 Engaging in argument from evidence	Understand what science is and why we explore it.  Develop common scientific terminology.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	www.sciencespot.net
3.4 Density Lab	SEPS.5 Using mathematics and computational thinking SEPS.6 Constructing explanations (for science) and	Understand what science is and why we explore it.  Develop common scientific terminology.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	www.sciencespot.net

<b>Lesson 3:</b>		<b>Unit: Nature of Science</b>		
<b>Essential Question(s): What is the scientific method and how does it help us?</b>				
<b>Key Terms: hypothesis, analyze, conclusion, data</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
	designing solutions (for engineering) SEPS.7 Engaging in argument from evidence			
3.5 Prediction Candy Lab/Isopod Labs	SEPS. 1 – SEPS. 8 SEPS.8 Obtaining, evaluating, and communicating information	Understand what science is and why we explore it.  Develop common scientific terminology.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Rollie Pollies provided by students. Rollie Pollie videos for information gathering.
<b>Assessment(s): Lab Report for Candy Lab Lab Report for Isopod Lab</b>				
<b>End of Unit Assessment: Nature of Science Quiz in Edmodo</b>				

# Unit: Structure and Function

<b>Lesson 1: Pre-Assessment: Structure and Function</b>			<b>Unit: Structure and Function</b>	
<b>Essential Question(s): What do we already know about how living things survive in their environment, and how can we learn more?</b>				
<b>Key Terms: Cell, compound light microscope, scientific illustration</b>				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
1.1 1 period	7.LS.1 Investigate and observe cells in living organisms and collect evidence showing that living things are made of cells. Compare and provide examples of prokaryotic and eukaryotic organisms. Identify the characteristics of living things.  7.LS.2 Create a model to show how the cells in multicellular organisms repeatedly divide to make more cells for growth and repair as a result of mitosis. Explain how mitosis is related to cancer.  7.LS.3 Explain how cells develop through differentiation into	Students brainstorm what they know and want to learn about cells, body systems, and how organisms get energy  Create several KWL charts on various structure and function topics to determine prior knowledge.  Organisms are made of cells. Body systems aid in survival. Organisms obtain energy in different ways	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Microscopes  Structure and Function Lab Kits

Lesson 1: Pre-Assessment: Structure and Function			Unit: Structure and Function	
Essential Question(s): What do we already know about how living things survive in their environment, and how can we learn more?				
Key Terms: Cell, compound light microscope, scientific illustration				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
	<p>specialized tissues and organs in multicellular organisms.</p> <p>7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune system, circulatory system and digestive system of the human body.</p> <p>7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.</p>			
1.2 1 period	7.LS.1-7.LS.5 (see above)	Use a compound light microscope to observe prepared microscope slides	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Microscopes  Structure and Function Lab Kits
1.3 1 period	7.LS.1-7.LS.5 (see above)	Observe unicellular and multicellular organisms and make a claim about how	Data in Lab Notebooks	Microscopes  Structure and Function Lab Kits

Lesson 1: Pre-Assessment: Structure and Function			Unit: Structure and Function	
<b>Essential Question(s):</b> What do we already know about how living things survive in their environment, and how can we learn more?				
<b>Key Terms:</b> Cell, compound light microscope, scientific illustration				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		some organisms survive as single cells while others survive with many cells.	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	
1.4 1/2 period	7.LS.1-7.LS.5 (see above)	Observe structures within plant and animal cells.  Make claims about the functions of the observed structures	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Microscopes  Structure and Function Lab Kits
Reflection 1/2 period	7.LS.1-7.LS.5 (see above)	Discuss how microscopes help us understand the function of organism structures.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Reflection-page 11
<b>Assessment(s):</b> KWL chart completion Reflection				
Student Sheets found at: <a href="https://ssec.si.edu/sites/default/files/page/SF%20Studentsheets.pdf">https://ssec.si.edu/sites/default/files/page/SF%20Studentsheets.pdf</a>				

Lesson 2: Cells		Unit: Structure and Function		
Essential Question(s): What roles can cells play in the development and survival of organisms?				
Key Terms: Archaea, Cell Membrane, Cell Theory, Cytoplasm, DNA, Eukaryotic, Nucleus, Organelle, Prokaryotic, Ribosome, Species, Unicellular, Wet-Mount Slide, Differentiation, Multicellular, Zygote, Embryo, Stem Cell, Cell, Cell Differentiation, Gene				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
2.1 1-2 periods	7.LS.1 Investigate and observe cells in living organisms and collect evidence showing that living things are made of cells. Compare and provide examples of prokaryotic and eukaryotic organisms. Identify the characteristics of living things.	Draw and describe the structures of a Euglena and suggest how they function.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Microscope  Structure and Function Lab Kits
2.2 1 period	7.LS.1 Investigate and observe cells in living organisms and collect evidence showing that living things are made of cells. Compare and provide examples of prokaryotic and eukaryotic organisms. Identify the characteristics of living things.	Draw and describe the structures of a Paramecium, suggest how they function, and compare it to a Euglena.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Microscopes  Structure and Function Lab Kits

Lesson 2: Cells		Unit: Structure and Function		
Essential Question(s): What roles can cells play in the development and survival of organisms?				
Key Terms: Archaea, Cell Membrane, Cell Theory, Cytoplasm, DNA, Eukaryotic, Nucleus, Organelle, Prokaryotic, Ribosome, Species, Unicellular, Wet-Mount Slide, Differentiation, Multicellular, Zygote, Embryo, Stem Cell, Cell, Cell Differentiation, Gene				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
2.3 2-3 periods	7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.  7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune system, circulatory system and digestive system of the human body.	Observe and read about the variety of cells that make up multicellular organisms.  Determine the function of these cells based on their structures and provided information.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Copies of Student Sheet Lesson 2.3  Microscopes  Cell Specialization Card Sets  Structure and Function Lab Kits
2.4 1 period	7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.  7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and	Compare images of embryos from different animal species to observe cell differentiation.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Copies of Student Sheet Lesson 2.4  Embryonic Development Card Sets  Structure and Function Lab Kits

<b>Lesson 2: Cells</b>			<b>Unit: Structure and Function</b>	
<b>Essential Question(s): What roles can cells play in the development and survival of organisms?</b>				
<b>Key Terms: Archaea, Cell Membrane, Cell Theory, Cytoplasm, DNA, Eukaryotic, Nucleus, Organelle, Prokaryotic, Ribosome, Species, Unicellular, Wet-Mount Slide, Differentiation, Multicellular, Zygote, Embryo, Stem Cell, Cell, Cell Differentiation, Gene</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
	organs in the immune system, circulatory system and digestive system of the human body.			
Reflection/Quiz 1 period		Use knowledge of cell structure, function, and specialization to design and carry out an investigation and provide evidence to support or rebut an argument.  Edit the “Cells” KWL chart	Quiz	Reflection-page 35  Quiz
<b>Assessment(s):</b> Lesson Quiz				
Student Sheets found at: <a href="https://ssec.si.edu/sites/default/files/page/SF%20Studentsheets.pdf">https://ssec.si.edu/sites/default/files/page/SF%20Studentsheets.pdf</a>				



Lesson 3: Cell Organelles		Unit: Structure and Function		
<b>Essential Question(s): What structures does a cell need in order to survive?</b>				
<b>Key Terms: Cell Wall, Central Vacuole, Chlorophyll, Chloroplast, Endoplasmic Reticulum, Golgi Body, Lysosome, Mitochondria, Vacuole, Cell Membrane, Cytoplasm, Mammal, Nucleus, Ribosome, Active Transport, Carrier Protein, Channel Protein, Diffusion, Equilibrium, Osmosis, Passive Transport, Semipermeable</b>				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
3.1 1 period		Draw the parts of a eukaryotic cell and describe how they function.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Structure and Function Lab Kits
3.2 1 period		Observe and identify certain organelles of plant cells.  Prepare scientific illustrations of plant cells.  Observe the effect of a salt solution on plant cells.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Sheet 3.2  Microscopes  Structure and Function Lab Kits
3.3 1 period	7.LS.1 Investigate and observe cells in living organisms and collect evidence showing that living things are made of cells. Compare and provide examples of prokaryotic and eukaryotic organisms. Identify the	Measure and compare different kinds of animal cells.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Microscopes  Structure and Function Lab Kits

Lesson 3: Cell Organelles		Unit: Structure and Function		
Essential Question(s): What structures does a cell need in order to survive?				
Key Terms: Cell Wall, Central Vacuole, Chlorophyll, Chloroplast, Endoplasmic Reticulum, Golgi Body, Lysosome, Mitochondria, Vacuole, Cell Membrane, Cytoplasm, Mammal, Nucleus, Ribosome, Active Transport, Carrier Protein, Channel Protein, Diffusion, Equilibrium, Osmosis, Passive Transport, Semipermeable				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
	<p>characteristics of living things.</p> <p>7.LS.2 Create a model to show how the cells in multicellular organisms repeatedly divide to make more cells for growth and repair as a result of mitosis. Explain how mitosis is related to cancer.</p>			
3.4 1 period	<p>7.LS.1 Investigate and observe cells in living organisms and collect evidence showing that living things are made of cells. Compare and provide examples of prokaryotic and eukaryotic organisms. Identify the characteristics of living things.</p> <p>7.LS.2 Create a model to show how the cells in multicellular organisms</p>	Model the difference between plant and animal cells.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Sheet 3.4 a Student Sheet 3.4 b  Structure and Function Lab KIts

