

Physical Science- Sound and Light

Content Area: **Science**
Course(s): **Grade 1**
Time Period: **First Trimester**
Length: **12 Weeks**
Status: **Published**

Unit Overview

This unit develops students' understanding of how to observe and manipulate sound and light. They explore these dimensions of the natural world using simple tools and musical instruments.

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 senses (ears and eyes) to gather information about their environment.

Throughout this unit, 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.

STAGE 1- DESIRED RESULTS

Educational Standards

2020 New Jersey Student Learning Standards- Science

Performance Expectations

Physical Sciences

SCI.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.
SCI.1-PS4-1	Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
SCI.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.
SCI.1-PS4	Waves and their Applications in Technologies for Information Transfer
SCI.1-PS4-2	Make observations to construct an evidence-based account that objects can be seen only when illuminated.

Life Sciences

SCI.1-LS3-1	Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
SCI.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.
SCI.1-LS3	Heredity: Inheritance and Variation of Traits
SCI.1-LS1	From Molecules to Organisms: Structures and Processes
SCI.1-LS1-2	Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

Earth and Space Sciences

SCI.1-LS3-1	Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
SCI.1-ESS1-2	Make observations at different times of year to relate the amount of daylight to the time of year.
SCI.1-LS3	Heredity: Inheritance and Variation of Traits
SCI.1-ESS1	Earth's Place in the Universe
SCI.1-ESS1-1	Use observations of the sun, moon, and stars to describe patterns that can be predicted.

Engineering Design

SCI.K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
SCI.K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
SCI.K-2-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Science and Engineering Practices

- Practice 1: Asking Questions and Defining Problems
- Practice 2: Developing and Using Models
- Practice 3: Planning and Carrying Out Investigations
- Practice 4: Analyzing and Interpreting Data
- Practice 5: Using Mathematics and Computational Thinking
- Practice 6: Constructing Explanations and Designing Solutions
- Practice 7: Engaging in Argument from Evidence
- Practice 8: Obtaining, Evaluating, and Communicating Information

Cross Cutting Concepts

- Patterns
- Cause and Effect
- Scale, Proportion, and Quantity
- Systems and System Models
- Energy and Matter
- Structure and Functions
- Stability and Change

Disciplinary Core Ideas

Physical Sciences

- PS1. Matter and Its Interaction
- PS1.A: Structure and Properties of Matter
- PS1.B: Chemical Reactions
- PS1.C: Nuclear Processes
- PS2. Motion and Stability: Forces of Interaction
- PS2.A: Forces and Motion
- PS2.B: Types of Interactions
- PS2.C: Stability and Instability in Physical Systems
- PS3. Energy
- PS3.A: Definitions of Energy

- PS3.B: Conservation of Energy and Energy Transfer
- PS3.C: Relationship Between Energy and Forces
- PS3.D: Energy and Chemical Processes in Everyday Life
- PS4. Waves and Their Applications in Technologies for Information Transfer
- PS4.A: Wave Properties
- PS4.B: Electromagnetic Radiation
- PS4.C: Information Technologies and Instrumentation

Life Sciences

- LS1. From Molecules to Organisms: Structure and Processes
- LS1.A: Structure and function
- LS1.B: Growth and development of organisms
- LS1.C: Growth and development of organisms
- LS1.D: Information Processing
- LS2. Ecosystems: Interactions, Energy, and Dynamics
- LS2.A: Interdependent relationships in ecosystems
- LS2.B: Cycles of matter and energy transfer in ecosystems
- LS2.C: Ecosystem dynamics, functioning, and resilience
- LS2.D: Social interactions and group behavior
- LS3. Heredity: Inheritance and Variation of Traits
- LS3.A: Inheritance of traits
- LS3.B: Variation of traits
- LS4. Biological Evolution: Unity and Diversity
- LS4.A: Evidence of common ancestry and diversity
- LS4.B: Natural selection
- LS4.C: Adaptation
- LS4.D: Biodiversity and humans

Earth and Space Sciences

- ESS1. Earth's Place in the Universe
- ESS1.A: The universe and its stars
- ESS1.B: Earth and the solar system
- ESS1.C: The history of planet Earth
- ESS2. Earth's System
- ESS2.A: Earth materials and systems
- ESS2.B: Plate tectonics and large-scale system interactions

- ESS2.C: The roles of water in Earth’s surface processes
- ESS2.D: Weather and climate
- ESS2.E: Biogeology
- ESS3. Earth and Human Activity
- ESS3.A: Natural resources
- ESS3.B: Natural hazards
- ESS3.C: Human impacts on Earth systems
- ESS3.D: Global climate change

Essential Questions

Investigation 1: Sound and Vibrations

Part 1: What causes sound?

