Willingboro
Public Schools

"Where Excellence is the Expectation"

Willingboro Public Schools
Grade 1 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:

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Within each unit, please find:

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Overview	**Content Standards - Arranged by Disciplinary Core Idea (DCI)** *Students who demonstrate understanding can:*	**Unit Focus**
Unit **Air and Weather**	**1-ESS1: Earth's Place in the Universe** ● **1-ESS1-1** Use observations of the sun, moon, and stars to describe patterns that can be predicted. [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.] ● **1-ESS1-2** Make observations at different times of year to relate the amount of daylight to the time of year. [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]	In this module, young students turn their focus upward. The anchor phenomena are the air that surrounds us and the natural objects that we see in the sky. Students explore the phenomenon that objects in the sky change position in predictable ways. They explore the natural world by using simple instruments and calendars to observe and monitor change. They use new tools and methods to build on their understanding of the weather and to find out about properties of air by exploring how objects interact with air. The driving question for the module is what is all around us and what do we observe in the sky above us? Students observe daily changes in air temperature and connect them to the daily movement of the Sun in the sky. They monitor changes in hours of daylight over the seasons and connect them to changing weather conditions. And they find the Moon in the day and night skies and monitor its movement over the month. Throughout the Air and Weather Module, students engage in science and engineering practices by collecting data and designing and using tools to answer questions. Students gain experiences that will contribute to the understanding of crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems and system models; structure and function; and stability and change.
Unit: ***Suggested Open Educational Resources***	● FOSS Next Generation Science Curriculum Resources ○ Think Link ○ Student Resource Books ● Generation Genius	

Overview	Content Standards - Arranged by Disciplinary Core Idea (DCI) *Students who demonstrate understanding can:*	Unit Focus
Unit **Sound and Light**	**1-PS4: Waves and their Applications in Technologies for Information Transfer** ● **1-PS4-1** Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. [Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.] ● **1-PS4-2** Make observations to construct an evidence-based account that objects can be seen only when illuminated. [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.] ● **1-PS4-3** Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror). The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.] [Assessment Boundary: Assessment does not include the speed of light.] ● **1-PS4-4** Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance. [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.] [Assessment Boundary: Assessment does not include technological details for how communication devices work.]	This module provides experiences that help students develop an understanding of how to observe and manipulate the phenomena of sound and light. They explore these dimensions of the natural world using simple tools and musical instruments. The driving question for the module is how do sound and light interact with objects? Students learn that sound comes from vibrating objects. They explore how to change sound volume and pitch, and develop simple models for how sound travels from a source to a receiver. With light, students also work with sources and receivers. They find out what happens when materials with different properties are placed in a beam of light, and explore how to create and change shadows and reflections. Students explore how to use sound and light devices to communicate information and compare the ways that animals use their senses (ears and eyes) to gather information about their environment. Throughout the Sound and Light Module, students engage in science and engineering practices by collecting data and designing and using tools to solve problems and answer questions. Students gain experiences that contribute to their understanding of the crosscutting concepts: patterns; cause and effect; and systems and system models.
	● FOSS Next Generation Science Curriculum Resources ○ Think Link ○ Student Resource Books	

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Overview	Content Standards - Arranged by Disciplinary Core Idea (DCI) *Students who demonstrate understanding can:*	Unit Focus
Suggested Open Educational Resources	● Generation Genius	
Unit **Plants and Animals**	**1-LS1: From Molecules to Organisms: Structure and Processes** ● **1-LS1-1** Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.] ● **1-LS1-2** Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations s) and the responses of the parents (such as feeding, comforting, and protecting the offspring).] **1-LS3: Heredity: Inheritance and Variation of Traits** ● **1-LS3-1** Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. [Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.] [Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]	This module engages students with the anchor phenomenon that young plants and animals (offspring) have structures and behaviors that help them grow and survive. The driving question for the module is how do young plants and animals survive in their habitat? Students observe firsthand the structures of plants and discover ways to propagate new plants from mature plants (from seeds, bulbs, roots, and stem cuttings). They observe and describe changes that occur as young plants grow, and compare classroom plants to those in the schoolyard. They design terrariums (habitat systems) and provide for the needs of both plants and animals living together in the classroom. Students explore the phenomenon of variation in the same kind of organism, including variation between young and adults. They learn about the behaviors of parents to help their young (offspring) survive. And they explore structure and function relationships as they sort different kinds of animal and plant structures. They use that understanding of structure and function, including animal sensory structures, to invent solutions to human problems. Throughout the Plants and Animals Module, students engage in science and engineering practices by collecting and interpreting data to build explanations and designing and using tools to answer questions. Students gain experiences that will contribute to the understanding of the crosscutting concepts of patterns; cause and effect; systems and system models; and structure and function.
Unit:	● FOSS Next Generation Science Curriculum Resources ○ Think Link ○ Student Resource Books	