Lesson 3: Cell Organelles			Unit: Structure and Function	
Essential Question(s): What structures does a cell need in order to survive?				
Key Terms: Cell Wall, Central Vacuole, Chlorophyll, Chloroplast, Endoplasmic Reticulum, Golgi Body, Lysosome, Mitochondria, Vacuole, Cell Membrane, Cytoplasm, Mammal, Nucleus, Ribosome, Active Transport, Carrier Protein, Channel Protein, Diffusion, Equilibrium, Osmosis, Passive Transport, Semipermeable				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
	repeatedly divide to make more cells for growth and repair as a result of mitosis. Explain how mitosis is related to cancer.			
3.5 1 period	7.LS.2 Create a model to show how the cells in multicellular organisms repeatedly divide to make more cells for growth and repair as a result of mitosis. Explain how mitosis is related to cancer.  7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.	Diagram the differences and similarities among three types of cells.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Structure and Function Lab Kits
3.6 2-3 periods	7.LS.2 Create a model to show how the cells in multicellular organisms repeatedly divide to make more cells for growth and repair as a result of mitosis.	Summarize the role of each organelle and apply it to a person, place, or object and connect them in a comic story line.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks  Cell Comic	Student Sheet 3.6 Student Sheet 3.6 Rubric

Lesson 3: Cell Organelles			Unit: Structure and Function	
Essential Question(s): What structures does a cell need in order to survive?				
Key Terms: Cell Wall, Central Vacuole, Chlorophyll, Chloroplast, Endoplasmic Reticulum, Golgi Body, Lysosome, Mitochondria, Vacuole, Cell Membrane, Cytoplasm, Mammal, Nucleus, Ribosome, Active Transport, Carrier Protein, Channel Protein, Diffusion, Equilibrium, Osmosis, Passive Transport, Semipermeable				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
	<p>Explain how mitosis is related to cancer.</p> <p>7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.</p>			
Reflection and Quiz	<p>7.LS.1 Investigate and observe cells in living organisms and collect evidence showing that living things are made of cells. Compare and provide examples of prokaryotic and eukaryotic organisms. Identify the characteristics of living things.</p> <p>7.LS.2 Create a model to show how the cells in multicellular organisms repeatedly divide to make more cells for growth and repair as a result of mitosis.</p>	<p>Use knowledge of organelles to determine if claims made during Lesson 2 are accurate.</p> <p>Edit the “Cells” KWL chart from Lesson 1.</p> <p>Demonstrate knowledge of cell organization.</p>	<p>Data in Lab Notebooks</p> <p>Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks</p> <p>Quiz</p>	<p>Quiz</p> <p>Reflection-page 57</p>

<b>Lesson 3: Cell Organelles</b>			<b>Unit: Structure and Function</b>	
<b>Essential Question(s): What structures does a cell need in order to survive?</b>				
<b>Key Terms: Cell Wall, Central Vacuole, Chlorophyll, Chloroplast, Endoplasmic Reticulum, Golgi Body, Lysosome, Mitochondria, Vacuole, Cell Membrane, Cytoplasm, Mammal, Nucleus, Ribosome, Active Transport, Carrier Protein, Channel Protein, Diffusion, Equilibrium, Osmosis, Passive Transport, Semipermeable</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
	<p>Explain how mitosis is related to cancer.</p> <p>7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.</p>			
<b>Assessment(s):</b> <b>Cell Comic Strip</b> <b>Cell Quiz</b>				
Student Sheets found at: <a href="https://ssec.si.edu/sites/default/files/page/SF%20Studentsheets.pdf">https://ssec.si.edu/sites/default/files/page/SF%20Studentsheets.pdf</a>				

<b>Lesson 4: Photosynthesis</b>			<b>Unit: Structure and Function</b>	
<b>Essential Question(s): What roles do matter and energy play during photosynthesis?</b>				
<b>Key Terms: Autotroph, Decomposer, Chlorophyll, Energy, Heterotroph, Matter, Omnivore, Photosynthesis, Transpiration, Trophic Level, Control, Glucose, Synthesize, Epidermis, Guard Cell, Mesophyll, Phloem, Stoma, Transpiration, Xylem</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
4.1 2-3 periods	7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.	Design and carry out an experiment to gather evidence as to what materials are required for photosynthesis to occur.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Structure and Function Lab Kits  Microscopes

Lesson 4: Photosynthesis		Unit: Structure and Function		
Essential Question(s): What roles do matter and energy play during photosynthesis?				
Key Terms: Autotroph, Decomposer, Chlorophyll, Energy, Heterotroph, Matter, Omnivore, Photosynthesis, Transpiration, Trophic Level, Control, Glucose, Synthesize, Epidermis, Guard Cell, Mesophyll, Phloem, Stoma, Transpiration, Xylem				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
	7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.			
4.2 1-2 periods	7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.  7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.	Observe and identify stomata on a leaf's epidermis.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Structure and Function Lab Kits  Microscopes
Reflection and Quiz 1 period	7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.  7.LS.5 Compare and contrast the form and function of the	Students explore chlorophyll, revisit their previous ideas on photosynthesis, and create a model of photosynthesis.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks  Quiz	Reflection-page 84  Quiz

<b>Lesson 4: Photosynthesis</b>			<b>Unit: Structure and Function</b>	
<b>Essential Question(s): What roles do matter and energy play during photosynthesis?</b>				
<b>Key Terms: Autotroph, Decomposer, Chlorophyll, Energy, Heterotroph, Matter, Omnivore, Photosynthesis, Transpiration, Trophic Level, Control, Glucose, Synthesize, Epidermis, Guard Cell, Mesophyll, Phloem, Stoma, Transpiration, Xylem</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
	organelles found in plant and animal cells.			
<b>Assessment(s):</b> End of Lesson Quiz				

<b>Lesson 5: Cellular Respiration</b>			<b>Unit: Structure and Function</b>	
<b>Essential Question(s): Where do cells get the resources they need to aid in an organism's survival?</b>				
<b>Key Terms: Cellular respiration, Aerobic, Anaerobic, ATP, Fermentation, Photosynthesis, Energy, Hibernation, Metabolic Rate, Cell Division, Mitosis</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
5.1 1-2 periods	7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.  7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.	Plan and carry out an investigation to determine the form of energy released during cellular respiration.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Structure and Function Lab Kit
5.2 2 periods	7.LS.3 Explain how cells develop through differentiation into specialized tissues and	Plan and carry out an investigation to determine if autotrophs	Data in Lab Notebooks	Structure and Function Lab Kit

Lesson 5: Cellular Respiration			Unit: Structure and Function	
<b>Essential Question(s):</b> Where do cells get the resources they need to aid in an organism's survival?				
<b>Key Terms:</b> Cellular respiration, Aerobic, Anaerobic, ATP, Fermentation, Photosynthesis, Energy, Hibernation, Metabolic Rate, Cell Division, Mitosis				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
	organs in multicellular organisms.  7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.	undergo cellular respiration.	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	
5.3 1 period	7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.  7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.	Analyze and interpret data to determine the energy value of different foods.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Structure and Function Lab Kit
Reflection and Quiz 1 period	7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.  7.LS.5 Compare and contrast the form and	Demonstrate an understanding that all living things, including plants and microorganisms, require energy and, therefore, go through a type of cellular respiration to accomplish this need.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks  Quiz	Quiz



Lesson 5: Cellular Respiration			Unit: Structure and Function	
<b>Essential Question(s):</b> Where do cells get the resources they need to aid in an organism's survival?				
<b>Key Terms:</b> Cellular respiration, Aerobic, Anaerobic, ATP, Fermentation, Photosynthesis, Energy, Hibernation, Metabolic Rate, Cell Division, Mitosis				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
	function of the organelles found in plant and animal cells.			
Mitosis 2-3 periods	7.LS.2 Create a model to show how the cells in multicellular organisms repeatedly divide to make more cells for growth and repair as a result of mitosis. Explain how mitosis is related to cancer.	Demonstrate an understanding that cells divide through a process called mitosis.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Mitosis Placemat Lab  Article and activity on mitosis and cancer
<b>Assessment(s):</b> End of Lesson Quiz				
Article: <a href="https://indiana.pbslearningmedia.org/resource/tdc02.sci.life.cell.lp_divide/cell-replication-and-cancerous-cells/#.WRnwPLpFyDs">https://indiana.pbslearningmedia.org/resource/tdc02.sci.life.cell.lp_divide/cell-replication-and-cancerous-cells/#.WRnwPLpFyDs</a>				

