Beach Haven School District

Social Studies Curriculum

Grade 4

Original Adoption: September 12, 2016
Created By: Kevin Waldron-Berkeley, Jamie Pratt-Brick, Cathy McBride-Long Beach Island, Christine Manna-Toms River
Revised on: June 22, 2022
Revised by: Deb Harkness, Sara Holleran
Proposed Revision Date: Summer 2025

Recommended Pacing Guide	
Unit 1: Engineering	**20 days- ongoing**
Unit 2: Energy	**20 days- ongoing**
Unit 3: Waves and Information Transfer	**20 days- ongoing**
Unit 4: Molecules to Organisms/ Structure & Function: Plants & Animals	**40 days- ongoing**
Unit 5: Changes to Earth's Surface	**20 days- ongoing**
Unit 6: Earth's Place in the Universe	**20 days- ongoing**
Unit 7: Earth and Human Activity	**40 days- ongoing**

Unit 1: Engineering	**Duration: 20 Days**

Standards/Learning Targets

New Jersey Student Learning Standards:

• 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.

Correlation Chart
EDI

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.

Science and Engineering Practices	Disciplinary Core Ideas
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.	• 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.
Crosscutting Concepts	**Learning Objectives**
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.	• Students use given scientific information and information about a situation or phenomenon to define a simple design problem that includes responding to a need or want. • The problem students define is one that can be solved with the development of a new or improved object, tool, process, or system. • Students describe that people's needs and wants change over time. • Based on the situation people want to change, students specify criteria (required features) of a successful solution. • Students describe the constraints or limitations on their design, which may include: cost, materials, and time.

Performance Expectation	
• **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.**	
Science and Engineering Practices	**Disciplinary Core Ideas**
• 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.	• 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. • 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.

Crosscutting Concepts	Learning Objectives
• Influence of Science, Engineering, and Technology on Society and the Natural World ○ Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.	• Students use grade-appropriate information from research about a given problem, including the causes and effects of the problem and relevant scientific information. • Students generate at least two possible solutions to the problem based on scientific information and understanding of the problem. • Students specify how each design solution solves the problem. • Students share ideas and findings with others about design solutions to generate a variety of possible solutions. • Students describe the necessary steps for designing a solution to a problem, including conducting research and communicating with others throughout the design process to improve the design [note: emphasis is on what is necessary for designing solutions, not on a stepwise process]. • Students test each solution under a range of likely conditions and gather data to determine how well the solutions meet the criteria and constraints of the problem.

Performance Expectation	
• **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.**	
Science and Engineering Practices	**Disciplinary Core Ideas**
• 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.	ETS1.B: Developing Possible Solutions • 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.
Crosscutting Concepts	**Learning Objectives**

• 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.	• Students describe the purpose of the investigation, which includes finding possible failure points or difficulties to identify aspects of a model or prototype that can be improved. • Identifying the evidence to be address the purpose of the investigation, students describe the evidence to be collected • Students create a plan for the investigation that describes different tests for each aspect of the criteria and constraints. • Students carry out the investigation, collecting and recording data according to the developed plan.

Primary Interdisciplinary Connections:

- ELA: SL.4.3. Identify the reasons and evidence a speaker provides to support particular points.
- NJSLARI.4.7: Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- NJSLAW.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.

Technology Standards:

- 8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.
- 8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
- 8.2.2.C.1 Brainstorm ideas on how to solve a problem or build a product
- 8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.
- 8.2.2.E.1 List and demonstrate the steps to an everyday task

Career Ready Practices:

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP4. Communicate clearly and effectively and with reason.
- CRP12. Work productively in teams while using cultural global competence.

21st Century Life and Career Standards:

- 9.1.4.A.1- Explain the difference between a career and a job, and identify various jobs in the community and the related earnings.

Suggested Accommodations

English Language Learners:

- Provide clear and specific directions
- Provide extended time
- Provide written directions with models and diagrams when possible
- Pre-teach vocabulary using visuals and gestures

- Chunk texts
- Summarize as you go
- Preview lessons
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge

Special Education/Students with Disabilities:

- Follow specific students accommodations and modifications as listed in individual student IEP plan.
- Pre-teach vocabulary using visuals and gestures
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Students at Risk of Failure:

- Make sure children feel welcome and comfortable while being discrete
- Provide structure and adhere to a consistent daily routine with clear and concise rules
- Be flexible

Economically Disadvantaged:

- Be flexible with assignments
- Provide extra time 28

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- Activate schema
- Build background knowledge
- Provide access to computers, magazines, newspapers, and books so low-income students can see and work with printed materials

Culturally Diverse:

- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions
- Provide differentiated instruction as needed
- Follow all IEP modifications/504 plan
- Provide manipulatives or the opportunity to draw solution strategies
- Provide students with notes from the lesson
- For additional support and guidance, provide students with lab group or partner for lab experiences
- Provide students with a study guide about the information they will be assessed on for a test or quiz
- Teach and model note taking strategies to assist student when reading their science textbook
- Teach and model strategies to learn and practice new vocabulary words
- Assist student in completing a word web for new vocabulary words to reinforce new words in their science unit
- Provide students with an organization system to help them organize their notes, labs, and classwork
- Read directions, tests, and/or quizzes aloud
- Use graphic organizers to take notes, organize new information, and help students relate new information with previous knowledge
- Provide students with additional time to complete assignments
- Provide small group and individual conferencing to help support student throughout the lesson
- Preferential seating based on student needs
- Review concepts of previous lesson before teaching the new lesson ● Complete review activities to reinforce concepts previously taught
- Check for students understanding often with formal, informal, verbal, and nonverbal measures
- Provide student with modified tests and quizzes organized in a manner that will easy for the student to follow, assessment quality over quantity, and has clear directions
- Allow students to verbalize before beginning tasks and lab experiments
- Repeat the directions for students as often as needed
- Allow wait time for students
- Provide visual aids to support concepts being taught, such as diagrams
- Redirect student and provide frequent breaks as needed
- Teach student mnemonic devices to help learn new concepts, as appropriate
- Use text-to-speech applications to help students when reading online texts above their reading level on the computer

Evidence of Student Learning	
Formative Tasks: ● Weekly assessment of STEAM activity and task performance.	**Alternative Assessments:** ● Engineering Projects

• Teacher Observation • Lab Journals • Conferencing • Questioning • Turn and Talk	
Summative Assessments: • Recurrent assessment of the Engineering Design Process.	**Benchmark Assessments:** • Scientific Notebook Check with Scoring Rubric
Knowledge & Skills	
Enduring Understandings: • Following established STEAM Lab rules and procedures that students and faculty remain safe and increase the likelihood that challenges are met successfully. • Engineers take on specific responsibilities in order to contribute to the success of the overall challenge. • The Engineering Design Process involves asking, questions, imagining possible solutions, planning a course of action, creating and testing a process or prototype, and analyzing results in order to make design improvements.	**Essential Questions:** • How do we use the STEAM Lab flexible seating and equipment safely? • How do we work together to meet our goals? • What are the steps of the engineering process?
Core Instructional & Supplemental Materials	
Suggested Activities/Resources: • Discussion of Safety Rules and Lab Procedures: Using materials appropriately and following established routines ensures student safely in the lab. • Use of the “Talk/Draw” Method of planning- Students draw and plan together on a large sheet of paper for the exchange of ideas, saving time and paper. • www.code.org Activities for beginner and advanced coding • www.code.org • Instructor Handbook of Unplugged and Online Lesson Plans • Using STEM to Investigate Issues in Managing Waste • Steam Kids 50+ science/technology engineering / art / math / hands-on project • The Big Book of Makerspace Projects	**Varied Levels of Text:** • The Boy Who Harnessed the Wind by William Kamkwamba and Bryan Mealer • Energy Island: How One Community Harnessed the Wind and Changed Their World by Alan Drummond • Systems • Energy Past and Present • Sunlight and Showers • Blackout • It’s All Energy • Warning: Tsunami! • Sound on the Move • Seeing Sound • The Scientist Who Cracked the Dolphin Code • Patterns in Communication • Investigating Animal Senses • I See What You Mean • Crow Scientist • Seeing Like a Shrimp and Smelling Like a Snake • Handbook of Animal Eyes

• STEAM Ahead! DIY for Kids • Make: Paper Inventions • *HMH Science Dimensions* • www.teachengineering.org • Brainpop • https://pbskids.org/designsquad • http://www.livebinders.com/play/play_or_edit?id=126258 • https://www.edutopia.org/article/STEAM-resources https://ozobot.com/stem-education https://hourofcode.com/us/learn	• Clues from the Past • Through the Eyes of a Geologist • Arguing to Solve a Mystery • Rocky Wonders • Fossil Hunter's Handbook

Unit 2: Energy	**Duration: 20 days- ongoing**

Standards/Learning Targets

New Jersey Student Learning Standards:

- 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.