Part 2: What kind of sounds are easy to identify?

Part 3: What information does sound give us?

Investigation 2: Changing Sound

Part 1: How can we make loud and soft sounds?

Part 2: How can we make low-pitched and high-pitched sounds?

Part 3: How does sound travel from the source to the receiver?

Part 4: How can we use sound to communicate over long distance?

Investigation 3: Light and Shadows

Part 1: What makes a shadow?

Part 2: How can we use the Sun to create shadows?

Part 3: What happens when different materials block light?

Investigation 4: Light and Mirrors

Part 1: How can we redirect a light beam?

Part 2: What can we see with a mirror?

Part 3: What can be seen with no light?

Part 4: How can we communicate with light?

Enduring Understanding

This physical science unit develops students' understanding of how: 1) To explain the structure, properties, and interactions of matter; 2) Waves are used to transfer energy and information; and 3) Organisms live, grow, respond to their environment, and reproduce.

Students will know...

VOCABULARY

Investigation 1: Sound and Vibrations

back-and –forth motion, compare, ear, hear, identify, information, listen, loud, observe, pluck, property, soft, sound, sound receiver, sound source, table fiddle, tuning fork, vibrate, vibration

Investigation 2: Changing Sound

communicate, direction (away, toward), gentle, guitar, hard, high-pitched, instrument, kalimba, length, low-pitched, medium-pitched, message, pitch, spoon-gong system, string, system, travel, volume, xylophone

Investigation 3: Light and Shadows

block, dark, flashlight, light, light source, opaque, shade, shadow, sun, sunlight, translucent, transparent

Investigation 4: Light and Mirrors

angle, eye, light detector, mirror, model, redirect, reflect, reflection, vision

Students will be able to...

Investigation 1: Sound and Vibrations

- Plan and carry out investigations with a variety of objects to see the rapid back-and-forth motion causes sounds and that sounds cause vibrations.
- Analyze and interpret data by describing observations of simple systems that vibrate to make sounds.
- Construct explanations about what causes sound, using firsthand observations to develop claims from evidence.
- Obtain, evaluate, and communicate information about sound and its properties using grade- appropriate text, and communicate information orally and in written forms.

Investigation 2: Changing Sound

- Ask questions and define problems about the design of a spoon-gong system and a string-cup telephone used to send and receive messages.
- Develop and use models to compare the similarities (common features) and differences in the models (drawing and diagrams) of spoon-gong systems.
- Plan and carry out investigations by observing the sounds made by materials that are plucked or hit hard or gently (loud and soft volume) and the sounds made by materials of the same kind but different length (different pitch).
- Analyze and interpret data by describing observations of simple systems that make sound, and by drawing pictures and diagrams of systems to communicate answers to questions about the nature of sound and how sound travels from the source to the receiver.
- Construct explanations and design solutions by assembling systems that serve specific functions (send messages through string) and making firsthand observations to develop claims from evidence.
- Obtain, evaluate, and communicate information about sound and its properties using grade- appropriate text, and communicating information orally and in writing.

Investigation 3: Light and Shadows

- Plan and carry out investigations by observing how light and objects of different materials interact to form shadows, and by making predictions about shadows.
- Analyze and interpret data by describing observations of shadows cast by different objects and how the quality of the shadow is affected by the amount of light that goes through different kinds of materials; draw pictures and diagrams to communicate answers to questions about light and shadows.
- Construct explanations by making claims supported by evidence derived from firsthand observations.
- Obtain, evaluate, and communicate information about how light travels through different materials and how shadows are made using grade-appropriate text, and communicating information orally and in writing.

Investigation 4: Light and Mirrors

- Ask questions about the design of systems that redirect light from place to place and systems that communicate information using light.
- Develop and use models to compare the similarities (common features) and differences in the models (drawings and diagram) of light and mirror systems, and to demonstrate patterns in the behavior of light.
- Plan and carry out investigations by observing how light can be redirected with mirrors.
- Analyze and interpret data by describing observations of simple systems that redirect light (flashlights and mirrors), and by drawing pictures and diagrams of systems to communicate answers to questions about how

light travels from place to place.