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Overview	**Content Standards - Arranged by Disciplinary Core Idea (DCI)** *Students who demonstrate understanding can:*	**Unit Focus**
Suggested Open Educational Resources	• Generation Genius	

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Air and Weather: Life and Physical Science

Overview

In this module, young students turn their focus upward. The anchor phenomena are the air that surrounds us and the natural objects that we see in the sky. Students explore the phenomenon that objects in the sky change position in predictable ways. They explore the natural world by using simple instruments and calendars to observe and monitor change. They use new tools and methods to build on their understanding of the weather and to find out about properties of air by exploring how objects interact with air. The driving question for the module is what is all around us and what do we observe in the sky above us?

Students observe daily changes in air temperature and connect them to the daily movement of the Sun in the sky. They monitor changes in hours of daylight over the seasons and connect them to changing weather conditions. And they find the Moon in the day and night skies and monitor its movement over the month.

Throughout the Air and Weather Module, students engage in science and engineering practices by collecting data and designing and using tools to answer questions. Students gain experiences that will contribute to the understanding of crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems and system models; structure and function; and stability and change.

Essential Questions	Enduring Understandings
Overarching Guiding Questions: *When you look up at the sky, what do you see, and how does it change?* *How do daylight, temperature, and weather change through the seasons?* **Focus Question Investigation 1:** ● What can air do? **Focus Questions Investigation 2:** ● What types of clouds are in the sky today? ● What time of day can we observe the Moon? **Focus Question Investigation 3:** ● How do we observe and describe the wind? **Focus Questions Investigation 4:** ● How does the daylight, temperature and weather change through the seasons? ● What does the Moon look like at different times during a month?	***Anchoring Phenomena: Air*** ● Air is all around us. ● Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. ● Seasonal patterns of sunrise and sunset can be observed, described, and predicted. ● There are distinct types of clouds; and cloud type can help predict weather.

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Air and Weather: Life and Physical Science

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

Students who demonstrate understanding can:

1-ESS1: Earth's Place in the Universe

- **1-ESS1-1** Use observations of the sun, moon, and stars to describe patterns that can be predicted. [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]
- **1-ESS1-2** Make observations at different times of year to relate the amount of daylight to the time of year. [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]

Science and Engineering Practices

Planning and Carrying out Investigations

- Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.
  - Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)

Analyzing and Interpreting Data

- Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
  - Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1- ESS1-1)

Disciplinary Core Ideas

ESS1.A: The Universe and its Stars

- Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1)

ESS1.B: Earth and the Solar System

- Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)

Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1), (1-ESS1-2)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes natural events happen today as they happened in the past. (1-ESS1-1)
- Many events are repeated. (1- ESS1-1)

Student Learning Objectives

Students will be able to...

Investigation one: Water and Observation

- investigate water —a critical factor defining weather and climate.
- explore the phenomena of water's observable properties, its interactions with other materials and substrates, and make connections to outdoor experiences with water.
- compare the ways water interacts with four different surfaces.
- compare the rate of flow of water on different slopes. They explore how sponges interact with water to soak up spills.
- explore how water interacts with natural materials outdoors.

Investigation two: Hot Water Cold Water

- investigate properties of water and observe the phenomenon of how temperature affects water's state and density.
- use standard metric units to measure temperature and observe the properties of water as it is heated, cooled, and frozen.
- construct a thermometer and find that water expands as it is heated.
- compare the density of water at different temperatures and find that warm water is less dense than cool water, and that ice is less dense than liquid water.
- investigate melting of ice in different conditions, outside.

Investigation Three:Weather and Water

- compare local weather data that they observe and collect to meteorologists' forecasts and historical weather data.
- explore the phenomena of evaporation and condensation, which account for the transformations of water between liquid to gas.
- find out how these transformations are the key drivers of the water cycle, the mechanism that redistributes water over the whole planet.