Performance Expectation

- **4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.**

Science and Engineering Practices	**Disciplinary Core Ideas**
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.	**PS3.A: Definitions of Energy-** • The faster a given object is moving, the more energy it possesses. **PS3.A: Definitions of Energy-** • Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2, 4-PS3-3) **PS3.B: Conservation of Energy and Energy Transfer-** • 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. (4-PS3-2, 4-PS3-4)

	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. (3-5-ETS1-1)
Crosscutting Concepts	**Learning Objectives**
Energy and Matter- ● Energy can be transferred in various ways and between objects.	● Students are presented with a simple illustration of a town, and they write initial explanations about what might cause a lamp to not turn on (cause and effect) ● Students read the book Systems to obtain information about what a system is and how parts within a system interact (systems and system models). ● Students design and make simple solar-powered electrical systems (energy and matter), developing solutions to make a fan spin. They investigate how the parts of their electrical systems interact and function together (systems and system models). ● Students use a digital model to investigate various electrical systems (systems and system models), to build an understanding of what energy is, and to gather evidence about which devices have electrical energy as an input (energy and matter). ● Students design and make different electrical systems (systems and system models) and communicate through discussion about how they can have light, motion, or sound energy as an output energy (energy and matter). ● Students make arguments, orally and in writing, based on evidence about what happened to the electrical system the night of the Ergstown blackout (systems and system models, cause and effect)

Performance Expectation	
4-PS3-2- Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. [Assessment Boundary: Assessment does not include quantitative measurements of energy.]	
Science and Engineering Practices	**Disciplinary Core Ideas**

Planning and carrying out investigations to answer questions or test solutions to problems- ● Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.	**PS3.A: Definitions of Energy-** ● Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2),(4-PS3-3) **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. (4-PS3-2),(4-PS3-3) ● Light also transfers energy from place to place. (4-PS3-2) ● 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.(4-PS3-2),(4- PS3-4) **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. (3-5-ETS1-1) **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. (3-5-ETS1-2) **ETS1.B: 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. (3-5-ETS1-2)
Crosscutting Concepts	**Learning Objectives**
Energy and Matter- ● Energy can be transferred in various ways and between objects.	● Students read a reference book to obtain information about energy converters. They then use a digital model to construct electrical systems (systems and system models) and analyze data about the ways in which these systems convert energy from one form to another (energy and matter).

	● Students read the book Energy Past and Present to obtain information about how modern electrical devices and non electrical devices from the past are both designed to solve engineering problems by converting energy from one form to another (energy and matter). ● Students analyze and interpret data to discover the relationship between the amount of energy needed to run electrical devices and the amount of energy in the electrical system (systems and system models, energy and matter). ● Students gather evidence—by using a digital model and by obtaining information from a reference book—to construct written arguments for a solution to the blackout problem in the electrical system (systems and system models).

Performance Expectation	
● **4-PS3-3 Ask questions and predict outcomes about the changes in energy that occur when objects collide.**	
Science and Engineering Practices	**Disciplinary Core Ideas**
Asking Questions and Defining Problems- ● Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.	**PS3.A: Definitions of Energy-** ● Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2, 4-PS3-3) **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. **PS3.C: Relationship Between Energy and Forces-** ● When objects collide, the contact forces transfer energy so as to change the object's motions. (4-PS3-3)(4-PS3-2)(4-PS3-2, 4-PS3-3) **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. (4-PS3-4)

	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. (4-ESS3-2) **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. (3-5-ETS1-1) **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. (3-5-ETS1-2) **ETS1.B: 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. (3-5-ETS1-2) **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. (3-5-ETS1-3)
Crosscutting Concepts	**Learning Objectives**
Energy and Matter- ● Energy can be transferred in various ways and between objects.	● Students gather evidence from a digital model about where the energy for various electrical systems comes from (systems and system models, energy and matter). ● Students compare energy converters to construct explanations about the different roles the energy converters play in the electrical system (systems and system models, structure and function). ● Students read the book Sunlight and Showers to obtain information about how a team of engineering students define a problem and develop and optimize solutions (cause and effect), using the sun as an energy source for a solar water heater (energy and matter). ● Students develop solutions to convert motion energy to electrical energy by designing and making the wind turbine, part of a wind

	converter system (systems and system models). ● Students optimize their designs based on testing and peer review. They make diagram models of their completed wind turbines, identifying each part and its function (systems and system models, structure and function). ● Students write arguments about which of two proposed solutions to the blackout problem in Ergstown's electrical system (systems and system models) will best meet the design criteria, including protecting natural resources (cause and effect).

Performance Expectation	
4-PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	
Science and Engineering Practices	**Disciplinary Core Ideas**
Constructing Explanations and Designing Solutions- ● Apply scientific ideas to solve design problems.	**PS3.A: Definitions of Energy-** ● Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2, 4-PS3-3) **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. (4-PS3-2, 4-PS3-3) ● 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. (4-PS3-2, 4-PS3-4)) **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. (4-PS3-4) **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. (4-ESS3-1) **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. (4-ESS3-2) **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. (3-5-ETS1-1) **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. (3-5-ETS1-2) **ETS1.B: 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. (3-5-ETS1-2) **ETS1.B: Developing Possible Solutions-** ● Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3) **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. (3-5-ETS1-3) **ETS1.B: Developing Possible Solutions-** ● Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3)
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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. **Connections to Nature of Science: Science**	● Students identify evidence about the causes of electrical system failures (cause and effect, systems and system models) in simple electrical systems they design and make for one another and also about failures—including those caused by natural hazards—described in the book Blackout! ● Students use a physical model and a diagram

is a Human Endeavor- ● Most scientists and engineers work in teams. ● Science affects everyday life.	model to learn about the electrical grid—the series of wires that connect the electrical system (systems and system models)—and discuss evidence about natural hazards that might have caused the Ergstown system to stop transferring energy (cause and effect). ● Students write arguments based on evidence and on criteria that define the problem for the best solution for protecting the Ergstown electrical grid from natural hazards (systems and system models, energy and matter). ● Students obtain and evaluate information from a variety of sources and communicate a recommendation to the mayor for the top two improvements to the whole electrical system in Ergstown that will meet the greatest number of design criteria (systems and system models, energy and matter). ● Students participate in a town hall meeting during which they orally present their claims and evidence to their peers about the two best solutions for improving Ergstown's electrical system (systems and system models, energy and matter). ● Students use what they have learned about energy conversion, energy transfer, and electrical systems (systems and system models, energy and matter) to write new explanations about what might cause a lamp to not turn on (cause and effect).

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- Provide students with a study guide about the information they will be assessed on for a test or quiz
- Teach and model note taking strategies to assist student when reading their science textbook
- Teach and model strategies to learn and practice new vocabulary words
- Assist student in completing a word web for new vocabulary words to reinforce new words in their science unit
- Provide students with an organization system to help them organize their notes, labs, and classwork
- Read directions, tests, and/or quizzes aloud
- Use graphic organizers to take notes, organize new information, and help students relate new information with previous knowledge
- Provide students with additional time to complete assignments
- Provide small group and individual conferencing to help support student throughout the lesson
- Preferential seating based on student needs
- Review concepts of previous lesson before teaching the new lesson ● Complete review activities to reinforce concepts previously taught
- Check for students understanding often with formal, informal, verbal, and nonverbal measures
- Provide student with modified tests and quizzes organized in a manner that will easy for the student to follow, assessment quality over quantity, and has clear directions
- Allow students to verbalize before beginning tasks and lab experiments
- Repeat the directions for students as often as needed
- Allow wait time for students

- Provide visual aids to support concepts being taught, such as diagrams
- Redirect student and provide frequent breaks as needed
- Teach student mnemonic devices to help learn new concepts, as appropriate
- Use text-to-speech applications to help students when reading online texts above their reading level on the computer

Evidence of Student Learning

Formative Tasks:

- Write initial explanations about what might cause a lamp to not turn on.
- Use a digital model to investigate various electrical systems, to build an understanding of what energy is, and to gather evidence about which devices have electrical energy as an input.
- Students gather evidence to: construct written arguments for a solution, where the energy comes from, and identify causes for system failure.

Alternative Assessments:

- Design a simple solar-powered electrical systems,develop solutions to make a fan spin. Investigate how the parts of electrical systems interact and function together.
- On-the-Fly assessments

Summative Assessments:

- Write new explanations to use what was learned about energy conversion, energy transfer, and electrical systems about what might cause a lamp to not turn on.
- Associated unit tests, quizzes
- Labs and engineering based projects
- Student created models
- Written student explanations of phenomenon

Benchmark Assessments:

- Pre-Unit Assessments
- Exit Tickets
- Lesson Quizzes

Core Instructional & Supplemental Materials

Suggested Activities/Resources:

- *HMH Science Dimensions*
- Energy Conversions Simulation
- Energy Conversions sorting tool
- NGSS Powerpoints, activities, articles
- Switch Energy Project
- https://www.brainpop.com/science/
- Better Lessons- Science
- Khan Academy
- NGSS Powerpoints, activities, articles
- Switch Energy Project
- Spool Racers: http://www.scienceworld.ca/resources/activities/popcan-porsche
- www.pbskids.org/designsquad/build/rubber-band-car/
- Energy at Play: https://www.thetech.org/sites/default/files/pdfs/Design-Challenge-Learning-Lessons/Energy_at_Play.pdf

Varied Levels of Text:

- The Boy Who Harnessed the Wind by William Kamkwamba and Bryan Mealer
- Energy Island: How One Community Harnessed the Wind and Changed Their World by Alan Drummond

• Force and Motion: This video segment from Idaho's PTV's D4K defines gravity, force, friction, and inertia through examples from amusement park rides. • http://idahoptv.org/sciencetrek/topics/force_and_motion/ • https://www.pinterest.com/pin/890868988615 28179/ Types of Energy • https://www.pinterest.com/pin/486670303458 178080/ Types of Energy • https://www.pinterest.com/pin/612208761656 11715/ Fossil Fuels • https://www.pinterest.com/pin/225250418841 936826 Types of Energy • https://www.pinterest.com/pin/480970435190 323236/ Renewable/Nonrenewable energy	

Unit 3: Waves and Information Transfer	**Duration: 20 days- ongoing**

Standards/Learning Targets

New Jersey Student Learning Standards:

- 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.

