

## Science Grade 4 Curriculum

**Content Area:** Science

**Grade Level(s):** Grade 4

**Date Developed/Revised:** July, 2019

**Date Adopted** \_\_\_\_\_

### **Course Description: Grade 4 Science**

**Unit 1 Engineering and Technology:** In this unit, students will explore how engineers define problems and solutions; learn about the importance of prototypes; use models to examine how prototypes are tested and improved

**Unit 2 Energy:** In this unit, students will discover what energy is and how it is transferred; explore how collisions show energy.

**Unit 3 Waves and Information:** In this unit, students will discover different parts of waves; explore how light can be reflected; examine and describe how information is transferred from place to place.

**Unit 4 Plant Structure and Function:** In this unit, students will explore the function of internal and external plant structures and how they aid in growth, survival, behavior and reproduction; learn how different plant structures work together as a system.

**Unit 5 Animal Structure and Function:** In this unit, students will explore the internal and external structures of animals; learn about how different senses work.

**Unit 6 Changes to Earth's Surface:** In this unit, students will explore how Earth has been shaped by water and other factors; discover how people map Earth's surface; learn about the patterns we can see from maps.

**Unit 7 Rocks and Fossils:** In this unit, students will explore the different layers of rocks and how they change; discover what we can learn about fossils and ancient environments; identify patterns in fossils.

**Unit 8 Natural Resources and Hazards:** In this unit, students will explore how renewable and nonrenewable resources are used for energy; discover how people can reduce land- and water- based hazards and their impacts.

Total Number of Units: 8

### Pacing Guide

Unit	Week	Standards: NJSL	Skill What we want students to “DO”
<b>1: Engineering and Technology</b>	<b>5 days</b>	<b>3-5-ETS1-1</b>	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
	<b>5 days</b>	<b>3-5-ETS1-2</b>	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
	<b>5 days</b>	<b>3-5-ETS1-3</b>	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
<b>2: Energy</b>	<b>5 days</b>	<b>4-PS3-1</b>	Use evidence to construct an explanation relating the speed of an object to the energy of that object.
	<b>5 days</b>	<b>4-PS3-2</b>	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
	<b>5 days</b>	<b>4-PS3-3</b>	Ask questions and predict outcomes about the changes in energy that occur when objects collide.

	<b>5 days</b>	<b>4-PS3-4</b>	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
<b>3: Waves and Information</b>	<b>7 days</b>	<b>4-PS4-1</b>	Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
	<b>7 days</b>	<b>4-PS4-2</b>	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
	<b>6 days</b>	<b>4-PS4-3</b>	Generate and compare multiple solutions that use patterns to transfer information, for example: drums sending coded information through sound waves, using a grid of 1s and 0s representing black and white to send information about a picture, and using Morse code to send text.
<b>4: Plant Structure and Function</b>	<b>10 days</b>	<b>4-LS1-1</b>	Construct and argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
<b>5: Animal Structure and Function</b>	<b>10 days</b>	<b>4-ESS2-1</b>	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
	<b>10 days</b>	<b>4-ESS2-2</b>	Analyze and interpret data from maps to describe patterns of Earth's features.
<b>6: Changes to Earth's</b>	<b>15 days</b>	<b>4-ESS2-1</b>	Make observations and/or measurements to

<b>Surface</b>	<b>10 days</b>	<b>4-ESS2-2</b>	provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.  Analyze and interpret data from maps to describe patterns of Earth's features.
<b>7: Rocks and Fossils</b>	<b>20 days</b>	<b>4-ESS1-1</b>	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
<b>8: Natural Resources and Hazards</b>	<b>12 days</b>	<b>4-ESS3-1</b>	Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
	<b>13 days</b>	<b>4-ESS3-2</b>	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

**Unit 1 Title: Engineering and Technology**  
**Time Frame: 10 Days**

### Essential Questions

- How do engineers define problems?
- How do engineers design solutions?
- How do engineers test and improve prototypes?

### Standards: NJSL

Standards / CPIs (cumulative Progress Indicators) taught and assessed:

#### **PERFORMANCE EXPECTATION**

- **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

#### **DISCIPLINARY CORE IDEAS**

- **ETS1.A Defining and Delimiting Engineering Problems**
  - Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.
- **ETS1.B Developing Possible Solutions**
  - Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. Developing Possible Solutions At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.
  - Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.
- **ETS1.C Optimizing the Design Solution**
  - Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.

## **SCIENCE and ENGINEERING PRACTICES**

- **Asking Questions and Defining Problems**

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.

- **Constructing Explanations and Designing Solutions**

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.

## **CROSS CUTTING CONCEPTS**

### **Influence of Science, Engineering, and Technology on Society and the Natural World**

- People's needs and wants change over time, as do their demands for new and improved technologies.
- Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.

### **Planning and Carrying Out Investigations**

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.

## **CONNECTIONS TO MATH**

**MP.2** Reason abstractly and quantitatively

**MP.4** Model with mathematics

**MP.5** Use appropriate tools strategically

## **CONNECTIONS TO ENGLISH LANGUAGE ARTS**

**W.4.7** Conduct short research projects that build knowledge through investigation of different aspects of a topic.

**W.4.8** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

**W.4.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

### **Technology:**

**8.1.5.A.1** Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

**8.1.5.A.2** Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.

### **Highlighted Career Ready Practices:**

- CRP4.** Communicate clearly and effectively and with reason.
- CRP6.** Demonstrate creativity and innovation.
- CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP12.** Work productively in teams while using cultural global competence.

**SEL Practices & Competencies:**

- Self-Management
- Social Awareness
- Responsible Decision-Making
- Relationship Skills

**Overall Goal (What is the big idea?)**

Students will explore the ways engineers come up with solutions to problems and learn about how these solutions are then integrated into technology that affects society and the environment.

**Pre-Assessment:**

Unit 1 Pretest: [Engineering and Technology](#)

**Please include interdisciplinary connections resources and plan in each activity**

Standards/ (SLO) Student Learning Objectives	Student Learning Strategies	Formative Assessment ***suggested but not limited to the following***	Activities ***suggested but not limited to the following***	Modifications & Reflections ***suggested but not limited to the following***
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<p><b><u>3-5-ETS1-1</u></b></p> <p><b>We are learning to to identify problems in the design of different objects...</b></p> <p><b>We are learning to identify constraints and criteria to design solutions to problems...</b></p>	<p><b><u>Essential Vocabulary:</u></b> criteria, engineering, constraint</p> <ul style="list-style-type: none"> <li>- learn introductory concepts of engineering and technology</li> <li>- explore engineering problems</li> <li>- develop solutions based on criteria and constraints</li> </ul> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- response notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>	<p><b>Lesson 1</b> <b>Apply What You Know</b> <b>Lesson 1 Check</b> <b>Lesson 1 Self Check</b> <b>Lesson 1 Roundup</b> <b>Lesson 1 Quiz</b></p>	<p><b>Exploration 1:</b> <b>Hands On Activity</b> <b><u>Menu Planning</u></b> Students ask questions and define problems related to food to plan menus. They will analyze constraints to come up with criteria.</p> <p><b>Exploration 2:</b> <b>NJSLS:</b> <b>MP.2</b> <b>Paper Building</b> Student teams are given 10 index cards and 10 cm of tape. In 10 minutes, students work as a team to build the tallest structure they can. It should support at least one book. Students list constraints and tell which was the hardest to meet and why.</p>	<p><b>RTI/ Extra Support</b> Connect students' answers to the use of problems in science, technology, and engineering. Give students an example of an engineering problem.</p> <p>Give students a series of scenarios that involve problems. For each scenario ask:</p> <ul style="list-style-type: none"> <li>- What is the problem?</li> <li>- What is the opposite of a problem?</li> </ul> <p><b>ELL: Support</b> Students whose primary language is not English may find it challenging to translate foods from their culture to words that describe the similar foods in English. Provide additional support by using pictures, if necessary, to help students make sure they are thinking correctly about the types of foods they want to make as part of the Hands On Activity.</p> <p><b>Extension:</b> Menu Planning This activity can be extended by having students research the food values such as calories, fat content, protein, carbohydrate, and vitamins found in each recipe. They can determine the criteria of</p>
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				<p>the meals based on meeting nutritional values.</p> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>-Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>-Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling)</li> </ul>
<p><u><a href="#">3-5-ETS1-2</a></u></p> <p><b>We are learning to research and design possible solutions to a problem...</b></p> <p><b>We are learning to investigate how well</b></p>	<p><b><u>Essential Vocabulary:</u></b> fair test</p> <ul style="list-style-type: none"> <li>- explore the ways engineers come up with solutions to problems</li> <li>- create explanations</li> <li>- design solutions of their own</li> </ul>	<p><b>Lesson 2</b> <b>Apply What You Know</b> <b>Lesson 2 Check</b> <b>Lesson 2 Self Check</b> <b>Lesson 2 Roundup</b> <b>Lesson 2 Quiz</b></p>	<p><b>Exploration 1:</b> <b>NJSLS: RI4.5</b> <b>Research Matters</b> Explore the processes for coming up with solutions to problems by studying how animals use their hearing in the wild. Draw images of animal ears, and explain how their ears work to keep them safe and fed. Compare</p>	<p><b>Extension:</b> Research Matters Challenge students to take this activity one step further by writing a brief summary of the features of the ear that allow the animal to hear so well, next to each of the drawings of the ears.</p> <p><b>ELL: Support</b></p>

<p><b>our solutions perform...</b></p>	<p>- learn about the processes that engineers go through, including using constraints and criteria</p> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- response notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>		<p>and contrast the different songs that birds sing, and consider how these songs, as well as animal ears, can influence engineers as they work on their designs.</p> <p><b>Exploration 3</b>  <b>Hands on Activity</b>  <b><u>Design It!</u></b></p> <p>Students collaborate with a team to design their own hearing-enhancing device. They must use the design criteria and constraints as they construct their device. They will also use what you've learned about past solutions, animals' ears, and fair test.</p>	<p><b>Use Realia</b>  Students learning English may struggle with the word representations that people use to identify what the different songbirds sound like. Play a clip for them of different bird songs.</p> <p><b>RTI/Extra Support</b>  Some students may not think that their designs need to be improved, but encourage them to come up with two or more possible designs that would allow their hearing-enhancing devices to work effectively.</p> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>-Keep instructions and directions '<u>chunked</u>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>-Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures,</li> </ul>
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				illustrations, graphs, charts, data tables, multimedia, modeling)
<p><b><u>3-5-ETS1-3</u></b></p> <p><b>We are learning to plan, design and test possible solutions for a prototype to determine which design best solves a problem.</b></p>	<p><b><u>Essential Vocabulary:</u></b>          prototype, failure analysis, optimize</p> <p>- plan, design, and test possible solutions for a prototype          - identify failure points or difficulties with a design          - suggest and implement changes that improve it</p> <p><b><u>Instructional Strategies:</u></b>          - response notebooks          - think pair share          - cooperative learning          - kwl chart          - question-answer relationship (QAR)</p>	<p><b>Lesson 3</b>  <b>Apply What You Know</b>  <b>Lesson 3 Check</b>  <b>Lesson 3 Self Check</b>  <b>Lesson 3 Roundup</b>  <b>Lesson 3 Quiz</b></p>	<p><b>Exploration 1:</b>  <b>Class Collaboration</b>          Students work with their class to further improve your team's design from the previous lesson.</p> <p><b>Exploration 1:</b>  <b>Hands on Activity</b>  <b>Tissue Rope</b>          Students work with a partner to find the best toilet-paper rope making technique they can. Limit 15 minutes to explore and build. A loop of their product will be tested to see how much weight it will support.</p>	<p><b>Extension:</b>          Have students do some research and look for famous inventions that were the direct result of a collaboration of a few or many different engineers. Have students share their research with the class.</p> <p><b>Suggested Strategies for ELL/ELD Students</b>          - Differentiate and use different modalities.          - Lessons that involve writing, speaking, drawing, and listening, give students <a href="#">four opportunities to deepen their understanding</a> - Additional engagements also provide a little breathing room so they can work through the language barrier.</p> <p><b>Suggested Strategies for Students with Special Needs</b>          -Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.          - Structure lessons around questions that are authentic, relate to students' interests, social/family background</p>

				<p>and knowledge of their community.</p> <p>-Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling)</p>
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<b>21<sup>st</sup> Century Theme Targeted: Global Awareness: Using 21st century skills to understand and address global issues.</b>					
<b>21st Century Skills Targeted</b>					
<b>Creativity &amp; Innovation</b>	<b>Information Literacy</b>	<b>Media Literacy</b>	<b>Critical Thinking &amp; Problem Solving</b>	<b>Communication &amp; Collaboration</b>	<b>Life &amp; Careers</b>
	<p><u>Leveled Readers:</u></p> <ul style="list-style-type: none"> <li>- What is the Engineering Process?</li> <li>- City Water Tunnel 3</li> </ul>	<p><u>Defining a Problem:</u></p> <p><u>Crash Course Kids</u></p>			<p><u>Solve Problems:</u></p> <p><u>Be an Engineer!</u></p>
<p><b>Summative Assessments: (include rubrics &amp; exemplars)</b></p> <p><b>Unit 1 Test: <u>Engineering and Technology</u></b></p> <p><b>Unit 1 Performance Task:</b></p>					

### Designing a Portable Chair:

Students develop models of a more comfortable chair. They analyze the problem and come up with solutions for their new designs, to demonstrate understanding of ETS1.A, ETS1.B, and ETS1.C in support of 3-5 ETS1-1.