- Construct explanations and design solutions by assembling systems that serve specific functions (mirror and light systems and devices that communicate information over distance) and making firsthand observations to develop claims from evidence.
- Obtain, evaluate, and communicate information about light and mirrors and about animals' eyes using grade-appropriate text, and communicate information orally and in writing.

STAGE 2- EVIDENCE OF LEARNING

Formative Assessment Suggestions

- 3- Minute Pause
- A-B-C Summaries
- Analogy Prompt
- Choral Response
- Debriefing
- Exit Card / Ticket
- Hand Signals
- Idea Spinner
- Index Card Summaries
- Inside-Outside Circle Discussion (Fishbowl)
- Journal Entry
- Misconception Check
- Observation
- One Minute Essay
- One Word Summary
- Portfolio Check
- Questions & Answers
- Quiz
- Self-Assessment
- Student Conference
- Think-Pair-Share
- Web or Concept Map

Authentic Assessments Suggestions

Investigation 1: Sound and Vibrations

- Science notebook entries
- Performance assessment
- Investigation 1 I-Check

Investigation 2: Changing Sounds

- Science notebook entries
- Performance assessment
- Investigation 2 I-Check

Investigation 3: Light and Shadows

- Science notebook entries
- Performance assessment
- Investigation 3 I-Check

Investigation 4: Light and Mirrors

- Science notebook entries
- Performance assessment
- Investigation 4 I-Check

Benchmark Assessments

Unit Post Test

STAGE 3- LEARNING PLAN

Instructional Map

Investigation 1: Sounds and Vibrations

Investigation 2: Changing Sound

Investigation 3: Light and Shadows

Investigation 4: Light and Mirrors

Investigation 1: Sounds and Vibrations

Investigation 1: Part 1- Making Sounds

Students discuss common animals, machines, and objects that make sound. They use cups with rubber bands and flat sticks to produce sound. They focus on the source of the sound and find that it is vibrating. Students explore a table fiddle to confirm their observations. They find that sounds always come from objects that are vibrating, and that vibrating objects always make sound. Sound can be stopped by stopping the object's vibration.

Content:

- Vibration is a rapid back-and-forth motion.
- Vibrating objects make sound; sound always comes from a vibrating object.
- Objects stop making sound when they stop vibrating.

Investigation 1: Part 2- Hearing Sound

Students practice sound discrimination by listening to the sound that objects make when dropped. They work with a partner to identify objects by the properties of their sound. They investigate how tuning forks and a tone generator make sounds and observe the effect of those sounds on other objects.

Content:

- Vibrating objects make sound; sound always comes from a vibrating object.
- Sound can make objects vibrate.
- Sounds can convey information.

Ears are one kind of sound receiver.

Investigation 1: Part 3- Outdoor Sounds

Students go outside and sit quietly to listen for sounds in the environment. Some sounds are the result of human activities, and some have natural sources. Students attempt to determine the sound source for each environmental sound they identify.

Content:

- Ears are one kind of sound receiver.

- Sound sources can be natural or human-made.
- Words can describe the sounds objects make.

Investigation 2: Changing Sounds

Investigation 2: Part 1- Changing Volume

Students investigate two systems: the one-string guitar and the xylophone. They confirm that sounds come from objects that are vibrating, and that vibrating objects always make sound. Sound can be stopped by stopping the object's vibration. The added concept is that sounds can differ in volume over a range from soft to loud. Students find a relationship between the amount of energy used to produce a sound and the volume of the sound.

Content:

- Vibration is a rapid back-and-forth motion.
- Vibrating objects make sound; sound always comes from a vibrating source.
- Volume is how loud or soft a sound is.

Investigation 2: Part 2- Changing Pitch

Students observe the volume and pitch of the table fiddle. They use the one-string guitar and xylophone to change the pitch of the sound. Students record their understanding of the relationship between length and pitch. They apply their understanding of pitch and volume to a kalimba.

Content:

- Pitch is how high or low a sound is.
- Large objects tend to vibrate slower than small objects.
- High-pitched sounds come from objects that vibrate rapidly.

Investigation 2: Part 3- Spoon-Gong System

Students use a spoon-gong system to review their understanding of how to produce sound and to develop a simple model of how sound travels.

Content:

- A system is made up of parts that work together.
- Sound vibrations travel through objects and the air.

- Drawings can show how sound travels from a source to the receiver.

Investigation 2: Part 4- Sound Challenges

Students apply their knowledge of how sounds travel to make a device to send whisper messages over a distance. They modify two spoon-gong systems to make a device to send a message from one end of a string to the other. They improve on the device to make a better string telephone.