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.

Science and Engineering Practices	Disciplinary Core Ideas
Planning and carrying out investigations to answer questions or test solutions to problems- • Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.	**4-PS4A.1-** • 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; it does not move in the direction of the wave except when the water meets the beach. (Note: This grade band endpoint was moved from K–2.) (4-PS4-1) **PS4.B:** • Electromagnetic Radiation. An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2) **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 form to voice—and vice versa. (4-PS4-3)
Crosscutting Concepts	**Learning Objectives**
• **Patterns** • **Energy and Matter** • **Systems and System Models**	• Students explain what they know about sound and analyze a diagram of a sound wave. • Students use physical models to observe wave motion and discover that waves move in patterns. • Students read the book Warning: Tsunami! To obtain and evaluate information about waves as a pattern of displacement rather than movement of matter across distances. • Students engage with a variety of wave models that depict sound energy as a wave that travels through material, which moves only a little in response to the wave. • Students construct a scientific explanation about how mother dolphins communicate across a distance with their calves.

Performance Expectation	
4-PS4-2 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.	
Science and Engineering Practices	**Disciplinary Core Ideas**
• **Asking questions and defining problems** • **Analyzing and Interpreting Data** • **Constructing Explanations and Designing Solutions** • **Obtaining, Evaluating, and Communicating Information** • **Developing and Using Models** • **Planning and Carrying Out Investigations**	**4-PS3A.2-** • Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2),(4-PS3-3) **4-LS1D.1-** • 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. (4-LS1-2) **4-PS3B.1-** • 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. (4-PS3-2),(4-PS3-3) **4-PS3C.1-**

	• When objects collide, the contact forces transfer energy so as to change the object's motions. (4-PS3-3)
Crosscutting Concepts	**Learning Objectives**
• **Patterns** • **Cause and Effect** • **Energy and Matter** • **Systems and System Models** • **Scale, Proportion, and Quantity**	• Students investigate sounds traveling through air and through solid materials. They read the book sound on the move to obtain information and visualize how sound travels. • Students observe a diagram showing how particles make up different materials and revise their Sound Diagrams to include the particles that make up water. • Students use the Sound Waves Simulation to observe what happens at the particle level and discover that sound waves are patterns of motion that occur when particles collide and spread apart. • Students use the Slinky model to create a physical model by using a set of coins to investigate energy transfer during particle collisions. • Students create kinesthetic models of particle collisions to figure out how sound energy travels at the particle level.

Performance Expectation	
4-PS4-3 Generate and compare multiple solutions that use patterns to transfer information.	
Science and Engineering Practices	**Disciplinary Core Ideas**
• **Asking questions and defining problems** • **Analyzing and Interpreting Data** • **Constructing Explanations and Designing Solutions** • **Obtaining, Evaluating, and Communicating Information** • **Developing and Using Models** • **Planning and Carrying Out Investigations** • **Using Mathematics and Computational Thinking**	**4-PS3A.2-** • Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2),(4-PS3-3) **4-PS4.A** • 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; it does not move in the direction of the wave except when the water meets the beach. (Note: This grade band endpoint was moved from K–2.) (4-PS4-1) **4-PS4-1:** • Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1)

Crosscutting Concepts	Learning Objectives
• **Patterns** • **Energy and Matter** • **Systems and System Models** • **Scale, Proportion, and Quantity**	• Using the Sound Waves Simulation, students discover that manipulating the amplitude of a sound wave affects the volume of the sound. • Students use the Sound Waves Simulation to observe that sounds can have different pitches and that sounds with different pitches have different wavelengths (patterns; scale, proportion, and quantity). • Students read a section of the book Patterns in Communication to obtain information about how changes in wavelength and amplitude affect the pitch and volume of sounds (patterns; scale, proportion, and quantity). • Students read the book *Seeing Sound* to obtain and communicate information about patterns in visual representations of sound (patterns; scale, proportion, and quantity). • Students compare recorded and visual representations of dolphin whistles to consider how pitch changes over time (patterns; scale, proportion, and quantity). • Students use the Sound Waves Simulation to reproduce dolphin signature whistles based on their understanding of the relationship between a sound's wavelength and pitch (patterns; scale, proportion, and quantity). • Students revise their Sound Diagrams and construct explanations about how a mother dolphin's call reaches her calf and how the calf recognizes this call (patterns, energy and matter).

Performance Expectation	
4-PS4C.1- Digitized information 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 form to voice—and vice versa. (4-PS4-3)	
Science and Engineering Practices	**Disciplinary Core Ideas**

• **Asking questions and defining problems** • **Analyzing and Interpreting Data** • **Constructing Explanations and Designing Solutions** • **Obtaining, Evaluating, and Communicating Information** • **Developing and Using Models** • **Planning and Carrying Out Investigations** • **Using Mathematics and Computational Thinking**	**4-PS4.C** • Digitized information 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 form to voice—and vice versa. (4-PS4-3) **PS3.A-** • Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2, 4-PS3-3) **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. (4-PS3-2, 4-PS3-3) **PS3.C-** • Relationship Between Energy and Forces: When objects collide, the contact forces transfer energy so as to change the object's' motions. (4-PS3-3) **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. (4-PS4-1) **PS4.A-**

	• Wave Properties: Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1) **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 form to voice—and vice versa. (4-PS4-3) **ETS1.B-** • 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. (3-5-ETS1-2) **ETS1.B-** • Developing Possible Solutions: Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3)
Crosscutting Concepts	**Learning Objectives**
• **Patterns** • **Cause and Effect** • **Energy and Matter** • **Systems and System Models** • **Scale, Proportion, and Quantity**	• Students read the book *Patterns in Communication* to obtain information about how humans use patterns such as codes to communicate (patterns). • Students decode an image communicated in binary code (patterns). • Students use the Code Communicator Tool to encode an image in binary code (patterns) and design a plan to communicate the image across a distance (patterns, energy and matter). • Students send, receive, and decode images communicated across a distance in binary

	code (patterns, energy and matter).

Primary Interdisciplinary Connections:

- ELA: SL.4.3. Identify the reasons and evidence a speaker provides to support particular points.
- NJSLARI.4.7: Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- NJSLAW.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.

Technology Standards:

- 8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.
- 8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
- 8.2.2.C.1 Brainstorm ideas on how to solve a problem or build a product
- 8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.
- 8.2.2.E.1 List and demonstrate the steps to an everyday task

Career Ready Practices:

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP4. Communicate clearly and effectively and with reason.
- CRP12. Work productively in teams while using cultural global competence.

21st Century Life and Career Standards:

- 9.1.4.A.1- Explain the difference between a career and a job, and identify various jobs in the community and the related earnings.

Suggested Accommodations

English Language Learners:

- Provide clear and specific directions
- Provide extended time
- Provide written directions with models and diagrams when possible
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge

Special Education/Students with Disabilities:

- Follow specific students accommodations and modifications as listed in individual student IEP plan.
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words

- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge
- Provide extra time

504 Plans:
- Follow specific students accommodations and modifications as listed in individual student 504 plan.
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge
- Provide extra time

Gifted and Talented:
- Differentiated assignments/projects/assessments
- Differentiate learning pace using curriculum acceleration
- Higher level texts
- Higher level questioning
- Students design questions
- Expose to sophisticated vocabulary
- Extend reading response to further enrich understanding

Students at Risk of Failure:
- Make sure children feel welcome and comfortable while being discrete
- Provide structure and adhere to a consistent daily routine with clear and concise rules
- Be flexible

Economically Disadvantaged:
- Be flexible with assignments
- Provide extra time 28
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge
- Provide access to computers, magazines, newspapers, and books so low-income students can see and work with printed materials