- You work for a company that builds seating for large events. Clients are complaining that the portable chairs you make are not comfortable. It is your team's task to learn about portable chairs and design one that your clients will like.

### Unit 1 Performance Task Rubric

## **Unit 2 Title: Energy**

**Time Frame: 20 Days**

### **Essential Questions**

- **What is Energy?**
- **How is Energy Transferred?**
- **How Do Collisions Show Energy?**

### **Standards: NJSL**

**Standards / CPIs (cumulative Progress Indicators) taught and assessed:**

#### **PERFORMANCE EXPECTATION**

- **4-PS3-1** Use evidence to construct an explanation relating the speed of an object to the energy of that object.
- **4-PS3-2** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
- **4-PS3-3** Ask questions and predict outcomes about the changes in energy that occur when objects collide.
- **4-PS3-4** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

#### **DISCIPLINARY CORE IDEAS**

- **PS3.A Definitions of Energy**
  - The faster a given object is moving, the more energy it possesses.

- **PS3.B Conservation of Energy and Energy Transfer**
  - Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. Light also transfers energy from place to place. Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy.
- **PS3.C Relationship Between Energy and Forces**
  - When objects collide, the contact forces transfer energy so as to change the objects' motions.
- **PS3.D Energy in Chemical Processes and Everyday Life**
  - The expression “produce energy” typically refers to the conversion of stored energy into a desired form for practical use.
- **ETS1. Defining Engineering Problems**
  - Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.

### **SCIENCE and ENGINEERING PRACTICES**

- **Constructing Explanations and Designing Solutions**
  - Use evidence (e.g., measurements, observations, patterns) to construct an explanation.
- **Planning and Carrying Out Investigations**
  - Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
- **Asking Questions and Defining Problems**
  - Ask questions that can be investigated based on patterns such as cause and effect relationships.
  - Define a simple problem that can be solved through the development of a new or improved object or tool.

### **CROSS CUTTING CONCEPTS**

- **Energy and Matter**
  - Energy can be transferred in various ways and between objects.
- **Influence of Engineering, Technology, and Science on Society and the Natural World**

- Engineers improve existing technologies or develop new ones. Science is a Human Endeavor Most scientists and engineers work in teams.
- **Science is a Human Endeavor**
  - Science affects everyday life.

### **CONNECTIONS TO MATH**

**MP.2** Reason abstractly and quantitatively

**MP.4** Model with mathematics

**4.OA.A.3** Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted.

**4.OA.C.5** Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

**4.MD.A.1** Know relative sizes of measurement units within one system of units. Express measurements in a larger unit in terms of a smaller unit.

### **CONNECTIONS TO ENGLISH LANGUAGE ARTS**

**RI.4.5** Describe the overall structure of events, ideas, concepts, or information in a text or part of a text.

**W.4.2** Write informative/explanatory texts.

**W.4.7** Conduct short research projects that build knowledge through investigation of different aspects of a topic.

**W.4.8** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

### **Technology:**

**8.1.5.A.1** Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

**8.1.5.A.2** Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.

**8.1.5.A.4** Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.

### **Highlighted Career Ready Practices:**

**CRP4.** Communicate clearly and effectively and with reason.

**CRP6.** Demonstrate creativity and innovation.

**CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.

**CRP11.** Use technology to enhance productivity.

**CRP12.** Work productively in teams while using cultural global competence.

**SEL Practices & Competencies:**

Self-Management  
Social Awareness  
Responsible Decision-Making  
Relationship Skills

**Overall Goal (What is the big idea?)**

Students will discover what energy is and how it is transferred. They will explore how collisions show energy.

**Pre-Assessment:**

Unit 2 Pretest: [Energy](#)

**Please include interdisciplinary connections resources and plan in each activity**

<b>Standards/ (SLO) Student Learning Objectives</b>	<b>Student Learning Strategies</b>	<b>Formative Assessment ***suggested but not limited to the following***</b>	<b>Activities ***suggested but not limited to the following***</b>	<b>Modifications &amp; Reflections ***suggested but not limited to the following***</b>
<a href="#">4-PS3-2</a> <a href="#">4-PS3-4</a>  <b>We are learning to recognize common transformations of electrical energy...</b>	<b><u>Essential Vocabulary:</u></b> energy, energy transfer, energy transformation  - define energy and explore ways it can be	<b>Lesson 1</b> <b>Apply What You Know</b> <b>Lesson 1 Check</b> <b>Lesson 1 Self Check</b> <b>Lesson 1 Roundup</b> <b>Lesson 1 Quiz</b>	<b>Exploration 1:</b> <b>NJSLS: W.4.8, MP.2</b> <b>Hands On Activity</b> <b>Energy Near You</b> Students work independently and explore the room to identify examples of energy. Before students get started, you may want to create a list on the board	<b>ELL: Support</b> <b>Using Realia</b> Help students grasp the concept of what is and is not energy by bringing in some items and doing a demonstration. Examples include turning on a radio, waving a fan, or gently

	<p>transferred between objects</p> <ul style="list-style-type: none"> <li>- recognize ways people use energy and the impact it has on society and nature</li> <li>- observe and participate in activities requiring strategic thinking about design solutions to problems</li> </ul> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- response notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>		<p>of the various ways to group energy, such as movement, heat, light... Have students look for a least one example of energy for each of the groups.</p> <p><b>Exploration 1: Hands On Activity</b> <b><u>Light the Bulb</u></b></p> <p>Students ask questions related to circuits and light bulbs. Given the materials students create a plan on how they should connect the materials to light the bulb. Students test their plan and revise their plan if needed until they light the bulb.</p> <p><b>Exploration 2: NJSLs: W.4.7, W.4.8 MP.2</b> <b>Energy Transformations</b></p> <p>Using pictures, students identify the form of energy the electrical energy changes into after it transfers into each device. Example, in a microwave, heat energy is cooking the food from the inside. Then given a list of objects, for example, blender - lamp - hair dryer... students write the name of each object into each energy form that is present when the object is turned on. Each object should have at least two forms of energy.</p>	<p>throwing a ball in the classroom.</p> <p><b>Extension:</b> For a challenge, have students research alternative power sources, such as wind turbines or water turbines. Small groups can do the research. Have students write and perform a brief commercial on their findings.</p> <p><b>RTI/Extra Support</b> If students have difficulties understanding the terms from the list of devices, show images of the device to help students have a proper understanding of the terms.</p> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<u>chunked</u>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g.</li> </ul>
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				multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling)
<p><a href="#"><u>4-PS3-2</u></a> <a href="#"><u>4-PS3-4</u></a></p> <p><b>We are learning to explain energy transfers of light, sound, and heat...</b></p> <p><b>We are learning to provide evidence illustrating the result of transferring energy...</b></p>	<p><b><u>Essential Vocabulary:</u></b> heat, light, sound, vibrate</p> <ul style="list-style-type: none"> <li>- collect evidence for energy storage</li> <li>- learn ways energy moves in waves and how it transfers through the addition or subtraction of heat</li> <li>- plan and build a cooker to transfer the sun's energy into food</li> </ul> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- response notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>	<p><b>Lesson 2</b> <b>Apply What You Know</b> <b>Lesson 2 Check</b> <b>Lesson 2 Self Check</b> <b>Lesson 2 Roundup</b> <b>Lesson 2 Quiz</b></p>	<p><b>Exploration 1:</b> <b>NJSLS: W.4.8</b> <b>Heat Energy</b> <b>Hot &amp; Cold</b> Students get 2 glasses of water filled about 1/3 of the way. One glass should be fairly hot and the other should be fairly cool. They use a thermometer to take the temperature of the water and record them. Students will then predict what will happen to the temperature of the water if the two glasses were mixed together. They will also predict the temperature of the mixed water. Students proceed to mix the two glasses of water. Students again take the temperature and record it. Students explain what happened to the water when it was mixed and why.</p> <p><b>Exploration 2:</b> <b>NJSLS: W.4.8</b> <b>Light Energy</b> <b>Hands on Activity</b> <b><u>Design and Test a Solar Cooker</u></b> Students collaborate to design and test a cooker that used energy from the sun.</p> <p><b>Exploration 3:</b> <b>NJSLS: 4.OA.C.5</b></p>	<p><b>RTI/Extra Support</b> Provide students with different types of materials, from metal objects to fabrics. Do not provide the same exact material to more than one student. Ask each student to touch the object. Then ask the students to describe whether the object was cool or warm. Engage in a discussion about why each object feels the way it does.</p> <p><b>ELL: Support</b> <b>Use Realia</b> Some English-language learners may be unfamiliar with the concept of a thermometer. When presenting students with an actual thermometer, explain that it measures how warm or cool a place or object is. For example, some thermometers tell how warm a classroom is. Others tell how warm an oven is.</p> <p><b>Extension:</b> Have students write a short essay describing how heat can be added to or removed from an object to change its state or structure. They</p>

			<p><b>Sound Energy</b>  <b>Hands on Activity</b>  <b>Make Vibrations</b>  Using a clean empty can along with some rice or confetti, students design a musical instrument that allows them to observe vibrations. Students describe what happened with the instrument they made and identify the type of energy transfer they observed.</p>	<p>should explain how the transfer occurs and give examples.</p> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling)</li> </ul>
<p><a href="#">4-PS3-1</a>  <a href="#">4-PS3-3</a>  <a href="#">4-PS3-4</a></p> <p><b>We are learning to explain how energy changes when objects in motion collide...</b></p>	<p><b>Essential Vocabulary:</b>  collision, energy, motion</p> <ul style="list-style-type: none"> <li>- learn that every object contains energy</li> <li>- when objects collide, they transfer energy</li> <li>- experiment with rubber bands and toys to</li> </ul>	<p>Lesson 3  Apply What You Know  Lesson 3 Check  Lesson 3 Self Check  Lesson 3 Roundup  Lesson 3 Quiz</p>	<p><b>Exploration 1:</b>  NJSLs: 4.MD.A.1, W.4.2  <b>Hands On Activity</b>  <a href="#">Test It! Stores Energy in a Rubber Band</a>  Students collaborate to compare amounts of stored energy. They cut a large rubber band in half, and tie the ends around the legs of a chair. Place two meter sticks in front of the chair in parallel lines to serve as a track. Tape an</p>	<p><b>RTI/Extra Support/ELL</b>  Students may struggle with the idea that energy can be stronger or weaker depending on how hard something is struck. Provide each student with a party horn. Have them blow gently into the horns. A mild sound will issue from the horn. Have them blow hard into the horns, to produce a</p>

<p><b>We are learning to recognize the relationship between speed and the amount of energy an object possesses...</b></p> <p><b>We are learning to identify collisions as a form of motion energy transfer...</b></p>	<p>observe the transfer of energy</p> <ul style="list-style-type: none"> <li>- visualize how potential energy can become stored energy and can be transferred through impacts</li> </ul> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- response notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>		<p>index card on the floor behind the rubber band. Mark lines on the card that are 2cm and 4cm behind the rubber band. Choose a third distance and mark it on the card. Place a toy car or truck against the rubber band. Pull the toy back to the 2 cm mark and release it. Measure and record the distance the toy travels. Repeat twice. Then replicate the steps using the 4 cm mark, and the third distance selected. Students record results in a table. Students then analyze their results.</p> <p><b>Exploration 3:</b> <b>NJSLS: RI.4.5</b> <b>Hands on Activity</b> <b>Rebounce</b> Hold a meter stick perpendicular to the ground. Have a partner hold a tennis ball parallel to the meter stick and drop it. Observe the ball as it bounces. Take turns doing this several times. Where does the energy go when the ball collides with the ground?</p>	<p>stronger, louder sound. Explain that the difference in volume is based on difference in energy.</p> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling)</li> </ul>
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<p><b>21<sup>st</sup> Century Theme Targeted: Global Awareness: Using 21st century skills to understand and address global issues.</b></p>					
<p><b>21st Century Skills Targeted</b></p>					
<p><b>Creativity &amp; Innovation</b></p>	<p><b>Information Literacy</b></p>	<p><b>Media Literacy</b></p>	<p><b>Critical Thinking &amp; Problem Solving</b></p>	<p><b>Communication &amp; Collaboration</b></p>	<p><b>Life &amp; Careers</b></p>

