Elementary Science Curriculum

Grade 1



NEPTUNE CITY SCHOOL DISTRICT Office of the Chief School Administrator, Principal 210 West Sylvania Avenue Neptune City, NJ 07753

The Neptune City School District is appreciative and proud to accept and align the curriculum of the NEPTUNE CITY School District to properly prepare the Neptune City students for successful integration into the NEPTUNE CITY High School Educational Program.

April 1, 2025

Document C1#1

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SCHOOL DISTRICT MISSION STATEMENT

The Neptune City School District, in partnership with the parents and the community, will support and sustain an excellent system of learning, promote pride in diversity, and expect all students to achieve the New Jersey Student Learning Standards at all grade levels to become responsible and productive citizens.

ELEMENTARY SCIENCE GRADE 1 CURRICULUM

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Elementary Science Grade 1

Acknowledgements

The Science Grade 1 Curriculum was developed for the NEPTUNE CITY Elementary Schools through the efforts of Jody Rizzo, elementary teacher, with guidance from curriculum steering committee members Stacie Ferrara, Ed.D., Supervisor of STEM, and Sally A. Millaway, Ed.D., Director for Curriculum, Instruction and Assessment.

Mrs. Rizzo is to be commended for her dedication in creating learning plans that are aligned with the 2020 New Jersey Student Learning Standards. These learning plans contain student-centered, inquiry-based activities that meet the requirements of the New Jersey Student Learning Standards. It is our hope that this guide will serve as a valuable resource for the staff members who teach first grade and that they will feel free to make recommendations for its continued improvement.

DISTRICT MISSION STATEMENT

The primary mission of the NEPTUNE CITY School District is to prepare all of our students for a life-long learning process and to become confident, competent, socially- and culturally-conscious citizens in a complex and diverse world. It is with high expectations that our schools foster:

- A strong foundation in academic and modern technologies
- A positive, equitable, and varied approach to teaching and learning
- An emphasis on critical thinking skills and problem-solving techniques
- A respect for and an appreciation for our world, its resources, and its diverse people
- A sense of responsibility, good citizenship, and accountability
- An involvement by the parents and the community in the learning process

NEPTUNE CITY School District

Educational Outcome Goals

The students in the NEPTUNE CITY schools will become life-long learners and will:

- Become fluent readers, writers, speakers, listeners, and viewers with comprehension and critical thinking skills.
- Acquire the mathematical skills, understandings, and attitudes that are needed to be successful in their careers and everyday life.
- Understand fundamental scientific principles, develop critical thinking skills, and demonstrate safe practices, skepticism, and open-mindedness when collecting, analyzing, and interpreting information.
- Become technologically literate.
- Demonstrate proficiency in all New Jersey Student Learning Standards (NJSLS).
- Develop the ability to understand their world and to have an appreciation for the heritage of America with a high degree of literacy in civics, history, economics and geography.
- Develop a respect for different cultures and demonstrate trustworthiness, responsibility, fairness, caring, and citizenship.
- Become culturally literate by being aware of the historical, societal, and multicultural aspects and implications of the arts.
- Demonstrate skills in decision-making, goal setting, and effective communication, with a focus on character development.
- Understand and practice the skills of family living, health, wellness and safety for their physical, mental, emotional, and social development.
- Develop consumer, family, and life skills necessary to be a functioning member of society.
- Develop the ability to be creative, inventive decision-makers with skills in communicating ideas, thoughts and feelings.
- Develop career awareness and essential technical and workplace readiness skills, which are significant to many aspects of life and work.

INTEGRATED SOCIAL AND EMOTIONAL LEARNING COMPETENCIES *The following social and emotional competencies are integrated in this curriculum document:*

Self-	Self-Awareness	
x	Recognize one's own feelings and thoughts	
x	Recognize the impact of one's feelings and thoughts on one's own behavior	
х	Recognize one's personal traits, strengths and limitations	
	Recognize the importance of self-confidence in handling daily tasks and challenges	
Self-	Self-Management	
	Understand and practice strategies for managing one's own emotions, thoughts and behaviors	
x	Recognize the skills needed to establish and achieve personal and educational goals	
х	Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals	
Social Awareness		
x	Recognize and identify the thoughts, feelings, and perspectives of others	
х	Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds	
х	Demonstrate an understanding of the need for mutual respect when viewpoints differ	
x	Demonstrate an awareness of the expectations for social interactions in a variety of setting	
Resp	oonsible Decision Making	
x	Develop, implement and model effective problem solving and critical thinking skill	
х	Identify the consequences associated with one's action in order to make constructive choices	
х	Evaluate personal, ethical, safety and civic impact of decisions.	
Rela	Relationship Skills	
	Establish and maintain healthy relationships	
x	Utilize positive communication and social skills to interact effectively with others	
	Identify ways to resist inappropriate social pressure	
x	Demonstrate the ability to present and resolve interpersonal conflicts in constructive ways	
x	Identify who, when, where, or how to seek help for oneself or others when needed	

Unit Plan Title	Safety
Suggested Time Frame	Ongoing and Embedded in Units as Appropriate

Overview / Rationale Safety in the classroom setting is important for students and teachers. Personal safety is reviewed at the beginning of each school year in science lessons and should be demonstrated and adhered to by teachers and students in all activities including class demonstrations, lab investigations, hands-on projects, gardening, outdoor classroom settings and any other school setting as well as SummerWood.