Culturally Diverse:
- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions

- Provide differentiated instruction as needed
- Follow all IEP modifications/504 plan
- Provide manipulatives or the opportunity to draw solution strategies
- Provide students with notes from the lesson
- For additional support and guidance, provide students with lab group or partner for lab experiences
- Provide students with a study guide about the information they will be assessed on for a test or quiz
- Teach and model note taking strategies to assist student when reading their science textbook
- Teach and model strategies to learn and practice new vocabulary words
- Assist student in completing a word web for new vocabulary words to reinforce new words in their science unit
- Provide students with an organization system to help them organize their notes, labs, and classwork
- Read directions, tests, and/or quizzes aloud
- Use graphic organizers to take notes, organize new information, and help students relate new information with previous knowledge
- Provide students with additional time to complete assignments
- Provide small group and individual conferencing to help support student throughout the lesson
- Preferential seating based on student needs
- Review concepts of previous lesson before teaching the new lesson ● Complete review activities to reinforce concepts previously taught
- Check for students understanding often with formal, informal, verbal, and nonverbal measures
- Provide student with modified tests and quizzes organized in a manner that will easy for the student to follow, assessment quality over quantity, and has clear directions
- Allow students to verbalize before beginning tasks and lab experiments
- Repeat the directions for students as often as needed
- Allow wait time for students
- Provide visual aids to support concepts being taught, such as diagrams
- Redirect student and provide frequent breaks as needed
- Teach student mnemonic devices to help learn new concepts, as appropriate
- Use text-to-speech applications to help students when reading online texts above their reading level on the computer

Evidence of Student Learning	
Formative Tasks: ● Pre-unit assessment ● On-the-Fly assessment ● Claim/Evidence/Reasoning Response ● Reflection questions ● Exit tickets ● Peer assessment ● Student observation	**Alternative Assessments:** ● Look for/Now what? Notes ● Critical juncture assessment
Summative Assessments: ● End-of Unit Assessment	**Benchmark Assessments:** ● Pre-Unit Assessments ● On-the-fly Assessments
Knowledge & Skills	
Enduring Understandings: ● A wave is a pattern of motion that travels away from a source. ● Sound energy travels as a wave. The thing it travels through moves only a little.	**Essential Questions:** ● How does sound get from one place to another? ● What can sound travel through?

• Materials are made of particles that are too small to see. • Sound can travel through different kind of materials. • Scientists make models to help them answer questions and visualize things that are difficult to see. • Sound travels as a wave. The particles of the material it travels through move only a little. • Sound travels as a series of collisions between particles. • When particles collide they transfer energy, and that changes how they move. • When sound waves have different amplitudes, we hear sounds with different volumes. • When sound waves have different wavelengths, we hear sounds with different pitches. • Humans use patterns to communicate information and use technology to communicate those patterns across long distances.	• How does sound energy travel through a material? • Why are some sounds different from other sounds? • How can dolphins use different sounds to communicate with one another.
Core Instructional & Supplemental Materials	
Suggested Activities/Resources: • Amplify Science- Waves, Energy, and Information Unit • Sound Waves simulation • Code Communicator tool • Sound Waves Diagramming tool • Sound Waves Sorting Tool • explorelearning/gizmos • Brainpop • Betterlesson • Live Binders PS4A.1 • Physics: Waves Introduction https://www.youtube.com/watch?v=RVyHkV3wIyk • Anton Paar eLearning: What are Waves? https://www.youtube.com/watch?v=cSqLXVmtVkc • 4th Grade Real World Science: Sound https://www.youtube.com/watch?v=nQcjcMl2d94 • http://betterlesson.com/user/58104/68223/169863/jillian-gates/curriculum • A Whole Unit of lessons on Waves http://betterlesson.com/user/327311/68227/169023/mary-ellen-kanthack/curriculum • A Whole Unit of lessons on Waves http://betterlesson.com/user/323177/68221/165914/melissa-romano/curriculum	**Varied Levels of Text:** • Warning: Tsunami! • Sound on the Move • Seeing Sound • The Scientist Who Cracked the Dolphin Code • Patterns in Communication • Reading Comprehension passage with questions • Reading Comprehension k12 reader • What Are Sound Waves? • The Next Wave by Elizabeth Rusch • Wordless book- Wave by Elizabeth Rusch • What is a Wave? Reading comprehension

• What are waves (great informational resouce) BBC Bitesize: Waves http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_pre_2011/wave_model/whatarewavesrev1.shtml • Physics for Kids: Waves (great information resource) http://www.ducksters.com/science/physics/waves.php • Physics for Kids: Properties of Waves (great informational resource) http://www.ducksters.com/science/physics/properties_of_waves.php • Make Some Waves Lesson https://www.teachengineering.org/view_activity.php?url=collection/cub_/activities/cub_soundandlight/cub_soundandlight_lesson1_activity1.xml • Interactive Gizmo on Waves https://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=1053 • Anchor Charts	

Unit 4: Molecules to Organisms / Structure & Function: Plants & Animals	Duration: 40 days- ongoing

Standards/Learning Targets

New Jersey Student Learning Standards:

- 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.

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.

Science and Engineering Practices	Disciplinary Core Ideas
Engaging in Argument from Evidence- ● Construct an argument with evidence, data, and/or a model.	**LS1.A: Structure and Function-** ● Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)
Crosscutting Concepts	**Learning Objectives**
Systems and System Models- ● A system can be described in terms of its components and their interactions.	● Students communicate their initial ideas about how plants use different structures to survive and adapt. (structure and function). ● Students obtain information from a hands-on activity and a slideshow that introduces them to plant structures that serve different functions and enable plants to respond to their environment (structure and function). ● Students ask and investigate questions from a book and a demonstration about the concept that plants have internal and external structures that function to support survival, growth and reproduction.i(structure and function). ● Students obtain information from several videos showing plants sensing their environment by using specialized structures (structure and function). They then use a model to explore the effect of light on plants. (cause and effect).

Performance Expectation

4-LS1-2- Use a model to describe that animals receive different types of information through their senses, process the information in their brains, and respond to the information in different ways.

Science and Engineering Practices	Disciplinary Core Ideas
Developing and Using Models- ● Use a model to test interactions concerning the functioning of a natural system.	**LS1.A: Information Processing-** ● Plants and animals have both internal and external structures that serve various functions in growth, survival,behavior and reproduction.(4-LS1-A)
Crosscutting Concepts	**Learning Objectives**
Systems and System Models- ● A system can be described in terms of its components and their interactions.	● Students use a digital model to investigate how light allows a predator to see its prey (cause and effect, structure and function). ● Students make a diagram model in order to show and refine their ideas about how light allows an animal to see what it is looking at (cause and effect, structure and function). ● Students ask questions as they continue to construct their understanding of how light allows an animal to see something (cause and effect, structure and function). ● Students first use a model to investigate the path of light from a source to an animal's eyes (structure and function) and then evaluate three models and describe what is wrong about each one. ● Students construct explanations of how light enables a Tokay gecko to see its prey (cause and effect, structure and function).

Performance Expectation	
4-PS4-2- Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. . [Assessment Boundary: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.]	
Science and Engineering Practices	**Disciplinary Core Ideas**
Developing and Using Models- ● Use a model to test interactions concerning the functioning of a natural system.	**PS4.B: Electromagnetic Radiation-** ● An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2)
Crosscutting Concepts	**Learning Objectives**
Cause and Effect- ● Cause and effect relationships are routinely identified.	● Students use a model to investigate the structures inside the body—the eyes and the brain—that allow the predator to see its prey (cause and effect, structure and function). ● Students ask questions as they read a book about a scientist who investigated whether crows use pattern recognition to recognize

	individual human faces (structure and function). ● Students obtain information by using a digital simulation and ask questions while they read a reference book to figure out which of an animal's structures allows it to see and recognize what it is seeing (cause and effect, structure and function). ● Students use a digital card sort to model their thinking and to reflect on the role of the brain and memories in animals' reactions to information about their environment (cause and effect, structure and function). ● Students create diagram models and write explanations to communicate their understanding of how animals know what they are looking at and know how to react to information from their environment (systems and system models, cause and effect).

Primary Interdisciplinary Connections:

- ELA: SL.4.3. Identify the reasons and evidence a speaker provides to support particular points.
- NJSLARI.4.7: Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- NJSLAW.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.

Technology Standards:

- 8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.
- 8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
- 8.2.2.C.1 Brainstorm ideas on how to solve a problem or build a product
- 8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.
- 8.2.2.E.1 List and demonstrate the steps to an everyday task

Career Ready Practices:

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP4. Communicate clearly and effectively and with reason.
- CRP12. Work productively in teams while using cultural global competence.

21st Century Life and Career Standards:

- 9.1.4.A.1- Explain the difference between a career and a job, and identify various jobs in the community and the related earnings.