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 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 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*	**Computer Science and Design Thinking Practices** 1. ☐ Fostering an Inclusive Computing and Design Culture

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-ESS1-1), (1-ESS1-2)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-1), (1-ESS1-2)

Connections to NJSLS - Mathematics

- MP.2 Reason abstractly and quantitatively. (1-ESS1-2)
- MP.4 Model with mathematics. (1-ESS1-2)
- MP.5 Use appropriate tools strategically. (1-ESS1-2)
- 1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)
- 1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)

2. ✓ Collaborating Around Computing and Design
3. ☐ Recognizing and Defining Computational Problems
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

- Individuals collect, use, and display data about individuals and the world around them.
    - 8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats.
- Data can be used to make predictions about the world.
    - 8.1.2.DA.3: Identify and describe patterns in data visualizations.
    - 8.1.2.DA.4: Make predictions based on data using charts or graphs.

Algorithms & Programming

- Complex tasks can be broken down into simpler instructions, some of which can be broken down even further.
    - 8.1.2.AP.4: Break down a task into a sequence of steps.

Engineering Design

- Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions.
    - 8.2.2.ED.1: Communicate the function of a product or device.
    - 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.
    - 8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process.
- Limitations (constraints) must be considered when engineering designs.
    - 8.2.2.ED.4: Identify constraints and their role in the engineering design process.

Nature of Technology

- Innovation and the improvement of existing technology involves creative thinking

	○ 8.2.2.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

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

Civic Responsibility

- 9.1.2.CR.1: Recognize ways to volunteer in the classroom, school and community.
- 9.1.2.CR.2: List ways to give back, including making donations, volunteering, and starting a business

9.2 Career Awareness, Exploration, Preparation, and Training

Career Awareness and Planning

- 9.1.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job

9.4 Life Literacies and Key Skills

Creativity and Innovation

- 9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
- 9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).

Critical Thinking and Problem-solving

- 9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).
- 9.4.2.CT.2: Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
- 9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive).

Digital Citizenship

- 9.4.2.DC.2: Explain the importance of respecting digital content of others
- 9.4.2.DC.7: Describe actions peers can take to positively impact climate change (e.g., 6.3.2.CivicsPD.1).

Information and Media Literacy

- 9.4.2.IML.2: Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).

Technology Literacy

- 9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1).
- 9.4.2.TL.2: Create a document using a word processing application.

Climate Change

Addressed in Unit 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
Air, sun, moon, stars, sky, patterns, observe, predict, describe, seasonal, sunrise, sunset, daylight, clouds, cloud type, predict, weather.

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:** • SEL Resource Books (SEL Resource) • Famous African American Climate Scientists (Amistad) • Teaching about the Holocaust/Genocide, Prejudice & Bullying Using UDL (Grades K5) (Holocaust) • Climate Change Activities for Early Elementary (Climate Change) • Generation Genius: "Four Seasons and Day Length", "Patterns in the Sky", "Introduction to Weather", "Sunlight Warms the Earth", etc • Youtube.com • Brainpop.com • www.teachersdomain.org • www.sciencenetlinks.com • Thesciencespot.com • Mystery Science • Quizlet.com • Kahoot.com **Project Ideas:**

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	• Sunrise/sunset diary • Bar charts for number of sunny/windy/rainy days each month

Instructional Best Practices and Exemplars

See Appendix A for Instructional Best Practices and Exemplars

Pacing Guide

1st Grade Unit 1 "Air and Weather" Pacing Guide

Sound and Light: Life and Physical Sciences

Overview

This module provides experiences that help students develop an understanding of how to observe and manipulate the phenomena of sound and light. They explore these dimensions of the natural world using simple tools and musical instruments. The driving question for the module is how do sound and light interact with objects? Students learn that sound comes from vibrating objects. They explore how to change sound volume and pitch, and develop simple models for how sound travels from a source to a receiver. With light, students also work with sources and receivers. They find out what happens when materials with different properties are placed in a beam of light, and explore how to create and change shadows and reflections. Students explore how to use sound and light devices to communicate information and compare the ways that animals use their senses (ears and eyes) to gather information about their environment.