Stage 1 – Desired Results

Established Goals:

Although there are no specific New Jersey Student Learning Standards in Science describing safety procedures or rules, teachers should refer to the standards in each unit that requires and utilizes laboratory activities, demonstrations and investigations to support meeting the standard(s).

	· · · · · · · · · · · · · · · · · · ·
 Essential Questions: How can accidents and injuries be avoided in the classroom and laboratory settings? What steps should be taken to respond to emergencies and accidents in the classroom, laboratory and workplace setting? 	 Enduring Understandings: Safety precautions are important for all areas of life and should be practiced by everyone on a daily basis. It is important that safety practices are understood and exercised in the classroom, laboratory, and on the job.
 Knowledge: Students will know Lab safety rules and expectations Names and uses of lab equipment Location and use of safety equipment 	 Skills: Students will be able to Explain appropriate health and safety practices in the classroom and laboratory. Identify common hazards in the classroom and school setting Identify name and use of material and equipment Explain how to respond to various safety situations and accidents. Demonstrate how to use materials and equipment.

Interdisciplinary Connections

New Jersey Student Learning Standards - English Language Arts (2016)

NJSLSA.R10. Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.

New Jersey Student Learning Standards-Comprehensive Health and Physical Education(2020)

2.1.2.EH.2: Identify what it means to be responsible and list personal responsibilities. • 2.1.2.EH.3: Demonstrate self-control in a variety of settings (e.g., classrooms, playgrounds, special programs).

2.1.2.EH.4: Demonstrate strategies for managing one's own emotions, thoughts and behaviors. 2.2.2.MSC.1: Perform a combination of sequences of locomotor movements and rhythmic activities (e.g., walking, balancing, hoping, skipping, running).

2.2.2.MSC.3: Demonstrate manipulative movements (e.g., throwing, catching, dribbling, running, kicking) while moving in personal and general space, time, directions, pathways and ranges

2.2.2.MSC.6: Execute appropriate behaviors and etiquette while participating in activities, games, sports, and other events to contribute to a safe environment.

2.3.2.PS1: Demonstrate personal habits and behaviors that contribute to keeping oneself and others healthy and the environment clean and safe.

2.3.2. PS.3: Recognize and demonstrate safety strategies to prevent injuries at home, school, in the community (e.g., traffic safety, bicycle/scooter safety, fire safety, poison safety, accident prevention).

2.3.2. PS.4: Develop an awareness of warning symbols and their meaning (e.g., red light, stop sign, poison symbol).

Teacher Resources

Flinn Safety Course for teachers online (free with registration) <u>https://labsafety.flinnsci.com/</u>

NSTA Safety Resources https://www.nsta.org/topics/safety

Duty of Care https://static.nsta.org/pdfs/DutyOfCare.pdf

Safety and the NGSS

https://static.nsta.org/pdfs/Safety%20and%20the%20Next%20Generation%20Science%20Stand ards_29Oct2020_FINAL.pdf

Safety Practices with Demonstrations https://static.nsta.org/pdfs/MinimumSafetyPracticesAndRegulations.pdf

Unit Plan Title	Unit 1: Plants and Animal Parts
Suggested Time Frame	25-30 days

Overview / Rationale

In this unit, students examine and compare the similarities and differences between animals and plants. Students discover different animal families on a fictional safari. Students investigate how plants and animals are like others of the same kind, how plants and animals sense things, and how plants and animals meet their needs. Students will be able to explain how offspring are like, but not exactly like, their parents.

Stage 1 – Desired Results

Established Goals:

New Jersey Student Learning Standards in Science (2020)

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.

1-LS1-2 Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

1-LS3-1 Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents

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.

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

Essential Questions:

- How are plants and animals like others of the same kind?
- How are plants and animals like their parents?
- What different parts do plants have?
- What different parts do animals have?
- How do plants and animals sense things?
- How do plants and animals take in water, food, air, and light?
- How do plants and animals stay safe?
- How do young plants and animals stay safe?

Enduring Understandings:

- Plants are one kind of living thing. Animals are another kind of living thing.
- Plants of one kind may have similar leaf shapes and colors. But there will also be some differences.
- Animals of one kind look alike in many ways. But they do not all look exactly the same as one another.
- Patterns can be used as evidence.
- Senses are important for animal parents to take care of their young.

Knowledge:

Students will know...

- Animals of the same kind are similar but can also vary in many ways.
- The parts of a plant.

- Animals have parts that help them see, hear, grasp objects, protect themselves, and help them take in food, water, and air.
- Engineers solve many problems by mimicking the ways plants and animals solve similar problems in the natural world.
- How an animal part's structure relates to its function.
- Living things have parts that help them stay safe.
- Some animal parents build or seek shelters for their young.

Skills:

Students will be able to ...