Content:

- Vibrating objects make sound; sound always comes from a vibrating object.
- Engineers design communication devices.

Investigation 3: Light and Shadows

Investigation 3: Part 1- Making Shadows

Students use a flashlight as a light source to find out what happens when you block light with an object. They determine how to position the light source relative to the object and observe the resulting shape and size of the shadow. They observe what happens to the shadow when the object gets closer to and farther away from the light source.

Content:

- Light sources are objects or systems that give off light (radiate), such as lamps, flashlights, candles, and the Sun.
- Shadows are the dark areas that result when light is blocked.
- To make a shadow, you need a light source, an object to block the light, and a surface in back of the object. The size of the shadow on the surface changes as the object moves closer to the light source.

Investigation 3: Part 2- Sun and Shadows

Students continue to explore how to make shadows, this time using a natural source of light, the Sun. They go outside to look for shadows and determine what objects are creating those shadows. They work as individuals and teams to meet shadow challenges.

Content:

- Shadows are the dark areas that result when light is blocked.
- The length and direction of a shadow depends on the position of the light source.
- Shadows change during the day because the position of the Sun changes in the sky.

Investigation 3: Part 3- Light and Materials

Students use objects made of different materials to see what happens when they place the objects over the lens of a flashlight. Students find that opaque materials block the light. Transparent materials allow light to travel through the materials. Translucent objects allow some of the light to travel through. The darkest shadows are made by objects that are opaque, whereas translucent objects create lighter shadows.

Content:

- Light travels away from a source in all directions.
- Materials that are opaque block light. Materials that are transparent allow light to pass through them. Materials that are translucent allow some light to pass through them.

Investigation 4: Light and Mirrors

Investigation 4: Part 1- Mirrors and Light Beams

Students are introduced to a mirror as an opaque object with a reflective surface. They use a flashlight and mirror to redirect a beam of light from their desks to the ceiling. Students go outside and use the mirror to redirect sunlight onto a wall.

Content:

- Light sources are objects that give off light (radiate), such as lamps, flashlights, candles, and the Sun.
- A mirror can be used to redirect light.
- Light travels in straight lines.

Investigation 4: Part 2- Reflections

Students explore how they can use a mirror to see things behind them, to the side of them, and on their face. They use a mirror to study and make a drawing of their own eyes. Students discuss photographs that have images reflected from smooth surfaces such as mirrors, glass, and water.

Content:

- Mirror images are the result of light reflected from a surface.
- Light travels in straight lines.
- An image produced by something that reflects, such as a mirror, is always reversed.

Investigation 4: Part 3- Eyes and Seeing

Students investigate what they can see in the dark, using a small closed box. On the back wall of the box is a card with four images of different shapes and colors. At first, students cannot see anything. As they gradually allow more light into the box, students find that they can first detect shapes and then color. They read about the process of seeing and compare a variety of animal eyes.

Content:

- Light is necessary for animals to see. Animal eyes receive light from objects and transfer the light to the brain to interpret as vision. Animal eyes are not all the same. There are different sizes, shapes, and placements on the head.

Investigation 4: Part 4- Designing with Light

Students review how to redirect light using one mirror. They design a way to redirect light with two mirrors. Students explore ways to communicate long distances, using light.

Content:

- Light travels in straight lines.
- Light can be used to communicate over long distances. Flashing lights of different colors communicate different information.

Modifications/Differentiation of Instruction

Differentiation Strategies for Special Education Students

- Remove unnecessary material, words, etc., that can distract from the content
- Use of off-grade level materials
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Time allowed
- Level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in “chunks”
- Varied texts and supplementary materials
- Use technology, if available and appropriate
- Varied homework and products
- Varied questioning strategies
- Provide background knowledge

- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Ability to work at their own pace
- Present ideas using auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment
- Differentiated checklists and rubrics, if available and appropriate

Differentiation Strategies for Gifted and Talented Students

- Increase the level of complexity
- Decrease scaffolding
- Variety of finished products
- Allow for greater independence
- Learning stations, interest groups
- Varied texts and supplementary materials
- Use of technology
- Flexibility in assignments
- Varied questioning strategies
- Encourage research
- Strategy and flexible groups based on formative assessment or student choice
- Acceleration within a unit of study
- Exposure to more advanced or complex concepts, abstractions, and materials
- Encourage students to move through content areas at their own pace
- After mastery of a unit, provide students with more advanced learning activities, not more of the same activity
- Present information using a thematic, broad-based, and integrative content, rather than just single-subject areas