Throughout the Sound and Light Module, students engage in science and engineering practices by collecting data and designing and using tools to solve problems and answer questions. Students gain experiences that contribute to their understanding of the crosscutting concepts: patterns; cause and effect; and systems and system models.

Essential Questions	Enduring Understandings
Overarching Driving Questions: *How do sound and light interact with objects?* *How can we change the properties of sound?* *How does light travel and change direction?* ***Focus Questions for Investigation 1, Sound and Vibrations:*** • What causes sound? • What kinds of sounds are easy to identify? • What information does sound give us? ***Focus Questions for Investigation 2 Changing Sound:*** • How can we change the properties of sound?	**Anchoring Phenomena: Sound and Light** • Sound can make matter vibrate, and vibrating matter can make sound. • Objects can be seen if light is available to illuminate them or if they give off their own light. • Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. • People also use a variety of devices to communicate (send and receive information) over long distances.

• How can we make loud and soft sounds? • How can we make low-pitched and high-pitched sounds? ***Focus Questions for Investigation 3 Light and Shadows:*** • What is shadow? • What makes a shadow? • What happens when different materials block light? ***Focus Questions for Investigation 4 Light and Mirrors:*** • How do animals (including humans) use light? • How can we redirect a light beam? • How can we communicate with light?	

Sound and Light: Life and Physical Sciences

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

Students who demonstrate understanding can:

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

- **1-PS4-1** Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. [Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.]
- **1-PS4-2** Make observations to construct an evidence-based account that objects can be seen only when illuminated. [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]
- **1-PS4-3** Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror). The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.] [Assessment Boundary: Assessment does not include the speed of light.]
- **1-PS4-4** Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance. [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.] [Assessment Boundary: Assessment does not include technological details for how communication devices work.]

Science and Engineering Practices

Planning and Carrying Out Investigations

Sound and Light: Life and Physical Sciences

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

- Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.
    - Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. (1-PS4-1), (1- PS4-3)

Constructing Explanations and Designing Solutions

- Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.
    - Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-PS4-2)
    - Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4)

Disciplinary Core Ideas

PS4.A: Wave Properties

- Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)

PS4.B: Electromagnetic Radiation

- Objects can be seen if light is available to illuminate them or if they give off their own light. (1- PS4-2)
- Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (1-PS4-3)

PS4.C: Information Technologies and Instrumentation

- People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)

Crosscutting Concepts

Cause and Effect

- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1), (1-PS4-2), (1-PS4-3)

Connections to Engineering, Technology, and Applications of Science

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

- People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4)

Connections to Nature of Science

Scientific Investigations Use a Variety of Methods

- Science investigations begin with a question. (1-PS4-1)
- Scientists use different ways to study the world. (1-PS4-1)

Student Learning Objectives

Students will be able to…

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Investigation 1:
- observe the phenomenon of sound using a table fiddle, tuning forks, a tone generator, cups, sticks, and rubber bands.
- look for vibrations at the sound source and come up with words to describe different sounds.
- learn how to discriminate between different kinds of sounds and what information sounds convey.
- find out about sounds that different animals make.

Investigation 2:
- use simple instruments (xylophone, one-string guitar) to investigate how to change the volume of sound (loud and soft) and the pitch of sound (high and low).
- develop a model using a spoon gong, to explain the phenomenon of sound traveling from a source to a receiver.
- redesign the spoon gong to make a device to both send and receive sound.
- learn about sound receivers used by different animals.

Investigation 3:
- use flashlights, sunlight, and solid materials that block light to explore the phenomena of light and shadows.
- create and change shadows and investigate how light interacts with objects that are transparent, translucent, and opaque.

Investigation 4:
- explore the phenomenon of light travel by positioning mirrors to reflect images so they can see their own eyes and view objects behind them.
- investigate how to use one and two mirrors to direct light to different locations.
- experience the phenomenon that objects can be seen only when light is available.
- explore the shapes and location of eyes on different animals.
- read about devices that use light to communicate information.

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	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	• Pair visual prompts with verbal presentations • Ask students to restate information, directions, and assignments. • Provide repetition and 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.