	<p><b><u>Leveled Readers:</u></b>  - How Do We Generate and Use Electricity?  - Energy on Demand: Making Electricity</p>	<p><b><u>Study Jams</u></b>  <b><u>Energy and Matter</u></b></p> <p><b><u>Study Jams</u></b>  <b><u>Light</u></b></p> <p><b><u>Study Jams</u></b>  <b><u>Heat</u></b></p>	<p><b>Unit 2 Project: <u>Truck Pull</u></b></p>		<p><b><u>Take it Further</u></b>  <b><u>Careers in Science</u></b></p>
<p><b>Summative Assessments: (include rubrics &amp; exemplars)</b></p> <p><b>Unit 2 Test - <u>Energy</u></b></p> <p><b>Unit 2 Performance Task:</b>  <b><u>Energy Transfers All Around</u></b>  Students work in teams to plan and carry out investigations to demonstrate their understanding of PS3.B and PS3.C in support of 4-PS3-1, 4-PS3-3, and 4-PS3-4.</p> <ul style="list-style-type: none"> <li>- <b>The publisher you work for is putting together a book called “Energy Transfers All Around.” Your team has been assigned to write a section about how objects transfer energy. To do that, you’ll need to set up some experiments, run them, and collect and analyze their data. Then you’ll create a multimedia presentation that reports on your procedures, results, and conclusions.</b></li> </ul> <p><b><u>Unit 2 Performance Task Rubric</u></b></p>					

## **Unit 3 Title: Waves and Information Transfer**

**Time Frame: 20 Days**

### **Essential Questions**

- **What are waves?**
- **How does light reflect?**
- **How is information transferred from place to place?**

### **Standards: NJSL**

**Standards / CPIs (cumulative Progress Indicators) taught and assessed:**

#### **PERFORMANCE EXPECTATION**

- **4-PS4-1** Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
- **4-PS4-2** Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
- **4-PS4-3** Generate and compare multiple solutions that use patterns to transfer information.

#### **DISCIPLINARY CORE IDEAS**

- **PS4.A Wave Properties**
  - Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach.
  - **Wave Properties:** Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks).
- **PS4.B Electromagnetic Radiation**
  - An object can be seen when light reflected from its surface enters the eyes.
- **PS4.C Information Technologies and Instrumentation**
  - Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized
- **ETS1.C Optimizing the Design Solution**

- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.

### **SCIENCE and ENGINEERING PRACTICES**

- **Developing and Using Models**
  - Develop a model using an analogy, example, or abstract representation to describe a scientific principle.
  - Develop a model to describe phenomena.
- **Scientific Knowledge is Based on Empirical Evidence**
  - Science findings are based on recognizing patterns.
- **Constructing Explanations and Designing Solutions**
  - Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design SOLUTION.

### **CROSS CUTTING CONCEPTS**

- **Patterns**
  - Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena.
  - Similarities and differences in patterns can be used to sort and classify designed products.
- **Cause and Effect**
  - Cause and effect relationships are routinely identified.
- **Interdependence of Science, Engineering, and Technology**
  - Knowledge of relevant scientific concepts and research findings is important in engineering.

### **CONNECTIONS TO MATH**

**MP.4** Model with mathematics

**4.MD.A.1** Know relative sizes of measurement units within one system of units. Express measurements in a larger unit in terms of a smaller unit.

**4.G.A.1** Draw point, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

**4.OA.C.5** Generate and analyze patterns.

### **CONNECTIONS TO ENGLISH LANGUAGE ARTS**

**RI.4.2** Determine the main idea of a text and explain how it is supported by key details; summarize the text.

**RI.4.5** Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.

**W.4.2.D** Use precise language and domain-specific vocabulary to inform about or explain the topic.

**L4.4.B** Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., telegraph, photograph, autograph).

**L4.4.C** Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.

**SL4.2** Paraphrase portions of a text read aloud or information presented in diverse media and formats.

**SL.4.5** Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

**Technology:**

**8.1.5.A.1** Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

**8.1.5.A.2** Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.

**8.1.5.A.4** Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.

**Highlighted Career Ready Practices:**

**CRP4.** Communicate clearly and effectively and with reason.

**CRP6.** Demonstrate creativity and innovation.

**CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.

**CRP11.** Use technology to enhance productivity.

**CRP12.** Work productively in teams while using cultural global competence.

**SEL Practices & Competencies:**

Self-Management

Social Awareness

Responsible Decision-Making

Relationship Skills

<p><b>Overall Goal (What is the big idea?)</b>  Students will discover the different parts of waves, explore how light can be reflected, and examine and describe how information is transferred from place to place.</p>
<p><b>Pre-Assessment:</b></p> <p>Unit 3 Pretest: <a href="#">Waves and Information Transfer</a></p>

Please include interdisciplinary connections resources and plan in each activity

Standards/ (SLO) Student Learning Objectives	Student Learning Strategies	Formative Assessment ***suggested but not limited to the following***	Activities ***suggested but not limited to the following***	Modifications & Reflections ***suggested but not limited to the following***
<p><a href="#">4-PS4-1</a></p> <p><b>We are learning to differentiate between wavelength and amplitude...</b></p> <p><b>We are learning to observe how waves interact...</b></p>	<p><b>Essential Vocabulary:</b>  wave, crest, trough, wavelength, amplitude, volume</p> <ul style="list-style-type: none"> <li>- explore the properties and characteristics of waves and the patterns they create</li> <li>- use models to learn about the ways in which waves create motion through the transfer of energy</li> <li>- using diagrams, visualize transverse</li> </ul>	<p><b>Lesson 1</b>  <b>Apply What You Know</b>  <b>Lesson 1 Check</b>  <b>Lesson 1 Self Check</b>  <b>Lesson 1 Roundup</b>  <b>Lesson 1 Quiz</b></p>	<p><b>Exploration 1:</b>  <b>NJSLS: MP.4</b>  <b>Hands On Activity</b>  <a href="#">Let's Make Waves!</a>  Students work in pairs to model how energy moves through waves. They will create waves with certain materials and measure the transfer of energy with other materials recording their information into a data table.</p> <p><b>Exploration 2:</b>  <b>NJSLS: 4.MD.A.1</b>  <b>Wave Parts</b>  Students draw a model of a wave and label the parts of the wave using crest, amplitude, wavelength, and trough. Given</p>	<p><b>RTI/Extra Support</b>  If students get confused by the table, model for them how to fill the table out. Some students may think they need to put the actual speed in the speed column, whereas they only need to indicate fast, medium, or slow. Remind students to pay attention to the timer so that accurate time data are collected.</p> <p><b>ELL: Making Comparisons</b>  Students will be making several comparisons (strong vs. weak; big vs small). Help students understand these comparisons through the use</p>

	<p>waves and differentiate between wavelength and amplitude.</p> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>		<p>drawings of waves, students compare each set of waves observing and discussing any patterns seen.</p>	<p>of images. For instance, when discussing small or large waves, show students images of small and large waves. Use these visuals as students work through the page activities.</p> <p><b>Extension:</b> Challenge students to take the study of waves further by researching how waves have enough energy and strength to change landforms. Allow students time to perform outside research and invite them to share findings with the whole class.</p> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures,</li> </ul>
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				illustrations, graphs, charts, data tables, multimedia, modeling).
<p><b><u>4-PS4-2</u></b></p> <p><b>We are learning to describe the effects of matter on light...</b></p> <p><b>We are learning to identify how light interacts with mirrors, lenses, prisms, and non-reflective surfaces due to their unique properties...</b></p>	<p><b><u>Essential Vocabulary:</u></b> transparent, translucent, opaque, reflection, refraction, convex, concave</p> <p>- investigate how light interacts with the surface of objects to form an image that we can see - develop and use models to manipulate a variety of objects - observe how the behavior of light changes the images sent to our eyes and perceived by our brains - investigate how light interacts with mirrors and lenses to deepen understanding of the development of many useful tools and technologies that utilize light</p> <p><b><u>Instructional Strategies:</u></b></p>	<p><b>Lesson 2</b> <b>Apply What You Know</b> <b>Lesson 2 Check</b> <b>Lesson 2 Self Check</b> <b>Lesson 2 Roundup</b> <b>Lesson 2 Quiz</b></p>	<p><b>Exploration 1:</b> <b>NJSLS: MP.4</b> <b>Hands on Activity</b> <b><u>Disappearing Coins</u></b> Students use pennies in a pan as a model to investigate how images differ when light interacts with air and water.</p> <p><b>Exploration 1:</b> <b>NJSLS: 4.G.A.1</b> <b>Hands on Activity</b> <b><u>Reflecting on Angles</u></b> Students make their own model of reflected objects to investigate how the angles of reflection affect light.</p> <p><b>Exploration 2:</b> <b>NJSLS: 4.MD.A.1, L.4.4.B, L.4.4.C, SL.4.5</b> <b>Human Lenses</b> Students write or diagram the process that produces vision into a flow chart showing six steps.</p>	<p><b>RTI/Extra Support</b> - Have students work in small groups of 3 or 4. Turn off the lights in the room and give each student groups a variety of items (some transparent, some translucent, and some opaque) and a flashlight. Have students shine the light through the objects and then classify them as transparent, translucent, or opaque. - Demonstrate refraction, or give students the materials to demonstrate refraction themselves. Give student pairs a small glass or clear plastic container of water and have them model refraction with a pencil.</p> <p><b>ELL: Support Modeling</b> Stage a demonstration of how shadows work using classroom materials. Involve students in the activity so they get a hands-on understanding of shadows and light. Ask students to observe what they see.</p> <p><b>Extension:</b> Some students might be interested in the history of the camera. Tell them that</p>

	<ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>			<p>the very first camera was a pinhole camera that was used as far back as the year 1500. Have students research and then draw a timeline from 1500 to present time, showing how cameras developed.</p> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions <a href="#">'chunked'</a>. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling)</li> </ul>
<p style="text-align: center;"><a href="#"><u>4-PS4-3</u></a></p> <p style="text-align: center;"><b>We are learning to</b></p>	<p><b><u>Essential Vocabulary:</u></b> Morse code, binary code, hieroglyphics, pixels</p>	<p style="text-align: center;"><b>Lesson 3</b> <b>Apply What You Know</b> <b>Lesson 3 Check</b> <b>Lesson 3 Self Check</b> <b>Lesson 3 Roundup</b> <b>Lesson 3 Quiz</b></p>	<p><b>Exploration 1:</b> <b>NJSLS: RI.4.1, RI.4.7, W.4.7</b> <b>Hands On Activity</b> <b>Make a Scytale</b> A scytale is a tool that can be used to send a coded message. A strip is wrapped around a tube. A</p>	<p><b>RTI/Extra Support/ELL</b> Model for students how to construct a scytale, and how to decode the message. Talk about what decisions must be made when writing the code</p>

<p><b>describe ways that codes and signals are used to transfer information...</b></p>	<ul style="list-style-type: none"> <li>- explore a variety of communication devices that are a result of science, engineering, and technology working together to meet people's needs</li> <li>- analyze how well each device solves a problem</li> <li>- design their own devices to communicate information over a distance</li> </ul> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>		<p>message will be added, then the tube removed. Get some paper, scissors, tape, pencil, and paper towel tube. Cut the paper into long strips. Tape one end of the strip to the side of the tube. Wrap the rest of the strip around the tube. Write a message from one end of the tube to the other. Then add a bunch of other letters around the ones you wrote to fill in the space. Take off the strip of paper and trade it with a classmate to see if they can figure out what you wrote.</p> <p><b>Exploration 1:</b>  <b>NJSLS: 4.OA.C.5, RI.4.5</b>  <b>Hands on Activity</b>  <b><u>Pixels to Pictures</u></b>  Students create a pixilated message using binary code and discuss the constraints of the design.</p>	<p>on the strips and the reasons for one choice or another.</p> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<u>chunked</u>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling)</li> </ul>
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<p><b>21<sup>st</sup> Century Theme Targeted: Global Awareness: Using 21st century skills to understand and address global issues.</b></p>					
<p><b>21st Century Skills Targeted</b></p>					
<p><b>Creativity &amp; Innovation</b></p>	<p><b>Information Literacy</b></p>	<p><b>Media Literacy</b></p>	<p><b>Critical Thinking &amp; Problem Solving</b></p>	<p><b>Communication &amp; Collaboration</b></p>	<p><b>Life &amp; Careers</b></p>
<p>Create a Code</p>	<p><b><u>Leveled Readers:</u></b>  - How Do We Use Forms of Energy?</p>	<p><b><u>Invention Of Morse Code</u></b></p>	<p>Unit 3 Project: <b><u>Reflecting Light</u></b></p>		<p><b><u>Take it Further Careers in Science</u></b></p>

	- What happens Under the Hood?	<a href="#">The Dr. Binocs Show</a>			
<p><b>Summative Assessments: (include rubrics &amp; exemplars)</b></p> <p><b>Unit 3 Test - <a href="#">Waves and Information Transfer</a></b></p> <p><b>Unit 3 Performance Task:</b>  <b><a href="#">The Rainbow Show</a></b>  Students use models to demonstrate how to make a rainbow through research and observing patterns. They demonstrate their understanding of PS4.B in support of 4-PS4-2 and 4-LS1-2</p> <ul style="list-style-type: none"> <li>- <b>Your task is to prepare and give a three-part educational presentation about rainbows. In Part One, you'll tell our class all about rainbows., what they are, and how they form. In Part Two, you'll dazzle your class by making a rainbow appear before their eyes. Then in Part Three, you'll wrap it all up by taking your rainbow and sending it back to where it came from.</b></li> </ul> <p><b><a href="#">Unit 3 Performance Task Rubric</a></b></p>					

<p><b>Unit 4 Title: Plant Structure and Function</b>  <b>Time Frame: 15 Days</b></p>
<p style="text-align: center;"><b>Essential Questions</b></p> <ul style="list-style-type: none"> <li>● What are some plant parts and how do they function?</li> <li>● How do plants grow and reproduce?</li> </ul>
<p style="text-align: center;"><b>Standards: NJSL</b></p>
<p><b>Standards / CPIs (cumulative Progress Indicators) taught and assessed:</b></p> <p><b><u>PERFORMANCE EXPECTATION</u></b></p>

- **4-LS1-1** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

### **DISCIPLINARY CORE IDEAS**

- **LS1.A Structure and Function**

- Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.

