Willingboro
Public Schools

"Where Excellence is the Expectation"

Willingboro Public Schools
Grade 4 Science

Revised June, 2022
Jennifer Brandon - Supervisor of Science

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SCIENCE CURRICULUM AND INSTRUCTION:

The Willingboro Public Schools Science program is dedicated to delivering our students an innovative hands-on science program. Our program supports the State's vision that scientifically literate students will gain the knowledge and understanding of scientific concepts as required for personal decision-making, participation in civic and cultural affairs, and economic productivity.

Students are encouraged to ask questions about the world around them and practice science skills.

- Students' science experiences teach them to connect science concepts to their experience, see how human nature influences science, and explore how science and technology affects their lives.
- The science classes include activities that engage students in applying their science skills and understandings to examine social issues, solve real problems and make decisions.
- Students have the opportunity to use a variety of equipment and technology in their scientific investigations.
- Students learn how to find out and make up their own minds by experimenting and investigating how the world works rather than just memorizing facts.
- Students are learning how to conduct scientific inquiry and use data to explain their conclusions.
- The process of investigation and explanation is just as important as knowing "the" answer.

Teachers plan instruction that builds on what students know and think to increase students' scientific understanding.

- Teachers use the New Jersey Student Learning Standards in Science to plan lessons that are challenging, engaging and age appropriate.
- There are resources and opportunities for students to do at-home science activities like participating in the STEM Conference.

Course Sequence/Table of Contents:

Click here for the Grade 4 Science Pacing Guide.

Within each unit, please find:

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This was modeled after the NJSLS Document

Overview	Content Standards - Arranged by Disciplinary Core Idea (DCI) *Students who demonstrate understanding can:*	Unit Focus
ESS Unit: **Soils, Rocks, and Landforms**	**4-ESS1: Earth's Place in the Universe** ● **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. [Clarification Statement: Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.] [Assessment Boundary: Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time.] **4-ESS2: Earth's Systems** ● **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 flow.] [Assessment Boundary: Assessment is limited to a single form of weathering or erosion.] ● **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.] **4-ESS3: Earth and Human Activity** ● **4-ESS3-1** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to	Geology is the study of our planet's earth materials and natural resources. Because they are so ubiquitous and abundant, they are often taken for granted. The Soils, Rocks, and Landforms Module provides students with firsthand experiences with soils and rocks and modeling experiences using tools such as topographic maps and stream tables to engage with the anchor phenomenon of the surface of Earth's landscape—the shape and the composition of landforms. The driving questions for the module are What are Earth's land surface made of? and Why are landforms not the same everywhere?

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Overview	Content Standards - Arranged by Disciplinary Core Idea (DCI) *Students who demonstrate understanding can:*	Unit Focus
	dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.] ● **4-ESS3-2** Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have 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.]	
Suggested Open Educational Resources	● FOSS Next Generation Science Curriculum Resources ○ Think Link ○ Student Resource Books ● Generation Genius	
PS Unit: **Energy**	**4-PS3: Energy** ● **4-PS3-1** Use evidence to construct an explanation relating the speed of an object to the energy of that object. [Assessment Boundary: Assessment does not include quantitative measures of changes in the speed of an object or on any precise or quantitative definition of energy.] ● **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.] ● **4-PS3-3** Ask questions and predict outcomes about the changes in energy that occur when objects collide. [Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.] [Assessment Boundary: Assessment does not include quantitative measurements of energy.] ● **4-PS3-4** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. [Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that converts light into heat. Examples of constraints could	The Energy Module provides first-hand experiences in physical science dealing with the anchor phenomenon of energy. The five investigations focus on the concepts that energy is present whenever there is motion, electric current, sound, light, or heat, and that energy can transfer from one place to another. The guiding question for the module is how does energy transfer between systems?

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Overview	Content Standards - Arranged by Disciplinary Core Idea (DCI) *Students who demonstrate understanding can:*	Unit Focus
	include the materials, cost, or time to design the device.] [Assessment Boundary: Devices should be limited to those that convert motion energy to electric energy or use stored energy to cause motion or produce light or sound.] **4- PS4: Waves and their Applications in Technologies for Information Transfer** ● **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. [Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.] [Assessment Boundary: Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.] ● **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.] ● **4-PS4-3** Generate and compare multiple solutions that use patterns to transfer information. [Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.]	
Suggested Open Educational Resources	● FOSS Next Generation Science Curriculum Resources ○ Think Link ○ Student Resource Books ● Generation Genius	
LS **Unit** **Environments**	**4-LS1: From Molecules to Organisms: Structures and Processes** ● **4-LS1-1** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.]	The study of the structures and behaviors of organisms and the relationships between one organism and its environment builds knowledge of all organisms. With this knowledge comes an awareness

Overview	**Content Standards - Arranged by Disciplinary Core Idea (DCI)** *Students who demonstrate understanding can:*	**Unit Focus**
	[Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.] ● **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. [Clarification Statement: Emphasis is on systems of information transfer.] [Assessment Boundary: Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.]	of limits. Such knowledge is important because humans can change environments.
Suggested Open Educational Resources	● FOSS Next Generation Science Curriculum Resources ○ Think Link ○ Student Resource Books ● Generation Genius	

Soils, Rocks, and Landforms: Life and Physical Sciences

Overview

Geology is the study of our planet's earth materials and natural resources. Because they are so ubiquitous and abundant, they are often taken for granted. The Soils, Rocks, and Landforms Module provides students with firsthand experiences with soils and rocks and modeling experiences using tools such as topographic maps and stream tables to engage with the anchor phenomenon of the surface of Earth's landscape—the shape and the composition of landforms. The driving questions for the module are What are Earth's land surface made of? and Why are landforms not the same everywhere?

Essential Questions	Enduring Understandings
Overarching Driving Questions: *What are Earth's land surfaces made of?* *Why are landforms not the same everywhere?* ***Focus Questions for Investigation 1:*** ● What is soil? ● How do erosion and deposition impact landforms? ***Focus Questions for Investigation 2:*** ● What do the location of fossils in rock layers tell us about past Earth life? ***Focus Questions for Investigation 3:*** ● How do maps help us observe the Earth's surface features? ***Focus Questions for Investigation 4:*** ● What might reduce the impact of catastrophic Earth surface events?	**Anchoring Phenomena: The variety of Earth's landforms and surfaces** ● Soils are composed of inorganic earth materials and humus. ● Flowing water moves earth materials from one location to another. ● Landforms are formed by weathering and erosion. ● Fossils help explain what plant and animal life lived in a particular time period and what their world was like. ● Scientists analyze and interpret data from maps to describe patterns of Earth's features. ● A variety of hazards result from natural processes. Humans cannot eliminate the hazards but can take steps to reduce their impacts.