• 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	• 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	• 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.1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. (1-PS4-2)
- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-1), (1-PS4-2), (1-PS4-3), (1-PS4- 4)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1), (1-PS4-2), (1-PS4-3)

Speaking and Listening

- SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-1), (1-PS4-2), (1-PS4-3)

Connections to NJSLS - Mathematics

- MP.5 Use appropriate tools strategically. (1-PS4-4)
- 1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1- PS4-4)
- 1.MD.A.2 Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. (1-PS4-4)

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
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

- Individuals collect, use, and display data about individuals and the world around them.
  - 8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats.
- Data can be used to make predictions about the world.
  - 8.1.2.DA.3: Identify and describe patterns in data visualizations.
  - 8.1.2.DA.4: Make predictions based on data using charts or graphs.

Algorithms & Programming

- Complex tasks can be broken down into simpler instructions, some of which can be broken down even further.
  - 8.1.2.AP.4: Break down a task into a sequence of steps.

Engineering Design

- Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions.
  - 8.2.2.ED.1: Communicate the function of a product or device.
  - 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.
  - 8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process.
- Limitations (constraints) must be considered when engineering designs.
  - 8.2.2.ED.4: Identify constraints and their role in the engineering design process.

Nature of Technology

	● Innovation and the improvement of existing technology involves creative thinking ○ 8.2.2.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

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

Civic Responsibility

- 9.1.2.CR.1: Recognize ways to volunteer in the classroom, school and community.
- 9.1.2.CR.2: List ways to give back, including making donations, volunteering, and starting a business

9.2 Career Awareness, Exploration, Preparation, and Training

Career Awareness and Planning

- 9.1.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job

9.4 Life Literacies and Key Skills

Creativity and Innovation

- 9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
- 9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).

Critical Thinking and Problem-solving

- 9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).
- 9.4.2.CT.2: Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3). • 9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive).

Digital Citizenship

- 9.4.2.DC.7: Describe actions peers can take to positively impact climate change (e.g., 6.3.2.CivicsPD.1).

Information and Media Literacy

- 9.4.2.IML.2: Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).

Technology Literacy

- 9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1).
- 9.4.2.TL.2: Create a document using a word processing application.

Climate Change

Addressed in Unit 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 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
Sound, vibrate, soft, loud, volume, low-pitch, high-pitch, energy, light, shadow, reflect, reflection, communicate, senses, ears, eyes, sight

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:** • Mae Jemison Biography **(Amistad)** • Positive Affirmation Frames **(SEL Resource)** • Teaching about the Holocaust/Genocide, Prejudice & Bullying Using UDL (Grades K5) **(Holocaust)** • Climate Change Activities for Early Elementary **(Climate Change)** • Astronaut Kalpana Chawla, Reaching for the Stars (Amazing Asian Americans) **(Diversity, Equity, and Inclusion)** • Generation Genius: “Four Seasons and Day Length”, “Patterns in the Sky”, “Introduction to Weather”, “Sunlight Warms the Earth”, etc • Youtube.com • www.teachersdomain.org • www.sciencenetlinks.com • Thesciencespot.com • Mystery Science • Quizlet.com • Kahoot.com • Ask Dr. Universe http://www.howstuffworks.com/ • NASA Solar System Exploration: Home • Saturn, a Planet with Rings, First Grade Reading Passage • Educator Guide: Moon Phases • Science Made Simple • Brain Pop video and quiz - Light

	● Website with resources for sound and light: PBS Learning Media ● First grade Lesson Light it up!! ● First grade Lesson What makes sound? ● Suggested Books: ○ Mae Among the Stars by Roda Ahmed **(Amistad)** ○ The Listening Walk by Paul Showers ○ All About Sound by Lisa Trumbauer ○ All About Light by Lisa Trumbauer ○ Nothing Sticks Like a Shadow by Ann Tompert ○ Flashlight by Lizi Boyd ○ Z in! Zin! Zin! A Violin by Lloyd Moss ○ What Makes a Shadow? by Clyde Robert Bulla **Project Ideas:** ● Flashlight Mirror "Tag" ● Building a Kaliedoscope ● Building an Instrument
Instructional Best Practices and Exemplars	
See Appendix A for Instructional Best Practices and Exemplars	
Pacing Guide	
1st Grade Unit 2 "Sound and Light" Pacing Guide	

Plants and Animals: Life and Physical Science

Overview

This module engages students with the anchor phenomenon that young plants and animals (offspring) have structures and behaviors that help them grow and survive. The driving question for the module is how do young plants and animals survive in their habitat? Students observe firsthand the structures of plants and discover ways to propagate new plants from mature plants (from seeds, bulbs, roots, and stem cuttings). They observe and describe changes that occur as young plants grow, and compare classroom plants to those in the schoolyard. They design terrariums (habitat systems) and provide for the needs of both plants and animals living together in the classroom. Students explore the phenomenon of variation in the same kind of organism, including variation between young and adults. They learn about the behaviors of parents to help their young (offspring) survive. And they explore structure and function relationships as they sort different kinds of animal and plant structures. They use that understanding of structure and function, including animal sensory structures, to invent solutions to human problems.