### **SCIENCE and ENGINEERING PRACTICES**

- **Engaging in Argument from Evidence**

- Construct an argument with evidence, data, and/or a model.

### **CROSS CUTTING CONCEPTS**

- **Systems and System Models**

- A system can be described in terms of its components and their interactions.

### **CONNECTIONS TO MATH**

**MP.2** Reason abstractly and quantitatively

**4.G.A.3** Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

### **CONNECTIONS TO ENGLISH LANGUAGE ARTS**

**RI.4.2** Determine the main idea of a text and explain how it is supported by key details; summarize the text.

**RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

**RI.4.8** Explain how an author uses reasons and evidence to support particular points in a text.

**RI.4.9** Integrate and reflect on information from two texts on the same topic in order to write or speak about the subject knowledgeably.

**W.4.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

**W.4.7** Conduct short research projects that build knowledge through investigation of different aspects of a topic

**W.4.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

**Technology:**

**8.1.5.A.1** Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

**8.1.5.A.2** Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.

**8.1.5.A.4** Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.

**Highlighted Career Ready Practices:**

**CRP4.** Communicate clearly and effectively and with reason.

**CRP6.** Demonstrate creativity and innovation.

**CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.

**CRP11.** Use technology to enhance productivity.

**CRP12.** Work productively in teams while using cultural global competence.

**SEL Practices & Competencies:**

Self-Management

Social Awareness

Responsible Decision-Making

Relationship Skills

**Overall Goal (What is the big idea?)**

Students will explore the function of internal and external plant structure and how they aid in growth, survival, behavior, and reproduction, and learn how different plant structures work together as a system.

**Pre-Assessment:**

Unit 4 Pretest: [Plant Structure and Function](#)

**Please include interdisciplinary connections resources and plan in each activity**

Standards/ (SLO) Student Learning Objectives	Student Learning Strategies	Formative Assessment ***suggested but not limited to the following***	Activities ***suggested but not limited to the following***	Modifications & Reflections ***suggested but not limited to the following***
<p><b><u>4-LS1-1</u></b></p> <p><b>We are learning to identify the different parts of plants and the functions of these parts...</b></p> <p><b>We are learning to construct and argument that these parts are used for survival, growth, reproduction, and behavior...</b></p>	<p><b><u>Essential Vocabulary:</u></b> spores, roots, leaves, stems</p> <ul style="list-style-type: none"> <li>- gather evidence about the function of internal and external plant parts</li> <li>- construct an argument that these parts work together to form a system used for growth, survival, reproduction, and behavior.</li> <li>- investigate how plants move, and they design and build a system to grow a plant in water rather than soil.</li> </ul> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>	<p><b>Lesson 1</b> Apply What You Know Lesson 1 Check Lesson 1 Self Check Lesson 1 Roundup Lesson 1 Quiz</p>	<p><b>Exploration 1:</b> <b>NJSLS: RI.4.8</b> <b>Functions of Plant Parts</b> Students label a diagram of plant parts correctly with the terms root, stem, leaf, flower and write a description of each part. Students will then explain how each of the parts helps a plant survive.</p> <p><b>Exploration 1:</b> <b>NJSLS: W.4.1</b> <b>Writing Opinion Pieces</b> Students make a claim about which plant part they think is most important overall for plant growth. They must use three facts to provide evidence to support their claim. Students can use facts from the lesson. They may also need to do additional research.</p> <p><b>Exploration 2:</b> <b>NJSLS: RI.4.7, MP.2</b> <b>Hands on Activity</b> <b><u>Hold the Soil</u></b> Students collaborate to test the function of roots as they build a system to grow plants in water rather than soil. Then students make a claim about the effectiveness of their process, based on their evidence.</p>	<p><b>Suggested Strategies for ELL/ELD Students</b></p> <ul style="list-style-type: none"> <li>- Differentiate and use different modalities.</li> <li>- Lessons that involve writing, speaking, drawing, and listening, give students <a href="#">four opportunities to deepen their understanding</a> - Additional engagements also provide a little breathing room so they can work through the language barrier.</li> </ul> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures,</li> </ul>

				illustrations, graphs, charts, data tables, multimedia, modeling)
<p><b><u>4-LS1-1</u></b></p> <p><b>We are learning to describe the process of pollination and fertilization in both flowering and non-flowering plants...</b></p> <p><b>We are learning to identify the basic reproductive structures of plants, and how the parts form a system for reproduction...</b></p>	<p><b><u>Essential Vocabulary:</u></b> pollination, fertilization, reproduces, seed, spores</p> <p>- develop an understanding of how the internal and external structure of both flowering and non-flowering plants function to support survival, growth, and reproduction</p> <p>- construct arguments from evidence to explain the components and interactions of systems and how they work together to enable reproduction</p> <p><b><u>Instructional Strategies:</u></b></p> <p>- evidence notebooks</p> <p>- think pair share</p> <p>- cooperative learning</p> <p>- kwl chart</p> <p>- question-answer relationship (QAR)</p>	<p><b>Lesson 2</b> <b>Apply What You Know</b> <b>Lesson 2 Check</b> <b>Lesson 2 Self Check</b> <b>Lesson 2 Roundup</b> <b>Lesson 2 Quiz</b></p>	<p><b>Exploration 1:</b> <b>NJSLS: W.4.9</b> <b>Hands on Activity</b> <b>Pollination Models</b> Make two models of flowers using cups to represent the flowers. Place a cotton ball in each to represent the stamen. Sprinkle some powder on one of the cotton balls to represent pollen. Using a pipe cleaner to represent a bee's leg, have students model moving pollen from one flower to the other.</p> <p><b>Exploration 1:</b> <b>NJSLS: RI.4.5</b> <b>The Steps of Reproduction</b> Given pictures of the steps of pollination and fertilization, students label what is happening in each image, and place the images in the correct order.</p> <p><b>Exploration 3:</b> <b>NJSLS: W.4.5</b> <b>Flying High</b> Students collaborate to design and test a device that disperses a seed using wind.</p>	<p><b>RTI/Extra Support</b></p> <p>- Bring in several plants and arrange students in groups to locate various parts and explain their function.</p> <p>- To aid students' understanding of the sequencing of pollination and reproduction, have students draw each labeled step in a circular diagram using arrows.</p> <p><b>Suggested Strategies for ELL/ELD Students</b></p> <p>- Differentiate and use different modalities.</p> <p>- Lessons that involve writing, speaking, drawing, and listening, give students <a href="#">four opportunities to deepen their understanding</a> - Additional engagements also provide a little breathing room so they can work through the language barrier.</p> <p><b>Extension:</b> Both male and female pinecones are on the same tree. Male pinecones tend to be on the lower branches. Have students research why the tree is structures this way.</p>

				<p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling)</li> </ul>
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**21<sup>st</sup> Century Theme Targeted: Global Awareness: Using 21st century skills to understand and address global issues.**

**21st Century Skills Targeted**

<b>Creativity &amp; Innovation</b>	<b>Information Literacy</b>	<b>Media Literacy</b>	<b>Critical Thinking &amp; Problem Solving</b>	<b>Communication &amp; Collaboration</b>	<b>Life &amp; Careers</b>
	<p><a href="#">Leveled Readers:</a> - How do Plants and Animals Reproduce and Adapt?</p>	<p>BrainPopJr. <a href="#">Parts of a Plant</a> BrainPop <a href="#">Seed Plants</a> <a href="#">Seedless Plants</a></p>	<p>Unit 4 Project: <a href="#">Plant and Animal Partnerships</a></p>		<p><a href="#">Take it Further Careers in Science</a></p>

	<p>- Exploring the Galapagos Islands?</p>	<p><a href="#">Pollination</a>  <a href="#">SciShow Kids</a>  <a href="#">Look Inside a Flower</a>  <a href="#">Plants with Weapons</a></p>			
<p><b>Summative Assessments: (include rubrics &amp; exemplars)</b></p> <p><b>Unit 4 Test - <a href="#">Plant Structure and Function</a></b></p> <p><b>Unit 4 Performance Task:</b>  <a href="#">Flower Parts</a>  Students analyze flowers to learn about the structures and parts of flowers. They will study how the flower’s parts function together as a whole to demonstrate understanding of LS1.A in support of 4-LS1-1.</p> <ul style="list-style-type: none"> <li>- <b>You work for a nursery that is putting together a botanist’s handbook. Your team is tasked with creating and educational illustration of a specific flower. To do that, you’ll need to dissect the flower and identify its individual parts. Then you’ll need draw those parts separately and write a caption for each that names it and explains its function.</b></li> </ul> <p><a href="#">Unit 4 Performance Task Rubric</a></p>					

## Unit 5 Title: Animal Structure and Function

Time Frame: 20 Days

### Essential Questions

- What are some external structures of animals?
- What are some internal structures of animals?
- How do senses work?

**Standards: NJSL**

**Standards / CPIs (cumulative Progress Indicators) taught and assessed:**

**PERFORMANCE EXPECTATION**

- **4-LS1-1** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- **4-LS1-2** Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
- **4-PS4-2** Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

**DISCIPLINARY CORE IDEAS**

- **LS1.A Structure and Function**
  - Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.
- **LS1.D Information Processing**
  - Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions.
- **PS4.B Electromagnetic Radiation**
  - An object can be seen when light reflected from its surface enters the eyes.

**SCIENCE and ENGINEERING PRACTICES**

**Engaging in Argument from Evidence**

- Construct an argument with evidence, data, and/or a model.

**Constructing Explanations and Designing Solutions**

- Use a model to test interactions concerning the functioning of a natural system.

**Developing and Using Models**

- Develop a model to describe phenomena.

**CROSS CUTTING CONCEPTS**

**Systems and System Models**

- A system can be described in terms of its components and their interactions.

#### **Cause and Effect**

- Cause and effect relationships are routinely identified.

#### **CONNECTIONS TO MATH**

**MP.2** Reason abstractly and quantitatively

**MP.4** Model with mathematics.

**4.G.A.3** Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

**4.OA.A.3** Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding

#### **CONNECTIONS TO ENGLISH LANGUAGE ARTS**

**RI.4.1** Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.

**RI.4.3.** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

**RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

**RI.4.9** Integrate and reflect on information from two texts on the same topic in order to write or speak about the subject knowledgeably.

**W.4.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

**W.4.2.A** Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.

**SL.4.5.** Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

#### **Technology:**

**8.1.5.A.1** Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

**8.1.5.A.2** Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.

**8.1.5.A.4** Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.

**Highlighted Career Ready Practices:**

- CRP4.** Communicate clearly and effectively and with reason.
- CRP6.** Demonstrate creativity and innovation.
- CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP11.** Use technology to enhance productivity.
- CRP12.** Work productively in teams while using cultural global competence.

**SEL Practices & Competencies:**

- Self-Management
- Social Awareness
- Responsible Decision-Making
- Relationship Skills

**Overall Goal (What is the big idea?)**

Students will explore the internal and external structures of animals and learn about how different senses work.