Soils, Rocks, and Landforms: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Students who demonstrate understanding can:

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Soils, Rocks, and Landforms: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

4-ESS1: Earth's Place in the Universe

- **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. [Clarification Statement: Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.] [Assessment Boundary: Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time.]

4-ESS2: Earth's Systems

- **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 flow.] [Assessment Boundary: Assessment is limited to a single form of weathering or erosion.]
- **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.]

4-ESS3: Earth and Human Activity

- **4-ESS3-1** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]
- **4-ESS3-2** Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have 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

Planning and Carrying Out Investigations

- Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.
  - Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-ESS2-1)
- Analyzing and Interpreting Data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.
  - Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2)

Constructing Explanations and Designing Solutions

- Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.
  - Identify the evidence that supports particular points in an explanation. (4-ESS1-1)

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth

- Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1)

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Soils, Rocks, and Landforms: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

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. (4-ESS2- 1)

ESS2.B: Plate Tectonics and LargeScale 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. (4-ESS2-2)

ESS2.E: Biogeology

- Living things affect the physical characteristics of their regions. (4- ESS2-1)

Crosscutting Concepts

Patterns

- Patterns can be used as evidence to support an explanation. (4-ESS1-1), (4-ESS2- 2)

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS2- 1)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems. (4- ESS1-1)

Student Learning Objectives

Students will be able to...

- Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
- Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
- Analyze and interpret data from maps to describe patterns of Earth's features.
- Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
- Use maps to locate different land and water features of Earth.
- Describe ways people can reduce the impact of hazards that affect the Earth.

Investigation 1: Soils and Weathering
Students investigate properties of soil by comparing four different soils. They learn that soils are composed of essentially the same types of materials (inorganic earth materials and humus), but the amounts of the materials vary. They begin to explore how rocks break into smaller pieces through physical and chemical weathering, then go outdoors to explore and compare properties of local soils.

Investigation 2: Landforms
Students use stream-table models to observe that water moves earth materials from one location to another. They investigate the variables of slope and water quantity and plan and conduct their own stream-table investigations. Students look for evidence of erosion and deposition outdoors. They learn about the different processes that can result in fossils and how fossils provide evidence of life and landscapes from the ancient past.

Investigation 3: Mapping Earth's Surface
Students are introduced to the study of topography by building a model of a mountain. They create a topographic map, and use this map to produce another representation of the landforms—a profile of the mountain. Students learn about volcanoes; they use the topographer's tools to analyze the impact of the Mount St. Helens' eruption. Students introduced to processes that cause rapid changes to Earth's surface: landslides, earthquakes, floods, and volcanoes.

Investigation 4: Natural Resources
Students review what they have learned in Investigations 1–3. Then they focus on earth materials as renewable and nonrenewable natural resources. They learn the importance of earth materials as resources. The class makes a stepping stone out of concrete and goes on a schoolyard walk to find objects and structures and considers what natural resources were used to construct them.

Integrated Accommodations and Modifications		
Special Education Students	**English Language Learners**	**At Risk**
• Utilize modifications & accommodations delineated in the student's IEP • Provide additional manipulatives to support instruction • Allow for alternative strategies to solve algorithms or tasks • Provide the steps needed to complete the task • Model frequently • Provide repetition and practice. • Use visuals to demonstrate/model the processes • Restate, reread, and clarify directions/questions • Ask students to restate information, directions, and assignments.	WIDA Can Do Descriptors https://wida.wisc.edu/teach/can-do/descriptors • Modify Assignments • Use testing and portfolio assessment • Utilize Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary) • Repeat, rephrase, paraphrase key concepts and directions • Allow for extended time for assignment completion as needed • Highlight key vocabulary	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Provide preferential seating to be mutually determined by the student and teacher • Allow the use of a computer to complete assignments. • Establish expectations for correct spelling on assignments

• Provide copy of class notes • Distribute study guide for classroom tests. • Provide preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Provide regular parent/ school communication • Allow extended time to complete assignment • Establish procedures for accommodations / modifications for assessments • Allow student to take/complete tests in an alternate setting as needed Appendix A: Special Education Accommodations and Modifications	• Define essential vocabulary in context • Use graphic organizers, visuals, manipulatives and other concrete materials • Use gestures, facial expressions and body language • Read aloud • Build on what students already know and prior experience	• Provide extra textbooks for home. • Provide Peer Support • Increase one on one time

Gifted and Talented Students	504 Plan
• Utilize advanced, accelerated, or compacted content • Provide assignments that emphasize higher- level thinking skills. • Allow for individual student interest • Gear assignments to development in areas of affect, creativity, cognition, and research skills • Allow for a variety in types of resources • Provide problem-based assignments with planned scope and sequence • Utilize inquiry-based instruction • Adjust the pace of lessons • Utilize Choice Boards • Provide Problem-Based Learning • Establish flexible Grouping	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Break long assignments into smaller parts • Assist student in setting short term goals • Allow for preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Model and reinforce organizational systems (i.e. color-coding) • Write out homework assignments, check student's recording of assignments

Interdisciplinary Connections	Computer Science and Design Thinking
Connections to NJSLS - English Language Arts *Reading* • RI.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web	**Computer Science and Design Thinking Practices** 1. ✓ Fostering an Inclusive Computing and Design Culture 2. ✓ Collaborating Around Computing and Design 3. ☐ Recognizing and Defining Computational Problems

pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS2-2)

Writing

- W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS1-1), 4-ESS2-1)
- W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information and provide a list of sources. (4-ESS1-1), 4-ESS2-1)
- W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (4- ESS1-1)

Connections to NJSLS - Mathematics

- MP.2 Reason abstractly and quantitatively. (4-ESS1-1), (4-ESS2-1)
- MP.4 Model with mathematics. (4-ESS1-1), (4-ESS2-1)
- 4.MD.A.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. (4-ESS1-1), (4-ESS2-1)
- 4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. (4-ESS2-1), (4-ESS2-2)

4. ✓ Developing and Using Abstractions
5. ✓ Creating Computational Artifacts
6. ✓ Testing and Refining Computational Artifacts
7. ✓ Communicating About Computing and Design

Computer Science and Design Thinking Standards

Data and Analysis

- Data can be organized, displayed, and presented to highlight relationships.
  - 8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.
- Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data.
  - 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.
  - 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.
- Many factors influence the accuracy of inferences and predictions.
  - 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Engineering Design

- Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others.
  - 8.2.5.ED.1: Explain the functions of a system and its subsystems.
  - 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
  - 8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
- Engineering design requirements include desired features and limitations that need to be considered.
  - 8.2.5.ED.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).
  - 8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process.
  - 8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process.