Throughout the Plants and Animals Module, students engage in science and engineering practices by collecting and interpreting data to build explanations and designing and using tools to answer questions. Students gain experiences that will contribute to the understanding of the crosscutting concepts of patterns; cause and effect; systems and system models; and structure and function.

Essential Questions

Overarching Driving Questions:

How do young plants and animals survive in their habitat?
What do offspring get from their parents that help young survive?

Focus Questions for Investigation 1:

- What are the structures of a young plant growing from a seed?
- How many different kinds of plants live in an area of the schoolyard?

Focus Questions for Investigation 2:

- How can we make a new plant from an old one?

Focus Questions for Investigation 3:

- How do plants and animals survive in their habitat?
- What structures or behaviors do plants or animals have that help them live in their habitat?

Focus Questions for Investigation 4:

- What do offspring get from their parents that help young survive?
- How do the plants in the schoolyard compare to the plants studied in class?

Enduring Understandings

Anchoring Phenomenon: Young Plants and Animals Grow

- Young plants have many similar structures, even if they are different kinds of plant.
- Plants grow in predictable patterns.
- There are many kinds of plants all around us.
- There are a variety of ways for plants to reproduce, including through seeds, tubers, cuttings, and more.
- Plants and animals have basic needs, such as food, water, and space.
- Plants and animals have structures and behaviors that help them survive.
- Plants and animals have specific needs, structures, and behaviors to survive the winter.
- Plant and animal parents have specific behaviors to help their offspring survive.
- There are many different kinds of plants and animals all around us.

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Plants and Animals: Life and Physical Sciences

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

Students who demonstrate understanding can:

1-LS1: From Molecules to Organisms: Structure and Processes

- **1-LS1-1** Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.]
- **1-LS1-2** Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations s) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]

1-LS3: Heredity: Inheritance and Variation of Traits

- **1-LS3-1** Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. [Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.] [Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information

- Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.
  - Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)

Constructing Explanations and Designing Solutions

- Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.
  - Use materials to design a device that solves a specific problem or a solution to a specific problem. (1- LS1-1)
  - Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1- LS3-1)

Disciplinary Core Ideas

LS3.A: Inheritance of Traits

- Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents. (1- LS3-1)

LS3.B: Variation of Traits

- Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1)

LS1.A: Structure and Function

- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1)

LS1.B: Growth and Development of Organisms

- Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)

LS1.D: Information Processing

Plants and Animals: Life and Physical Sciences

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

- Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)

Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-LS3-1), (1-LS1-2)

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)

Connections to Engineering, Technology, and Applications of Science

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

- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. (1-LS1-1)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Scientists look for patterns and order when making observations about the world. (1-LS1-2)

Student Learning Objectives

Students will be able to…

Investigation 1: Origin of seeds

- conduct a seed hunt by opening fresh fruit and locating the seeds.
- describe and compare seed properties.
- examine and sort a selection of seeds—bean, pea, sunflower, and corn.
- investigate the effect water has on seeds by setting up seed sprouters and observing and recording changes over a week.
- systematically find out how much water lima beans soak up in a day.
- investigate seed dispersal mechanisms of plants.

Investigation 2 : Growing Further

- examine germinated seeds to determine similarities and differences in the way the organisms grow.
- set up a hydroponic garden to observe the life cycle of a bean plant.
- go outdoors to investigate the roots and shoots of various plants.
- use tools to dig up plants and compare the structures above ground to those below ground.
- learn about plant structures and functions, through direct experience and readings.

Investigation 3: Meet the Crayfish

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- analyze and observe crayfish by keeping a record of the structures of a crustacean, the crayfish, and compare it to other organisms.
- establish a feeding and maintenance schedule for the organisms.
- investigate crayfish behavior and map where the crayfish spend time within their habitat.
- learn about adaptations of organisms in different environments, including different kinds of group and social behaviors, through readings, organism cards, and a video.
- use a computer simulation to study variation of traits in species and explore how variation might affect survival of individuals.
- engage in an outdoor simulation activity to explore food chains.