**Pre-Assessment:**

Unit 5 Pretest: [Animal Structure and Function](#)

**Please include interdisciplinary connections resources and plan in each activity**

<b>Standards/ (SLO) Student Learning Objectives</b>	<b>Student Learning Strategies</b>	<b>Formative Assessment ***suggested but not limited to the following***</b>	<b>Activities ***suggested but not limited to the following***</b>	<b>Modifications &amp; Reflections ***suggested but not limited to the following***</b>
<a href="#">4-LS1-1</a>	<b><u>Essential Vocabulary:</u></b> external structures	Lesson 1 Apply What You Know Lesson 1 Check Lesson 1 Self Check	Exploration 1: NJSLs: RI.4.7, W.4.1 Design to Survive	<b>RTI/Extra Support</b> - Encourage a whole class discussion about cold and hot climates. Invite students who

<p><b>We are learning to identify the external parts animals have...</b></p> <p><b>We are learning to explain how their parts are used for growth, survival, behavior, and reproduction...</b></p>	<ul style="list-style-type: none"> <li>- learn and understand that plants have external and internal structures</li> <li>- use evidence from the lesson to engage in arguments</li> <li>- describe the components of systems and their interactions</li> </ul> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>	<p><b>Lesson 1 Roundup</b> <b>Lesson 1 Quiz</b></p>	<p>Students pick an environment and describe the conditions in that environment. They will then select body parts from several animals to create a new animal that would survive there. They must decide what the animal eats. They will design their animal on a poster and label and describe the animal's body parts. They must make sure to explain how the parts help the animal survive in its environment.</p> <p><b>Exploration 2:</b> <b>NJSLS: RI.4.3</b> <b>Hands On Activity</b> <b><u>Staying Warm</u></b></p> <p>Students will discover how an animal's covering affects its survival by building and using a model. They will evaluate evidence drawn from an experiment and describe how animal features function in survival.</p>	<p>have visited such climates to describe them to peers.</p> <p><b>ELL: Support</b></p> <ul style="list-style-type: none"> <li>- For students who have difficulty recognizing a specific animal type, bring in photos and fact sheets in their native language to help them understand each animal.</li> <li>- Make a group list of words that describe how each animal eats. For example, bite, gnaw, peck, chew, suck, swallow, gulp.</li> </ul> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<u>chunked</u>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures,</li> </ul>
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				illustrations, graphs, charts, data tables, multimedia, modeling).
<p><b><u>4-LS1-1</u></b></p> <p><b>We are learning to observe and describe some of the internal structures of animals...</b></p> <p><b>We are learning to compare similar body parts that have similar and different uses from species to species or multiple uses within a species...</b></p> <p><b>We are learning to recognize that some animals have modified systems or don't have them at all...</b></p>	<p><b><u>Essential Vocabulary:</u></b> internal structures, organ, organ system</p> <p>- gather evidence to support an argument regarding the importance of the internal structures of animals in growth, survival, behavior, and reproduction</p> <p>- explore the components and functions of several body systems of animals</p> <p>- compare and contrast the systems to identify similarities and differences of the body systems in different groups of animals</p> <p><b><u>Instructional Strategies:</u></b></p> <p>- evidence notebooks</p> <p>- think pair share</p> <p>- cooperative learning</p> <p>- kwl chart</p>	<p><b>Lesson 2</b></p> <p><b>Apply What You Know</b></p> <p><b>Lesson 2 Check</b></p> <p><b>Lesson 2 Self Check</b></p> <p><b>Lesson 2 Roundup</b></p> <p><b>Lesson 2 Quiz</b></p>	<p><b>Exploration 1:</b> <b>NJSLS: RI.4.1, RI.4.5, 4.OA.A.3</b> <b>Hands on Activity</b> <b><u>Pump it Up</u></b> Students investigate to gather evidence about the relationship between exercise, heart rate, and breathing rate.</p> <p><b>Exploration 2:</b> <b>NJSLS: RI.4.7</b> <b>Hands on Activity</b> <b>All Systems Go</b> Students choose four animals or kinds of animals. They can be animals in illustrations or they can research other animals. They make a chart that compares and contrasts the digestive systems of the animals they chose. Have students make sure to include both similarities and differences in their chart.</p>	<p><b>Suggested Strategies for ELL/ELD Students</b></p> <p>- Differentiate and use different modalities.</p> <p>- Lessons that involve writing, speaking, drawing, and listening, give students <a href="#">four opportunities to deepen their understanding</a> - Additional engagements also provide a little breathing room so they can work through the language barrier.</p> <p><b>Suggested Strategies for Students with Special Needs</b></p> <p>- Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</p> <p>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</p> <p>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures,</p>

	- question-answer relationship (QAR)			illustrations, graphs, charts, data tables, multimedia, modeling)
<p><a href="#"><u>4-LS1-1</u></a> <a href="#"><u>4-LS1-2</u></a></p> <p><b>We are learning to construct an argument that animals have internal structures that support survival and behavior...</b></p> <p><a href="#"><u>4-PS4-2</u></a></p> <p><b>We are learning to study models of eyes and ears, including their structures and functions, and participate in activities to test individual senses...</b></p>	<p><b><u>Essential Vocabulary:</u></b> receptors</p> <ul style="list-style-type: none"> <li>- explore the ways in which people and animals use their senses</li> <li>- learn about the physical parts and unique structures that make it possible for people and animals to analyze information through senses, through which sensory information can be processed in the brain</li> <li>- interpret sensory systems and apply what they learn to construct intelligent explanations using evidence and data</li> </ul> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>	<p><b>Lesson 3</b> <b>Apply What You Know</b> <b>Lesson 3 Check</b> <b>Lesson 3 Self Check</b> <b>Lesson 3 Roundup</b> <b>Lesson 3 Quiz</b></p>	<p><b>Exploration 1:</b> <b>NJSLS: W.4.1, MP.4</b> <b>Hands on Activity</b> <b><u>Touch Test</u></b> Students collaborate to investigate how receptors work in their body. They will develop a way to test the sense of touch by modeling how receptors work in the body.</p> <p><b>Exploration 2:</b> <b>Hands on Activity</b> <b>Name that Scent!</b> Prepare for this activity by preassembling an assortment of things for students to smell. Select things such as pencil erasers, flower petals, coffee beans, or blades of grass. Students work in partners. One partner is blindfolded while trying to see how many smells he or she can identify correctly. Make sure that students do not see the assortment of things to smell prior to becoming blindfolded otherwise, they will be able to guess.</p> <p><b>Exploration 3:</b> <b>Hands on Activity</b> <b>Test It!</b> Students work with a partner. One partner is blindfolded while the other makes clicking noises</p>	<p><b>Suggested Strategies for ELL/ELD Students</b></p> <ul style="list-style-type: none"> <li>- Differentiate and use different modalities.</li> <li>- Lessons that involve writing, speaking, drawing, and listening, give students <a href="#"><u>four opportunities to deepen their understanding</u></a> - Additional engagements also provide a little breathing room so they can work through the language barrier.</li> </ul> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<a href="#"><u>chunked</u></a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures,</li> </ul>

			in front of, to the left of, to the right of, and behind the blindfolded partner. The student observes how their partner used the clicking noises to locate their position.	illustrations, graphs, charts, data tables, multimedia, modeling)
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**21<sup>st</sup> Century Theme Targeted: Global Awareness: Using 21st century skills to understand and address global issues.**

**21st Century Skills Targeted**

<b>Creativity &amp; Innovation</b>	<b>Information Literacy</b>	<b>Media Literacy</b>	<b>Critical Thinking &amp; Problem Solving</b>	<b>Communication &amp; Collaboration</b>	<b>Life &amp; Careers</b>
	<u>Leveled Readers:</u> - How do Plants and Animals Reproduce and Adapt? - Exploring the Galapagos Islands?	BrainPopJr. <u>Lungs</u> <u>Digestive System</u> <u>Heart</u> BrainPop <u>Eyes</u> <u>Hearing</u> SciShow Kids <u>Animal Tricksters!</u>	Unit 5 Project: <u>Chew Clue</u>		<u>Take it Further</u> <u>Careers in Science</u>

**Summative Assessments: (include rubrics & exemplars)**

**Unit 5 Test - Animal Structure and Function**

**Unit 5 Performance Task:**

Breathing in and Out

Students develop models of a portable invention to come up with a design for a new product. They will apply concepts of body systems to demonstrate understanding of LS1.A in support of 4-LS1-1 and 4-LS1-2.

- You work for a medical company that manufactures a product for those with asthma and other breathing difficulties. The portable invention is designed to fill its user's lungs with fresh air. The company has decided to develop a version of this product for young people. Your team is tasked with gathering data on the lung capacity of fourth-grade students.

[Unit 5 Performance Task Rubric](#)

## **Unit 6 Title: Changes to Earth's Surface**

**Time Frame: 25 Days**

### **Essential Questions**

- How does water shape Earth's surface?
- What other factors shape Earth's surface?
- How do people map Earth's surface?
- What patterns do maps show us?

### **Standards: NJSL**

**Standards / CPIs (cumulative Progress Indicators) taught and assessed:**

#### **PERFORMANCE EXPECTATION**

- **4-ESS2-1** Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
- **4-ESS2-2** Analyze and interpret data from maps to describe patterns of Earth's features.

#### **DISCIPLINARY CORE IDEAS**

- **ESS2.A Earth Materials and Systems**

- Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.

- **ESS2.B Plate Tectonics and Large-Scale System Interactions**

- The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth.

### **SCIENCE and ENGINEERING PRACTICES**

- **Biogeology**

- Living things affect the physical characteristics of their regions.

- **Engaging in Argument from Evidence**

- Construct an argument with evidence.

- **Analyzing and Interpreting Data**

- Analyze and interpret data to make sense of phenomena using logical reasoning.

### **CROSS CUTTING CONCEPTS**

- **Cause and Effect**

- Cause and effect relationships are routinely identified, tested, and used to explain change.

- **Patterns**

- Patterns can be used as evidence to support an explanation.

### **CONNECTIONS TO MATH**

**MP.2** Reason abstractly and quantitatively

**MP.4** Model with mathematics.

**MP.5** Use appropriate tools strategically.

**4.MD.A.1** Know relative sizes of measurement units within one system of units including km, m, cm, mm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table.

**4.MD.A.2** Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in

a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

### **CONNECTIONS TO ENGLISH LANGUAGE ARTS**

**RI.4.5.** Describe the overall structure of events, ideas, concepts, or information in a text or part of a text.

**RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

**W.4.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

**W.4.8.** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

**SL.4.5.** Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

### **Technology:**

**8.1.5.A.1** Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

**8.1.5.A.2** Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.

**8.1.5.A.4** Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.

### **Highlighted Career Ready Practices:**

**CRP4.** Communicate clearly and effectively and with reason.

**CRP6.** Demonstrate creativity and innovation.

**CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.

**CRP11.** Use technology to enhance productivity.

**CRP12.** Work productively in teams while using cultural global competence.

### **SEL Practices & Competencies:**

Self-Management

Social Awareness

Responsible Decision-Making

Relationship Skills

**Overall Goal (What is the big idea?)**

Students will explore how Earth has been shaped by water and other factors, discover how people map Earth’s surface, and learn about the patterns we can see from maps.