- Observe and record information about different kinds of animals and animals of the same kind.
- Use observations and data to make comparisons of different animals.
- Identify patterns in animal parts to explain similarities and differences in animals.
- Look for patterns in animals in order to match parents with their offspring.
- Make observations of animals to determine ways young animals are or are not like their parents.
- Use evidence to make predictions about what an animal will look like as an adult.
- Use evidence from an investigation to support that animals of one kind look alike in many ways but all do not look exactly the same as one another.
- Make and record observations by watching a plant grow.
- Identify plant parts (roots, stems, leaves, flowers, and fruits) that help it take in food, water, and air.
- Solve an engineering problem of creating a tower that can stand on its own.
- Use materials to design and build a tower, relate its design and function to a plant's roots.
- Observe, identify, and compare the functions of different animals' body parts.
- Choose materials and develop and test a glove that models an animal's blubber.
- Discuss their model and find ways to improve their design.
- Investigate ways animals use and respond to their senses with behaviors that help them survive.
- Identify body parts and senses associated with each body part.
- Use first-hand observations and media to compare ways humans and other animals use their senses.
- Identify the parts that the animals use to meet their needs.
- Record and analyze data about ways animals meet their needs.
- Compare the parts that plants and animals use to human-made objects.
- Identify animal body parts that influence the design of human-made products.
- Design an animal with parts it uses to take in food, water, and air.
- Observe ways different parts of a hermit crab help it to stay safe.
- Record and interpret data about ways hermit crabs behave.
- Explain how the shape and stability of a hermit crab's parts relate to their functions.
- Give examples of ways engineers study the ways plants and animals solve problems in the natural world and apply those ideas to human-made products.
- Make observations of parents and their young in the wild and identify ways parents keep their young safe.
- Record data about ways parents help their offspring survive.
- Identify patterns in the natural world to understand how parents take care of their young.
- Explain ways different animals take care of their young.

Interdisciplinary Connections

New Jersey Student Learning Standards for English Language Arts (2016)

NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

NJSLSA.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

New Jersey Student Learning Standards for Mathematics (2016)

Practice 1 Make sense of problems and persevere in solving them. Practice 5 Use appropriate tools strategically.

New Jersey Student Learning Standards for Career Readiness,Life Literacies, and Key Skills (2020)

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

New Jersey Student Learning Standards for Computer Science and Design Thinking (2020)

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.

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.

New Jersey Student Learning Standards for Comprehensive Health and Physical Education (2020)

2.1.2.PP.1: Define reproduction.

2.1.2.PP.2: Explain the ways in which parents may care for their offspring (e.g., animals, people, fish).

Student Resources

- Interactive notebook (available in Spanish)
- Science Journal (available in Spanish)

Teacher Resources

- TeachTCI <u>www.teachtci.com</u> need teacher subscriptions, reach out to STEM Supervisor for login and password.
- Unit 1 Lesson guides 1-8
- Science journal
- TeachTCI Handouts Animal Act-It-Out Cards from Handout A.
- TeachTCI Handout B: Sorting Zoo Animals
- Videos
 - <u>https://wonderopolis.org/wonder/do-all-plants-have-roots/</u>

The following books offer opportunities to extend the content in this lesson.

The Animal Book by Steve Jenkins. (Boston, MA: HMH Books for Young Readers, 2013) Did you know that most animals are insects? This book is filled with fun facts about animals. It is broken into sections that cover family, animal senses, predators, defenses, and animal extremes. Use this book to start a discussion about the diverse world of animals. Check out Jenkins's other animal books, such as Actual Size and Biggest, Strongest, Fastest and How to Swallow a Pig.

National Geographic Little Kids First Big Book of Animals by Catherine D. Hughes. (Washington, D.C.) National Geographic, 2010) Organized by type of habitat (i.e., grassland, ocean, desert, forest, and polar), this book introduces students to 30 different animals. With over 200 beautiful nature photographs, students are sure to be captivated by the animal world.

Plants Live Everywhere! by Mary Dodson Wade. (Berkeley Heights, NJ: Enslow Elementary, 2009) Learn what plants grow in different habitats. Students can find out which plants need more water by doing the included experiment.

Stage 2 – Assessment Evidence Pre-Assessments: • Observing phenomena Formative Assessments: • Wrap Up: My Science Concepts • Make Sense of Phenomena • Show What You Know • Vocabulary • Wrap Up:Self-Assessment Summative Assessments: Unit Assessment • **Performance** Task(s): Show What You Know • Engineering Design Task Stage 3 – Learning Plan

Bold= Fast track (required activities)

Italic = Extended track (optional activities to support student learning)

Lesson 1: How Are Plants and Animals like Others of the Same Kind?

Observing phenomena (5 min.): Students observe a photo and write questions.

Investigation Zoo Trip (20 min.): Students take virtual zoo trip, make observations, and look for patterns.

Acting Out Animals (20 mins): Students will be given a card (picture of animal) and asked to act out the animal.

Sorting Animals By Kind (10 min.): Given pictures of animals, students will think of ways to group the animals.

Vocabulary (3 min.): plant, animal

Wrap-Up: My Science Concepts (4 min.): Students complete a self-assessment on learning.

Show What You Know (5 min.): Students look at pictures of frogs and palm trees and write a response to "How do you know they are the same?

Making Sense of the Phenomenon (5 min.): Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. Kinds of living things
- 2. Animals of a kind
- 3. Plants of a kind

Career Highlight: Zookeeper, Zoologist

Lesson 2 : How Are Plants and Animals Like Their Parents?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Growing Up (5 min.) Students will use evidence of physical similarities between animals to create the claim that the parents and offspring are related.