	Interaction of Technology and Humans ● Societal needs and wants determine which new tools are developed to address real-world problems. ○ 8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system. ● A new tool may have favorable or unfavorable results as well as both positive and negative effects on society. Technology spurs new businesses and careers. ○ 8.2.5.ITH.2: Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have. ○ 8.2.5.ITH.3: Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use. ○ 8.2.5.ITH.4: Describe a technology/tool that has made the way people live easier or has led to a new business or career. *Nature of Technology* ● Technology innovation and improvement may be influenced by a variety of factors. Engineers create and modify technologies to meet people's needs and wants; scientists ask questions about the natural world. ○ 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies. *Effects of Technology on the Natural World* ● The technology developed for the human designed world can have unintended consequences for the environment. Technology must be continually developed and made more efficient to reduce the need for non-renewable resources. ○ 8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems. ○ 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. ○ 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. ○ 8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment. ○ 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.
Career Readiness, Life Literacies and Key Skills	

Career Readiness, Life Literacies and Key Skills Practices

- Act as a responsible and contributing community members and employee.
- Attend to financial well-being.
- Consider the environmental, social and economic impacts of decisions.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them.
- Model integrity, ethical leadership and effective management.
- Plan education and career paths aligned to personal goals.
- Use technology to enhance productivity, increase collaboration and communicate effectively.
- Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies and Key Skills Standards

9.1 Personal Financial Literacy

- You can give back in areas that matter to you.
    - 9.1.5.CR.1: Compare various ways to give back and relate them to your strengths, interests, and other personal factors

9.2 Career Awareness, Exploration, Preparation, and Training

- An individual's passions, aptitude and skills can affect his/her employment and earning potential.
    - 9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
    - 9.2.5.CAP.2: Identify how you might like to earn an income.
    - 9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
    - 9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.
- Income and benefits can vary depending on the employer and type of job or career.
    - 9.2.5.CAP.5: Identify various employee benefits, including income, medical, vacation time, and lifestyle benefits provided by different types of jobs and careers.

9.4 Life Literacies and Key Skills

Creativity and Innovation

- Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.
    - 9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
    - 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7).
- Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills
    - 9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
    - 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6).

Critical Thinking and Problem-solving

- The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.
    - 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
    - 9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
    - 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
    - 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).

Digital Citizenship

- Intellectual property rights exist to protect the original works of individuals. It is allowable to use other people's ideas in one's own work provided that proper credit is given to the original source
    - 9.4.5.DC.2: Provide attribution according to intellectual property rights guidelines using public domain or creative commons media.
    - 9.4.5.DC.3: Distinguish between digital images that can be reused freely and those that have copyright restrictions.

Global and Cultural Awareness

- Culture and geography can shape an individual's experiences and perspectives.
    - 9.4.5.GCA.1: Analyze how culture shapes individual and community perspectives and points of view (e.g., 1.1.5.C2a, RL.5.9, 6.1.5.HistoryCC.8).

Information and Media Literacy

- Digital tools can be used to modify and display data in various ways that can be organized to communicate ideas.
    - 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). • 9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data
- Specific situations require the use of relevant sources of information.
    - 9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM. IPRET.5).

Technology Literacy

- Different digital tools have different purposes.
    - 9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images graphics, or symbols.
- Collaborating digitally as a team can often develop a better artifact than an individual working alone.
    - 9.4.5.TL.4: Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).
    - 9.4.5.TL.5: Collaborate digitally to produce an artifact (e.g., 1.2.5CR1d).

Climate Change

- **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.
- Also addressed in Units 2 and 3

SEL Competencies

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

https://www.nj.gov/education/safety/wellness/selearning/index.shtml

District/School Formative Assessment Plan	District/School Summative Assessment Plan
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. Teachers are encouraged to incorporate Formative Assessments into all lessons. During instruction, teachers will collect ongoing information on students' mastery of content through a variety of methods: ● Pre-Assessment ● Questioning: using Socratic method, probing questions, a hierarchical system in complexity (Bloom's Taxonomy) ● Exit tickets, rotational activities (stations), quizzes, and small group activities ● Classwork, homework, group work (formative assessment) ● Teacher's observation, class discussion, and Student Notebook	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* **Benchmark Assessments:** ● Assessment 1.1: Mid-Unit Assessment ● Assessment 1.2: End of Unit Assessment ● Assessment 1.3: End of Unit Performance Assessment **Standardized Assessments:** ● NJSLA **Other Summative Assessments:** Teachers are encouraged to design and implement their own assessments (topic/module tests and quizzes) individually and/or with their department or grade-level partners, as per Uniform Grading Profile.

Targeted Academic Vocabulary
Rocks, soil, humus, organic matter, microbiology, microbial life, carbon sequestration, landforms, cliffs, mountains, plains, lakes, ponds, ocean, river, shoreline, water, ice, wind, erosion, weathering, vegetation, natural hazards, earthquakes, volcanos, tornadoes, flooding, maps, fossils

District/School Tasks	District/School Primary and Supplementary Resources

• Common Formative Assessments • Common District Summative Assessments • See above Assessment Sections for more information	**District-Mandated Resources** • FOSS Curriculum **Assessment Resources:** • Available on FOSS - ThinkLink • For additional resources, log in to https://edconnectnj.schoolnet.com **Other Resources:** • Generation Genius: "Weathering and Erosion", "Fossils and Extinction", "Earth's Landscapes" • Famous African American Climate Scientists (Amistad Law Resource) • Famous Fossil Scientists: Charles Darwin and Mary Anning • Teaching about the Holocaust/Genocide, Prejudice & Bullying Using UDL (Grades K5) (Holocaust Law) • How well do you understand Climate Change? Quiz • NASA - Climate Kids **Project Ideas:** • Creating a map of local landforms • "Digging" for fossils • Creating fossil imprints with molds and casts.
Instructional Best Practices and Exemplars	
See Appendix A for Instructional Best Practices and Exemplars	
Pacing Guide	
Grade 4 Unit 1 "Soils, Rocks, and Landforms" Pacing Guide	

Energy: Life and Physical Sciences

Overview

The Energy Module provides first-hand experiences in physical science dealing with the anchor phenomenon of energy. The five investigations focus on the concepts that energy is present whenever there is motion, electric current, sound, light, or heat, and that energy can transfer from one place to another. The guiding question for the module is how does energy transfer between systems?