Lesson 6: Levels of Organization			Unit: Structure and Function	
<b>Essential Question(s):</b> How does the organization of an organism's body aid in survival?				
<b>Key Terms:</b> Tissue, Connective Tissue, Dermal Tissue, Epithelial Tissue, Ground Tissue, Muscle Tissue, Nervous Tissue, Organ, Organ System, Vascular Tissue, Model Organism, Adaptation, Endothermic, Regenerate, Antibody, Cell Cycle, Dermis				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
6.1 2-3 periods	7.LS.3 Explain how cells develop through differentiation into	Gather evidence that different tissues play a pivotal role in the	Data in Lab Notebooks	Structure and Function Lab Kit

Lesson 6: Levels of Organization			Unit: Structure and Function	
Essential Question(s): How does the organization of an organism's body aid in survival?				
Key Terms: Tissue, Connective Tissue, Dermal Tissue, Epithelial Tissue, Ground Tissue, Muscle Tissue, Nervous Tissue, Organ, Organ System, Vascular Tissue, Model Organism, Adaptation, Endothermic, Regenerate, Antibody, Cell Cycle, Dermis				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
	<p>specialized tissues and organs in multicellular organisms.</p> <p>7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune system, circulatory system and digestive system of the human body.</p> <p>7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.</p>	survival of an organism.	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	<p>Microscopes</p> <p>Copies Student Sheets 6.1</p>
6.2 1 period	<p>7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.</p> <p>7.LS.4 Research and describe the functions</p>	Develop models that display how the bodies of plants and animals are systems of interacting subsystems composed of cells, tissues, organs, and organ systems.	<p>Data in Lab Notebooks</p> <p>Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks</p>	Structure and Function Lab Kit

Lesson 6: Levels of Organization			Unit: Structure and Function	
Essential Question(s): How does the organization of an organism's body aid in survival?				
Key Terms: Tissue, Connective Tissue, Dermal Tissue, Epithelial Tissue, Ground Tissue, Muscle Tissue, Nervous Tissue, Organ, Organ System, Vascular Tissue, Model Organism, Adaptation, Endothermic, Regenerate, Antibody, Cell Cycle, Dermis				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
	<p>and relationships between various cell types, tissues, and organs in the immune system, circulatory system and digestive system of the human body.</p> <p>7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.</p>			
6.3 2-3 periods	<p>7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.</p> <p>7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune system, circulatory system and digestive</p>	<p>Research an organ system found in humans using reliable resources, create a visual aid that encompasses the research, and present findings to the class.</p>	<p>Data in Lab Notebooks</p> <p>Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks</p>	<p>Structure and Function Lab Kit</p> <p>Copies Student Sheets 6.3</p>

Lesson 6: Levels of Organization			Unit: Structure and Function	
<b>Essential Question(s): How does the organization of an organism's body aid in survival?</b>				
<b>Key Terms: Tissue, Connective Tissue, Dermal Tissue, Epithelial Tissue, Ground Tissue, Muscle Tissue, Nervous Tissue, Organ, Organ System, Vascular Tissue, Model Organism, Adaptation, Endothermic, Regenerate, Antibody, Cell Cycle, Dermis</b>				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
	system of the human body.			
6.4 2-3 periods	7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.  7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune system, circulatory system and digestive system of the human body.	Use a model of a frog to gather evidence of the roles that various tissues, organs, and organ systems play in the survival of the organism.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Structure and Function Lab Kit  Copies Student Sheets 6.4
6.5 1 period	7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.	Gather evidence to determine which bone groups are similar in a variety of animal species.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Structure and Function Lab Kit  Copies Student Sheets 6.5

Lesson 6: Levels of Organization			Unit: Structure and Function	
Essential Question(s): How does the organization of an organism's body aid in survival?				
Key Terms: Tissue, Connective Tissue, Dermal Tissue, Epithelial Tissue, Ground Tissue, Muscle Tissue, Nervous Tissue, Organ, Organ System, Vascular Tissue, Model Organism, Adaptation, Endothermic, Regenerate, Antibody, Cell Cycle, Dermis				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
	<p>7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune system, circulatory system and digestive system of the human body.</p> <p>7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.</p>			
6.6 1 period	<p>7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.</p> <p>7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune</p>	Infer evolutionary relationships between present-day and fossilized organisms by observing and analyzing a basic set of anatomical structures.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Structure and Function Lab Kit  Copies Student Sheets 6.6

<b>Lesson 6: Levels of Organization</b>			<b>Unit: Structure and Function</b>	
<b>Essential Question(s): How does the organization of an organism’s body aid in survival?</b>				
<b>Key Terms: Tissue, Connective Tissue, Dermal Tissue, Epithelial Tissue, Ground Tissue, Muscle Tissue, Nervous Tissue, Organ, Organ System, Vascular Tissue, Model Organism, Adaptation, Endothermic, Regenerate, Antibody, Cell Cycle, Dermis</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
	system, circulatory system and digestive system of the human body.			
Reflection and Quiz	<p>7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.</p> <p>7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune system, circulatory system and digestive system of the human body.</p> <p>7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.</p>	Demonstrate knowledge of the systems of the human body.	<p>Data in Lab Notebooks</p> <p>Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks</p> <p>Quiz</p>	<p>Reflection—page 132</p> <p>Quiz</p>
<b>Assessment(s):</b>				

<b>Lesson 6: Levels of Organization</b>			<b>Unit: Structure and Function</b>	
<b>Essential Question(s): How does the organization of an organism's body aid in survival?</b>				
<b>Key Terms: Tissue, Connective Tissue, Dermal Tissue, Epithelial Tissue, Ground Tissue, Muscle Tissue, Nervous Tissue, Organ, Organ System, Vascular Tissue, Model Organism, Adaptation, Endothermic, Regenerate, Antibody, Cell Cycle, Dermis</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
End of Lesson Quiz				

<b>Lesson 7: The Nervous System</b>			<b>Unit: Structure and Function</b>	
<b>Essential Question(s): How does the brain send and receive information?</b>				
<b>Key Terms: Stimulus, Central Nervous System, Homeostasis, Neuron, Neurotransmitter, Sensory Neuron, Synapse, Memory, Olfactory receptor, Reflex, Reflex arc</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
7.1 1-2 periods	7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune system, circulatory system and digestive system of the human body.	Analyze the structure and function of different tissues and cells that work together in the nervous system.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Structure and Function Lab Kit
7.2 1 period	7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune	Identify the cause-and-effect relationship between stimuli and response.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Structure and Function Lab Kit

Lesson 7: The Nervous System			Unit: Structure and Function	
Essential Question(s): How does the brain send and receive information?				
Key Terms: Stimulus, Central Nervous System, Homeostasis, Neuron, Neurotransmitter, Sensory Neuron, Synapse, Memory, Olfactory receptor, Reflex, Reflex arc				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
	system, circulatory system and digestive system of the human body.			
7.3 2 periods	7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune system, circulatory system and digestive system of the human body.	Explore different senses to determine how the brain gathers and synthesizes information, resulting in an immediate response or behavior.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Structure and Function Lab Kit  Student Sheet 7.3
7.4 1 period	7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune system, circulatory system and digestive system of the human body.	Explore some limitations of sensory receptors and how information is gathered and processed by the brain.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Structure and Function Lab Kit
Reflection and Quiz	7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and	Test whether impaired sensory systems react to visual stimuli as quickly as unimpaired sensory systems.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Quiz



<b>Lesson 7: The Nervous System</b>			<b>Unit: Structure and Function</b>	
<b>Essential Question(s): How does the brain send and receive information?</b>				
<b>Key Terms: Stimulus, Central Nervous System, Homeostasis, Neuron, Neurotransmitter, Sensory Neuron, Synapse, Memory, Olfactory receptor, Reflex, Reflex arc</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
	organs in the immune system, circulatory system and digestive system of the human body.		Quiz	
<b>Assessment(s):</b> End of Lesson Quiz				

<b>Lesson 8: Assessment: Structure and Function</b>			<b>Unit: Structure and Function</b>	
<b>Essential Question(s): How are different animals specially adapted to survive in their environment?</b>				
<b>Key Terms: (terms from previous lessons)</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
Written Assessment 1 period	7.LS.1-7.LS.5	Apply knowledge and skills to answer questions in a written assessment about concepts related to structure and function.		Student Sheet 8.WA
<b>Assessment(s):</b> The written assessment.				
Student Sheets found at: <a href="https://ssec.si.edu/sites/default/files/page/SF%20Studentsheets.pdf">https://ssec.si.edu/sites/default/files/page/SF%20Studentsheets.pdf</a>				

## Unit: Earth's Dynamic Systems

<b>Lesson 1: Pre-Assessment: Earth's Dynamic System</b>			<b>Unit: Earth's Dynamic System</b>	
<b>Essential Question(s): What do you know about geologic processes?</b>				
<b>Key Terms: Crater, Earthquake, Geyser, Hot spring, Volcano, Fossil</b>				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
1.1 1 period	7.ESS.3, 7.ESS.4	<ul style="list-style-type: none"> <li>• Examine real-world observations and images related to geologic processes and phenomena.</li> <li>• Describe what a data set represents and interpret similarities and differences within it</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
1.2 1 period	7.ESS.1, 7.ESS.3, 7.ESS.4	<ul style="list-style-type: none"> <li>• Examine real-world observations and images related to geologic processes and phenomena.</li> <li>• Describe what a data set represents and interpret similarities and differences within it</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Reflection 1 period	7.ESS.1, 7.ESS.3, 7.ESS.4	<ul style="list-style-type: none"> <li>• Reflect on how geologic processes affect a landscape.</li> <li>• Integrate knowledge gained in the lesson to explain phenomena of the Burgess Shale</li> </ul>	Self-Assessment  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Reflection-page 11  Quiz