Investigation (30min.) Playing "Match That Living Thing" Let's play a matching game. Students will match an offspring to its parent.

Playing "Find My Parent" (10 min.) Students will receive a plant or animal card. Learners who have an offspring card must find the matching parent card.

Playing "Find my Offspring" (5 min.) students will receive a plant or animal card. The parent card holders need to find the offspring matching card.

Observing Videos (10 min.)

Vocabulary (3 min.): offspring, parent

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) Draw an animal offspring and its parent. Show one way they are different.

Making Sense of the Phenomenon (5 min.) Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. New Living Things
- 2. Animal Offspring
- 3. Plant Offspring

Career Highlights: Zoologist, Botanist

Lesson 3: What Different Parts Do Plants Have?

Observing phenomena (5 min.) Students observe a photo and ask questions.

Investigation: Students will grow plants. Students will observe their roots, stems, and leaves. Students will use what they learn about plant parts to design a tower that can stand up.

- Plant Parts (5 min.)
- Growing Plants (15 min.)
- Watching Your Plant Grow (10 min.)

Engineering Challenge (10 mins): Defining the Problem

Finding a Solution (10 min.) Students will design a way for their tower to stand up. Sharing Solutions (10 min.) Students will answer questions about their design.

Vocabulary (3 min.): flower, fruit, leaf, roots, seed, stem

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) Students will label the plant parts.

Making Sense of the Phenomenon (5 min.) What parts do these flowers have in common?What parts of these flowers are different?

Career Highlights: Botanist

Lesson 4: What Different Parts Do Animals Have?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Identifying Animal Parts (15 min.) Students will play a game identifying different animal parts.

Engineering Challenge: Mimicking Animal Parts (20 min.) Watch the video.

Testing Designs (10 min.) Students will test their designs.

Improving Designs (15 min.) How can we improve our designs?

Vocabulary (3 min.) fin, scales

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (5 min.) Label the animal parts.

Making Sense of the Phenomenon (5 min.) Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. Animal Bodies
- 2. Eyes, Ears, Mouth, and Nose
- 3. Legs and Arms
- 4. Wings and Fins
- 5. Tails
- 6. Feathers, Fur, and Scales

Lesson 5: How Do Plants and Animals Sense Things?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Sense Like An Animal (5 min.) Students can use their senses to explore the world around them.

Identifying Senses (10 min.) Students will write the name of the body part used for each sense.

Using Your Animal Senses (25 min.) How do your senses differ from those of cats, whales, manatees, bears and catfish?

Vocabulary (3 min.) sense

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (5 min.) Label the picture identifying the senses.

Making Sense of the Phenomenon (5 min.) Use what you have learned to explain this phenomenon.

- 1. Senses
- 2. Sensing Light
- 3. Sensing Sound
- 4. Sensing Touch
- 5. Sensing Smells
- 6. Sensing Taste

Lesson 6: How Do Plants and Animals Take in Water, Food, Air, and Light?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Investigation: Analyzing Videos(15 min.) Students will watch videos of animals using their parts to meet their needs.

Analyzing More Videos (10 min.) Students will continue to watch more videos to observe a butterfly, a lizard, and a turtle.

Mimicking Animal Parts (10 min.) Students will match each animal part to the human made object that does the same job.

Vocabulary (3 min.) gills

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) Draw a picture of a made-up animal. Label the parts.

Making Sense of the Phenomenon (5 min.) Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. Taking in Water
- 2. Taking in Food
- 3. Taking in Air
- 4. Taking in Sunlight

Lesson 7: How Do Plants and Animals Stay Safe?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Investigation: Observing a Hermit Crab (15 min.) Students will observe a live animal-a hermit crab. Students will look for ways this animal stays safe from danger.

Observing Hermit Crabs in Their Habitat (45 min.) Students will observe hermit crabs in their habitat.

Using Parts to Stay Safe (10 min.) Match the part with how it keeps the crab safe.

Vocabulary (3 min.) quills

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (5 min.) How does the barbed wire look like the spines of a cactus? What do they both do?

Making Sense of the Phenomenon (5 min.) How can plants stay safe from predators?

- 1. Scaring Enemies
- 2. Hiding From Danger
- 3. Keeping People Safe

Lesson 8: How Do Young Plants and Animals Stay Safe?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Baby Care in the Wild (5 min.) Students will view animal parents and their young in the wild.

Investigation: Observing Nature (30 min.) Students will view animal parents and their young in the wild.

Making and Reading Books (30 min.) Students will make a book that will show how adult animals take care of their young.

Vocabulary (3 min.) seedling

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) Students will draw a picture of an animal and its young.

Making Sense of the Phenomenon (5 min.) Use what you have learned to explain this phenomenon.

- 1. Young Plants
- 2. Young Animals
- 3. Parents and Their Young
- 4. Animal Babies In The Wild

Unit Plan Title	Unit 2: Light and Sound
Suggested Time Frame	25 - 30 days

Overview / Rationale

In this unit, students explore light and sound by discovering how light helps us see, how light travels, how sound is made, and how sound travels. Students then combine both light and sound to find out about the ways people use light and sound to send messages.