**Pre-Assessment:**

Unit 6 Pretest: [Changes to Earth’s Surface](#)

Please include interdisciplinary connections resources and plan in each activity

Standards/ (SLO) Student Learning Objectives	Student Learning Strategies	Formative Assessment ***suggested but not limited to the following***	Activities ***suggested but not limited to the following***	Modifications & Reflections ***suggested but not limited to the following***
<p><a href="#">4-ESS2-1</a></p> <p><b>We are learning to identify, explain, and record evidence about how water shapes Earth’s surface...</b></p> <p><b>We are learning to describe ways in which water causes weathering, erosion, and deposition to take place...</b></p>	<p><b>Essential Vocabulary:</b> weathering, erosion, deposition</p> <p>- identify and record evidence of how water, weathering, erosion, and deposition shape Earth’s surface</p> <p>- investigate how water impacts Earth</p> <p>- examine the relationships between Earth’s surface and the physical forces of weathering, erosion, and deposition</p>	<p><b>Lesson 1</b> <b>Apply What You Know</b> <b>Lesson 1 Check</b> <b>Lesson 1 Self Check</b> <b>Lesson 1 Roundup</b> <b>Lesson 1 Quiz</b></p>	<p><b>Exploration 1:</b> <b>NJSLS: 4.MD.A.1, W.4.8</b> <b>Hands on Activity</b> <b>Water Effects</b> Students research to find images of ways that floods can damage roads. Students respond to: What do you notice about the roads and what they are made of? Do you think that flood waters could break other things into pieces? Use evidence from your research to support your response.</p> <p><b>Exploration 3:</b> <b>NJSLS: W.4.8, MP.2</b> <b>Hands On Activity</b> <b>Watching Water Grow</b> Fill a clear plastic cup halfway with water. Use a permanent</p>	<p><b>RTI/ELL/Extra Support</b> - If students are having difficulty remembering the vocabulary words and definitions, have them use the acronym WED. Weathering: breaks it (down), Erosion: take it (away), Deposition: drops it.</p> <p><b>RTI/Extra Support</b> - If students are having difficulty finding images of how floods can damage roads, you may want to show them some photographs that reinforce floods’ enormous destructive power: Call on volunteers to describe what they see in each photo.</p>

<p><b>We are learning to identify how speed and volume of water affect weathering, erosion, and deposition...</b></p>	<p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>		<p>marker to make a line on the side of the cup where the top of the water is. Place the cup in the freezer overnight. The following days, take the cup out of the freezer. Observe the top of the water. Is it the same place where you drew the line? If not, can you explain why?</p> <p><b>Exploration 3:</b>  <b>NJSLS: W.4.8</b>  <b>Hands On Activity</b>  <u><b>The Rate of Change</b></u>  Students collaborate to investigate the effect of slope on erosion. They will plan and conduct an investigation to model and observe the effect of slope on the erosion of Earth's surface.</p>	<ul style="list-style-type: none"> <li>- To help students understand what causes rocks to break down, place a handful of soft rocks, such as shale, limestone, or sandstone, into a coffee can with lid. Use pieces of chalk if rocks aren't available. Shake the can forcefully for two minutes. Put the rocks on a piece of paper, and have students observe and take notes on changes in their appearance.</li> </ul> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<u>chunked</u>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</li> </ul>
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<p style="text-align: center;"><b><u>4-ESS2-1</u></b></p> <p style="text-align: center;"><b>We are learning to identify, explain, and record evidence about factors that shape Earth’s surface, such as rainfall, organisms, wind, ice, and gravity...</b></p>	<p><b><u>Essential Vocabulary:</u></b> deserts, rain forest</p> <ul style="list-style-type: none"> <li>- identify, explain, and record evidence regarding how rainfall, weathering, erosion, and deposition shape Earth’s surface</li> <li>- investigate how living things impact Earth and then examine and explain the relationships between them all</li> </ul> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>	<p style="text-align: center;"><b>Lesson 2</b></p> <p style="text-align: center;"><b>Apply What You Know</b></p> <p style="text-align: center;"><b>Lesson 2 Check</b></p> <p style="text-align: center;"><b>Lesson 2 Self Check</b></p> <p style="text-align: center;"><b>Lesson 2 Roundup</b></p> <p style="text-align: center;"><b>Lesson 2 Quiz</b></p>	<p><b>Exploration 1:</b> <b>NJSLS: RI.4.3, RI.4.7, W.4.8</b></p> <p><b>Hands on Activity</b> <b>Dry Plants</b></p> <p>Show students a picture of the saguaro cactus, or bring in a small cactus to prompt discussion. The saguaro cactus is a type of cactus that lives in the southwest. Despite the extreme temperatures and dry weather of the desert, the saguaro can grow up to 70 feet tall! Students do some research to find two key features that help the saguaro thrive in its environment.</p> <p><b>Exploration 2:</b> <b>NJSLS: W.4.8</b></p> <p><b>Hands on Activity</b> <b><u>Finding Change</u></b></p> <p>Students collaborate with their team to model processes that produce change on Earth’s surface, and determine what kinds of evidence those processes leave behind.</p>	<p><b>RTI/Extra Support</b></p> <ul style="list-style-type: none"> <li>- In pairs, give students a set of index cards with animals and plants on them. Include a wide variety of living things. Have students look at each organism and predict whether they think the organism lives in a habitat with a little water or a lot of water. Have them provide reasons for their thinking.</li> </ul> <p><b>ELL: Modeling</b></p> <ul style="list-style-type: none"> <li>- Have student pairs fill a small clear container with pebbles or small rocks. One of the students pokes a pencil slowly down into the rocks as far as it will go. The other student counts how many rocks are moved or affected by the pencil. Explain to students that the pencil models a root growing down into rock to get water and that roots break apart rock in a process called weathering.</li> </ul> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<u>chunked</u>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic,</li> </ul>
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				<p>relate to students' interests, social/family background and knowledge of their community.</p> <p>-Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</p>
<p><b><u>4-ESS2-2</u></b></p> <p><b>We are learning to use maps to learn about Earth's features...</b></p>	<p><b><u>Essential Vocabulary:</u></b> continents, scale, elevation</p> <p>- make observations and analyze data about maps - understand that maps can help locate the different land and water features of Earth - reveal how large-scale systems interact as shown in the patterns of mountain ranges, ocean trenches, and other natural phenomena</p> <p><b><u>Instructional Strategies:</u></b> - evidence notebooks - think pair share - cooperative learning</p>	<p><b>Lesson 3</b> <b>Apply What You Know</b> <b>Lesson 3 Check</b> <b>Lesson 3 Self Check</b> <b>Lesson 3 Roundup</b> <b>Lesson 3 Quiz</b></p>	<p><b>Exploration 1:</b> <b>NJSLS: RI.4.7, W.4.1</b> <b>What is a Map?</b> Students learn about different types of maps. Have them write note cards of each type of map: weather, road, locator, floor plan, world map, and topographical. They may include a short description or sketch. Then small groups work together to select and describe a type of map from the note cards.</p> <p><b>Exploration 2:</b> <b>Hands on Activity</b> <b>Make a Map</b> Show examples of floor plans, including plans of homes or schools. Note the features of the map, helping students to recall the goals of a floor plan. Students draw a map of the school, including a map key that would help a reader identify key features of the school, such as</p>	<p><b>RTI/Extra Support</b> - Students may benefit from a step-by-step demonstration on using map keys. Model how to find information in the map by using the key to answer questions. Make sure to point out what border is.</p> <p><b>Suggested Strategies for ELL/ELD Students</b> - Differentiate and use different modalities. - Lessons that involve writing, speaking, drawing, and listening, give students <a href="#">four opportunities to deepen their understanding</a> - Additional engagements also provide a little breathing room so they can work through the language barrier.</p> <p><b>Suggested Strategies for Students with Special Needs</b></p>

	<ul style="list-style-type: none"> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>		<p>exits, water fountains, offices, and so on.</p> <p><b>Exploration 3: Hands on Activity Park Designer</b></p> <p>Students collaborate to design a park using what they have learned about maps, following specific criteria and constraints. A park designer uses a map to plan where equipment and features go in the park. Students should think about how a park designer uses a map to do his or her job.</p>	<ul style="list-style-type: none"> <li>- Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</li> </ul>
<p><a href="#"><u>4-ESS2-2</u></a></p> <p><b>We are learning to identify and explain where on Earth's surface earthquakes, volcanoes, mountains, and ocean trenches can be found...</b></p> <p><b>We are learning to use maps to describe the</b></p>	<p><b><u>Essential Vocabulary:</u></b> trenches</p> <ul style="list-style-type: none"> <li>- analyze and interpret data about the locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes</li> <li>- use maps to identify the patterns of the locations in which they</li> </ul>	<p><b>Lesson 4</b> <b>Apply What You Know</b> <b>Lesson 4 Check</b> <b>Lesson 4 Self Check</b> <b>Lesson 4 Roundup</b> <b>Lesson 4 Quiz</b></p>	<p><b>Exploration 1: NJSLs: RI.4.5</b> <b>Hands on Activity</b> <b>Earthquakes and Buildings</b></p> <p>Earthquakes can cause much damage to buildings. Work with two or three others to design and test a building that will survive a model earthquake. Students brainstorm for 2 minutes to come up with a possible toothpick-clay building design. One design constraint is that the structure must be 4 stories high; 1 toothpick length equals 1 story height. They sketch their design on paper. Students construct</p>	<p><b>RTI/Extra Support</b></p> <ul style="list-style-type: none"> <li>- If students are having trouble distinguishing between earthquakes and volcanic eruptions, it may be helpful to show them videos of volcanoes erupting and earthquakes shaking the ground.</li> <li>- Have students compare the occurrences of earthquakes, volcanoes, and mountains continent by continent: Africa, Antarctica, Asia, Australia, North America, South America.</li> </ul>

<p><b>patterns about the locations of earthquakes, volcanoes, mountains, and ocean trenches...</b></p>	<p>appear on land and in oceans</p> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>		<p>their model building in 5 minutes or less. Then they test their design gently shaking desks or tables for 1 minute to simulate an earthquake. They then spend 3 minutes discussing how well their design withstood the earthquake. Identify two or three ways to improve their design.</p> <p><b>Exploration 2: NJSLs: RI.4.7 Maps and Patterns</b> Given four maps showing earthquakes and features of the ocean floor, students compare the four maps to see how they are the same and different. Then have them identify the similarities and differences in the location of earthquakes, mountains, trenches, and volcanoes found on the ocean floor.</p> <p><b>Exploration 2: Hands on Activity <u>Tracking Quakes</u></b> Students collaborate to examine data to find out where most earthquakes occur.</p>	<ul style="list-style-type: none"> <li>- Have students compare the occurrences of ocean earthquakes, volcanoes, trenches, and mountains ocean by ocean: Arctic, Atlantic, Indian, Pacific.</li> </ul> <p><b>Suggested Strategies for ELL/ELD Students</b></p> <ul style="list-style-type: none"> <li>- Differentiate and use different modalities.</li> <li>- Lessons that involve writing, speaking, drawing, and listening, give students <a href="#">four opportunities to deepen their understanding</a> - Additional engagements also provide a little breathing room so they can work through the language barrier.</li> </ul> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g.</li> </ul>
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				multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
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**21<sup>st</sup> Century Theme Targeted: Global Awareness: Using 21st century skills to understand and address global issues.**

**21st Century Skills Targeted**

<b>Creativity &amp; Innovation</b>	<b>Information Literacy</b>	<b>Media Literacy</b>	<b>Critical Thinking &amp; Problem Solving</b>	<b>Communication &amp; Collaboration</b>	<b>Life &amp; Careers</b>
	<u><a href="#">Leveled Readers:</a></u> - Earth's Changing Surface and Natural Resources - Conserving Earth's Resources	StudyJams <u><a href="#">Volcanoes</a></u> <u><a href="#">Earthquakes</a></u> SciShow Kids <u><a href="#">Where do mountains come from?</a></u> <u><a href="#">All about Volcanoes</a></u> <u><a href="#">What Causes Earthquakes?</a></u>	Unit 6 Project: <u><a href="#">Nearby Weathering</a></u>		<u><a href="#">Take it Further Careers in Science</a></u>

**Summative Assessments: (include rubrics & exemplars)**

Unit 6 Test - [Changes to Earth's Surface](#)

**Unit 6 Performance Task:**  
[Model It, Map It](#)

Students develop models and plan and carry out an investigation to demonstrate the effect of how a land feature is changed by wind or water to demonstrate understanding of ESS2.A in support of 4-ESS2-1.

- A pair of three-dimensional models can contrast what something looks like before and after a change. Your team will build two models that show how a land feature is changed by wind or water over a long period of time. Then you'll make topographic maps of your models. Your maps' keys will explain the processes that shaped the land features.

[Unit 6 Performance Task Rubric](#)

## **Unit 7 Title: Rocks and Fossils**

**Time Frame: 20 Days**

### **Essential Questions**

- How do rock layers change?
- What do fossils tell us about ancient environments?
- What are some patterns fossils show us?

### **Standards: NJSL**

**Standards / CPIs (cumulative Progress Indicators) taught and assessed:**

#### **PERFORMANCE EXPECTATION**

- **4-ESS1-1** Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.

#### **DISCIPLINARY CORE IDEAS**

- **ESS1.C The History of Planet Earth**
  - Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed.

#### **SCIENCE and ENGINEERING PRACTICES**

##### **Constructing Explanations and Designing Solutions**

- Identify the evidence that supports particular points in an explanation.

#### **CROSS CUTTING CONCEPTS**

## **Patterns**

- Patterns can be used as evidence to support an explanation.

## **Scientific Knowledge Assumes an Order and Consistency in Natural Systems**

- Science assumes consistent patterns in natural systems.

## **CONNECTIONS TO MATH**

**MP.2** Reason abstractly and quantitatively

**MP.4** Model with mathematics.

**MP.5** Use appropriate tools strategically.

**4.MD.A.1** Know relative sizes of measurement units within one system of units including km, m, cm, mm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table.

## **CONNECTIONS TO ENGLISH LANGUAGE ARTS**

**W.4.7** Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.

**W.4.8.** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

**W.4.9** Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.

## **Technology:**

**8.1.5.A.1** Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

**8.1.5.A.2** Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.

**8.1.5.A.4** Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.

## **Highlighted Career Ready Practices:**

**CRP4.** Communicate clearly and effectively and with reason.

**CRP6.** Demonstrate creativity and innovation.

**CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.

**CRP11.** Use technology to enhance productivity.

**CRP12.** Work productively in teams while using cultural global competence.

**SEL Practices & Competencies:**

Self-Management  
Social Awareness  
Responsible Decision-Making  
Relationship Skills

**Overall Goal (What is the big idea?)**

Students will explore the different layers of rocks and how they change, discover what we can learn about fossils and ancient environments, and identify patterns in fossils.