<b>Lesson 1: Pre-Assessment: Earth's Dynamic System</b>			<b>Unit: Earth's Dynamic System</b>	
<b>Essential Question(s): What do you know about geologic processes?</b>				
<b>Key Terms: Crater, Earthquake, Geyser, Hot spring, Volcano, Fossil</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
<b>Assessment(s):</b> Self-assessment				
Student sheets can be found at: <a href="https://ssec.si.edu/earths-dynamic-systems">https://ssec.si.edu/earths-dynamic-systems</a>				

<b>Lesson 2: When the Earth Shakes</b>			<b>Unit: Earth's Dynamic System</b>	
<b>Essential Question(s): Why are some structures damaged when Earth shakes?</b>				
<b>Key Terms: Earthquake, Fault, Intensity, Magnitude, Model, Risks, Seismogram, Destructive, Controlled experiment, Dependent variable, Independent variable, Intensity, Magnitude, Optimize, Prototype, Aftershock, Force</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
2.1 1 period	7.ESS.3  Engineering and Process Standards	<ul style="list-style-type: none"> <li>• Develop a model of an earthquake.</li> <li>• Describe how a shake table can be used to test a model</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
2.2 1 period	7.ESS.3  Engineering and Process Standards	<ul style="list-style-type: none"> <li>• Design and evaluate a model of an earthquake-resistant structure</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
2.3 2 periods	7.ESS.3  Engineering and Process Standards	<ul style="list-style-type: none"> <li>• Design, modify, and evaluate a model of an earthquake-resistant structure</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit

<b>Lesson 2: When the Earth Shakes</b>			<b>Unit: Earth's Dynamic System</b>	
<b>Essential Question(s): Why are some structures damaged when Earth shakes?</b>				
<b>Key Terms: Earthquake, Fault, Intensity, Magnitude, Model, Risks, Seismogram, Destructive, Controlled experiment, Dependent variable, Independent variable, Intensity, Magnitude, Optimize, Prototype, Aftershock, Force</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
Reflection and Quiz	7.ESS.3	<ul style="list-style-type: none"> <li>Investigate how soil conditions affect the processes of earthquakes</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide p. 31  Quiz
<b>Assessment(s):</b> End of Lesson Quiz				
Student sheets can be found at: <a href="https://ssec.si.edu/earths-dynamic-systems">https://ssec.si.edu/earths-dynamic-systems</a>				

<b>Lesson 3: Analyzing Earthquake Data</b>			<b>Unit: Earth's Dynamic System</b>	
<b>Essential Question(s): How can we collect data about earthquakes?</b>				
<b>Key Terms: Earthquake Surface wave, Model S-wave, P-wave, Aftershock, Seismograph, Tsunami, Epicenter, Seismic station, Focus, Seismogram, Focus, Seismometer, Magnitude, Mitigate, Asthenosphere, Intensity, Plate, Core, Lithosphere, Plate tectonics, Crust, Force, Mantle, Rocks, Seismic wave</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
Investigation 3.1 2 periods	7.ESS.3, 7.ESS.4, 7.PS.8	<ul style="list-style-type: none"> <li>Use a spring to model, observe, record, and identify different types of earthquake waves.</li> <li>Relate earthquake waves to the transfer of energy.</li> <li>Use a spring to model possible damaging effects of earthquake waves.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 3.2 2 periods	7.ESS.3, 7.ESS.4, 7.PS.8	<ul style="list-style-type: none"> <li>Record data from simulated earthquakes using a model seismograph.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit

Lesson 3: Analyzing Earthquake Data			Unit: Earth's Dynamic System	
Essential Question(s): How can we collect data about earthquakes?				
Key Terms: Earthquake Surface wave, Model S-wave, P-wave, Aftershock, Seismograph, Tsunami, Epicenter, Seismic station, Focus, Seismogram, Focus, Seismometer, Magnitude, Mitigate, Asthenosphere, Intensity, Plate, Core, Lithosphere, Plate tectonics, Crust, Force, Mantle, Rocks, Seismic wave				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		<ul style="list-style-type: none"> <li>Investigate how common variables affect data recorded by a model seismograph.</li> </ul>		
Investigation 3.3 1 period	7.ESS.3, 7.ESS.4, 7.PS.8	<ul style="list-style-type: none"> <li>Identify, analyze, and interpret earthquake wave patterns using seismogram data.</li> <li>Apply mathematical concepts to answer scientific quest</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 3.4 1 period	7.ESS.3, 7.ESS.4, 7.PS.8	<ul style="list-style-type: none"> <li>Locate the epicenter of an earthquake using data from three seismic stations.</li> <li>Apply mathematical concepts to answer scientific questions.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Reflection and Quiz 1 period	7.ESS.3, 7.ESS.4, 7.PS.8	<ul style="list-style-type: none"> <li>Demonstrate understanding of the properties of earthquakes and how earthquake data is collected, analyzed, and interpreted.</li> <li>Describe how to reduce the effects of future earthquakes</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 63  Quiz

Lesson 3: Analyzing Earthquake Data			Unit: Earth's Dynamic System	
<b>Essential Question(s):</b> How can we collect data about earthquakes?				
<b>Key Terms:</b> Earthquake Surface wave, Model S-wave, P-wave, Aftershock, Seismograph, Tsunami, Epicenter, Seismic station, Focus, Seismogram, Focus, Seismometer, Magnitude, Mitigate, Asthenosphere, Intensity, Plate, Core, Lithosphere, Plate tectonics, Crust, Force, Mantle, Rocks, Seismic wave				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Extending Your Knowledge Reading Selections	7.ESS.5	<ul style="list-style-type: none"> <li>• “Why Earthquakes Are Hard to Predict” Read about the factors that prevent scientists from predicting earthquakes.</li> <li>• “Using Waves to Explore Earth’s Interior” Read about how scientists use data from earthquake waves as evidence to make claims about the structure of Earth’s interior</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guides
<b>Assessment(s):</b> End of Lesson Quiz Student sheets can be found at: <a href="https://ssec.si.edu/earths-dynamic-systems">https://ssec.si.edu/earths-dynamic-systems</a>				

Lesson 4: Investigating Plate Movement			Unit: Earth's Dynamic System	
<b>Essential Question(s):</b> How do changes in the lithosphere affect Earth’s surface?				
<b>Key Terms:</b> Crust, Fault, Latitude, Longitude, Oceanic ridge, Plate tectonics, Ring of Fire, Continental crust, Lithosphere, Mantle, Oceanic crust, Convergent plate boundary, Divergent plate boundary, Landform, Plate boundary, Rift valley Subduction, Transform plate boundary, Elasticity, Fault, Friction, Stress, Fracture, Tectonic plate, Lava, Oceanic ridge, Oceanic trench, Tectonic plate, Tsunami, Brittle, Deformation, Elasticity, Fracture, Strain, Stress				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Investigation 4.1 1 period	7.ESS.3, 7.ESS.4	<ul style="list-style-type: none"> <li>• Plot the locations, depths, and magnitudes of earthquakes and</li> </ul>	Data in Lab Notebooks	Earth’s Dynamic Systems Lab Kit

Lesson 4: Investigating Plate Movement		Unit: Earth's Dynamic System		
Essential Question(s): How do changes in the lithosphere affect Earth's surface?				
Key Terms: Crust, Fault, Latitude, Longitude, Oceanic ridge, Plate tectonics, Ring of Fire, Continental crust, Lithosphere, Mantle, Oceanic crust, Convergent plate boundary, Divergent plate boundary, Landform, Plate boundary, Rift valley Subduction, Transform plate boundary, Elasticity, Fault, Friction, Stress, Fracture, Tectonic plate, Lava, Oceanic ridge, Oceanic trench, Tectonic plate, Tsunami, Brittle, Deformation, Elasticity, Fracture, Strain, Stress				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		use the data to identify patterns in the locations of earthquakes.	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	
Investigation 4.2 1 period	7.ESS. 3, 7.ESS.5	<ul style="list-style-type: none"> <li>Recognize that an understanding of the motion of earthquake waves can help scientists formulate hypotheses about Earth's interior.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 4.3 2 periods	7.ESS. 3, 7.ESS.5	<ul style="list-style-type: none"> <li>Contrast properties of the lithosphere and the mantle and describe how these differing properties contribute to tectonic movement.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 4.4 1 period	7.ESS. 3, 7.ESS.5	<ul style="list-style-type: none"> <li>Use models to simulate the movement of lithospheric plates as they collide, separate, and slide past one another.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Graham Cracker Lab	7.ESS. 3, 7.ESS.5	<ul style="list-style-type: none"> <li>Use models to simulate the movement of lithospheric plates as they collide, separate, and slide past one another.</li> </ul>	Data in Lab Notebooks	Graham Crackers Frosting Wax Paper Student Sheets in OneNote