Stage 1 – Desired Results

Established Goals:

New Jersey Student Learning Standards in Science (2020)

1-PS4-1 Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

1-PS4-2 Make observations to construct an evidence-based account that objects can be seen only when illuminated.

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.

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.

Essential Questions:

- How does light help you see?
- How does light travel?
- How are shadows made?
- How is sound made?
- How does sound travel?
- How do people use light and sound to send messages?

Enduring Understandings:

- Light lets you see things
- Some things make light(campfire, a light bulb, candle flame, the sun)
- Light travels in straight lines.
- Light does not travel through all materials (wood)
- Light can bounce off a mirror and go in another direction.
- The place where light does not reach is called a shadow.
- Shadows made by the sun change length during the day.
- When objects vibrate, they make sound.
- Sound can make objects vibrate.
- Sound travels in all directions
- Sound travels through many kinds of materials.
- An echo is when sound hits an object, and the sound bounces back to you.
- Many tools use light and sound to send messages.
- People design ways to send messages.

Knowledge:

Students will know...

- How to develop an understanding of the availability of light and ability to see objects.
- How to discover that events have causes.
- How to participate in an investigation by observing media and analyzing information to construct an evidence-based account indicating that objects can be seen only when a light source illuminates them or they give off their own light.
- Simple tests to determine cause and effect.
- That some materials allow light to pass through them, while others allow only some light, and others block the light completely to create a shadow.
- That mirrors can be used to redirect a light beam.
- That sound can make matter vibrate, that air is matter, and that sound makes the air vibrate. Sound travels in all directions through the air, and when it reaches your ears, you hear it.
- That an echo is sound hitting an object and bouncing back toward you. The sound changes direction. A mirror changes the direction of light.
- Cause-and-effect relationships of messages that are sent using sound and light.
- The structure and function of a signaling device relates directly to how it can be used to communicate to others.

Skills:

Students will be able to ...

- Observe that objects can be seen if light is available to illuminate them or if they give off their own light.
- Perform simple tests in a light game that are designed to gather evidence to support or refute student ideas about causes.
- Engage in shared research by reviewing and analyzing videos and making observations to construct an evidence-based account for natural phenomena.
- Design simple tests to gather evidence to support or refute ideas causes and effects when certain materials are placed in the path of light.
- Observe that some materials let light through, some materials let only a little light through, some materials block the light and don't let any light through, and mirrors can be used to redirect a light beam.
- Use firsthand observations to describe patterns that occur when one object can cast shadows with many different sizes and shapes.

- Use simple tests designed to gather evidence about what causes the location and sizes of shadows.
- Gather evidence to support explanations for how shadows form.
- Observe and experiment with instruments to identify what causes instruments to make sounds.
- Plan an investigation with others to provide evidence that an instrument makes sound when parts of it vibrate.
- Understand that parts of an instrument work together to form a whole instrument that makes sound.
- Use instruments to make sound and perform in a band.
- Observe what happens to sand on a balloon drum when it is placed in front of a playing speaker to provide evidence that sound can make matter vibrate.
- Observe that vibrations cause a tuning fork to make sound and that stopping the vibrations causes the sound to stop.
- Investigate and gather evidence to find out whether sound can travel through yarn.
- Ask questions, design tests, then gather evidence to answer questions whether sound can travel through different materials such as air, wood, metal, water, and glass.
- Design codes using light and sound to communicate a message across the room.
- Design a device that uses a code to play a game of sending messages using only sound or light.

Interdisciplinary Connections

New Jersey Student Learning Standards for English Language Arts (2016)

NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

NJSLSA.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

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

New Jersey Student Learning Standards for Computer Science and Design Thinking (2020)

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.

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.

Student Resources

- Interactive notebook (available in Spanish)
- Science Journal (available in Spanish)

Teacher Resources

- Teach TCI teacher subscription www.teachtci.com
- Unit 2 Lesson guides 1-6
- Science journal
- TeachTCI Handouts

The following books offer opportunities to extend the content in this lesson:

National Geographic Readers: Thomas Edison by Barbara Kramer. (Washington, D.C.:, National Geographic, 2014)

Thomas Edison is credited for inventing the incandescent light bulb, bringing accessible and safe light to all homes. Trace the life of Thomas Edison and learn about his sources of inspiration, his challenges, early successes, and the many inventions for which he is best known. This book can be an inspiration for all inventors in your classroom.

Oh, the Things They Invented!: All About Great Inventors by Bonnie Worth (New York, NY: Random House Children's Books, 2015)

Travel with the Cat in the Hat as he goes back in time to rediscover more than a dozen inventions that have influenced our lives today. From famous figures like Thomas Edison to lesser-known ones like Garrett Morgan (traffic light), your students learn basic information about each invention, as well as fascinating facts.

Sending Messages with Light and Sound by Jennifer Boothroyd. (Minneapolis, MN: Lerner Classroom, 2014)

How do we send and receive messages using light and sound? This book explains different methods of sending messages and shows how light and sound make sending these messages possible. Encourage students to explore ways to send messages using light and sound on their own.