**Pre-Assessment:**

Unit 7 Pretest: [Rocks and Fossils](#)

Please include interdisciplinary connections resources and plan in each activity

<b>Standards/ (SLO) Student Learning Objectives</b>	<b>Student Learning Strategies</b>	<b>Formative Assessment</b> ***suggested but not limited to the following***	<b>Activities</b> ***suggested but not limited to the following***	<b>Modifications &amp; Reflections</b> ***suggested but not limited to the following***
<p><a href="#">4-ESS1-1</a></p> <p><b>We are learning to determine the relative age of rock layers...</b></p> <p><b>We are learning to explain how rock layers change...</b></p>	<p><b><u>Essential Vocabulary:</u></b> relative age</p> <p>- model rock layers to gather evidence about how they form and what information they contain about the history of planet Earth</p> <p>- look at examples of exposed layers in</p>	<p><b>Lesson 1</b> <b>Apply What You Know</b> <b>Lesson 1 Check</b> <b>Lesson 1 Self Check</b> <b>Lesson 1 Roundup</b> <b>Lesson 1 Quiz</b></p>	<p><b>Exploration 1:</b> <b>Hands on Activity</b> <b><u>Layered Landforms</u></b> Students use a clear glass jar and three types of materials to model how rock layers form. Each material represents a different rock layer. Students first place the three materials in a jar one by one, making note of the order. They then repeat the exercise, but this time placing the materials in a different order.</p>	<p><b>ELL: Use Realia</b> - Locate and print images from the Internet that show exposed rock formations from the English language learners' native areas. Explain where the images come from and what they show, and ask students whether they heard of the places or been to them. Showing an interest in student's home can help</p>

	<p>different formations and come up with explanations for how these layers tell stories about the past and the Earth processes that shape and change rocks</p> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>		<p>Finally they explain what the layers of material represent (rock layers) and how they can be down in a different order.</p> <p><b>Exploration 2:</b>  <b>Hands On Activity</b>  <u><a href="#">Modeling How Rocks Can Form and Change</a></u>  Collaborate with a partner to model how rock layers might form and how these layers can change.</p> <p><b>Exploration 3:</b>  <b>Hands on Activity</b>  <u><a href="#">The Story of the Canyon</a></u>  Students look at pictures and watch a video of the Grand Canyon. Tell students:  Put on your creative cap! You're going to be a cartoonist! Draw a cartoon strip that shows how you think the Grand Canyon formed. Your strip should have a least three panels (boxes) Be sure to show what the land looked like before, during, and after formation of the canyon.</p>	<p>engage him or her in the learning process.</p> <p><b>Extension:</b> Rock layers are often made of similar colors. For example, the layers in Mushroom Rock start out as red and gray in the lower layers before turning to brown or tan. The colors of a layer can tell us something about the rock itself. Have students research the colors of rock layers, explaining why they look the way they do.</p> <p><b>RTI/Extra Support</b></p> <ul style="list-style-type: none"> <li>- Present students with two materials, one that is hard, but easy to break and one that is rubbery and bendable. Explain that your hand will apply pressure just a slabs of land apply when they push against each other. Break the first object, and then bend the second. Explain to students Due to heat and pressure, some rocks often bend and an earthquake may crack rocks.</li> </ul> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<u><a href="#">chunked</a></u>'. Provide one step at a time, don't overload the student on too</li> </ul>
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				<p>many pieces of information at once.</p> <ul style="list-style-type: none"> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</li> </ul>
<p><b><u>4-ESS1-1</u></b></p> <p><b>We are learning to examine fossil evidence to determine how organisms of the past lived, based on their physical traits...</b></p> <p><b>We are learning to examine fossil evidence to determine in what environments organisms of the past lived, based on their physical traits...</b></p>	<p><b><u>Essential Vocabulary:</u></b>  fossil, extinct, aquatic fossil, terrestrial fossil</p> <ul style="list-style-type: none"> <li>- examine fossils representing life from different periods in Earth's history</li> <li>- determine the habitats in which those fossils lived</li> <li>- draw conclusions about what modern-day organisms for fossils may be related to</li> <li>- look closely at the structures of fossils and living organisms to see repeated forms and</li> </ul>	<p><b>Lesson 2</b>  <b>Apply What You Know</b>  <b>Lesson 2 Check</b>  <b>Lesson 2 Self Check</b>  <b>Lesson 2 Roundup</b>  <b>Lesson 2 Quiz</b></p>	<p><b>Exploration 1:</b>  <b>NJSLS: W.4.8</b>  <b>Hands on Activity</b>  <u><b>Old and New</b></u>  Students collaborate in small groups to examine fossils identifying the structures and features of the fossil. They will determine the kind of organism that each belonged to, how it lived, and in what environments it could be found.</p> <p><b>Exploration 2:</b>  <b>NJSLS: W.4.9</b>  <b>Hands on Activity</b>  <b>Apply What You Know</b>  <b>Past Meets Present</b>  Research two fossils. For each fossil, find a related or similar modern day organism and determine what type of environment it lives in. Infer</p>	<p><b>Extension:</b> Provide students with images of fossils that have not been discussed in class, and ask them to research organisms living today that have similar traits. Ask students to prepare a short presentation for each image, explaining why the organism may have developed the trait and what environment it lived in.</p> <p><b>Suggested Strategies for ELL/ELD Students</b></p> <ul style="list-style-type: none"> <li>- Differentiate and use different modalities.</li> <li>- Lessons that involve writing, speaking, drawing, and listening, give students <a href="#">four opportunities to deepen their understanding</a> - Additional engagements also</li> </ul>

	<p>traits that helped these organisms survive in specific environments</p> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>		<p>whether the organisms that became fossils lived in similar environments.</p>	<p>provide a little breathing room so they can work through the language barrier.</p> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<u>chunked</u>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</li> </ul>
<p><b><u>4-ESS1-1</u></b></p> <p><b>We are learning to use information from fossils and rock layers to describe how an environment has changed over time...</b></p>	<p><b><u>Essential Vocabulary:</u></b> fossil, extinct, aquatic fossil, terrestrial fossil</p> <ul style="list-style-type: none"> <li>- use evidence to determine what past environments were like</li> <li>- examine the fossils in different layers of rock</li> </ul>	<p><b>Lesson 3</b> <b>Apply What You Know</b> <b>Lesson 3 Check</b> <b>Lesson 3 Self Check</b> <b>Lesson 3 Roundup</b> <b>Lesson 3 Quiz</b></p>	<p><b>Exploration 1:</b> <b><u>Layer by Layer</u></b> Students collaborate with their groups to build a replica of rock layers, constructing an explanation for how fossil evidence can reveal much about the organism and environment each layer represents. Students list the environments in a chart, layer by layer, from oldest to youngest, and include</p>	<p><b>RTI/Extra Support</b></p> <ul style="list-style-type: none"> <li>- Some students may have a difficult time grasping what they are recording in the chart. Explain that each line of the chart represents a different layer in the model, which in turn represents a different environment, in the same way that each layer of rock does.</li> </ul>

<p><b>We are learning to use information from fossils and rock layers to determine the relative ages of fossils and rock layers...</b></p>	<p>to reveal the history of planet Earth</p> <ul style="list-style-type: none"> <li>- construct explanations for how environments have changed over time</li> <li>- study patterns in rocks and fossils to determine how changes to Earth's surface have affected and will continue to affect rock layers</li> </ul> <p><u><b>Instructional Strategies:</b></u></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>		<p>observations that helped them identify the environments.</p> <p><b>Exploration 2:</b>  <b>NJSLS: W.4.9</b>  <b>Hands on Activity</b>  <u><b>Disordered Days</b></u></p> <p>Before the activity, make sure each student has 10 sheets of paper each. Students have seen rock layers that lay flat, one on top of the other. But some rock layers are not quite so neat.</p> <ol style="list-style-type: none"> <li>1. Label five pieces of paper with the days of the week, starting with Monday</li> <li>2. Stack the papers one on top of the other in the order of the days, with Monday at the bottom</li> <li>3. Before putting Thursday on the pile, remove Wednesday. Then put Thursday on top of Tuesday.</li> <li>4. Finish by adding Friday</li> <li>5. Create a second set of layers by repeating the first two steps. Do not remove the Wednesday layer this time.</li> </ol> <p>Students compare and contrast the two sets of layers. Have them think about what the missing layer could represent if the layers were made of rock. What could cause a layer to be missing? (erosion)</p>	<p><b>Suggested Strategies for ELL/ELD Students</b></p> <ul style="list-style-type: none"> <li>- Differentiate and use different modalities.</li> <li>- Lessons that involve writing, speaking, drawing, and listening, give students <a href="#">four opportunities to deepen their understanding</a> - Additional engagements also provide a little breathing room so they can work through the language barrier.</li> </ul> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</li> </ul>
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**21<sup>st</sup> Century Theme Targeted: Global Awareness: Using 21st century skills to understand and address global issues.**

**21st Century Skills Targeted**

Creativity & Innovation	Information Literacy	Media Literacy	Critical Thinking & Problem Solving	Communication & Collaboration	Life & Careers
<p><b>Unit 7</b>  <b>Project: <a href="#">Dino Zoo</a></b></p>	<p><b><a href="#">Leveled Readers:</a></b>                      - Earth's Changing Surface and Natural Resources                      - Conserving Earth's Resources</p>	<p><b>SciShow Kids</b>  <a href="#">How to Find Thousands of Oceanic Fossils in... Ohio?</a>  <a href="#">The 10 Oldest Fossils, and What They Say About Evolution</a></p>		<p><b><a href="#">Fossil Rock Anthem</a></b></p>	<p><b><a href="#">Take it Further Careers in Science</a></b>   <b>SciShow Kids</b>  <a href="#">Mary Anning: Fossil Hunter</a></p>

**Summative Assessments: (include rubrics & exemplars)**

**Unit 7 Test - [Rocks and Fossils](#)**

**Unit 7 Performance Task:**

**[Rocking the Layers](#)**

Students provide explanations and develop models to demonstrate rock processes and patterns to demonstrate understanding of ESS1.C in support of 4-ESS1-1.

- **Observe the way the rock layers shown have changed. Your task is to research how rock layers can change and identify the processes that made the changes. You should then design a model of the process that formed the rock layers or you can model one of the other processes that change rock layers. As part of your model, you may wish to show how rock layers are formed.**

**[Unit 7 Performance Task Rubric](#)**

## **Unit 8 Title: Natural Resources and Hazards**

**Time Frame: 25 Days**

### **Essential Questions**

- **What nonrenewable resources are used for energy?**
- **What renewable resources are used for energy?**
- **How can people reduce the impact of land based hazards?**
- **How can people reduce the impact of water based hazards?**

### **Standards: NJSL**

**Standards / CPIs (cumulative Progress Indicators) taught and assessed:**

#### **PERFORMANCE EXPECTATION**

- **4-ESS3-1** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- **4-ESS3-2** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

#### **DISCIPLINARY CORE IDEAS**

- **ESS3.A Natural Resources**
  - Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.
- **ESS3.B Natural Hazards**
  - A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts.
- **ETS1.B Designing Solutions to Engineering Problems**
  - Testing a solution involves investigating how well it performs under a range of likely conditions.

#### **SCIENCE and ENGINEERING PRACTICES**

- **Obtaining, Evaluating, and Communicating Information**
  - Obtain and combine information from books and other reliable media to explain phenomena.
- **Constructing Explanations and Designing Solutions**

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.

### **CROSS CUTTING CONCEPTS**

- **Cause and Effect**

- Cause and effect relationships are routinely identified and used to explain change.

- **Interdependence of Science, Engineering, and Technology**

- Knowledge of relevant scientific concepts and research findings is important in engineering.

- **Influence of Engineering, Technology, and Science on Society and the Natural World**

- Over time, people's needs and wants change, as do their demands for new and improved technologies.
- Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands.

### **CONNECTIONS TO MATH**

**MP.2** Reason abstractly and quantitatively

**MP.4** Model with mathematics.

**4.OA.A.1** Interpret a multiplication equation as a comparison, e.g., interpret  $35 = 5 \times 7$  as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

### **CONNECTIONS TO ENGLISH LANGUAGE ARTS**

**RI.4.1.** Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.

**RI.4.9.** Integrate and reflect on (e.g. practical knowledge, historical/cultural context, and background knowledge) information from two texts on the same topic in order to write or speak about the subject knowledgeably.