Evidence of Student Learning

Formative Tasks:	**Alternative Assessments:**
● Pre-unit assessment ● On-the-Fly assessment	● Look for/Now what? Notes ● Critical juncture assessment

• Claim/Evidence/Reasoning Response • Reflection questions • Exit tickets • Peer assessment • Student observation	• Group Work/Class Discussion Rubric • Guided Observations Questions • Modified Tests/Quizzes/Classwork • Science A-Z Activities Science Related
Summative Assessments: • End-of Unit Assessment	**Benchmark Assessments:** • Pre-Unit Assessments • On-the-fly Assessments
Enduring Understandings: • Animals have different structures that allow them to get information from their environment. • Sound and scent can carry information about the environment to an animal. • Animals have different structures that allow them to get information from their environment, which helps them survive. • Light, sound, and scent can carry information about the environment to an animal. • Light needs to get to an object for an animal to see the object. • Light needs to reflect off an object and get to the eye for an animal to see the object. • When scientists change only one variable in an investigation, they can figure out if it makes a difference. • Light receptors in the eye respond to light and send information to the brain. The brain processes this information to form an image. • After forming an image, the brain compares the image to memories. Then an animal can make a decision that could help it survive. • Different animals can have light receptors with different sensitivities. The brain cannot form a clear image if there is too much or too little light for the type of receptors an animal has. • Plants and animals both have internal and external structures • Structures of plants and animals help them grow and reproduce	**Essential Questions:** • How do animals use their senses to get information about their environment? • How does light allow an animal to see something? • How do an animal's structures allow it to see its prey? • How do animals know how to react when they get information about their environment? • Why do different animals need different amounts of light to see well? • How are growth, behavior and reproduction important to plant and animal life? • How is survival for animals & plants similar/different?
Core Instructional & Supplemental Materials	
Suggested Activities/Resources: • Anchor Phenomenon • Animals and Light Simulation • https://www.brainpop.com/science/ • Better Lessons- Science	**Varied Levels of Text:** • Investigating Animal Senses • I See What You Mean • Crow Scientist • Seeing Like a Shrimp and Smelling Like a Snake

• Khan Academy • Livebinder-LS1 • Livebinder LS1-2 • Gizmos:https://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=518 • Lesson Sampler with resources attached:http://landing.carolina.com/Global/FileLib/bbs-content/gr4_plantanimal_2nded_sampler.pdf • You tube videos:https://www.youtube.com/watch?v=trWzDlRvv1M&feature=youtu.be • Teacher resource for LS1 • Night Primate Videos • Possible Anchor Chart • *HMH Dimensions*	• Handbook of Animal Eyes • Eye: How It Works Author: David Macaulay http://us.macmillan.com/eyehowitworks/davidmacaulay Animal Senses: How Animals See Hear Taste Smell and Feel (Animal Behavior) Author: Pamela Hickman https://www.amazon.com/Animal-Senses-Animals-Taste-Behavior/dp/1550744259 • Animal Touch(Animals and Their Senses) by Hall, or Kingfisher Readers L2: Amazing Animal Senses by Llewellyn • Henryś Heart By Charise Mericle Harper • Bones by Steve Jenkins • Creature Features by Steve Jenkins • Investigating Light • Animal Senses • Animal Sense by Pamela Hickman

Unit 5: Changes to Earth's Surface	**Duration: 20 days- ongoing**

Standards/Learning Targets

New Jersey Student Learning Standards:

- 4-ESS1-1-Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- 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.
- 4-ESS3-2-Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have on humans.

Performance Expectation	
4-ESS1-1-Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	
Science and Engineering Practices	**Disciplinary Core Ideas**
Constructing Explanations and Designing Solutions- • Identify the evidence that supports particular points in an explanation.	**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. (4-ESS1-1)
Crosscutting Concepts	**Learning Objectives**
Patterns- • Patterns can be used as evidence to support an explanation.	• Students write initial explanations of how a fossil came to be in a rocky outcrop and how they can use the fossil and the surrounding

Scientific Knowledge Assumes an Order and Consistency in Natural Systems- ● Science assumes consistent patterns in natural systems.	rock to learn about what that place was like in the past and how it has changed (stability and change). They also communicate their ideas and ask questions about rocks and fossils. ● Students obtain and evaluate information from the book Clues from the Past to see how geologists use observations of fossils in the present, and cause-and-effect relationships, to make inferences about the past (cause and effect). ● Students gather information about how fossils form and then communicate their ideas about the changes that lead to fossil formation (stability and change) through talking and writing. ● Students observe patterns of Earth's features on a map (patterns) and discuss where fossils are mostly likely to be found based on surface rock types. They then use a digital model to investigate how rock forms and communicate their ideas about how a sample of sedimentary rock formed. ● Students create physical models of sedimentary rock formation, showing how separate sediments can change into a cohesive rock over time (stability and change). ● Students create digital models of the changes that occur over time (stability and change) to form fossils and sedimentary rock. They then engage in argument about what the environment of Desert Rocks National Park was like in the past.

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.	
Science and Engineering Practices	**Disciplinary Core Ideas**
Planning and Carrying Out Investigations- ● Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.	**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.E: Biogeology-** ● Living things affect the physical characteristics of their regions.
Crosscutting Concepts	**Learning Objectives**

Cause and Effect- ● Cause and effect relationships are routinely identified, tested, and used to explain change.	● Students analyze and interpret data from the book Through the Eyes of a Geologist as they consider how the environments in specific places have changed over millions of years (stability and change). ● Students gather information from the reference book Fossil Hunter's Handbook about two kinds of sedimentary rock and the environments in which they form. They then use a digital model to investigate how different environments cause different rocks to form (cause and effect). ● Students gather information from Fossil Hunter's Handbook about why different sediments build up in different environments and create physical models to show how a change in environment (stability and change) can cause different sediments to build up and different rock types to form (cause and effect). ● Students use a digital model to investigate what different sedimentary rock layers in one location suggest about the history of its environment. They then reflect on how Desert Rocks National Park appears stable day by day, but its rock layers provide evidence that it has changed a lot over time (stability and change). ● Students analyze and interpret data to make a claim about what the environment of the Desert Rocks National Park was like in the past (stability and change). ● Students engage in oral and written argument about what the environment of Desert Rocks National Park was like when a particular rock layer formed. They then explain how they know that the environment at Desert Rocks National Park changed over time (stability and change).

Performance Expectation	
4-ESS2-2-Analyze and interpret data from maps to describe patterns of Earth's features.	
Science and Engineering Practices	**Disciplinary Core Ideas**
Analyzing and Interpreting Data- ● Analyze and interpret data to make sense of phenomena using logical reasoning.	**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.
Crosscutting Concepts	**Learning Objectives**
Patterns- ● Patterns can be used as evidence to support an explanation.	● Students create and discuss physical models of sedimentary rock layers to construct understanding about the order in which rock layers form as the environment changes over time (stability and change). ● Students obtain and organize evidence from models and Fossil Hunter's Handbook to support claims about the order in which rock layers form as the environment changes over time (stability and change). ● Students read Arguing to Solve a Mystery to obtain information about how scientists argue and how argument is helpful in figuring things out. They read competing arguments based on evidence found in fossils and rock layers about what caused dinosaurs to go extinct (cause and effect) and then evaluate which argument is most convincing and why. ● Students use a digital model to investigate how to determine the order of past environments by looking at the rock layers that form in one location as the environment changes (stability and change). Students then apply and communicate their understanding by using rock-layer diagram models to infer past environments. ● Students engage in oral and written arguments about how Desert Rocks National Park has changed over time (stability and change).

Performance Expectation	
4-ESS3-2-Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have on humans.	
Science and Engineering Practices	**Disciplinary Core Ideas**
Obtaining, Evaluating, and Communicating Information- ● Obtain and combine information from books and other reliable media to explain phenomena.	**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.
Crosscutting Concepts	**Learning Objectives**
Cause and Effect-	● Students obtain information about erosion and natural hazards as they read Rocky Wonders.

● 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.	The book describes how water, wind, ice, and plants caused rock to break down over time (cause and effect), forming rocky wonders all around the world. ● Students use a digital model to investigate how rivers can erode different amounts of rock, causing canyons of different depths to form (cause and effect). ● Students use a physical model to investigate the effect of the amount of time a river has flowed (cause and effect) on how much the underlying rock erodes (stability and change). ● Students use a physical model to investigate the effect of a river's speed on how much the underlying rock erodes (stability and change). They then create a digital model to show their understanding of the effects of a river's characteristics on erosion (cause and effect). ● Students engage in oral and written argument about what caused more rock layers to be exposed in Desert Rocks Canyon than in nearby Keller's Canyon (cause and effect). They conclude the unit by reflecting on what they have learned and asking lingering questions about rocks and fossils.

Primary Interdisciplinary Connections:

- ELA: SL.4.3. Identify the reasons and evidence a speaker provides to support particular points.
- NJSLARI.4.7: Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- NJSLAW.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.

Technology Standards:

- 8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.
- 8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
- 8.2.2.C.1 Brainstorm ideas on how to solve a problem or build a product
- 8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.
- 8.2.2.E.1 List and demonstrate the steps to an everyday task

Career Ready Practices:

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP4. Communicate clearly and effectively and with reason.
- CRP12. Work productively in teams while using cultural global competence.

21st Century Life and Career Standards:

- 9.1.4.A.1- Explain the difference between a career and a job, and identify various jobs in the community and the related earnings.

