

**CURRICULUM**

**FOR**

**SCIENCE**

**GRADE 4**

This curriculum is part of the Educational Program of Studies of the Rahway Public Schools.

### **ACKNOWLEDGMENTS**

**Dr. Susan Dube, Program Supervisor of Math, Science, and Technology Education**

The Board acknowledges the following who contributed to the preparation of this curriculum.

**Kayla Podell**

**Dr. Tiffany A. Beer, Director of Curriculum and Instruction**

Subject/Course Title:  
**Science**  
**Grade 4**

Date of Board Adoption:  
**September 19, 2023**

# RAHWAY PUBLIC SCHOOLS CURRICULUM

Science- Grade 4

## *PACING GUIDE*

<b>Unit</b>	<b>Title</b>	<b>Pacing</b>
1	Environments	12 weeks
2	Energy & Waves	14 weeks
3	Earth's Systems	14 weeks

## ***ACCOMMODATIONS***

<p><b>504 Accommodations:</b></p> <ul style="list-style-type: none"> <li>● Provide scaffolded vocabulary and vocabulary lists.</li> <li>● Provide extra visual and verbal cues and prompts.</li> <li>● Provide adapted/alternate/excerpted versions of the text and/or modified supplementary materials.</li> <li>● Provide links to audio files and utilize video clips.</li> <li>● Provide graphic organizers and/or checklists.</li> <li>● Provide modified rubrics.</li> <li>● Provide a copy of teaching notes, especially any key terms, in advance.</li> <li>● Allow additional time to complete assignments and/or assessments.</li> <li>● Provide shorter writing assignments.</li> <li>● Provide sentence starters.</li> <li>● Utilize small group instruction.</li> <li>● Utilize Think-Pair-Share structure.</li> <li>● Check for understanding frequently.</li> <li>● Have student restate information.</li> <li>● Support auditory presentations with visuals.</li> <li>● Weekly home-school communication tools (notebook, daily log, phone calls or email messages).</li> <li>● Provide study sheets and teacher outlines prior to assessments.</li> <li>● Quiet corner or room to calm down and relax when anxious.</li> <li>● Reduction of distractions.</li> <li>● Permit answers to be dictated.</li> <li>● Hands-on activities.</li> <li>● Use of manipulatives.</li> <li>● Assign preferential seating.</li> <li>● No penalty for spelling errors or sloppy handwriting.</li> <li>● Follow a routine/schedule.</li> <li>● Provide student with rest breaks.</li> <li>● Use verbal and visual cues regarding directions and staying on task.</li> <li>● Assist in maintaining agenda book.</li> </ul>	<p><b>IEP Accommodations:</b></p> <ul style="list-style-type: none"> <li>● Provide scaffolded vocabulary and vocabulary lists.</li> <li>● Differentiate reading levels of texts (e.g., Newsela).</li> <li>● Provide adapted/alternate/excerpted versions of the text and/or modified supplementary materials.</li> <li>● Provide extra visual and verbal cues and prompts.</li> <li>● Provide links to audio files and utilize video clips.</li> <li>● Provide graphic organizers and/or checklists.</li> <li>● Provide modified rubrics.</li> <li>● Provide a copy of teaching notes, especially any key terms, in advance.</li> <li>● Provide students with additional information to supplement notes.</li> <li>● Modify questioning techniques and provide a reduced number of questions or items on tests.</li> <li>● Allow additional time to complete assignments and/or assessments.</li> <li>● Provide shorter writing assignments.</li> <li>● Provide sentence starters.</li> <li>● Utilize small group instruction.</li> <li>● Utilize Think-Pair-Share structure.</li> <li>● Check for understanding frequently.</li> <li>● Have student restate information.</li> <li>● Support auditory presentations with visuals.</li> <li>● Provide study sheets and teacher outlines prior to assessments.</li> <li>● Use of manipulatives.</li> <li>● Have students work with partners or in groups for reading, presentations, assignments, and analyses.</li> <li>● Assign appropriate roles in collaborative work.</li> <li>● Assign preferential seating.</li> <li>● Follow a routine/schedule.</li> </ul>
<p><b>Gifted and Talented Accommodations:</b></p> <ul style="list-style-type: none"> <li>● Differentiate reading levels of texts (e.g., Newsela).</li> <li>● Offer students additional texts with higher lexile levels.</li> <li>● Provide more challenging and/or more supplemental readings and/or activities to deepen understanding.</li> <li>● Allow for independent reading, research, and projects.</li> <li>● Accelerate or compact the curriculum.</li> <li>● Offer higher-level thinking questions for deeper analysis.</li> <li>● Offer more rigorous materials/tasks/prompts.</li> <li>● Increase number and complexity of sources.</li> <li>● Assign group research and presentations to teach the class.</li> <li>● Assign/allow for leadership roles during collaborative work and in other learning activities.</li> </ul>	<p><b>ML Accommodations:</b></p> <ul style="list-style-type: none"> <li>● Provide extended time.</li> <li>● Assign preferential seating.</li> <li>● Assign peer buddy who the student can work with.</li> <li>● Check for understanding frequently.</li> <li>● Provide language feedback often (such as grammar errors, tenses, subject-verb agreements, etc...).</li> <li>● Have student repeat directions.</li> <li>● Make vocabulary words available during classwork and exams.</li> <li>● Use study guides/checklists to organize information.</li> <li>● Repeat directions.</li> <li>● Increase one-on-one conferencing.</li> <li>● Allow student to listen to an audio version of the text.</li> <li>● Give directions in small, distinct steps.</li> <li>● Allow copying from paper/book.</li> <li>● Give student a copy of the class notes.</li> </ul>