Stage 2 – Assessment Evidence

Pre-Assessments:

• Observing phenomena

Formative Assessments:

- Wrap Up: My Science Concepts
- Make Sense of Phenomena
- Show What You Know
- Vocabulary

Summative Assessments:

• Unit Assessment

Performance Task(s):

- Show What You Know
- Engineering Design Task

Stage 3 – Learning Plan

Bold= Fast track (required activities)

Italic = *Extended track (optional activities to support student learning)*

Lesson 1: How Does Light Help You See?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Spotlight Game (10 min.) Talk with your partner. Try to figure out the answer to the riddle.

Investigation (20 min.) You will play a game in which you try to identify an object when you can only see part of it. You will visit dark places to see how light helps you see things. Then you will write a story about visiting a dark place.

Writing A Story (20 min.) Today, you will write a story. In the story, you are in a dark place, but you have a light to help you see.

Vocabulary (3 min.) light

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.)

Making Sense of the Phenomena (5 minutes): Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. What Light Does
- 2. Making light

Lesson 2: How Does Light Travel?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Light Beams (5 min.) Students will observe a picture and answer questions about light.

Investigation(10 min.) Test what happens when you place different materials in the path of a beam of light.

Exploring a Science Question (20 min.) What happens when you place different materials in the path of a beam of light?

Testing Other Materials (20 min.) Students will test other materials to see if light beams through. Students will chart their data on a table.

Testing Mirrors (20 min.) Students will learn what happens when light shines on a mirror.

Vocabulary (3 min.) mirror

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) Look at the picture. Circle what will happen.

Making Sense of the Phenomena (5 minutes): Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. Light Travels
- 2. Light and Different Materials
- 3. Mirrors and Light

Lesson 3: How Are Shadows Made?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Investigation (15 min.) Students will learn that one object can make different shadows. Students will plan a shadow puppet show. The show will have two characters, but you will use only one puppet.

Performing A Shadow Puppet Show (60 min.) Students will use their knowledge of creating shadows to develop a puppet show,

Vocabulary (3 min.) shadow

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) How might you make the shadow of a bunny who grows up to be a giant rabbit?

Making Sense of the Phenomena (5 minutes): Use what you have learned to explain this phenomenon.

- 1. Light and Shadows
- 2. Shadows on the Wall
- 3. Shadows and the Sun

Lesson 4: How Is Sound Made?

Observing phenomena (5 min.): Students observe a photo and ask questions

Investigation (15 min.) Making Sounds: Students will close their eyes and listen for sounds. What sounds do you hear? What do you think is making that sound?

Performing in a Band (40 min.) Students will form a garage band and make sounds with different instruments. The garage band will perform on stage. Students will show how sounds make other objects vibrate.

Making Objects Vibrate (15 min.) Students will find out how sounds make objects vibrate.

Vocabulary (3 min.) vibrate, sound

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) Students will watch a video with sound and without sound. Students will record what they observe.

Making Sense of the Phenomena (5 minutes): Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. Sounds Around Us
- 2. Making Sound
- 3. Making Objects Vibrate

Lesson 5: How Does Sound Travel?

Observing phenomena (5 min.): Students observe a photo and ask questions

Investigation Sound Waves: (5 min.) Students will find out if sound from a tuning fork can travel through yarn. Students will plan their own investigation to test whether other sounds can travel through yarn.

Making Sound With A Tuning Fork (15 min.) Students will explore sounds made with a tuning fork.

Testing A Science Question (15 min.) Sound can travel through air. Can sound travel through yarn? Students will share their findings.

Planning An Investigation (15 min.) Students will develop questions about sound traveling through other materials. Ex. ruler, yarn

Vocabulary (3 min.) echo

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) Students will watch a video with sound and without sound. Students will record what they observe.

Making Sense of the Phenomena (5 minutes): Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. Sound Travels
- 2. Sounds and different Materials
- 3. Echoes

Lesson 6: How Do People Use Light and Sound to Send Messages?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Investigation Creating Secret Codes (15 min.) Students will explore different ways to send coded messages with the light and sound makers.

Investigation Secret Simon (5 min.); Playing Simon Says (10 min.); Recording Messages (25 min.) Students will create a secret code that uses light or sound to send a message across a room. Students will use the code to play a game like Simon Says.

Sending Messages (15 min.) Students will use their code to play Secret Simon.

Vocabulary (3 min.) message

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) Students will watch a video with sound and without sound. Students will record what they observe.

Making Sense of the Phenomena (5 minutes): Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. Using Light and Sound
- 2. Light for Sending Messages
- 3. Sound for Sending Messages
- 4. Engineering Design: Designing Ways to Send Messages

Career Highlights: scientist

Unit Plan Title	Unit 3: Sky Patterns
Suggested Time Frame	25-30 days

Overview / Rationale

In this unit students go stargazing. Working in groups, students become experts about a star topic. Then, they observe videos showing stars in the night sky. They ask questions and learn about the stars from the student experts. Finally, students write and illustrate a story explaining what they saw during the stargazing trip.

Stage 1 – Desired Results

Established Goals:

New Jersey Student Learning Standards in Science (2020)

• 1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.

1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.

• K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.

• 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

Essential Questions:

- What do you see in the sky?
- Where is the sun in the sky?
- How long is the sun in the sky?
- Where is the moon in the sky?
- Where are the stars in the sky?

Enduring Understandings:

- It is light during the day and it is dark at night.
- Patterns happen again and again.