Essential Questions	Enduring Understandings
Overarching Driving Questions: *How does energy transfer between systems?* *What is energy?* ***Focus Questions for Investigation 1, Energy and Circuits:*** ● What is electricity? ● How can energy be transferred? ● How can energy cause light and motion? ***Focus Questions for Investigation 2, The Force of Magnetism:*** ● What is magnetism and how does it work? ● How do compasses work? ***Focus Questions for Investigation 3, Electromagnets:*** ● What is an electromagnet? ● How can I engineer a simple telegraph machine? ***Focus Questions for Investigation 4, Energy Transfer:*** ● How can energy be stored? ● How can energy affect motion? ***Focus Questions for Investigation 5: Waves:*** ● What do waves have to do with energy?	**Anchoring Phenomenon: Energy** ● Energy is everywhere and it makes things happen. ● Most of the energy we use comes from the sun. ● Energy can be transferred from place to place by sound, light, heat, and electricity. ● 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. ● Waves are a repeating pattern of motion that transfer energy from place to place. ● The faster a given object is moving, the more energy it possesses.

Energy: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Students who demonstrate understanding can:

4-PS3: Energy

- **4-PS3-1** Use evidence to construct an explanation relating the speed of an object to the energy of that object. [Assessment Boundary: Assessment does not include quantitative measures of changes in the speed of an object or on any precise or quantitative definition of energy.]
- **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.]
- **4-PS3-3** Ask questions and predict outcomes about the changes in energy that occur when objects collide. [Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.] [Assessment Boundary: Assessment does not include quantitative measurements of energy.]
- **4-PS3-4** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. [Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.] [Assessment Boundary: Devices should be limited to those that convert motion energy to electric energy or use stored energy to cause motion or produce light or sound.]

4- PS4: Waves and their Applications in Technologies for Information Transfer

- **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. [Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.] [Assessment Boundary: Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.]
- **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.]
- **4-PS4-3** Generate and compare multiple solutions that use patterns to transfer information. [Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.]

Science and Engineering Practices

Developing and Using Models

- Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. Develop a model using an analogy, example, or abstract representation to describe a scientific principle. (4-PS4-1)
    - Develop a model to describe phenomena. (4-PS4-2)

Asking Questions and Defining Problems

- Asking questions and defining problems in grades 3–5 builds on K–2 experiences and progresses to specifying qualitative relationships.
    - Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (4-PS3-3)

Planning and Carrying Out Investigations

- Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.
    - Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (4-PS3-2)

Constructing Explanations and Designing Solutions

- Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

Energy: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

- Use evidence (e.g., measurements, observations, patterns) to construct an explanation. (4-PS3-1)
- Apply scientific ideas to solve design problems. (4-PS3-4)
- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-PS4-3)

Disciplinary Core Ideas

PS3.A: Definitions of Energy

- The faster a given object is moving, the more energy it possesses. (4-PS3-1)
- 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)

PS3.C: Relationship Between Energy and Forces

- When objects collide, the contact forces transfer energy so as to change the objects' motions. (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)

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. (Note: This grade band endpoint was moved from K–2.) (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)

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)

ETS1.A: Defining Engineering Problems

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. *(secondary to 4-PS3- 4)*

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. (*secondary to 4-PS4-3*)

Crosscutting Concepts

Patterns

- Similarities and differences in patterns can be used to sort and classify natural phenomena. (4- PS4-1) Similarities and differences in patterns can be used to sort and classify designed products. (4- PS4-3)

Energy: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Cause and Effect
- Cause and effect relationships are routinely identified. (4-PS4-2)

Energy and Matter
- Energy can be transferred in various ways and between objects. (4-PS3-1), (4-PS3-2), (4-PS3-3), (4-PS3-4)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology
- Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4- 3)

Influence of Science, Engineering and Technology on Society and the Natural World
- Engineers improve existing technologies or develop new ones. (4-PS3-4)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence
- *Science findings are based on recognizing patterns. (4-PS4-1)*

Science is a Human Endeavor
- Most scientists and engineers work in teams. (4-PS3-4)
- Science affects everyday life. (4- PS3-4)

Student Learning Objectives

Students will be able to...
- Use evidence to construct an explanation relating the speed of an object to the energy of that object.
- Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
- Ask questions and predict outcomes about the changes in energy that occur when objects collide.
- Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
- Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
- Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
- Generate and compare multiple solutions that use patterns to transfer information.
- Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

Investigation 1: Energy and Circuits
- investigate electric current and circuits.
- work with a variety of components and explore conductors and insulators.
- explore series and parallel circuits and compare the functioning of the components in each circuit.

- formulate and justify their predictions, based on their observations of electricity transferring energy to produce light and motion, the ways through which electricity flows.

Investigation 2: The Force of Magnetism

- investigate the properties of magnets and their interaction with materials and each other.
- conduct an investigation to determine if like or opposite poles of a magnet attract.
- construct a simple compass and use it to detect magnetic effects.
- discover that magnetism can be induced in a piece of iron.
- investigate the strength of the force of attraction between two magnets, they graph data to look for patterns of interaction.
- investigate outdoors to find objects in the environment that are attracted to magnets.

Investigation 3: Electromagnets

- learn how to use electricity to make an electromagnet.
- explore the variables that influence the strength of the magnetism produced by their electromagnets and engineer a simple telegraph system to communicate using a click code.

Investigation 4: Energy Transfers

- observe energy transfer that results in heat, light, sound, and motion and they are introduced to sources of energy and components that store energy. They conduct structured investigations to discover how the variable of starting position on the ramp affects the speed of the rolling ball. Using controlled experiments, students test the variables of mass and release position to find out how they affect energy transfer.