- Provide written and oral instructions.
- Differentiate reading levels of texts (e.g., Newsela).
- Shorten assignments.
- Read directions aloud to student.
- Give oral clues or prompts.
- Record or type assignments.
- Adapt worksheets/packets.
- Create alternate assignments.
- Have student enter written assignments in criterion, where they can use the planning maps to help get them started and receive feedback after it is submitted.
- Allow student to resubmit assignments.
- Use small group instruction.
- Simplify language.
- Provide scaffolded vocabulary and vocabulary lists.
- Demonstrate concepts possibly through the use of visuals.
- Use manipulatives.
- Emphasize critical information by highlighting it for the student.
- Use graphic organizers.
- Pre-teach or pre-view vocabulary.
- Provide student with a list of prompts or sentence starters that they can use when completing a written assignment.
- Provide audio versions of the textbooks.
- Highlight textbooks/study guides.
- Use supplementary materials.
- Give assistance in note taking
- Use adapted/modified textbooks.
- Allow use of computer/word processor.
- Allow student to answer orally, give extended time (time-and-a-half).
- Allow tests to be given in a separate location (with the ESL teacher).
- Allow additional time to complete assignments and/or assessments.
- Read question to student to clarify.
- Provide a definition or synonym for words on a test that do not impact the validity of the exam.
- Modify the format of assessments.
- Shorten test length or require only selected test items.
- Create alternative assessments.
- On an exam other than a spelling test, don't take points off for spelling errors.

## *UNIT OVERVIEW*

**Content Area:** Science

**Unit Title:** Earth Science (Earth Systems & Earth and Human Activity)

**Target Course/Grade Level:** Grade 4

**Unit Summary:** This unit provides the students with investigations, observations, and information that focus the concepts of weathering and how water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. Deposition is the result of that transport process that builds new landforms.

Students will make observations and/ or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind or vegetation.

**Approximate Length of Unit:** About 12 weeks

## *LEARNING TARGETS*

### **NJ Student Learning Standards:**

#### **Science**

- 4-ESS1-1.** Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
- 4-ESS2-1.** Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
- 4-ESS2-2.** Analyze and interpret data from maps to describe patterns of Earth's features.
- 4-ESS3-1.** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- 4-ESS3-2.** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

#### **Career Readiness, Life Literacies, and Key Skills:**

- 9.4.5.CI.1:** Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3, 7.1.NM.IPERS.6).
- 9.4.5.CI.2:** Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7).
- 9.4.5.CI.3:** Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
- 9.4.5.CI.4:** Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6).
- 9.4.5.CT.1:** Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

- 9.4.5.CT.2:** Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
- 9.4.5.CT.3:** Describe how digital tools and technology may be used to solve problems.
- 9.4.5.CT.4:** Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
- 9.4.5.DC.4:** Model safe, legal, and ethical behavior when using online or offline technology (e.g., 8.1.5.NI.2).
- 9.4.5.IML.2:** Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3).
- 9.4.5.IML.3:** Represent the same data in multiple visual formats in order to tell a story about the data.

### **Interdisciplinary Connections and Standards:**

#### **ELA Literacy:**

- RI.4.1.** Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
- RI.4.2.** Determine the main idea of a text and explain how it is supported by key details; summarize the text.
- RI.4.3.** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
- NJSLSA.W1.** Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
- NJSLSA.W7.** Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.
- NJSLSA.W8.** Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
- NJSLSA.W9.** Draw evidence from literary or informational texts to support analysis, reflection, and research.

#### **Technology:**

- 8.1.2.A.4** Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).