Lesson 4: Investigating Plate Movement			Unit: Earth's Dynamic System	
<b>Essential Question(s):</b> How do changes in the lithosphere affect Earth's surface?				
<b>Key Terms:</b> Crust, Fault, Latitude, Longitude, Oceanic ridge, Plate tectonics, Ring of Fire, Continental crust, Lithosphere, Mantle, Oceanic crust, Convergent plate boundary, Divergent plate boundary, Landform, Plate boundary, Rift valley Subduction, Transform plate boundary, Elasticity, Fault, Friction, Stress, Fracture, Tectonic plate, Lava, Oceanic ridge, Oceanic trench, Tectonic plate, Tsunami, Brittle, Deformation, Elasticity, Fracture, Strain, Stress				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
			Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	
Investigation 4.5 1 period	7.ESS. 3, 7.ESS.5	<ul style="list-style-type: none"> <li>• Design an investigation to explore the effects of applying a force to a model of a fault.</li> <li>• Relate the interaction of forces at plate boundaries to the occurrence of earthquakes.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Reflection and Quiz	7.ESS. 3, 7.ESS.4, 7.ESS.5	<ul style="list-style-type: none"> <li>• Review concepts from this lesson and consider how the knowledge can contribute to earthquake understanding and preparation.</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 104
<b>Assessment(s):</b> End of Lesson Quiz				
Student sheets can be found at: <a href="https://ssec.si.edu/earths-dynamic-systems">https://ssec.si.edu/earths-dynamic-systems</a>				



Lesson 5: Cycling Matter and Energy			Unit: Earth's Dynamic System	
Essential Question(s): How do heat and pressure impact geologic features?				
Key Terms: Convection, Mantle, Mineral, Rock cycle, Tectonic plate, Igneous Rock, Magma, Metamorphic Rock, Sedimentary Rock, Sediments, Weathering, Erosion, Mineral, Geology				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Investigation 5.1	7.ESS.1, 7.ESS.2, 7.ESS.3, 7.ESS.5	<ul style="list-style-type: none"> <li>Carry out investigations using a simulation that models the formation of landforms when lithospheric plates move in different directions over a scale of thousands and millions of years.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 5.2	7.ESS.1, 7.ESS.4	<ul style="list-style-type: none"> <li>Construct an explanation based on evidence from a model of how igneous, sedimentary, and metamorphic rocks are formed.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 5.3	7.ESS.1, 7.ESS.4	<ul style="list-style-type: none"> <li>Observe patterns in rock texture and use those patterns to categorize a set of rock samples.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Reflection and Quiz	7.ESS.1, 7.ESS.2, 7.ESS.3, 7.ESS.4, 7.ESS.5	<ul style="list-style-type: none"> <li>Classify rocks as igneous, metamorphic, or sedimentary based on descriptions of their formation.</li> <li>Construct explanations of how igneous,</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 137  Quiz

<b>Lesson 5: Cycling Matter and Energy</b>			<b>Unit: Earth's Dynamic System</b>	
<b>Essential Question(s): How do heat and pressure impact geologic features?</b>				
<b>Key Terms: Convection, Mantle, Mineral, Rock cycle, Tectonic plate, Igneous Rock, Magma, Metamorphic Rock, Sedimentary Rock, Sediments, Weathering, Erosion, Mineral, Geology</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
		sedimentary, and metamorphic rocks are formed		
Extending Your Knowledge Reading Selection	7.ESS.1, 7.ESS.2	<ul style="list-style-type: none"> <li>• “Rocks Worth Keeping” Learn about the vast rock collection at the Smithsonian National Museum of Natural History and how rocks and minerals are different.</li> <li>“GEO Profile: White Cliffs of Dover” Understand how both stability and microscopic change over time have affected one of Britain’s most famous geological landmarks.</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 142-147
<b>Assessment(s):</b> End of Lesson Quiz				
Student sheets can be found at: <a href="https://ssec.si.edu/earths-dynamic-systems">https://ssec.si.edu/earths-dynamic-systems</a>				

Lesson 6: Volcanoes: Building Up			Unit: Earth's Dynamic System	
Essential Question(s): How are volcanoes formed?				
Key Terms: Landform, Magma, Lava, Volcano, Seismometer, Tiltmeter, Volcano inflation, Cinder Cone Volcano, Composite Volcano, Fissure, Hot Spot, Shield Volcano, Vent, Viscosity, Crust, Mantle, Petrology, Tsunami				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Investigation 6.1 1 period	7.ESS.3, 7.ESS.4	<ul style="list-style-type: none"> <li>Analyze and interpret data on volcanoes and earthquakes and use that analysis to forecast future events.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 6.2 1 period	7.ESS.2, 7.ESS.3, 7.ESS.5	<ul style="list-style-type: none"> <li>Use models to understand how geological events change Earth's surface at varying time and spatial scales.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 6.3 1 period	7.ESS.2, 7.ESS.3, 7.ESS.5	<ul style="list-style-type: none"> <li>Use models to understand how geological events change Earth's surface at varying time and spatial scales.</li> <li>Understand how scientists use patterns in data to predict volcanic eruptions.</li> <li>Understand how new technology and engineering can help scientists observe patterns in geologic activity.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 6.4 1 period	7.ESS.3, 7.ESS.5	<ul style="list-style-type: none"> <li>Observe patterns in the shape of volcanoes and use those observations</li> </ul>	Data in Lab Notebooks	Earth's Dynamic Systems Lab Kit

Lesson 6: Volcanoes: Building Up			Unit: Earth's Dynamic System	
Essential Question(s): How are volcanoes formed?				
Key Terms: Landform, Magma, Lava, Volcano, Seismometer, Tiltmeter, Volcano inflation, Cinder Cone Volcano, Composite Volcano, Fissure, Hot Spot, Shield Volcano, Vent, Viscosity, Crust, Mantle, Petrology, Tsunami				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		to categorize volcanoes into groups.	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	
Reflection and Quiz	7.ESS.2, 7.ESS.3, 7.ESS.4, 7.ESS.5	<ul style="list-style-type: none"> <li>• Review new knowledge about how the shape of a volcano gives clues about its type.</li> <li>• Consider the influence of fault type and lava characteristics on the shape and type of a volcano.</li> <li>• Devise a strategy for determining whether a volcano is active.</li> <li>• Revise the concept map on geoscience processes that result in volcano formation based on new knowledge gained.</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 166  Quiz
<b>Assessment(s):</b> End of Lesson Quiz Student sheets can be found at: <a href="https://ssec.si.edu/earths-dynamic-systems">https://ssec.si.edu/earths-dynamic-systems</a>				

Lesson 7: Volcanoes: Eruption			Unit: Earth's Dynamic System	
Essential Question(s): How do volcanoes change Earth's surface?				
Key Terms: Lava, Magma, Submarine, Volcano, Viscosity, Convection, Oceanic Ridge, Volcanology				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Investigation 7.1 1 period	7.ESS.3, 7.ESS.4	<ul style="list-style-type: none"> <li>Investigate lava flow by making predictions about variables like temperature, frequency, and viscosity.</li> <li>Construct an explanation of how lava flow impacts the creation of new landforms.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 7.2 1 period	7.ESS.3, 7.ESS.4, 7.ESS.5	<ul style="list-style-type: none"> <li>Use previous knowledge to draw conclusions about the properties and effects of underwater volcanoes.</li> <li>Develop and build a model of an eruption from an underwater volcano.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 7.3 1 period  (Optional Enrichment Activity Based on time)	7.ESS.2, 7.ESS.3	<ul style="list-style-type: none"> <li>Plan and carry out a controlled experiment to investigate patterns of volcanic ash fall.</li> <li>Use mathematics to interpret data from the experiment.</li> <li>Compare results to determine patterns, draw</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit

Lesson 7: Volcanoes: Eruption			Unit: Earth's Dynamic System	
Essential Question(s): How do volcanoes change Earth's surface?				
Key Terms: Lava, Magma, Submarine, Volcano, Viscosity, Convection, Oceanic Ridge, Volcanology				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		conclusions, and make connections to actual ash fall events.		
Investigation 7.4 1 period	7.ESS.3	<ul style="list-style-type: none"> <li>Analyze VEI data to identify patterns of volcanic activity.</li> <li>Ask questions about the potential benefits of understanding the VEI of a particular volcano.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Reflection and Quiz 1 period	7.ESS.2, 7.ESS.3, 7.ESS.4, 7.ESS.5	<ul style="list-style-type: none"> <li>Argue from evidence about the long-term effects of the eruption of Krakatau and the nature of Anak Krakatau compared with the original volcanic mountain.</li> <li>Explain how volcanic eruptions have changed Earth's surface and help predict future eruptions.</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 200
<b>Assessment(s):</b> End of Lesson Quiz Student sheets can be found at: <a href="https://ssec.si.edu/earths-dynamic-systems">https://ssec.si.edu/earths-dynamic-systems</a>				