Invesitigation 4 : Human Body

- observe the articulated human skeletal system in action, use posters and a sense of touch to estimate and refine a count of the 206 human bones, and build skeleton puzzles from memory.
- dissect rodent bones from owl pellets and compare them to human bones.
- explore joints and their role in movement focusing on opposable thumbs.
- build operational models of muscle-bone systems to see how muscles move bones.
- investigate their skin by making and analyzing fingerprint patterns.

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. • Provide copy of class notes • Distribute study guide for classroom tests.	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 • Define essential vocabulary in context • Use graphic organizers, visuals, manipulatives and other concrete materials	• 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 extra textbooks for home. • Provide Peer Support • Increase one on one time

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Interdisciplinary Connections	Computer Science and Design Thinking
Connections to NJSLS - English Language Arts *Reading* • RL.1.1 Ask and answer questions about key details in a text. (1-LS1-2), (1-LS3-1) • RL.1.2 Identify the main topic and retell key details of a text. (1-LS1-2) • RL.1.10 With prompting and support, read and comprehend stories and poetry at grade level text complexity or above. (1-LS1-2)	**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 4. ✓ Developing and Using Abstractions

Writing

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS1-1)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-LS3-1)

Connections to NJSLS - Mathematics

- 1.NBT.B.3 Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols >, =, and <. (1-LS1-2)
- 1.NBT.C.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning uses. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2)
- 1.NBT.C.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2)
- 1.NBT.C.6 Subtract multiples of 10 in the range 10–90 from multiples of 10 in the range 10–90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2)

5. ☐ Creating Computational Artifacts
6. ☐ Testing and Refining Computational Artifacts
7. ☐ Communicating About Computing and Design

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Nature of Technology

- Innovation and the improvement of existing technology involves creative thinking
  - 8.2.2.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

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

Civic Responsibility

- 9.1.2.CR.1: Recognize ways to volunteer in the classroom, school and community.
- 9.1.2.CR.2: List ways to give back, including making donations, volunteering, and starting a business

9.2 Career Awareness, Exploration, Preparation, and Training

Career Awareness and Planning

- 9.1.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job

9.4 Life Literacies and Key Skills

Creativity and Innovation

- 9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
- 9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).

Critical Thinking and Problem-solving

- 9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).
- 9.4.2.CT.2: Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3). • 9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive).

Digital Citizenship

- 9.4.2.DC.7: Describe actions peers can take to positively impact climate change (e.g., 6.3.2.CivicsPD.1).

Information and Media Literacy

- 9.4.2.IML.2: Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).

Technology Literacy

- 9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1).
- 9.4.2.TL.2: Create a document using a word processing application.

Climate Change
• **1-LS1-1** Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
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 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
Offspring, young, parent, reproduce, structures, behaviors, plants, animals, patterns, prediction, biodiversity, diversity, variation, basic needs, food, water, space, seed, tuber, cuttings, winter, survive.

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:
	• Positive Affirmation Frames (SEL Resource)
	• Famous African American Climate Scientists (Amistad)
	• Teaching about the Holocaust/Genocide, Prejudice & Bullying Using UDL (Grades K5) (Holocaust)
	• Climate Change Activities for Early Elementary (Climate Change)
	• Generation Genius: "Four Seasons and Day Length", "Patterns in the Sky", "Introduction to Weather", "Sunlight Warms the Earth", etc
	• Youtube.com
	• Brainpop.com
	• www.teachersdomain.org
	• www.sciencenetlinks.com
	• Thesciencespot.com
	• Mystery Science
	• Quizlet.com
	• Kahoot.com
	• Suggested Books:
	  ○ National Geographic Kids: George Washington Carver (2016)
	  ○ Who Was? George Washington Carver by Jim Gigliotti (2015)
	
	Project Ideas:
	• Growing plants
	• Backyard biodiversity journal
	• Growth Mindset Activities (Plant Growth, SEL Growth Mindset)

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

Pacing Guide
Grade 1 Unit 3 "Plants and Animals" 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

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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

Appendix C:

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

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