- The sun is the brightest object in the sky.
- The sun is in different places at different times of the day.
- If we know the sun's pattern, we can predict where the sun will be.
- The sun does not always rise and set at the same time.
- Summer and Fall are seasons.
- Winter and Spring are seasons.
- The part of the moon we see is called a moon phase.
- The moon goes through phases.
- The moon can be seen in different places in the sky.
- Some stars look like they form a picture in the sky.
- Stars do not stay in one place.
- The telescope helps make things look bigger, brighter, and clearer in the sky.

Knowledge:

Students will know...

- There is a difference between day and night.
- Where the sun is in the sky during the day.
- The sun is in the sky at different times of the year.
- The moon is in the sky.
- Stargazing can be mimicked by looking at a series of pictures.

Skills:

Students will be able to...

- Describe and answer questions about the sun, moon, and stars in the day and night skies.
- Use evidence from observations to support a claim that the sky is day or night.
- Sort and classify pictures of the sky as belonging to day or night.
- Observe and describe patterns in the day and night sky.
- Use observations to predict patterns of the sun, moon, and stars.
- Understand the patterns of the motion of objects in the sky.
- Observe and describe patterns in the way the sun appears to move across the sky during the day.
- Engineer a playhouse with windows that let sun shine into the playhouse all day.
- Identify and understand the problem before designing a solution.
- Model how the sun moves to observe and predict where the sun will shine on the playhouse.
- Design where the windows in a playhouse will be and test their designs.
- Identify the changing seasons as a pattern.
- Name a season then order the seasons that follow it.
- Collect data about the number of daylight hours for each season and use data to make a bar graph.
- Use data to make a bar graph about daylight hours in each season then use data to make a bar graph.
- Compare the number of hours of daylight in different seasons.
- Learn that patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted.
- Observe images that show a pattern of the moon's path in one night to use as evidence to order the moon phases in a flip book.
- Use observations of pictures of moon phases to describe the pattern of the moon as it appears in the sky during one month.
- Ask questions about stars that can be answered by an investigation.

- Describe patterns of the motions of stars in the sky.
- Use the observations to describe patterns and relationships about the stars.

Interdisciplinary Connections

New Jersey Student Learning Standards for English Language Arts (2016)

NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

NJSLSA.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

New Jersey Student Learning Standards for Mathematics (2016)

Practice 1 Make sense of problems and persevere in solving them. Practice 5 Use appropriate tools strategically.

New Jersey Student Learning Standards for Career Readiness,Life Literacies, and Key Skills (2020)

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

New Jersey Student Learning Standards for Computer Science and Design Thinking (2020)

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.

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.

Student Resources

- Interactive notebook (available in Spanish)
- Science Journal (available in Spanish)

Teacher Resources

- Teach TCI teacher subscription www.teachtci.com
- Unit 2 Lesson guides 1-5
- Science journal
- TeachTCI Handouts

The following books offer opportunities to extend the content in this lesson.

Day and Night by Margaret Hall. Illustrations by Jo Miller. (Mankato, MN: Capstone Press, 2009)

It is day. Then night comes. Then it is day again. This book introduces how day and night occur and explains why they are one of nature's patterns. After reading this book, have students illustrate the pattern of day and night.

Sky Magic by Lee Bennett Hopkins. Illustrations by Mariusz Stawarski. (New York, NY: Dutton Children's Books, 2009)

This collection of poems takes readers from sunrise to sunset, honoring the sun, the moon, and the stars. It beautifully traces the path of day and night. Have students write their own science poems about what they see in the sky.

Why the Sun and the Moon Live in the Sky by Elphinstone Dayrell. Illustrations by Blair Lent. (Boston, MA: HMH Books for Young Readers, 1990)

This beautifully illustrated African folktale tells how the sun and moon came to live in the sky. Use it to introduce the lesson on what students see in the sky and connect to your language arts program.

Stage 2 – Assessment Evidence

Pre-Assessments:

• Observing phenomena

Formative Assessments:

- Wrap Up: My Science Concepts
- Make Sense of Phenomena
- Show What You Know
- Vocabulary

Summative Assessments:

• Unit Assessment

Performance Task(s):

• Show What You Know

Stage 3 – Learning Plan

Lesson 1: What Do You See In The Sky?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Investigation Sorting Sky Pictures and Looking For Patterns (15 min.) What do you see in the day and night skies?

Investigation Identifying Sky Objects (5 min.) Students will focus on space objects: the sun, the moon, and the stars.

Investigation Analyzing Sky Pictures (10 min.) Students will observe the sky and look at a picture.

Vocabulary (3 min.) pattern

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) Students will draw the sky during the day and at night. They will show the sun, the moon, or the stars in the sky.

Making Sense of the Phenomena (5 minutes): Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. Day and Night
- 2. Patterns in the Sky

Lesson 2: Where Is The Sun In The Sky?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Investigation: The Path of the Sun (5 min.) Students learn that the sun appears to move across the sky during the day. The sun rises in the East and sets in the West.

Setting Up a Playhouse (10 min.) students will design a playhouse with windows that allows the sun to shine inside all day long.

Investigation Modeling the Sun on a Playhouse (10 min.) Students will watch how the light shines on different parts of the playhouse.