Lesson 8: Changing Earth's Surface			Unit: Earth's Dynamic System	
Essential Question(s): How have geoscience processes changed Earth's surface?				
Key Terms: Earthquakes, Erosion, Lahar, Abrasion, Deposition, Erosion, Loess, Sand Dune, Weathering, Suspended Load, Glacial ablation, Glacial rebound, Glacier, Moraine, Sinkhole, Crater, Fossil				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Investigation 8.1 1 period	7.ESS.4	<ul style="list-style-type: none"> <li>• Develop an understanding of lahars and how they relate to volcanoes.</li> <li>• Investigate lahars by making predictions and creating a model to test predictions.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 8.2a 1 period	7.ESS.1, 7.ESS.4	<ul style="list-style-type: none"> <li>• Build a model to simulate wind erosion and draw conclusions about the effects on Earth.</li> <li>• Demonstrate an understanding of weathering, erosion, and deposition.</li> <li>• Draw connections between wind erosion and asteroid impacts.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 8.2b 1 period	7.ESS.1, 7.ESS.4	<ul style="list-style-type: none"> <li>• Build a stream table to model water erosion and draw conclusions about the effects on Earth.</li> <li>• Demonstrate an understanding of weathering, erosion, and deposition.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit

Lesson 8: Changing Earth's Surface			Unit: Earth's Dynamic System	
Essential Question(s): How have geoscience processes changed Earth's surface?				
Key Terms: Earthquakes, Erosion, Lahar, Abrasion, Deposition, Erosion, Loess, Sand Dune, Weathering, Suspended Load, Glacial ablation, Glacial rebound, Glacier, Moraine, Sinkhole, Crater, Fossil				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		<ul style="list-style-type: none"> <li>Use mathematics to interpret data from the investigation.</li> </ul>		
Investigation 8.2c 1 period	7.ESS.1, 7.ESS.4	<ul style="list-style-type: none"> <li>Build a model to simulate glacial erosion and draw conclusions about the effects on Earth.</li> <li>Explain possible causes of glacial ablation and retreat.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 8.2d 1 period	7.ESS.1, 7.ESS.4	<ul style="list-style-type: none"> <li>Build a model to simulate sinkholes and draw conclusions about the effects on Earth.</li> <li>Construct an explanation for how human activity plays a role in the formation of sinkholes.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 8.3	7.ESS.1, 7.ESS.4	<ul style="list-style-type: none"> <li>Conduct research to explain how a geoscience process is responsible for forming a real- life structure on Earth.</li> <li>Evaluate the credibility of online resources using a rubric.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit



Lesson 8: Changing Earth's Surface			Unit: Earth's Dynamic System	
<b>Essential Question(s):</b> How have geoscience processes changed Earth's surface?				
<b>Key Terms:</b> Earthquakes, Erosion, Lahar, Abrasion, Deposition, Erosion, Loess, Sand Dune, Weathering, Suspended Load, Glacial ablation, Glacial rebound, Glacier, Moraine, Sinkhole, Crater, Fossil				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		<ul style="list-style-type: none"> <li>• Demonstrate knowledge by presenting research to the class in a 5-minute presentation.</li> </ul>		
Reflection and Quiz	7.ESS.1, 7.ESS.4	<ul style="list-style-type: none"> <li>• Predict the timescales of geoscience processes.</li> <li>• Investigate craters to explain how ancient asteroid impacts changed Earth's surface.</li> <li>• Draw connections between the Burgess Shale and geoscience processes.</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 231  Quiz
<b>Assessment(s):</b> End of Lesson Quiz Student sheets can be found at: <a href="https://ssec.si.edu/earths-dynamic-systems">https://ssec.si.edu/earths-dynamic-systems</a>				

Lesson 9: Analyzing the Fossil Record			Unit: Earth's Dynamic System	
<b>Essential Question(s):</b> What do fossils and layers of sediment tell us about Earth's past?				
<b>Key Terms:</b> Strata, Excavate, Paleontology, Law of Superposition, Biodiversity, Geologic Timescale, Mass Extinction				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Investigation 9.1 1 period	7.ESS.2	Develop a model to demonstrate formation of mold and cast fossils. <ul style="list-style-type: none"> <li>• Watch a video demonstrating the excavation process of</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit

Lesson 9: Analyzing the Fossil Record			Unit: Earth's Dynamic System	
Essential Question(s): What do fossils and layers of sediment tell us about Earth's past?				
Key Terms: Strata, Excavate, Paleontology, Law of Superposition, Biodiversity, Geologic Timescale, Mass Extinction				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		fossils and practice a similar technique with a fossil-bearing mound.		
Investigation 9.2 1 period	7.ESS.2, 7.ESS.5	<ul style="list-style-type: none"> <li>• Create a model of rock strata with fossils to explain Earth's history.</li> <li>• Develop an understanding of radiometric dating and its uses.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 9.3 1 period	7.ESS.2	<ul style="list-style-type: none"> <li>• Use a simulation to explore radiometric dating and the related vocabulary.</li> <li>• Apply knowledge of radiometric dating to explain the fossil record.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 9.4 1 period	7.ESS.2	<ul style="list-style-type: none"> <li>• Describe how life-forms have changed throughout Earth's history.</li> <li>• Use evidence and reasoning to explain changes in diversity over time.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 9.5 1 period	7.ESS.2	<ul style="list-style-type: none"> <li>• Identify extinctions and other patterns using the fossil record.</li> </ul>	Data in Lab Notebooks	Earth's Dynamic Systems Lab Kit

<b>Lesson 9: Analyzing the Fossil Record</b>			<b>Unit: Earth's Dynamic System</b>	
<b>Essential Question(s): What do fossils and layers of sediment tell us about Earth's past?</b>				
<b>Key Terms: Strata, Excavate, Paleontology, Law of Superposition, Biodiversity, Geologic Timescale, Mass Extinction</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
		<ul style="list-style-type: none"> <li>• Illustrate changes that result from a geological scenario.</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	
Reflection and Quiz	7.ESS.2, 7.ESS.5	<ul style="list-style-type: none"> <li>• Draw connections between the fossil record and the distribution of fossils.</li> <li>• Describe the tools used to date fossils</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 265  Quiz
<b>Assessment(s):</b> End of Lesson Quiz				
Student sheets can be found at: <a href="https://ssec.si.edu/earths-dynamic-systems">https://ssec.si.edu/earths-dynamic-systems</a>				

<b>Lesson 10: Distribution of Resources on Earth</b>			<b>Unit: Earth's Dynamic System</b>	
<b>Essential Question(s): How do geoscience process impact the distribution of resources on Earth?</b>				
<b>Key Terms: Natural Resource, Geodynamic Region, Aquifer, Groundwater, Groundwater mining, Recharge, Mineral</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
Investigation 10.1 1 period	7.ESS.4, 7.ESS.6	<ul style="list-style-type: none"> <li>• Construct an explanation for the locations of copper deposits by mapping and comparing data about the locations of copper deposits with locations of volcano and earthquake activity.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 10.2 1 period	7.ESS.6, 7.ESS.7	<ul style="list-style-type: none"> <li>• Build a model of an oil reserve and then try to</li> </ul>	Data in Lab Notebooks	Earth's Dynamic Systems Lab Kit

Lesson 10: Distribution of Resources on Earth			Unit: Earth's Dynamic System	
Essential Question(s): How do geoscience process impact the distribution of resources on Earth?				
Key Terms: Natural Resource, Geodynamic Region, Aquifer, Groundwater, Groundwater mining, Recharge, Mineral				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		discover buried oil in a reserve made by another group. While exploring for oil, keep track of drilling costs.	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	
Investigation 10.3 2 periods	7.ESS.1, 7.ESS.6	<ul style="list-style-type: none"> <li>• Conduct research about a specific mineral to learn how that mineral is formed, where is it found, and how we use it.</li> <li>• Present research findings to the class.</li> <li>• Create a bibliography and assess the sources used (at least five) in research.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Reflection and Quiz	7.ESS.1, 7.ESS.4, 7.ESS.6, 7.ESS.7	<ul style="list-style-type: none"> <li>• Create a summary based on a reading passage.</li> <li>• Explain how scientists expect to access nonrenewable minerals after humans have used up what is on Earth.</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 285  Quiz
<b>Assessment(s):</b> End of Lesson Quiz Student sheets can be found at: <a href="https://ssec.si.edu/earths-dynamic-systems">https://ssec.si.edu/earths-dynamic-systems</a>				