Investigation 5: Waves

- experience waves through firsthand experiences using ropes, demonstrations with waves in water, spring toys, and a sound generator.
- use mirrors to experience reflecting light and build a conceptual model about how light travels.
- design series and parallel solar cell circuits and observe the effect on the speed of a motor.

Integrated Accommodations and Modifications		
Special Education Students	**English Language Learners**	**At Risk**
• Utilize modifications & accommodations delineated in the student's IEP • Provide additional manipulatives to support instruction • Allow for alternative strategies to solve algorithms or tasks • Provide the steps needed to complete the task • Model frequently	WIDA Can Do Descriptors https://wida.wisc.edu/teach/can-do/descriptors • Modify Assignments • Use testing and portfolio assessment • Utilize Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary)	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes

• Provide repetition and practice. • Use visuals to demonstrate/model the processes • Restate, reread, and clarify directions/questions • Ask students to restate information, directions, and assignments. • Provide copy of class notes • Distribute study guide for classroom tests. • Provide preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Provide regular parent/ school communication • Allow extended time to complete assignment • Establish procedures for accommodations / modifications for assessments • Allow student to take/complete tests in an alternate setting as needed Appendix A: Special Education Accommodations and Modifications	• Repeat, rephrase, paraphrase key concepts and directions • Allow for extended time for assignment completion as needed • Highlight key vocabulary • Define essential vocabulary in context • Use graphic organizers, visuals, manipulatives and other concrete materials • Use gestures, facial expressions and body language • Read aloud • Build on what students already know and prior experience	• Provide preferential seating to be mutually determined by the student and teacher • Allow the use of a computer to complete assignments. • Establish expectations for correct spelling on assignments • Provide extra textbooks for home. • Provide Peer Support • Increase one on one time

Gifted and Talented Students	**504 Plan**
• Utilize advanced, accelerated, or compacted content • Provide assignments that emphasize higher- level thinking skills. • Allow for individual student interest • Gear assignments to development in areas of affect, creativity, cognition, and research skills • Allow for a variety in types of resources • Provide problem-based assignments with planned scope and sequence • Utilize inquiry-based instruction • Adjust the pace of lessons • Utilize Choice Boards • Provide Problem-Based Learning • Establish flexible Grouping	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Break long assignments into smaller parts • Assist student in setting short term goals • Allow for preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Model and reinforce organizational systems (i.e. color-coding) • Write out homework assignments, check student's recording of assignments
Interdisciplinary Connections	**Computer Science and Design Thinking**

Connections to NJSLS - English Language Arts

Reading

- RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-PS4-3)
- RI.4.3 Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. (4-PS3-1)
- RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS4-3)

Writing

- W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (4- PS3-1)
- W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-PS3-2), (4-PS3-3), (4-PS3-4)
- W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information and provide a list of sources. (4-PS3-1), (4-PS3-2), (4- PS3-3), (4-PS3-4)
- W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (4- PS3-1)

Speaking and Listening

- SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-PS4-1), (4-PS4-2)

Connections to NJSLS - Mathematics

- MP.4 Model with mathematics. (4-PS4-1), (4-PS4-2)
- 4.G.A.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4-PS4-1), (4-PS4-2)
- 4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in

Computer Science and Design Thinking Practices

8. ✓ Fostering an Inclusive Computing and Design Culture
9. ✓ Collaborating Around Computing and Design
10. ☐ Recognizing and Defining Computational Problems
11. ✓ Developing and Using Abstractions
12. ✓ Creating Computational Artifacts
13. ✓ Testing and Refining Computational Artifacts
14. ✓ Communicating About Computing and Design

Computer Science and Design Thinking Standards

Impacts of Computing

- The development and modification of computing technology is driven by individuals' needs and wants and can affect individuals differently.
  - 8.1.5.IC.1: Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.

Data and Analysis

- Data can be organized, displayed, and presented to highlight relationships.
  - 8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.
- Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data.
  - 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.
  - 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.
- Many factors influence the accuracy of inferences and predictions.
  - 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Engineering Design

- Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others.
  - 8.2.5.ED.1: Explain the functions of a system and its subsystems.

which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (4-PS3-4)	○ 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models. ○ 8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task. ● Engineering design requirements include desired features and limitations that need to be considered. ○ 8.2.5.ED.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints). ○ 8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process. ○ 8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process. *Interaction of Technology and Humans* ● Societal needs and wants determine which new tools are developed to address real-world problems. ○ 8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system. ● A new tool may have favorable or unfavorable results as well as both positive and negative effects on society. Technology spurs new businesses and careers. ○ 8.2.5.ITH.2: Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have. ○ 8.2.5.ITH.3: Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use. ○ 8.2.5.ITH.4: Describe a technology/tool that has made the way people live easier or has led to a new business or career. *Nature of Technology* ● Technology innovation and improvement may be influenced by a variety of factors. Engineers create and modify technologies to meet people's needs and wants; scientists ask questions about the natural world. ○ 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies. Effects of Technology on the Natural World ● The technology developed for the human designed world can have unintended consequences for the environment. Technology must be continually developed and made more efficient to reduce the need for non-renewable resources. ○ 8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems.

	○ 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. ○ 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.

Career Readiness, Life Literacies and Key Skills

Career Readiness, Life Literacies and Key Skills Practices

- Act as a responsible and contributing community members and employee.
- Attend to financial well-being.
- Consider the environmental, social and economic impacts of decisions.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them.
- Model integrity, ethical leadership and effective management.
- Plan education and career paths aligned to personal goals.
- Use technology to enhance productivity, increase collaboration, and communicate effectively.
- Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies and Key Skills Standards

9.1 Personal Financial Literacy

- You can give back in areas that matter to you.
    - 9.1.5.CR.1: Compare various ways to give back and relate them to your strengths, interests, and other personal factors

9.2 Career Awareness, Exploration, Preparation, and Training

- An individual's passions, aptitude and skills can affect his/her employment and earning potential.
    - 9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
    - 9.2.5.CAP.2: Identify how you might like to earn an income.
    - 9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
    - 9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.
- Income and benefits can vary depending on the employer and type of job or career.
    - 9.2.5.CAP.5: Identify various employee benefits, including income, medical, vacation time, and lifestyle benefits provided by different types of jobs and careers.

9.4 Life Literacies and Key Skills

Creativity and Innovation

- Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.

- 9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
- 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7).

- Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills
  - 9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
  - 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6).

Critical Thinking and Problem-solving

- The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.
  - 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
  - 9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
  - 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
  - 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).

Digital Citizenship

- Intellectual property rights exist to protect the original works of individuals. It is allowable to use other people's ideas in one's own work provided that proper credit is given to the original source
  - 9.4.5.DC.2: Provide attribution according to intellectual property rights guidelines using public domain or creative commons media.
  - 9.4.5.DC.3: Distinguish between digital images that can be reused freely and those that have copyright restrictions.

Global and Cultural Awareness

- Culture and geography can shape an individual's experiences and perspectives.
  - 9.4.5.GCA.1: Analyze how culture shapes individual and community perspectives and points of view (e.g., 1.1.5.C2a, RL.5.9, 6.1.5.HistoryCC.8).

Information and Media Literacy

- Digital tools and media resources provide access to vast stores of information, but the information can be biased or inaccurate.
  - 9.4.5.IML.1: Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., Social Studies Practice - Gathering and Evaluating Sources).
- Digital tools can be used to modify and display data in various ways that can be organized to communicate ideas.
  - 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). • 9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data
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- Collaborating digitally as a team can often develop a better artifact than an individual working alone.
  - 9.4.5.TL.4: Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).
  - 9.4.5.TL.5: Collaborate digitally to produce an artifact (e.g., 1.2.5CR1d).

Climate Change
● Climate change can be adressed with a discussion of the natural resources we use for fuel for electricity, and the energy transfers of light and heat from the sun. ● Also addressed in Units 1 and 3
SEL Competencies
● **Self - Awareness** ● **Self - Management** ● **Social Awareness** ● **Responsible Decision Making** ● **Relationship Skills** **https://www.nj.gov/education/safety/wellness/selearning/index.shtml**

District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. Teachers are encouraged to incorporate Formative Assessments into all lessons. During instruction, teachers will collect ongoing information on students' mastery of content through a variety of methods: ● Questioning: using Socratic method, probing questions, a hierarchical system in complexity (Bloom's Taxonomy) ● Exit tickets, rotational activities (stations), quizzes, and small group activities ● Classwork, homework, group work (formative assessment) ● Pre-Assessment, teacher's observation, class discussion, and journal	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* **Formal Lab Report** **Benchmark Assessments:** ● Assessment 1.1: Mid-Unit Assessment ● Assessment 1.2: End of Unit Assessment ● Assessment 1.3: End of Unit Performance Assessment **Standardized Assessments:** ● NJSLA **Other Summative Assessments:** Teachers are encouraged to design and their own assessments (topic/module tests and quizzes) individually and/or with their department or grade-level partners, as per Uniform Grading Profile.
Targeted Academic Vocabulary	

energy, waves, electricity, electric currents, series circuits, parallel circuits, conductors, insulators, magnets, static, poles, compass, magnetism, attraction, electromagnets, stored electricity, heat, temperature, motion, mass, matter, sound, light, reflect, mirror

District/School Tasks	District/School Primary and Supplementary Resources
• Common Formative Assessments • Common District Summative Assessments • See above Assessment Sections for more information	**District-Mandated Resources** • FOSS Curriculum **Assessment Resources:** • Available on FOSS - ThinkLink • For additional resources, log in to https://edconnectnj.schoolnet.com • Formal Lab Report Rubric **Other Resources:** • Generation Genius:"Light Reflection and Vision", "Wave properties", "Energy transfer" • Famous African American Climate Scientists (Amistad Law Resource) • Famous Fossil Scientists: Charles Darwin and Mary Anning • Teaching about the Holocaust/Genocide, Prejudice & Bullying Using UDL (Grades K5) (Holocaust Law) • How well do you understand Climate Change? Quiz • NASA - Climate Kids **Project Ideas:** • Photo/images/drawings of evidence of energy. Discuss: can we see energy? • Energy transfer "maze": can you draw a model and label all of the points where energy is transferred? (example: a kitchen!)

Instructional Best Practices and Exemplars
See Appendix A for Instructional Best Practices and Exemplars

Pacing Guide
Grade 4 Unit 2 "Energy" Pacing Guide

Environments: Life and Physical Sciences

Overview

The study of the structures and behaviors of organisms and the relationships between one organism and its environment builds knowledge of all organisms. With this knowledge comes an awareness of limits. Such knowledge is important because humans can change environments.

Essential Questions	Enduring Understandings
Overarching Driving Questions: *What is the relationship between an organism and its environment?* *How do humans affect and change environments?* ***Focus Questions for Investigation 1 Environmental Factors:*** ● How is optimum environment related to organism and population survival? ● How do biotic and abiotic factors differ in terrestrial environments? ● How do the structures of terrestrial organisms function to support the survival of the organism in that environment? ***Focus Questions for Investigation 2, Ecosystems:*** ● How do the structures of aquatic organisms function to support the survival of the organism in that environment? ● How are the structures of aquatic organisms similar and different from land animals? ● How do organisms sense and interact with their environment? ***Focus Questions for Investigation 3, Brine Shrimp Hatching:*** ● How is optimum environment related to organism and population survival? ● What environmental conditions result in the best growth and survival of aquatic animals? ***Focus Questions for Investigation 4, Range of Tolerance:*** ● What environmental conditions result in the best growth and survival of different plants?	**Anchoring Phenomena: Organisms' survival is affected by the environment** ● An environment is everything living and nonliving that surrounds and influences an organism. A relationship exists between environmental factors and how well organisms grow. ● Organisms that live in water have structures that function to meet their needs. Terrestrial and aquatic organisms have similar needs; while their structures are different, the functions are similar ● Animals are able to use their perceptions and memories to guide their actions. Some responses to information are instinctive—that is, animals' brains are organized so that they do not have to think about how to respond to certain stimuli. ● The growth and survival of organisms depend on the factors in the environment. ● Lack of resources and other factors limit the growth of populations of organisms. ● Organisms have ranges of tolerance for environmental factors; there are optimum conditions that produce maximum growth.

Environments: Life and Physical Sciences

NJSLS Science Content Standards - Arranged by Disciplinary Core idea (DCI)

Students who demonstrate understanding can:

4-LS1: From Molecules to Organisms: Structures and Processes

- **4-LS1-1** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]
- **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. [Clarification Statement: Emphasis is on systems of information transfer.] [Assessment Boundary: Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.]