Differentiated Strategies for ELL Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in “chunks”

- Varied texts and supplementary materials, including visuals
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Allow students to work at their own pace
- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Role play
- Provide graphic organizers, highlighted materials
- Strategy and flexible groups based on formative assessment

Differentiation Strategies for At Risk Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in “chunks”
- Varied texts and supplementary materials
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment

Students can qualify for 504 plans if they have physical or mental impairments that affect or limit any of their abilities to:

- walk, breathe, eat, or sleep
- communicate, see, hear, or speak
- read, concentrate, think, or learn
- stand, bend, lift, or work

Examples of accommodations in 504 plans include:

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- adjusted class schedules or grading
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits
- occupational or physical therapy

Modification Strategies

- Extended Time
- Frequent Breaks
- Highlighted Text
- Interactive Notebook
- Modified Test
- Oral Directions
- Peer Tutoring
- Preferential Seating
- Re-Direct
- Repeated Drill / Practice
- Shortened Assignments
- Teacher Notes
- Tutorials

- Use of Additional Reference Material
- Use of Audio Resources

High Preparation Differentiation

- Alternative Assessments
- Choice Boards
- Games and Tournaments
- Group Investigations
- Guided Reading
- Independent Research / Project
- Interest Groups
- Learning Contracts
- Leveled Rubrics
- Literature Circles
- Menu Assignments
- Multiple Intelligence Options
- Multiple Texts
- Personal Agendas
- Project Based Learning (PBL)
- Stations / Centers
- Think-Tac-Toe
- Tiered Activities / Assignments
- Varying Graphic Organizers

Low Preparation Differentiation

- Choice of Book / Activity
- Cubing Activities
- Exploration by Interest (using interest inventories)
- Flexible Grouping
- Goal Setting With Student
- Homework Options
- Jigsaw
- Mini Workshops to Extend Skills
- Mini Workshops to Re-teach
- Open-ended Activities
- Think-Pair-Share by Interest

- Think-Pair-Share by Learning Style
- Think-Pair-Share by Learning Style
- Think-Pair-Share by Readiness
- Use of Collaboration
- Use of Reading Buddies
- Varied Journal Prompts
- Varied Product Choice
- Varied Supplemental Materials
- Work Alone / Together

Horizontal Integration- Interdisciplinary Connections

New Jersey Student Learning Standards for Mathematics

N-Q.A.Reason quantitatively and use units to solve problems.

1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; chose and interpret the scale and the origin in graphs and data displays
2. Define appropriate quantities for the purpose of descriptive modeling.
3. Choose the level of accuracy appropriate to limitations on measurement when reporting quantities.

N-CN.A. Perform arithmetic operations with complex numbers.

1. Know there is a complex number.
2. Use the commutative, associative, and distributive properties.

A-SSE.A. Interpret the structure of expressions

1. Interpret expressions that represent a quantity in terms of its context.

A-SSE.B. Write expressions in equivalent forms to solve problems.

1. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

F-IF.A. Understand the concept of a function and use functional notation.

1. Understand that a function from one set to another set.

F-IF.B Interpret functions that arise in applications in terms of the context.

F-IF.C. Analyze functions using different representations

S-ID.A. Summarize, represent, and interpret data on a single count or measurement variable

1. Represent data with plots on a real number line.

S-ID.B. Summarize, represent, and interpret data on two categorical and quantitative variables.

S-ID.C. Interpret linear models.

S-IC.A. Understand and evaluate random processes underlying statistical experiments.

S-IC.B. Make inferences and justify conclusions from surveys, experiments, and observational studies.

English Language Arts Standards – Grade 1

RF 4: Read text with purpose and understanding.

RI 1: Ask and answer questions about key details.

RI 2: Identify main topic and retell key details.

RI 3: Describe the connection between two ideas.

RI 4: Ask and answer questions about unknown words.

RI 5: Identify the front cover, back cover, and title page of a book.

RI 7: Describe the relationship between illustrations and the text.

RI 8: Identify the reasons an author gives to support points.

RI 9: Identify similarities in and differences between text on the same topic.

RI 10: Actively engage in group reading activities with purpose and understanding.

SL 1: Participate in collaborative conversations.

SL 2: Ask and answer questions about key details and request clarification.