**W.4.7** Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.

**W.4.8.** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

**W.4.9** Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.

### **Technology:**

**8.1.5.A.1** Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.

**8.1.5.A.2** Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.

**8.1.5.A.4** Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.

**Highlighted Career Ready Practices:**

**CRP4.** Communicate clearly and effectively and with reason.

**CRP6.** Demonstrate creativity and innovation.

**CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.

**CRP11.** Use technology to enhance productivity.

**CRP12.** Work productively in teams while using cultural global competence.

**SEL Practices & Competencies:**

Self-Management

Social Awareness

Responsible Decision-Making

Relationship Skills

**Overall Goal (What is the big idea?)**

Students will explore how renewable and nonrenewable resources are used for energy, and discover how people can reduce land- and water- based hazards and their impacts.

**Pre-Assessment:**

Unit 8 Pretest: [Natural Resources and Hazards](#)

**Please include interdisciplinary connections resources and plan in each activity**

Standards/ (SLO) Student Learning Objectives	Student Learning Strategies	Formative Assessment ***suggested but not limited to the following***	Activities ***suggested but not limited to the following***	Modifications & Reflections ***suggested but not limited to the following***
<p><u><a href="#">4-ESS3-1</a></u></p> <p><b>We are learning to describe nonrenewable resources and explain the effects of using them...</b></p>	<p><b><u>Essential Vocabulary:</u></b> resource, natural resource, nonrenewable resource, pollution, drawbacks</p> <ul style="list-style-type: none"> <li>- obtain, evaluate, and communicate information about nonrenewable resources, protecting and reducing the use of nonrenewable resources</li> <li>- learn how people's needs and wants change over time as they demand new and better technologies</li> </ul> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>	<p><b>Lesson 1</b> Apply What You Know Lesson 1 Check Lesson 1 Self Check Lesson 1 Roundup Lesson 1 Quiz</p>	<p><b>Exploration 1:</b> NJSLs: W.4.8, W.4.9 <b>Hands on Activity</b> <b>The Schools Energy</b> Do research to find out about the energy generating station that supplies electricity to your school. How does it generate electricity? Make a poster about your findings. Compare your findings with your classmates.</p> <p><b>Exploration 2:</b> NJSLs: W.4.8, MP.2 <b>Hands On Activity</b> <b>Mining Challenge</b> Model a mining operation by tallying up the value of the minerals mined and subtracting the cost of mining. Supply students with a pan with birdseed and beads in it. The birdseed represents the minable earth, and the beads represent different minerals and costs associated with mining. Each minute students will use cost \$10 in reclamation fees. Using only a single spoon to pick up materials, they have up to 10 minutes to mine beads out of the birdseed. They must also use only the spoon to return any birdseed removed back into the pan. Students subtract their costs</p>	<p><b>ELL: Use Realia</b> - Point out cognates of key terms from students' home languages, for example, resource/recurso, natural resource/recurso natural, to help bridge understanding of pertinent lesson vocabulary. Pronounce each word, and spotlight the similarities. Ask other students to share the same words in their home languages.</p> <p><b>Suggested Strategies for Students with Special Needs</b> - Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once. - Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. -Provide students with multiple choices for how they can represent their understandings (e.g.</p>

			<p>from the value of what they mined. Did they make profit?  gold bead = \$5  silver bead = \$4  blue bead = \$3  sunflower seed = \$2</p> <p><b>Exploration 2:  Hands on Activity</b>  <u>Catch That Dirt</u>  Students collaborate to investigate pollution in the air.</p>	<p>multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</p>
<p><u><b>4-ESS3-1</b></u></p> <p><b>We are learning to explain the potential risks and benefits of using wind, water, and solar energy compared to fossil fuels...</b></p>	<p><b><u>Essential Vocabulary:</u></b>  renewable resource</p> <ul style="list-style-type: none"> <li>- learn about renewable energy resources, including how we make use of them</li> <li>- evaluate the benefits and drawbacks of renewable resources</li> </ul> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>	<p><b>Lesson 2</b>  <b>Apply What You Know</b>  <b>Lesson 2 Check</b>  <b>Lesson 2 Self Check</b>  <b>Lesson 2 Roundup</b>  <b>Lesson 2 Quiz</b></p>	<p><b>Exploration 1:</b>  <b>NJSLS: W.4.8</b>  <b>Exploring Renewable Resources</b>  Describe two renewable and two nonrenewable resources where you live. What are the natural resources and the electricity-producing devices?</p> <p><b>Exploration 2:</b>  <b>NJSLS: 4.MD.B.4, MP.2, MP.4</b>  <b>Hands on Activity</b>  <u>Running on Sunshine</u>  Students must work within a budget to determine the materials they can bring with them on a camping trip. They have a budget of \$10 dollars and must collaborate to build a solar hot water heater.</p>	<p><b>ELL: Use Realia</b>  - Use objects such as a ball, a battery, and a light bulb to demonstrate energy of movement, electrical energy, light, and other forms of energy.</p> <p><b>Extension</b>  - Some renewable energy sources still work in places where you might not expect them to work. Germany and Ohio aren't places you think of as being very sunny. However, solar panels can be a great source of renewable energy in these places. Ask students to research how much of Germany's electricity comes from solar energy. Have them research and discuss how it is possible for solar energy to work in cloudy places.</p> <p><b>Suggested Strategies for ELL/ELD Students</b></p>

				<ul style="list-style-type: none"> <li>- Differentiate and use different modalities.</li> <li>- Lessons that involve writing, speaking, drawing, and listening, give students <a href="#">four opportunities to deepen their understanding</a> -</li> </ul> <p>Additional engagements also provide a little breathing room so they can work through the language barrier.</p> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</li> </ul>
<a href="#"><u>4-ESS3-2</u></a>	<b><u>Essential Vocabulary:</u></b>	<p>Lesson 3</p> <p>Apply What You Know</p> <p>Lesson 3 Check</p> <p>Lesson 3 Self Check</p>	<p>Exploration 1:</p> <p>Hands on Activity</p> <p><a href="#"><u>Make Your Own Seismometer</u></a></p>	<p><b>Suggested Strategies for ELL/ELD Students</b></p> <ul style="list-style-type: none"> <li>- Differentiate and use different modalities.</li> </ul>

<p><b>We are learning to describe some natural hazards and tell how people can stay safe when they occur...</b></p>	<p>natural hazard, volcanic eruption, earthquake, wildfire, landslide</p> <ul style="list-style-type: none"> <li>- learn about natural hazards that take place on land, such as volcanic eruptions, earthquakes, landslides, and wildfires</li> <li>- explore the causes and effects of these events</li> <li>- analyze information about how maps can be used to assess the risk of natural hazards</li> </ul> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>	<p><b>Lesson 3 Roundup</b> <b>Lesson 3 Quiz</b></p>	<p>A seismometer detects and measures ground movement. In this activity students will make a seismometer.</p> <p><b>Hands on Activity</b> <b>Shakeproof, Quakeproof</b> Have students design an earthquake-proof building that they will test. Provide each group with building materials such as straws or toothpicks for model beams and clay for joining the beams. To test each building, place the building on an upside-down aluminum cake pan. Tap the cake pan for 10 to 30 seconds to model the compression waves that are felt at the beginning of an earthquake. After that, lightly shake the cake pan side to side to model the secondary waves that follow the compression waves of an earthquake. After every group's models have been tested, have students revisit their designs. They should list the elements that worked in their designs as well as the elements of the design that failed to withstand the forces of the model earthquake. Once every group is done redesigning their buildings, retest the buildings using the same testing method from their initial design.</p> <p><b>Exploration 1:</b> <b>Hands on Activity</b></p>	<ul style="list-style-type: none"> <li>- Lessons that involve writing, speaking, drawing, and listening, give students <a href="#">four opportunities to deepen their understanding</a> -</li> <li>Additional engagements also provide a little breathing room so they can work through the language barrier.</li> </ul> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions <a href="#">'chunked'</a>. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>-Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</li> </ul>
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			<p><b><u>Reduce the Risk</u></b> Students collaborate to develop a plan to reduce the impact of a landslide.</p>	
<p><b><u>4-ESS3-2</u></b></p> <p><b>We are learning to describe some water-based hazards and tell how people can stay safe when they occur...</b></p>	<p><b><u>Essential Vocabulary:</u></b> hurricane, drought, tsunami, flood</p> <ul style="list-style-type: none"> <li>- study a variety of water-based Earth processes that can be hazardous to humans</li> <li>- design and test multiple solutions to lessen impacts of these processes on humans</li> </ul> <p><b><u>Instructional Strategies:</u></b></p> <ul style="list-style-type: none"> <li>- evidence notebooks</li> <li>- think pair share</li> <li>- cooperative learning</li> <li>- kwl chart</li> <li>- question-answer relationship (QAR)</li> </ul>	<p><b>Lesson 4</b> <b>Apply What You Know</b> <b>Lesson 4 Check</b> <b>Lesson 4 Self Check</b> <b>Lesson 4 Roundup</b> <b>Lesson 4 Quiz</b></p>	<p><b>Exploration 1:</b> <b>Hands on Activity</b> <b>Take Action</b> Imagine you and your family live in a region called Watertown. Your region is currently being impacted by a drought. Students choose an activity below to complete: - Create a poster informing the residents of Watertown what they can do to help reduce the impacts of a drought, and tell how the effects of those two impacts could be decreased. - Write a letter to the editor of Watertown Newspaper that draws attention to the need for residents to take actions to reduce the impact of a drought. Include evidence to support your claim. - In a group, brainstorm and come up with ways you can help members of Watertown save water in their house, in their backyard, and at their school. Present your ideas in the form of a three-column table.</p> <p><b>Exploration 2:</b> <b>Hands on Activity</b> <b>Is It Safe?</b> Collaborate with your team to figure out how to reduce the damage a tsunami might do to a</p>	<p><b>Extension:</b> Have students carry out brief research to identify and gather information about another technology that is used to lessen the impact of a water-based hazard. Have them obtain an image and write a brief caption. Have them share their information with the remainder of the class.</p> <p><b>Suggested Strategies for ELL/ELD Students</b></p> <ul style="list-style-type: none"> <li>- Differentiate and use different modalities.</li> <li>- Lessons that involve writing, speaking, drawing, and listening, give students <a href="#">four opportunities to deepen their understanding</a> - Additional engagements also provide a little breathing room so they can work through the language barrier.</li> </ul> <p><b>Suggested Strategies for Students with Special Needs</b></p> <ul style="list-style-type: none"> <li>- Keep instructions and directions '<a href="#">chunked</a>'. Provide one step at a time, don't overload the student on too many pieces of information at once.</li> </ul>

			small neighborhood. Identify a solution to help reduce the impact. Use materials to design and build a model of your solutions. You have a budget of 500 units in local currency to build this small neighborhood.	<ul style="list-style-type: none"> <li>- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.</li> <li>-Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques- auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</li> </ul>
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**21<sup>st</sup> Century Theme Targeted: Global Awareness: Using 21st century skills to understand and address global issues.**

**21st Century Skills Targeted**

<b>Creativity &amp; Innovation</b>	<b>Information Literacy</b>	<b>Media Literacy</b>	<b>Critical Thinking &amp; Problem Solving</b>	<b>Communication &amp; Collaboration</b>	<b>Life &amp; Careers</b>
	<p><b><u>Leveled Readers:</u></b></p> <ul style="list-style-type: none"> <li>- Earth's Changing Surface and Natural Resources</li> <li>- Conserving Earth's Resources</li> </ul>	<p><b>SciShow Kids</b></p> <p><b><u>Volcanoes</u></b></p> <p><b><u>What Causes Earthquakes?</u></b></p> <p><b><u>Tsunamis: The Biggest Waves</u></b></p> <p><b><u>Why do Floods Happen?</u></b></p> <p><b>The Dr. Binocs Show</b></p> <p><b><u>Landslide</u></b></p> <p><b><u>Drought</u></b></p>		<p><b>Unit 8 Project:</b></p> <p><b><u>Resources Debate</u></b></p>	<p><b><u>Take it Further</u></b></p> <p><b><u>Careers in Science</u></b></p>

**Summative Assessments: (include rubrics & exemplars)**

**Unit 8 Test - [Natural Resources and Hazards](#)**

**Unit 8 Performance Task:**

**[Avoiding Disaster](#)**

Students obtain information and develop solutions to demonstrate how to minimize the risk of flood hazards in the community to demonstrate understanding of ESS3.A in support of 4-ESS3-2.

- **You are a small town mayor in the midwestern United States. Last summer, your town experienced record rainfall and flooded for the first time in history. Nobody was hurt, but there was a lot of damage. This year, you and a group of volunteers are tasked with planning strategies to minimize the danger and damage of flooding.**

**[Unit 8 Performance Task Rubric](#)**