Scientific and Engineering Practices

Developing and Using Models

- Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.
  - Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2)

Engaging in Argument from Evidence

- Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).
  - Construct an argument with evidence, data, and/or a model. (4- LS1-1)

Disciplinary Core Ideas

LS1.A: Structure and Function

- Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)

LS1.D: Information Processing

- Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)

Crosscutting Concepts

Systems and System Models

- A system can be described in terms of its components and their interactions. (4-LS1-1), (4-LS1-2)

Student Learning Objectives

Students will be able to...

- Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- Use a model to describe that animals receive different types of information, process the information in the brain, and respond to the information in different ways.

- Investigate and organize information about how structures function to meet the needs of organisms in terrestrial environments.
- Compare the structures of land and water organisms and the ways the structures function to meet the organisms' needs.
- Investigate how animals receive information from their environment through their sensory system and use that information to guide their actions.
- Demonstrate an understanding of plant adaptations that allow organisms to thrive in certain environments.

Investigation 1: Environmental Factors

- observe and describe the living and nonliving components (biotic and abiotic factors) in terrestrial environments.
- set up a mealworm environment at two temperatures and observe the life cycle over time.
- investigate how isopods respond to environmental factors such as water and light, and set up an isopod environment.
- investigate small animals that live in leaf litter and study their structures.

Investigation 2: Ecosystems

- set up a freshwater aquarium with different kinds of fish, plants, and other organisms.
- monitor the environmental factors in the system and look for feeding interactions among the populations.
- learn about the role of producers, consumers, and decomposers in food chains and food webs in terrestrial and aquatic systems, including a marine ecosystem. Through an outdoor simulation, students learn about how food affects a population's home range.
- explore how animals receive information from their environment through their sensory system and use the information to guide their actions.

Investigation 3: Brine Shrimp Hatching

- conduct a controlled experiment to determine which of four salt concentrations allow brine shrimp eggs to hatch, then determine a range of tolerance and optimum conditions for brine shrimp hatching.
- Through an outdoor simulation, students look at variation in a population and consider how variation among individuals contributes to survival of a population.

Investigation 4: Range of Tolerance

- set up and monitor experiments to determine the range of tolerance of water on the germination of four kinds of seeds: corn, pea, barley, and radish.
- test the effect of salinity on these seeds.
- study local plants by mapping schoolyard plants, and relating plant distribution to environmental factors. They also look at plant adaptations.

Integrated Accommodations and Modifications		
Special Education Students	**English Language Learners**	**At Risk**
• Utilize modifications & accommodations delineated in the student's IEP • Provide additional manipulatives to support instruction	WIDA Can Do Descriptors https://wida.wisc.edu/teach/can-do/descriptors • Modify Assignments • Use testing and portfolio assessment	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and practice • Model skills / techniques to be mastered.

• Allow for alternative strategies to solve algorithms or tasks • Provide the steps needed to complete the task • Model frequently • Provide repetition and practice. • Use visuals to demonstrate/model the processes • Restate, reread, and clarify directions/questions • Ask students to restate information, directions, and assignments. • Provide copy of class notes • Distribute study guide for classroom tests. • Provide preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Provide regular parent/ school communication • Allow extended time to complete assignment • Establish procedures for accommodations / modifications for assessments • Allow student to take/complete tests in an alternate setting as needed Appendix A: Special Education Accommodations and Modifications	• Utilize Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary) • Repeat, rephrase, paraphrase key concepts and directions • Allow for extended time for assignment completion as needed • Highlight key vocabulary • Define essential vocabulary in context • Use graphic organizers, visuals, manipulatives and other concrete materials • Use gestures, facial expressions and body language • Read aloud • Build on what students already know and prior experience	• Provide extended time to complete class work • Provide copy of class notes • Provide preferential seating to be mutually determined by the student and teacher • Allow the use of a computer to complete assignments. • Establish expectations for correct spelling on assignments • Provide extra textbooks for home. • Provide Peer Support • Increase one on one time

Gifted and Talented Students	**504 Plan**
• Utilize advanced, accelerated, or compacted content • Provide assignments that emphasize higher- level thinking skills. • Allow for individual student interest • Gear assignments to development in areas of affect, creativity, cognition, and research skills • Allow for a variety in types of resources • Provide problem-based assignments with planned scope and sequence • Utilize inquiry-based instruction • Adjust the pace of lessons • Utilize Choice Boards • Provide Problem-Based Learning • Establish flexible Grouping	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and practice • Model skills / techniques to be mastered. • Provide extended time to complete class work • Provide copy of class notes • Break long assignments into smaller parts • Assist student in setting short term goals • Allow for preferential seating to be mutually determined by the student and teacher • Provide extra textbooks for home. • Model and reinforce organizational systems (i.e. color-coding) • Write out homework assignments, check student's recording of assignments

Interdisciplinary Connections	Computer Science and Design Thinking
Connections to NJSLS - English Language Arts *Writing* ● W.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4- LS1-1) *Speaking and Listening* ● SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-LS1-2) **Connections to NJSLS - Mathematics** ● 4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (4-LS1-1)	**Computer Science and Design Thinking Practices** 15. ✓ Fostering an Inclusive Computing and Design Culture 16. ✓ Collaborating Around Computing and Design 17. ☐ Recognizing and Defining Computational Problems 18. ✓ Developing and Using Abstractions 19. ✓ Creating Computational Artifacts 20. ✓ Testing and Refining Computational Artifacts 21. ✓ Communicating About Computing and Design **Computer Science and Design Thinking Standards** *Data and Analysis* ● Data can be organized, displayed, and presented to highlight relationships. ● 8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim. ● Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data. ● 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data. ● 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim. ● Many factors influence the accuracy of inferences and predictions. ○ 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data. *Engineering Design* ● Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge. Often, several design solutions exist, each better in some way than the others. ○ 8.2.5.ED.1: Explain the functions of a system and its subsystems. *Interaction of Technology and Humans* ● Societal needs and wants determine which new tools are developed to address real-world problems. ○ 8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system.

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	● A new tool may have favorable or unfavorable results as well as both positive and negative effects on society. Technology spurs new businesses and careers. ○ 8.2.5.ITH.2: Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have. ○ 8.2.5.ITH.3: Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use. *Nature of Technology* ● Technology innovation and improvement may be influenced by a variety of factors. Engineers create and modify technologies to meet people's needs and wants; scientists ask questions about the natural world. ○ 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies. Effects of Technology on the Natural World ● The technology developed for the human designed world can have unintended consequences for the environment. Technology must be continually developed and made more efficient to reduce the need for non-renewable resources. ○ 8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems. ○ 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. ○ 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.