Suggested Accommodations

English Language Learners:
- Provide clear and specific directions
- Provide extended time
- Provide written directions with models and diagrams when possible
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge

Special Education/Students with Disabilities:
- Follow specific students accommodations and modifications as listed in individual student IEP plan.
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge
- Provide extra time

504 Plans:
- Follow specific students accommodations and modifications as listed in individual student 504 plan.
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
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- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge
- Provide extra time

Gifted and Talented:
- Differentiated assignments/projects/assessments
- Differentiate learning pace using curriculum acceleration
- Higher level texts
- Higher level questioning
- Students design questions

- Expose to sophisticated vocabulary
- Extend reading response to further enrich understanding

Students at Risk of Failure:
- Make sure children feel welcome and comfortable while being discrete
- Provide structure and adhere to a consistent daily routine with clear and concise rules
- Be flexible

Economically Disadvantaged:
- Be flexible with assignments
- Provide extra time 28
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge
- Provide access to computers, magazines, newspapers, and books so low-income students can see and work with printed materials

Culturally Diverse:
- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions
- Provide differentiated instruction as needed
- Follow all IEP modifications/504 plan
- Provide manipulatives or the opportunity to draw solution strategies
- Provide students with notes from the lesson
- For additional support and guidance, provide students with lab group or partner for lab experiences
- Provide students with a study guide about the information they will be assessed on for a test or quiz
- Teach and model note taking strategies to assist student when reading their science textbook
- Teach and model strategies to learn and practice new vocabulary words
- Assist student in completing a word web for new vocabulary words to reinforce new words in their science unit
- Provide students with an organization system to help them organize their notes, labs, and classwork
- Read directions, tests, and/or quizzes aloud
- Use graphic organizers to take notes, organize new information, and help students relate new information with previous knowledge
- Provide students with additional time to complete assignments
- Provide small group and individual conferencing to help support student throughout the lesson
- Preferential seating based on student needs
- Review concepts of previous lesson before teaching the new lesson ● Complete review activities to reinforce concepts previously taught
- Check for students understanding often with formal, informal, verbal, and nonverbal measures
- Provide student with modified tests and quizzes organized in a manner that will easy for the student to follow, assessment quality over quantity, and has clear directions
- Allow students to verbalize before beginning tasks and lab experiments
- Repeat the directions for students as often as needed
- Allow wait time for students
- Provide visual aids to support concepts being taught, such as diagrams

- Redirect student and provide frequent breaks as needed
- Teach student mnemonic devices to help learn new concepts, as appropriate
- Use text-to-speech applications to help students when reading online texts above their reading level on the computer

Evidence of Student Learning

Formative Tasks:
- Pre-unit assessment
- On-the-Fly assessment
- Claim/Evidence/Reasoning Response
- Reflection questions
- Exit tickets
- Peer assessment
- Student observation
- Graphic Organizers & Guided Note Taking
- Directed Reading
- Cooperative Group Learning
- Journal Entries

Alternative Assessments:
- Look for/Now what? Notes
- Critical juncture assessment
- Group Work/Class Discussion Rubric
- Guided Observations Questions
- Modified Tests/Quizzes/Classwork
- Science A-Z Activities Science Related

Summative Assessments:
- End-of Unit Assessment

Knowledge & Skills

Enduring Understandings:
- A fossil forms when an organism dies and is covered with sediment that turns into rock.
- A sedimentary rock layer forms when sediment sinks and builds up in water, compacts under more sediment, and cements over time.
- Over time, a rock layer becomes thicker as sediment continues to build up.
- Geologists use observations of and ideas about rocks and fossils to make inferences about past environments.
- Different sediments build up in different environments. Therefore, different kinds of sedimentary rock form in different environments.
- Different sedimentary rock layers in a place mean that the environment in that place has changed.
- New rock layers form on top of existing rock layers. Therefore, lower rock layers are older than the layers above them.
- Geologists observe the order of rock layers to infer the order of past environments.
- Rock can be broken down and eroded by things in the environment, such as wind, water, plants, and ice.

Essential Questions:
- How do fossils form?
- How does sedimentary rock form?
- How do geologists learn what a place was like in the past?
- How do rocks provide information about what an environment was like in the past?
- How can there be different sedimentary rock layers in the same place?
- How can geologists tell what order rock layers formed in?
- How can geologists figure out the order of past environments?
- How does rock get exposed?
- What affects the amount of rock that water can erode?

• The speed of water and amount of time it flows affect how much rock it erodes.	

Core Instructional & Supplemental Materials

Suggested Activities/Resources:

- HMH Dimensions Science
- explorelearning/gizmos
- Brainpop
- Better Lessons https://betterlesson.com/next_gen_science/browse/2149/ngss-4-ess-earth-and-spacesciences?from=megamenu_domain
- Science A-Z https://www.sciencea-z.com/
- NGSS Better Lesson earth and the universe
- Weebly Processes That Shape the Earth
- Bill Nye: Erosion
- Earth's Features Additional Resources
- Possible Anchor Charts:

Varied Levels of Text:

- Clues from the Past
- Through the Eyes of a Geologist
- Arguing to Solve a Mystery
- Rocky Wonders
- Fossil Hunter's Handbook
- Erosion: Changing Earth's Surface Author: Robin Koontz http://trpub.booksource.com/TeacherResources/TitleLevel/A53ACAEF-42F2-429C-AEA1-550184891901?source=blog
- How People Have Been Shaping the Earth/Student Science Magazine https://student.societyforscience.org/article/how-people-have-been-shaping-earth
- Pebble in My Pocket
- Erosion: Changes in the Earthś Surface
- Erosion and Weathering
- How do Wind and Water Change the Earth?
- Earthquakes, Eruptions and other Events that Change the Earth
- Our Natural Resources

Unit 6: Earth's Place in the Universe	**Duration: 20 days- ongoing**

Standards/Learning Targets

New Jersey Student Learning Standards:

- **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.**

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.	
Science and Engineering Practices	**Disciplinary Core Ideas**
Constructing Explanations and Designing Solutions- • Identify the evidence that supports particular points in an explanation.	**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. (4-ESS1-1)
Crosscutting Concepts	**Learning Objectives**

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.	● Students write initial explanations of how a fossil came to be in a rocky outcrop and how they can use the fossil and the surrounding rock to learn about what that place was like in the past and how it has changed (stability and change). They also communicate their ideas and ask questions about rocks and fossils. ● Students obtain and evaluate information from the book Clues from the Past to see how geologists use observations of fossils in the present, and cause-and-effect relationships, to make inferences about the past (cause and effect). ● ● Students gather information about how fossils form and then communicate their ideas about the changes that lead to fossil formation (stability and change) through talking and writing. ● Students observe patterns of Earth's features on a map (patterns) and discuss where fossils are mostly likely to be found based on surface rock types. They then use a digital model to investigate how rock forms and communicate their ideas about how a sample of sedimentary rock formed. ● Students create physical models of sedimentary rock formation, showing how separate sediments can change into a cohesive rock over time (stability and change). ● Students create digital models of the changes that occur over time (stability and change) to form fossils and sedimentary rock. They then engage in argument about what the environment of Desert Rocks National Park was like in the past.

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. [Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water ow.] [Assessment Boundary: Assessment is limited to a single form of weathering or erosion.]	
Science and Engineering Practices	**Disciplinary Core Ideas**
Planning and Carrying Out Investigations- ● Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.	**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.E: Biogeology-** ● Living things affect the physical characteristics of their regions.
Crosscutting Concepts	**Learning Objectives**
Cause and Effect- ● Cause and effect relationships are routinely identified, tested, and used to explain change.	● Students analyze and interpret data from the book Through the Eyes of a Geologist as they consider how the environments in specific places have changed over millions of years (stability and change). ● Students gather information from the reference book Fossil Hunter's Handbook about two kinds of sedimentary rock and the environments in which they form. They then use a digital model to investigate how different environments cause different rocks to form (cause and effect). ● Students gather information from Fossil Hunter's Handbook about why different sediments build up in different environments and create physical models to show how a change in environment (stability and change) can cause different sediments to build up and different rock types to form (cause and effect). ● Students use a digital model to investigate what different sedimentary rock layers in one location suggest about the history of its environment. They then reflect on how Desert Rocks National Park appears stable day by day, but its rock layers provide evidence that it has changed a lot over time (stability and change). ● Students analyze and interpret data to make a claim about what the environment of the Desert Rocks National Park was like in the past (stability and change). ● Students engage in oral and written argument about what the environment of Desert Rocks National Park was like when a particular rock layer formed. They then explain how they know that the environment at Desert Rocks National Park changed over time (stability and change).

Performance Expectation
4-ESS2-2- Analyze and interpret data from maps to describe patterns of Earth's features. [Clarification Statement: Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]

Science and Engineering Practices	Disciplinary Core Ideas
Analyzing and Interpreting Data- ● Analyze and interpret data to make sense of phenomena using logical reasoning.	**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.
Crosscutting Concepts	**Learning Objectives**
Patterns- ● Patterns can be used as evidence to support an explanation.	● Students create and discuss physical models of sedimentary rock layers to construct understanding about the order in which rock layers form as the environment changes over time (stability and change). ● Students obtain and organize evidence from models and Fossil Hunter's Handbook to support claims about the order in which rock layers form as the environment changes over time (stability and change). ● Students read Arguing to Solve a Mystery to obtain information about how scientists argue and how argument is helpful in figuring things out. They read competing arguments based on evidence found in fossils and rock layers about what caused dinosaurs to go extinct (cause and effect) and then evaluate which argument is most convincing and why. ● Students use a digital model to investigate how to determine the order of past environments by looking at the rock layers that form in one location as the environment changes (stability and change). Students then apply and communicate their understanding by using rock-layer diagram models to infer past environments. ● Students engage in oral and written argument about how Desert Rocks National Park has changed over time (stability and change).