Lesson 11: Evidence of a Dynamic Earth			Unit: Earth's Dynamic System	
Essential Question(s): What evidence suggests that Earth is a dynamic geological system?				
Key Terms: Geological Timescale, Glacier, Strata, Law of Superposition, Pangaea, Supercontinent, Magnetite, Seafloor Spreading,				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Investigation 11.1 1 period	7.ESS.2	<ul style="list-style-type: none"> <li>Describe geological influences on fossil distribution.</li> <li>Develop a time line of Earth's past events.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 11.2 1 period	7.ESS.1, 7.ESS.2, 7.ESS.3	<ul style="list-style-type: none"> <li>Apply the law of superposition to studying fossils in rock strata.</li> <li>Identify conditions in which the distribution of fossils may be irregular.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 11.3 1 period	7.ESS.1, 7.ESS.2, 7.ESS.3	<ul style="list-style-type: none"> <li>Use knowledge of supercontinents to explain how plate tectonics have influenced the appearance of Earth.</li> <li>Explain similar fossil and rock data found on different landmasses.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit
Investigation 11.4 1 period	7.ESS.2, 7.ESS.3, 7.ESS.5	<ul style="list-style-type: none"> <li>Draw connections among divergent plates, volcanic rock, and magnetism.</li> <li>Use data and graphs to demonstrate evidence of Earth's magnetic reversals.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Earth's Dynamic Systems Lab Kit

<b>Lesson 11: Evidence of a Dynamic Earth</b>			<b>Unit: Earth's Dynamic System</b>	
<b>Essential Question(s): What evidence suggests that Earth is a dynamic geological system?</b>				
<b>Key Terms: Geological Timescale, Glacier, Strata, Law of Superposition, Pangaea, Supercontinent, Magnetite, Seafloor Spreading,</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
		<ul style="list-style-type: none"> <li>Identify benefits of magnetic data on rock and fossil dating.</li> </ul>		
Reflection and Quiz	7.ESS.1, 7.ESS.2, 7.ESS.3, 7.ESS.5	<ul style="list-style-type: none"> <li>Provide support for using rocks to explain events in Earth's history.</li> <li>Develop a time line for Earth's future based on knowledge of past events.</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 312  Quiz
<b>Assessment(s):</b> End of Lesson Quiz				
Student sheets can be found at: <a href="https://ssec.si.edu/earths-dynamic-systems">https://ssec.si.edu/earths-dynamic-systems</a>				

<b>Lesson 12: Assessment: Earth's Dynamic Systems</b>			<b>Unit: Earth's Dynamic System</b>	
<b>Essential Question(s): How can we use knowledge of Earth's dynamic systems to understand the past and prepare for the future?</b>				
<b>Key Terms:</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
Performance Assessment and Reflection 5-8 periods	7.ESS.1 – 7.ESS.7	<ul style="list-style-type: none"> <li>Examine real-world observations and images related to geoscience processes and phenomena.</li> <li>Describe what a data set represents and interpret similarities and differences within it.</li> </ul>		Performance Assessment Sheet and Rubrics

<b>Lesson 12: Assessment: Earth's Dynamic Systems</b>			<b>Unit: Earth's Dynamic System</b>	
<b>Essential Question(s): How can we use knowledge of Earth's dynamic systems to understand the past and prepare for the future?</b>				
<b>Key Terms:</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
Written Assessment 1 period	7.ESS.1 – 7.ESS.7	<ul style="list-style-type: none"> <li>Examine real-world observations and images related to geoscience processes and phenomena.</li> <li>Describe what a data set represents and interpret similarities and differences within it.</li> </ul>		Copies of Written Assessment and Answer Keys
<b>Assessment(s):</b> Unit Written Assessment and Performance Assessment Student sheets can be found at: <a href="https://ssec.si.edu/earths-dynamic-systems">https://ssec.si.edu/earths-dynamic-systems</a>				

## Unit: Energy, Forces, and Motion

<b>Pre-Lesson: The Structure of Matter</b>			<b>Unit: Energy, Forces, and Motion</b>	
<b>Essential Question(s): What is the structure of matter and how can it change?</b>				
<b>Key Terms: Atoms, Elements, Molecules, and Compounds, States of Matter, Solid, Liquid, Gas, Motion, Density, Temperature, Thermal Energy</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
Investigation Pre.1 1-2 days	7.PS.1	<ul style="list-style-type: none"> <li>Phet simulation to create atom models and molecule models.</li> <li>Explain that atoms are the building blocks of matter.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Online Phet simulations

Finalize activities and resources for Pre-Lesson: Elements, Molecules, States of Matter, etc.

Pre-Lesson: The Structure of Matter		Unit: Energy, Forces, and Motion		
Essential Question(s): What is the structure of matter and how can it change?				
Key Terms: Atoms, Elements, Molecules, and Compounds, States of Matter, Solid, Liquid, Gas, Motion, Density, Temperature, Thermal Energy				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		<ul style="list-style-type: none"> <li>Use diagrams to explain the positions and charges of protons, neutrons, and electrons within an atom.</li> </ul>		
Investigation Pre.2 1-2 days	7.PS.1	<ul style="list-style-type: none"> <li>Explain that every element is composed of a specific type of atom.</li> <li>Explain that a molecule is made of two or more atoms (same or different types of atoms - Example - H<sub>2</sub>O and H<sub>2</sub> are both molecules.)</li> <li>A compound is two or more elements. (Ex - H<sub>2</sub>O or CO<sub>2</sub>)</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Resources to construct models
Investigation Pre.3	7.PS.2	<ul style="list-style-type: none"> <li>List the properties of solids, liquids and gases. Find examples of each state of matter.</li> <li>Explain that adding heat (thermal energy) to a substance increases the speed of the atoms, which eventually alters the substances state of</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Dry Ice



<b>Pre-Lesson: The Structure of Matter</b>			<b>Unit: Energy, Forces, and Motion</b>	
<b>Essential Question(s): What is the structure of matter and how can it change?</b>				
<b>Key Terms: Atoms, Elements, Molecules, and Compounds, States of Matter, Solid, Liquid, Gas, Motion, Density, Temperature, Thermal Energy</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
		<p>matter (solid -&gt; liquid -&gt; gas).</p> <ul style="list-style-type: none"> <li>• Explain that removing heat (thermal energy) from a substance decreases the speed of the atoms, which eventually alters the substances state of matter (gas -&gt; liquid -&gt; solid).</li> <li>• May even discuss evaporation, condensation, sublimation, desublimation, freezing and melting. Provide real-world examples of each.</li> </ul>		
<b>Assessment(s): End of Lesson Quiz</b>				

Lesson: 1 Pre-Assessment: Let's Get Moving		Unit: Energy, Forces, and Motion		
Essential Question(s): What do you know about energy, forces, and motion?				
Key Terms: Force, Energy, Mass, Speed				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Investigation 1.1-1.6  (Pre-Assessment Stations) 2-3 days total	7.PS.3, 7.PS.8  SEPS Standards 1-8	<ul style="list-style-type: none"> <li>• Plan and carry out investigations to answer questions about forces, energy changes, and motion.</li> <li>• Ask testable questions to investigate the forces acting on a system.</li> <li>• Construct and analyze graphs to understand speed and motion.</li> <li>• Model the energy changes taking place in a moving system.</li> <li>• Determine criteria for a design project and then use the criteria to test and improve designs.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Energy, Forces, and Motion Lab Kit  Student Sheet 1.2  Copies of Student Self-Assessment
<b>Assessment(s):</b> Self-Assessment Quiz				
Student sheets can be found here: <a href="https://ssec.si.edu/sites/default/files/page/EFM%20BLMs_1607.pdf">https://ssec.si.edu/sites/default/files/page/EFM%20BLMs_1607.pdf</a>				

Lesson 2: Force, Velocity, and Acceleration			Unit: Energy, Forces, and Motion	
Essential Question(s): Why do objects speed up, slow down, or change direction?				
Key Terms: Force, Mass, Predict, Speed, Acceleration, Average Speed, Velocity, Balanced Forces, Net Force, Gravity, Newton, Weight, Law				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Investigation 2.1 2 periods	7.PS.4, 7.PS.5	<ul style="list-style-type: none"> <li>• Measure the speed and average speed of an object in motion across a flat surface.</li> <li>• Analyze and interpret data from investigations on motion.</li> <li>• Describe the motion of an object, and explain how your reference frame affects your description.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Energy, Forces, and Motion Lab Kit
Investigation 2.2 1 period	7.PS.4, 7.PS.5	<ul style="list-style-type: none"> <li>• Measure the speed and average speed of an object in motion across a flat surface.</li> <li>• Investigate how forces affect the motion of an object.</li> <li>• Analyze and interpret data from investigations on motion.</li> <li>• Employ force diagrams to model forces acting on an object.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Energy, Forces, and Motion Lab Kit
Investigation 2.3 1 period	7.PS.3, 7.PS.4, 7.PS.5	<ul style="list-style-type: none"> <li>• Plan and carry out an investigation to explore how mass affects an object's motion.</li> </ul>	Data in Lab Notebooks	Energy, Forces, and Motion Lab Kit