Career Readiness, Life Literacies and Key Skills

Career Readiness, Life Literacies and Key Skills Practices

- Act as a responsible and contributing community member and employee.
- Attend to financial well-being.
- Consider the environmental, social and economic impacts of decisions.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them.
- Model integrity, ethical leadership and effective management.
- Plan education and career paths aligned to personal goals.
- Use technology to enhance productivity, increase collaboration and communicate effectively.
- Work productively in teams while using cultural/global competence.

Career Readiness, Life Literacies and Key Skills Standards

9.1 Personal Financial Literacy

- You can give back in areas that matter to you.
    - 9.1.5.CR.1: Compare various ways to give back and relate them to your strengths, interests, and other personal factors

9.2 Career Awareness, Exploration, Preparation, and Training

- An individual's passions, aptitude and skills can affect his/her employment and earning potential.
    - 9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
    - 9.2.5.CAP.2: Identify how you might like to earn an income.
    - 9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
    - 9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.
- Income and benefits can vary depending on the employer and type of job or career.
    - 9.2.5.CAP.5: Identify various employee benefits, including income, medical, vacation time, and lifestyle benefits provided by different types of jobs and careers.

9.4 Life Literacies and Key Skills

Creativity and Innovation

- Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions.
    - 9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
    - 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7).
- Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills
    - 9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
    - 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6).

Critical Thinking and Problem-solving

- The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.
    - 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
    - 9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
    - 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
    - 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).

Digital Citizenship

- Intellectual property rights exist to protect the original works of individuals. It is allowable to use other people's ideas in one's own work provided that proper credit is given to the original source
    - 9.4.5.DC.2: Provide attribution according to intellectual property rights guidelines using public domain or creative commons media.
    - 9.4.5.DC.3: Distinguish between digital images that can be reused freely and those that have copyright restrictions.

Global and Cultural Awareness

- Culture and geography can shape an individual's experiences and perspectives.
  - 9.4.5.GCA.1: Analyze how culture shapes individual and community perspectives and points of view (e.g., 1.1.5.C2a, RL.5.9, 6.1.5.HistoryCC.8).

Information and Media Literacy

- Digital tools and media resources provide access to vast stores of information, but the information can be biased or inaccurate.
  - 9.4.5.IML.1: Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., Social Studies Practice - Gathering and Evaluating Sources).
- Digital tools can be used to modify and display data in various ways that can be organized to communicate ideas.
  - 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). • 9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data
- Specific situations require the use of relevant sources of information.
  - 9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM. IPRET.5).

Technology Literacy

- Different digital tools have different purposes.
  - 9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings.
  - 9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images graphics, or symbols.
- Collaborating digitally as a team can often develop a better artifact than an individual working alone.
  - 9.4.5.TL.4: Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).
  - 9.4.5.TL.5: Collaborate digitally to produce an artifact (e.g., 1.2.5CR1d).

Climate Change

- Can be addressed through discussions of environmental factors, the speed at which they change, and how animals react to or are affected by the changing stimuli.
- Also addressed in Units 1 and 2

SEL Competencies

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

https://www.nj.gov/education/safety/wellness/selearning/index.shtml

District/School Formative Assessment Plan	District/School Summative Assessment Plan
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards.	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* **Benchmark Assessments:**

Teachers are encouraged to incorporate Formative Assessments into all lessons. During instruction, teachers will collect ongoing information on students' mastery of content through a variety of methods: ● Questioning: using Socratic method, probing questions, a hierarchical system in complexity (Bloom's Taxonomy) ● Exit tickets, rotational activities (stations), quizzes, and small group activities ● Classwork, homework, group work (formative assessment) ● Pre-Assessment, teacher's observation, class discussion, and journal	● Assessment 1.1: Mid-Unit Assessment ● Assessment 1.2: End of Unit Assessment ● Assessment 1.3: End of Unit Performance Assessment ● WPS Grade 4 MP 3 Competency 1 ● WPS Grade 4 MP 4 Competency 1- STEM Conference project **Standardized Assessments:** ● NJSLA **Other Summative Assessments:** Teachers are encouraged to design their own assessments (topic/module tests and quizzes) individually and/or with their department or grade-level partners, as per Uniform Grading Profile.

Targeted Academic Vocabulary

Environment, habitat, environmental conditions, biotic factors, abiotic factors, salinity, structures, sense, information, stimuli, perception, memories, instinct, terrestrial, aquatic, organism, survival, growth, behavior, reproduction, leaf litter,

District/School Tasks	District/School Primary and Supplementary Resources
● Common Formative Assessments ● Common District Summative Assessments ● See above Assessment Sections for more information	**District-Mandated Resources** ● FOSS Curriculum **Assessment Reosurces:** ● Available on FOSS - ThinkLink ● For additional resources, log in to https://edconnectnj.schoolnet.com **Other Resources:** ● Generation Genius: "Structure of Living Things", "Brain Processing of Senses", "Water Quality and Distribution" ● Famous African American Climate Scientists (Amistad Law Resource) ● Teaching about the Holocaust/Genocide, Prejudice & Bullying Using UDL (Grades K5) (Holocaust Law)

	• How well do you understand Climate Change? Quiz • NASA - Climate Kids **Project Ideas:** • SEL: How stress affects our reaction to stimuli
Instructional Best Practices and Exemplars	
See Appendix A for Instructional Best Practices and Exemplars	
Pacing Guide	
Grade 4 Unit 3 "Environments" Pacing Guide	

Appendix A: **Instructional Best Practices and Exemplars**

Appendix A: Instructional Best Practices and Exemplars: Unit 1

Appendix A: Instructional Best Practices and Exemplars: Unit 2

Appendix A: Instructional Best Practices and Exemplars: Unit 3

Appendix B:
Exemplars and Explanations

Appendix B: Instructional Exemplars and Explanations: Unit 1

Appendix B: Instructional Exemplars and Explanations: Unit 2

Appendix B: Instructional Exemplars and Explanations: Unit 3

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Appendix C:

<subject> Classroom Philosophy, Schedule, Structure, and Expectations