Performance Expectation
4-ESS3-2- Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. [Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.] [Assessment Boundary: Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.]

Science and Engineering Practices	Disciplinary Core Ideas
Obtaining, Evaluating, and Communicating Information- ● Obtain and combine information from books and other reliable media to explain phenomena.	**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.
Crosscutting Concepts	**Learning Objectives**
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.	● Students obtain information about erosion and natural hazards as they read Rocky Wonders. The book describes how water, wind, ice, and plants caused rock to break down over time (cause and effect), forming rocky wonders all around the world. ● Students use a digital model to investigate how rivers can erode different amounts of rock, causing canyons of different depths to form (cause and effect). ● Students use a physical model to investigate the effect of the amount of time a river has flowed (cause and effect) on how much the underlying rock erodes (stability and change). ● Students use a physical model to investigate the effect of a river's speed on how much the underlying rock erodes (stability and change). They then create a digital model to show their understanding of the effects of a river's characteristics on erosion (cause and effect). ● Students engage in oral and written argument about what caused more rock layers to be exposed in Desert Rocks Canyon than in nearby Keller's Canyon (cause and effect). They conclude the unit by reflecting on what they have learned and asking lingering questions about rocks and fossils.

Primary Interdisciplinary Connections:

- ELA: SL.4.3. Identify the reasons and evidence a speaker provides to support particular points.
- NJSLARI.4.7: Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- NJSLAW.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.

Technology Standards:

- 8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.

- 8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
- 8.2.2.C.1 Brainstorm ideas on how to solve a problem or build a product
- 8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.
- 8.2.2.E.1 List and demonstrate the steps to an everyday task

Career Ready Practices:

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP4. Communicate clearly and effectively and with reason.
- CRP12. Work productively in teams while using cultural global competence.

21st Century Life and Career Standards:

- 9.1.4.A.1- Explain the difference between a career and a job, and identify various jobs in the community and the related earnings.

Suggested Accommodations

English Language Learners:

- Provide clear and specific directions
- Provide extended time
- Provide written directions with models and diagrams when possible
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge

Special Education/Students with Disabilities:

- Follow specific students accommodations and modifications as listed in individual student IEP plan.
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge
- Provide extra time

504 Plans:

- Follow specific students accommodations and modifications as listed in individual student 504 plan.
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words

- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge
- Provide extra time

Gifted and Talented:
- Differentiated assignments/projects/assessments
- Differentiate learning pace using curriculum acceleration
- Higher level texts
- Higher level questioning
- Students design questions
- Expose to sophisticated vocabulary
- Extend reading response to further enrich understanding

Students at Risk of Failure:
- Make sure children feel welcome and comfortable while being discrete
- Provide structure and adhere to a consistent daily routine with clear and concise rules
- Be flexible

Economically Disadvantaged:
- Be flexible with assignments
- Provide extra time 28
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge
- Provide access to computers, magazines, newspapers, and books so low-income students can see and work with printed materials

Culturally Diverse:
- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions
- Provide differentiated instruction as needed
- Follow all IEP modifications/504 plan
- Provide manipulatives or the opportunity to draw solution strategies
- Provide students with notes from the lesson
- For additional support and guidance, provide students with lab group or partner for lab experiences
- Provide students with a study guide about the information they will be assessed on for a test or quiz
- Teach and model note taking strategies to assist student when reading their science textbook
- Teach and model strategies to learn and practice new vocabulary words
- Assist student in completing a word web for new vocabulary words to reinforce new words in their science unit
- Provide students with an organization system to help them organize their notes, labs, and classwork
- Read directions, tests, and/or quizzes aloud
- Use graphic organizers to take notes, organize new information, and help students relate new information with previous knowledge

- Provide students with additional time to complete assignments
- Provide small group and individual conferencing to help support student throughout the lesson
- Preferential seating based on student needs
- Review concepts of previous lesson before teaching the new lesson
- Complete review activities to reinforce concepts previously taught
- Check for students understanding often with formal, informal, verbal, and nonverbal measures
- Provide student with modified tests and quizzes organized in a manner that will easy for the student to follow, assessment quality over quantity, and has clear directions
- Allow students to verbalize before beginning tasks and lab experiments
- Repeat the directions for students as often as needed
- Allow wait time for students
- Provide visual aids to support concepts being taught, such as diagrams
- Redirect student and provide frequent breaks as needed
- Teach student mnemonic devices to help learn new concepts, as appropriate
- Use text-to-speech applications to help students when reading online texts above their reading level on the computer

Evidence of Student Learning

Formative Tasks:
- Pre-unit assessment
- On-the-Fly assessment
- Claim/Evidence/Reasoning Response
- Reflection questions
- Exit tickets
- Peer assessment
- Student observation
- Graphic Organizers & Guided Note Taking
- Directed Reading
- Cooperative Group Learning
- Journal Entries

Alternative Assessments:
- Look for/Now what? Notes
- Critical juncture assessment
- Group Work/Class Discussion Rubric
- Guided Observations Questions
- Modified Tests/Quizzes/Classwork
- Science A-Z Activities Science Related

Summative Assessments:
- End-of Unit Assessment

Knowledge & Skills

Enduring Understandings:
- A fossil forms when an organism dies and is covered with sediment that turns into rock.
- A sedimentary rock layer forms when sediment sinks and builds up in water, compacts under more sediment, and cements over time.
- Over time, a rock layer becomes thicker as sediment continues to build up.
- Geologists use observations of and ideas about rocks and fossils to make inferences about past environments.
- Different sediments build up in different environments. Therefore, different kinds of sedimentary rock form in different environments.

Essential Questions:
- How do fossils form?
- How does sedimentary rock form?
- How do geologists learn what a place was like in the past?
- How do rocks provide information about what an environment was like in the past?
- How can there be different sedimentary rock layers in the same place?
- How can geologists tell what order rock layers formed in?
- How can geologists figure out the order of past environments?
- How does rock get exposed?
- What affects the amount of rock that water can erode?

• Different sedimentary rock layers in a place mean that the environment in that place has changed. • New rock layers form on top of existing rock layers. Therefore, lower rock layers are older than the layers above them. • Geologists observe the order of rock layers to infer the order of past environments. • Rock can be broken down and eroded by things in the environment, such as wind, water, plants, and ice. • The speed of water and amount of time it flows affect how much rock it erodes.	

Core Instructional & Supplemental Materials

Suggested Activities/Resources: • Anchor Phenomenon • Science-Earth's Features Unit • Earth's Features Simulation • explorelearning/gizmos • Brainpop • Better Lessons https://betterlesson.com/next_gen_science/browse/2149/ngss-4-ess-earth-and-spacesciences?from=megamenu_domain • Science A-Z https://www.sciencea-z.com/ • NGSS Better Lesson earth and the universe • Weebly Processes That Shape the Earth • Bill Nye: Erosion • Earth's Features Additional Resources • Possible Anchor Charts:	**Varied Levels of Text:** • Clues from the Past • Through the Eyes of a Geologist • Arguing to Solve a Mystery • Rocky Wonders • Fossil Hunter's Handbook • Erosion: Changing Earth's Surface Author: Robin Koontz http://trpub.booksource.com/TeacherResources/TitleLevel/A53ACAEF-42F2-429C-AEA1-550184891901?source=blog • How People Have Been Shaping the Earth/Student Science Magazine https://student.societyforscience.org/article/how-people-have-been-shaping-earth • Pebble in My Pocket • Erosion: Changes in the Earthś Surface • Erosion and Weathering • How do Wind and Water Change the Earth? • Earthquakes, Eruptions and other Events that Change the Earth • Our Natural Resources

Unit 7: Earth and Human Activity	**Duration: 40 days- ongoing**

Standards/Learning Targets

New Jersey Student Learning Standards:
- 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 and climate change have on humans.

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.	
Science and Engineering Practices	**Disciplinary Core Ideas**
Constructing Explanations and Designing Solutions- ● Identify the evidence that supports particular points in an explanation.	**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. (4-ESS1-1)
Crosscutting Concepts	**Learning Objectives**
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.	● Students write initial explanations of how a fossil came to be in a rocky outcrop and how they can use the fossil and the surrounding rock to learn about what that place was like in the past and how it has changed (stability and change). They also communicate their ideas and ask questions about rocks and fossils. ● Students obtain and evaluate information from the book Clues from the Past to see how geologists use observations of fossils in the present, and cause-and-effect relationships, to make inferences about the past (cause and effect). ● ● Students gather information about how fossils form and then communicate their ideas about the changes that lead to fossil formation (stability and change) through talking and writing. ● Students observe patterns of Earth's features on a map (patterns) and discuss where fossils are mostly likely to be found based on surface rock types. They then use a digital model to investigate how rock forms and communicate their ideas about how a sample of sedimentary rock formed. ● Students create physical models of sedimentary rock formation, showing how separate sediments can change into a cohesive rock over time (stability and change). ● Students create digital models of the changes that occur over time (stability and change) to form fossils and sedimentary rock. They then engage in argument about what the environment of Desert Rocks National Park was like in the past.