Lesson 2: Force, Velocity, and Acceleration			Unit: Energy, Forces, and Motion	
Essential Question(s): Why do objects speed up, slow down, or change direction?				
Key Terms: Force, Mass, Predict, Speed, Acceleration, Average Speed, Velocity, Balanced Forces, Net Force, Gravity, Newton, Weight, Law				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		<ul style="list-style-type: none"> <li>Analyze and interpret data from investigations on motion.</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	
Investigation 2.4 1 period	7.PS.3, 7.PS.4, 7.PS.5	<ul style="list-style-type: none"> <li>Students observe evidence for acceleration due to gravity.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Energy, Forces, and Motion Lab Kit
Investigation 2.5 1 period	7.PS.3, 7.PS.4, 7.PS.5	<ul style="list-style-type: none"> <li>Describe how mass and weight are related.</li> <li>Construct and analyze data tables and graphs describing the relationship between mass and weight.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Energy, Forces, and Motion Lab Kit
Reflection and Quiz	7.PS.3, 7.PS.4, 7.PS.5	<ul style="list-style-type: none"> <li>Construct explanations about object motion using evidence gathered from investigations.</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 28  Quiz
<b>Assessment(s):</b> End of Lesson Quiz Student sheets can be found here: <a href="https://ssec.si.edu/sites/default/files/page/EFM%20BLMs_1607.pdf">https://ssec.si.edu/sites/default/files/page/EFM%20BLMs_1607.pdf</a>				

Lesson 4: Newton's First and Second Laws			Unit: Energy, Forces, and Motion	
<b>Essential Question(s):</b> How can we predict if the motion of an object will change or stay the same?				
<b>Key Terms:</b> Balanced Forces, Inertia, Net Force, Newton's First Law, Newton's Second Law, Unbalanced Forces, Acceleration, Mass, Speed, Gravity				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Investigation 4.1 1 period	7.PS.4, 7.PS.5	<ul style="list-style-type: none"> <li>Apply Newton's first law to plan an investigation regarding the motion of a car.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Energy, Forces, and Motion Lab Kit
Investigation 4.2 1 period	7.PS.4, 7.PS.5	<ul style="list-style-type: none"> <li>Apply Newton's second law to plan an investigation regarding the motion of a car.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Energy, Forces, and Motion Lab Kit
Reflection and Quiz 1 period	7.PS.4, 7.PS.5	<ul style="list-style-type: none"> <li>Construct explanations about the motion of a car using evidence gathered from investigations</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 57  Quiz
<b>Assessment(s):</b> End of Lesson Quiz				
Student sheets can be found here: <a href="https://ssec.si.edu/sites/default/files/page/EFM%20BLMs_1607.pdf">https://ssec.si.edu/sites/default/files/page/EFM%20BLMs_1607.pdf</a>				

Lesson 6: Newton's Third Law			Unit: Energy, Forces, and Motion	
<b>Essential Question(s):</b> How would a ball move if you threw it in space?				
<b>Key Terms:</b> Balanced Forces, Collision, Force Pair, Newton's Second Law, Newton's Third Law, Unbalanced Forces, Friction, Gravity, Inertia, Velocity				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Investigation 6.1 2 periods	7.PS.4, 7.PS.5, 7.PS.6, 7.PS.7	<ul style="list-style-type: none"> <li>Build a battery-powered fan car and make</li> </ul>	Data in Lab Notebooks	Energy, Forces, and Motion Lab Kit

Lesson 6: Newton's Third Law			Unit: Energy, Forces, and Motion	
<b>Essential Question(s):</b> How would a ball move if you threw it in space?				
<b>Key Terms:</b> Balanced Forces, Collision, Force Pair, Newton's Second Law, Newton's Third Law, Unbalanced Forces, Friction, Gravity, Inertia, Velocity				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		predictions about its motion. • Determine the effects of balanced and unbalanced forces on the motion of the fan car.	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	
Investigation 6.2 1 period	7.PS.6, 7.PS.7	• Apply Newton's third law of motion.	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Energy, Forces, and Motion Lab Kit
Reflection and Quiz 1 period	7.PS.4, 7.PS.5, 7.PS.6, 7.PS.7	• Explain the differences between action-reaction force pairs and balanced forces	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 90  Quiz
<b>Assessment(s):</b> End of Lesson Quiz				
Student sheets can be found here: <a href="https://ssec.si.edu/sites/default/files/page/EFM%20BLMs_1607.pdf">https://ssec.si.edu/sites/default/files/page/EFM%20BLMs_1607.pdf</a>				

Lesson 8: Transforming Energy			Unit: Energy, Forces, and Motion	
<b>Essential Question(s):</b> How do energy transformation inform the design of a roller coaster?				
<b>Key Terms:</b> Constraints, Kinetic Energy, Potential Energy, Energy Transformation, System				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Investigation 8.1 6-8 periods	7.PS.7, 7.PS.8	• Define and investigate relevant scientific	Data in Lab Notebooks	Energy, Forces, and Motion Lab Kit

Lesson 8: Transforming Energy		Unit: Energy, Forces, and Motion		
Essential Question(s): How do energy transformation inform the design of a roller coaster?				
Key Terms: Constraints, Kinetic Energy, Potential Energy, Energy Transformation, System				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		principles inherent to the design of a marble roller coaster.	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Cardboard Tubes, Tape, Marble Run Data Sheet
Investigation 8.2 7-9 periods	7.PS.7	<ul style="list-style-type: none"> <li>Apply understanding of energy, forces, and motion to construct a roller coaster that accomplishes a design challenge.</li> <li>Collect and use data to evaluate competing design solutions.</li> <li>Use engineering processes to test and refine roller coaster design for optimization.</li> </ul>	Data in Lab Notebooks  Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Energy, Forces, and Motion Lab Kit  Cardboard Tubes, Tape, Marble Run Data Sheet
Reflection and Quiz 1 period	7.PS.7, 7.PS.8	<ul style="list-style-type: none"> <li>Use evidence to support claims related to the design challenge.</li> <li>Use criteria to evaluate the success of roller coaster designs.</li> <li>Describe changes in kinetic and potential energy for a passenger moving along a roller coaster track.</li> </ul>	Analyzations, Conclusions, Responses, and Reflections in Lab Notebooks	Student Guide – page 133  Quiz
<b>Assessment(s):</b> End of Lesson Quiz				

<b>Lesson 8: Transforming Energy</b>			<b>Unit: Energy, Forces, and Motion</b>	
<b>Essential Question(s):</b> How do energy transformation inform the design of a roller coaster?				
<b>Key Terms:</b> Constraints, Kinetic Energy, Potential Energy, Energy Transformation, System				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Student sheets can be found here: <a href="https://ssec.si.edu/sites/default/files/page/EFM%20BLMs_1607.pdf">https://ssec.si.edu/sites/default/files/page/EFM%20BLMs_1607.pdf</a>				

<b>Lesson 9: Energy Transfer and Heat Transfer</b>			<b>Unit: Energy, Forces, and Motion</b>	
<b>Essential Question(s):</b> How is energy transferred from one form to another?				
<b>Key Terms:</b> Law of Conservation of Energy, Open System, Closed System, Heat Transfer, Radiation, Convection, Conduction				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Investigation 9.1	7.PS.8	<ul style="list-style-type: none"> <li>Define energy as the capacity to do work.</li> <li>Must be able to prove that the total amount of energy does not change during the transfer in a closed system.</li> <li>In a closed system, matter and energy do not leave the system. The amount of energy remains constant in the system.</li> <li>In an open system, matter and energy can enter or leave the system. Almost all systems are open.</li> </ul>		

Finalize activities and resources for Lesson 9, Conservation of Energy, Heat transfer



<b>Lesson 9: Energy Transfer and Heat Transfer</b>			<b>Unit: Energy, Forces, and Motion</b>	
<b>Essential Question(s): How is energy transferred from one form to another?</b>				
<b>Key Terms: Law of Conservation of Energy, Open System, Closed System, Heat Transfer, Radiation, Convection, Conduction</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
		<ul style="list-style-type: none"> <li>Analyze data or investigate how energy is transferred in a closed system versus an open system</li> </ul>		
Investigation 9.2	7.PS.9	<ul style="list-style-type: none"> <li>Define and provide examples of radiation, convection, and conduction.</li> </ul>		
<b>Assessment(s):</b>				
<b>Lesson 10: Assessment: Energy, Forces, and Motion</b>			<b>Unit: Energy, Forces, and Motion</b>	
<b>Essential Question(s): How do people use an understanding of energy, forces, and motion to make predictions and design tools that make the world safe, enjoyable, and accessible?</b>				
<b>Key Terms:</b>				
<b>Investigation &amp; Duration</b>	<b>Standards</b>	<b>Objectives</b>	<b>Assessment (formative)</b>	<b>Resources</b>
Performance Assessment 2 periods	7.PS.1-7.PS.9	<ul style="list-style-type: none"> <li>Using knowledge of energy, forces, and motion, create a plan for transporting produce without it falling off the vehicle</li> </ul>		Student Performance Assessment and Rubrics
Written Assessment 1 period	7.PS.1-7.PS.9	<ul style="list-style-type: none"> <li>Apply knowledge and skills to answer questions in a written assessment about concepts related to energy, forces, and motion.</li> </ul>		Copies of Student Written Assessment
<b>Assessment(s):</b> Unit Written Assessment and Performance Assessment				
<b>Student sheets can be found here:</b> <a href="https://ssec.si.edu/sites/default/files/page/EFM%20BLMs_1607.pdf">https://ssec.si.edu/sites/default/files/page/EFM%20BLMs_1607.pdf</a>				