SL 3: Ask and answer questions to seek help, information, or to clarify.

SL 4: Describe with details.

W 5: Strengthen writing.

W 8: Gather information to answer a question.

2020 New Jersey Student Learning Standards- Computer Science and Design Thinking

Computer Science and Design Thinking Practices

CSDT.K-12.CSDTP1	Fostering an Inclusive Computing and Design Culture
CSDT.K-12.CSDTP2	Collaborating Around Computing and Design
CSDT.K-12.CSDTP3	Recognizing and Defining Computational Problems
CSDT.K-12.CSDTP4	Developing and Using Abstractions
CSDT.K-12.CSDTP5	Creating Computational Artifacts
CSDT.K-12.CSDTP6	Testing and Refining Computational Artifacts
CSDT.K-12.CSDTP7	Communicating About Computing and Design

8.2 Design Thinking

<p>8.2.2.ED.1: Communicate the function of a product or device.</p> <p>8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.</p> <p>8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process.</p> <p>8.2.2.ED.4: Identify constraints and their role in the engineering design process.</p>
<p>8.2.2.ITH.1: Identify products that are designed to meet human wants or needs.</p> <p>8.2.2.ITH.2: Explain the purpose of a product and its value.</p> <p>8.2.2.ITH.3: Identify how technology impacts or improves life.</p> <p>8.2.2.ITH.4: Identify how various tools reduce work and improve daily tasks.</p> <p>8.2.2.ITH.5: Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution.</p>

8.2.2.NT.1: Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together.
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.
8.2.2.ETW.1: Classify products as resulting from nature or produced as a result of technology.
8.2.2.ETW.2: Identify the natural resources needed to create a product.
8.2.2.ETW.3: Describe or model the system used for recycling technology.
8.2.2.ETW.4: Explain how the disposal of or reusing a product affects the local and global environment.
8.2.2.EC.1: Identify and compare technology used in different schools, communities, regions, and parts of the world.

2020 New Jersey Student Learning Standards- Career Readiness, Life Literacies, and Key Skills

Career Readiness, Life Literacies, and Key Skills Practices

CRP.K-12.CRP1	Act as responsible and contributing community members and employee.
CRP.K-12.CRP2	Attend to financial well-being.
CRP.K-12.CRP3	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP4	Demonstrate creativity and innovation.
CRP.K-12.CRP5	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP6	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP7	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP8	Use technology to enhance productivity, increase collaboration and communicate effectively.
CRP.K-12.CRP9	Work productively in teams while using cultural/global competence.

9.2 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

9.4.2.CI.1: Demonstrate openness to new ideas and perspectives.
9.4.2.CI.2: Demonstrate originality and inventiveness in work.
9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem.
9.4.2.CT.2: Identify possible approaches and resources to execute a plan.
9.4.2.CT.3: Use a variety of types of thinking to solve problems.
9.4.2.DC.1: Explain differences between ownership and sharing of information.
9.4.2.DC.2: Explain the importance of respecting digital content of others.
9.4.2.DC.3: Explain how to be safe online and follow safe practices when using the internet.
9.4.2.DC.4: Compare information that should be kept private to information that might be made public.
9.4.2.DC.5: Explain what a digital footprint is and how it is created.
9.4.2.DC.6: Identify respectful and responsible ways to communicate in digital environments.
9.4.2.DC.7: Describe actions peers can take to positively impact climate change.
9.4.2.IML.1: Identify a simple search term to find information in a search engine or digital resource.
9.4.2.IML.2: Represent data in a visual format to tell a story about the data.
9.4.2.IML.3: Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults.
9.4.2.IML.4: Compare and contrast the way information is shared in a variety of contexts.
9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool.
9.4.2.TL.2: Create a document using a word processing application.
9.4.2.TL.3: Enter information into a spreadsheet and sort the information.
9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content.
9.4.2.TL.5: Describe the difference between real and virtual experiences.

9.4.2.TL.6: Illustrate and communicate ideas and stories using multiple digital tools.
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9.4.2.TL.7: Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts.
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Vertical Integration- Discipline Mapping

PS1: Grade 2: Solids and Liquids; Pebbles, Sand, and Silt;

Grade 3: Water and Climate; Motion and Matter

Grade 5: Earth and Sun; Mixtures and Solutions

Grade 8: Chemical Interactions

PS4: Grade 4: Energy

Grade 6: Waves

Grade 7: Planetary Science

Additional Materials

Visit Fossweb.com for websites and additional readings.