Performance Expectation	
4-ESS3-2 Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have on humans.	
Science and Engineering Practices	**Disciplinary Core Ideas**
Planning and Carrying Out Investigations- ● Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.	**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.E: Biogeology-** ● Living things affect the physical characteristics of their regions.
Crosscutting Concepts	**Learning Objectives**
Cause and Effect- ● Cause and effect relationships are routinely identified, tested, and used to explain change.	● Students analyze and interpret data from the book Through the Eyes of a Geologist as they consider how the environments in specific places have changed over millions of years (stability and change). ● Students gather information from the reference book Fossil Hunter's Handbook about two kinds of sedimentary rock and the environments in which they form. They then use a digital model to investigate how different environments cause different rocks to form (cause and effect). ● Students gather information from Fossil Hunter's Handbook about why different sediments build up in different environments and create physical models to show how a change in environment (stability and change) can cause different sediments to build up and different rock types to form (cause and effect). ● Students use a digital model to investigate what different sedimentary rock layers in one location suggest about the history of its environment. They then reflect on how Desert Rocks National Park appears stable day by day, but its rock layers provide evidence that it has changed a lot over time (stability and change). ● Students analyze and interpret data to make a claim about what the environment of the Desert Rocks National Park was like in the past (stability and change). ● Students engage in oral and written argument

	about what the environment of Desert Rocks National Park was like when a particular rock layer formed. They then explain how they know that the environment at Desert Rocks National Park changed over time (stability and change).

Performance Expectation	
4-ESS3-2 Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have on humans.	
Science and Engineering Practices	**Disciplinary Core Ideas**
Analyzing and Interpreting Data- ● Analyze and interpret data to make sense of phenomena using logical reasoning.	**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.
Crosscutting Concepts	**Learning Objectives**
Patterns- ● Patterns can be used as evidence to support an explanation.	● Students create and discuss physical models of sedimentary rock layers to construct understanding about the order in which rock layers form as the environment changes over time (stability and change). ● Students obtain and organize evidence from models and Fossil Hunter's Handbook to support claims about the order in which rock layers form as the environment changes over time (stability and change). ● Students read Arguing to Solve a Mystery to obtain information about how scientists argue and how argument is helpful in figuring things out. They read competing arguments based on evidence found in fossils and rock layers about what caused dinosaurs to go extinct (cause and effect) and then evaluate which argument is most convincing and why. ● Students use a digital model to investigate how to determine the order of past environments by looking at the rock layers that form in one location as the environment changes (stability and change). Students then apply and communicate their understanding by using rock-layer diagram models to infer past environments.

	• Students engage in oral and written argument about how Desert Rocks National Park has changed over time (stability and change).

Performance Expectation	
4-ESS3-2 Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have on humans.	
Science and Engineering Practices	**Disciplinary Core Ideas**
Obtaining, Evaluating, and Communicating Information- • Obtain and combine information from books and other reliable media to explain phenomena.	**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.
Crosscutting Concepts	**Learning Objectives**
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.	• Students obtain information about erosion and natural hazards as they read Rocky Wonders. The book describes how water, wind, ice, and plants caused rock to break down over time (cause and effect), forming rocky wonders all around the world. • Students use a digital model to investigate how rivers can erode different amounts of rock, causing canyons of different depths to form (cause and effect). • Students use a physical model to investigate the effect of the amount of time a river has flowed (cause and effect) on how much the underlying rock erodes (stability and change). • Students use a physical model to investigate the effect of a river's speed on how much the underlying rock erodes (stability and change). They then create a digital model to show their understanding of the effects of a river's characteristics on erosion (cause and effect). • Students engage in oral and written argument about what caused more rock layers to be exposed in Desert Rocks Canyon than in nearby Keller's Canyon (cause and effect). They conclude the unit by reflecting on what they have learned and asking lingering questions about rocks and fossils.

Primary Interdisciplinary Connections:
- ELA: SL.4.3. Identify the reasons and evidence a speaker provides to support

particular points.
- NJSLARI.4.7: Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- NJSLAW.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.

Technology Standards:
- 8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.
- 8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
- 8.2.2.C.1 Brainstorm ideas on how to solve a problem or build a product
- 8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.
- 8.2.2.E.1 List and demonstrate the steps to an everyday task

Career Ready Practices:
- CRP1. Act as a responsible and contributing citizen and employee.
- CRP4. Communicate clearly and effectively and with reason.
- CRP12. Work productively in teams while using cultural global competence.

21st Century Life and Career Standards:
- 9.1.4.A.1- Explain the difference between a career and a job, and identify various jobs in the community and the related earnings.

Suggested Accommodations

English Language Learners:
- Provide clear and specific directions
- Provide extended time
- Provide written directions with models and diagrams when possible
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge

Special Education/Students with Disabilities:
- Follow specific students accommodations and modifications as listed in individual student IEP plan.
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge

- Provide extra time

504 Plans:
- Follow specific students accommodations and modifications as listed in individual student 504 plan.
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
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- Activate schema
- Build background knowledge
- Provide extra time

Gifted and Talented:
- Differentiated assignments/projects/assessments
- Differentiate learning pace using curriculum acceleration
- Higher level texts
- Higher level questioning
- Students design questions
- Expose to sophisticated vocabulary
- Extend reading response to further enrich understanding

Students at Risk of Failure:
- Make sure children feel welcome and comfortable while being discrete
- Provide structure and adhere to a consistent daily routine with clear and concise rules
- Be flexible

Economically Disadvantaged:
- Be flexible with assignments
- Provide extra time 28
- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge
- Provide access to computers, magazines, newspapers, and books so low-income students can see and work with printed materials

Culturally Diverse:
- Involve families in student learning
- Provide social/emotional support
- Respect cultural traditions
- Provide differentiated instruction as needed
- Follow all IEP modifications/504 plan
- Provide manipulatives or the opportunity to draw solution strategies
- Provide students with notes from the lesson

- For additional support and guidance, provide students with lab group or partner for lab experiences
- Provide students with a study guide about the information they will be assessed on for a test or quiz
- Teach and model note taking strategies to assist student when reading their science textbook
- Teach and model strategies to learn and practice new vocabulary words
- Assist student in completing a word web for new vocabulary words to reinforce new words in their science unit
- Provide students with an organization system to help them organize their notes, labs, and classwork
- Read directions, tests, and/or quizzes aloud
- Use graphic organizers to take notes, organize new information, and help students relate new information with previous knowledge
- Provide students with additional time to complete assignments
- Provide small group and individual conferencing to help support student throughout the lesson
- Preferential seating based on student needs
- Review concepts of previous lesson before teaching the new lesson ● Complete review activities to reinforce concepts previously taught
- Check for students understanding often with formal, informal, verbal, and nonverbal measures
- Provide student with modified tests and quizzes organized in a manner that will easy for the student to follow, assessment quality over quantity, and has clear directions
- Allow students to verbalize before beginning tasks and lab experiments
- Repeat the directions for students as often as needed
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Formative Tasks: ● Pre-unit assessment ● On-the-Fly assessment ● Claim/Evidence/Reasoning Response ● Reflection questions ● Exit tickets ● Peer assessment ● Student observation ● Graphic Organizers & Guided Note Taking ● Directed Reading ● Cooperative Group Learning ● Journal Entries	**Alternative Assessments:** ● Look for/Now what? Notes ● Critical juncture assessment ● Group Work/Class Discussion Rubric ● Guided Observations Questions ● Modified Tests/Quizzes/Classwork ● Science A-Z Activities Science Related
Summative Assessments: ● End-of Unit Assessment	
Knowledge & Skills	
Enduring Understandings: ● A fossil forms when an organism dies and is covered with sediment that turns into rock. ● A sedimentary rock layer forms when sediment sinks and builds up in water,	**Essential Questions:** ● How do fossils form? ● How does sedimentary rock form? ● How do geologists learn what a place was like in the past?

compacts under more sediment, and cements over time. ● Over time, a rock layer becomes thicker as sediment continues to build up. ● Geologists use observations of and ideas about rocks and fossils to make inferences about past environments. ● Different sediments build up in different environments. Therefore, different kinds of sedimentary rock form in different environments. ● Different sedimentary rock layers in a place mean that the environment in that place has changed. ● New rock layers form on top of existing rock layers. Therefore, lower rock layers are older than the layers above them. ● Geologists observe the order of rock layers to infer the order of past environments. ● Rock can be broken down and eroded by things in the environment, such as wind, water, plants, and ice. ● The speed of water and amount of time it flows affect how much rock it erodes.	● How do rocks provide information about what an environment was like in the past? ● How can there be different sedimentary rock layers in the same place? ● How can geologists tell what order rock layers formed in? ● How can geologists figure out the order of past environments? ● How does rock get exposed? ● What affects the amount of rock that water can erode?
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