Understanding the Problem (10 min.) Students will plan where to put the windows in the playhouse.

Making and Testing Your Playhouse Design (30 min.) Students will design their playhouse and decide where they will put 3 windows. Students will use a flashlight to test their design.

Discussing Playhouse Designs (5 min.) Students will discuss how they designed their playhouse.

Vocabulary (3 min.) sunrise, sunset

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) Students use pictures and words to show where the sun is in the sky at each time of the day.

Making Sense of the Phenomena (5 minutes): Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. The Sun in the Sky
- 2. The Sun's Path Across the Sky

Lesson 3: How Long Is The Sun In The Sky?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Investigation Reviewing Patterns (14 min.) Students will learn that a pattern will repeat.

Playing Dial - A- Season (15 min.) Students will draw a picture for each season.

Dialing For Seasons At Home (5 min.) Students can keep track of seasons at home.

Investigation Collecting Data (15 min.) How long is the sun in the sky in different seasons?

Analyzing Data (15 min.) Students will make a graph to compare the number of hours of daylight at different times of the year.

Vocabulary (3 min.) fall, seasons, spring, summer, winter

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) Students will read riddles and answer questions.

Making Sense of the Phenomena (5 minutes): Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. Sunrise to Sunset
- 2. Summer and Fall
- 3. Winter and Spring

Lesson 4: Where Is The Moon In The Sky?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Observing Moon Patterns (5 min.) Students will look at an animation and look for moon patterns.

Investigation Making a Moonflip Book (20 min.) Students will look at pictures of the moon at different times one night.

Making A Moon Calendar (20 min.) Students will look at pictures of the moon and determine how each picture is different. The moon pictures are numbered. The number tells us the order that the moon shape appears in the sky.

Looking For Patterns (10 min.) Students will look at a moon calendar and look for patterns. Share and discuss.

Vocabulary (3 min.) moon phase

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) Students will complete a calendar diagram.

Making Sense of the Phenomena (5 minutes): Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. The Moon in the Sky
- 2. Phases of the Moon
- 3. The Moon's Path Across the Sky

Lesson 5: Where Are The Stars In The Sky?

Observing phenomena (5 min.): Students observe a photo and ask questions.

Asking Questions (5 min.) Students will go on a star gazing trip. Students will look at the stars and develop questions they may have about stars.

This activity, developing questions, connects to the DRA 2 reading assessment. This skill is used when assessing with a non fiction text.

Investigation Reading to Learn (10 min.) Students will practice reading and answering questions.

Observing The Stars (20 min.) Watch the video.

Writing About Experiences (20 min.) Students will write a story about the stargazing trip. The story must include a title. Students have to tell where they were and explain what they saw. Finally, students will draw pictures to go with their story.

Vocabulary (3 min.) telescope

Wrap-Up: My Science Concepts (4 min.) Students complete a self-assessment on learning.

Show What You Know (10 min.) Students will think about what they know about stars and answer a question.

Making Sense of the Phenomena (5 minutes): Use what you have learned to explain this phenomenon.

Text With Notes (Reading)

- 1. The Stars at Night
- 2. Looking at the Sky (Engineering Design)

Career Highlights: astronomer

Accommodations and Modifications:

Below please find a list of suggestions for accommodations and modifications to meet the diverse needs of our students. Teachers should consider this a resource and understand that they are not limited to the recommendations included below.

An accommodation changes HOW a student learns; the change needed does not alter the grade-level standard. A modification changes WHAT a student learns; the change alters the grade-level expectation.

Special Education and 504 Plans All modifications and accommodations must be specific to each individual child's IEP (Individualized Educational Plan) or 504 Plan.

- Provide redirection
- Provide notes and copies of handouts with
- Pre-teach or preview vocabulary
- Have students repeat directions
- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments
- Model skills/techniques to be mastered
- Emphasize key words or critical information by highlighting
- Use of graphic organizers
- Teachers should note any issue that may impact safety- ex. contact lenses, allergies.

English Language Learners:

All modifications and accommodations should be specific to each individual child's LEP level as determined by the WIDA screening or ACCESS, utilizing the WIDA Can Do Descriptors.

- Pre-teach or preview vocabulary
- Repeat or reword directions
- Have students repeat directions
- Use of small group instruction

- Scaffold language based on their Can Do Descriptors
- Alter materials and requirements according to Can Do Descriptors

Students at Risk of Failure:

- Use of self-assessment rubrics for check-in
- Pair visual prompts with verbal presentations
- Ask students to restate information and/or directions
- Opportunity for repetition and additional practice
- Model skills/techniques to be mastered
- Extended time
- Provide copy of class notes
- Strategic seating with a purpose
- Provide students opportunity to make corrections and/or explain their answers
- Support organizational skills

High Achieving:

Extension Activities

• Allow for student choice from a menu of differentiated outcomes; choices grouped by complexity

- of thinking skills; variety of options enable students to work in the mode that most interests them
- Allow students to pursue independent projects based on their individual interests
- Provide enrichment activities that include more complex material
- Allow opportunities for peer collaboration and team-teaching
- Set individual goals

NEPTUNE CITY SCHOOL DISTRICT Office of the Chief School Administrator, Principal 210 West Sylvania Avenue Neptune City, NJ 07753

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