#### **Mathematics:**

- 4.MD.A.1** Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb., oz.; l, ml; hr., min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.
- 4.MD.A.2** Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
- 4.OA.A.1** Interpret a multiplication equation as a comparison, e.g., interpret  $35 = 5 \times 7$  as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

#### **Mathematical Practices:**

- MP.2** Reason abstractly and quantitatively.
- MP.4** Model with mathematics.
- MP.5** Use appropriate tools strategically.

#### **Unit Understandings:**

*Students will understand that...*

- identifying evidence from patterns in rock formations and fossils in rock layers can support an explanation for changes in a landscape over time.

- measurements and/or observations can provide evidence of the effects of weathering or the rate of erosion by water, ice, wind or vegetation.
- analyzing and interpreting data from maps are used to describe patterns of Earth's features.
- multiple solutions can be generated and compared to reduce the impacts of natural Earth processes on humans.

**Unit Essential Questions:**

- What is mechanical and chemical weathering and how does it affect the environment?
- What is erosion and how does it affect the environment?
- How do living things affect their environments?
- How does rainfall affect the environment?

**Knowledge and Skills:**

*Students will know...*

- Earth has four systems that work together.
- Earth's four systems are the atmosphere, biosphere, geosphere, and hydrosphere.
- Weathering is the breakdown or dissolving of rocks on Earth's surface.
- Mechanical weathering is when physical processes break down rock.
- Chemical weathering is when chemicals change the materials that make up a rock.
- Erosion is the movement of broken down rocks.
- All living things affect the physical characteristics of their environment.
- Rainfall impacts what an environment is like and what organisms live there.

*Students will be able to...*

- Create a model of ice weathering a rock and relate it to weathering in nature.
- Create a model of water weathering a rock and relate it to weathering in nature.
- Create a model of erosion and relate it to erosion in nature.
- Create a model of weathering and erosion and relate it to weathering and erosion in nature.
- Identify chemical versus mechanical weathering.
- Distinguish weathering and erosion.
- Identify the effects of weathering and erosion in the environment around their school.

***EVIDENCE OF LEARNING***

**Common Assessments:**

*What evidence will be collected and deemed acceptable to show that students truly "understand"?*

- **Common Unit Assessments: See assessment folder for links to assessments**
- **Common Quiz Assessments: See assessment folder for links to assessments**
- Notebook entries
- Response sheets
- Performance assessments throughout investigations



- Investigation I-Checks
- Survey/Post tests

### Investigations:

- Weathering & Erosion Labs
  - [W Mechanical Weathering Lab Grade 4.docx](#)
  - [W Weathering by Water Lab grade 4.docx](#)
  - [W Chemical Weathering Lab Grade 4.docx](#)
  - [W Erosion Lab Grade 4.docx](#)
  - [W Weathering & Erosion Skittles Lab Grade 4.docx](#)
  - [W Weathering & Erosion in our Environment Walk Grade 4.docx](#)
  -
- Investigation 1: Soils and Weathering
  - Soil Composition
  - Physical Weathering
  - Chemical Weathering
  - Schoolyard Soils
- Investigation 2: Landforms
  - Erosion and deposition
  - Stream- Table Investigations

## *RESOURCES*

### Teacher Resources:

- ★ [P Earth's Systems Presentation Grade 4.pptx](#)
- ★ Next Generation Science Standards (<https://www.nextgenscience.org/>)
- ★ FOSS Kit Energy Investigations Guide
- ★ FOSS Web Resources for the Soils, Rocks, and Landforms Module
- ★ Grades 3-5 resources:  
[https://ny.pbslearningmedia.org/collection/universe/grade/universe-3-5/?utm\\_source=Iterable&utm\\_medium=email&utm\\_campaign=campaign\\_%7BBUACILs6to12%7D](https://ny.pbslearningmedia.org/collection/universe/grade/universe-3-5/?utm_source=Iterable&utm_medium=email&utm_campaign=campaign_%7BBUACILs6to12%7D)
- ★ Generation Genius
- ★ Mystery Science
- ★ Edpuzzle
- ★ Discovery Education
- ★ Thinklink
- ★ Kahoot
- ★ Legends of Learning
- ★ pbskids.org
- ★ Readworks.org

**Equipment Needed:**

- Smart Board or Interactive White Board
- Kit Materials—see materials needed per investigation (See Materials Section in Teachers Guide)
- Safety posters
- Laptops or computers/headphones
- White boards and markers
- Notebook Sheets
- FOSS Web Resources
- Word Wall materials
- Home/School Connections Materials
- Library books as specified in materials section of teachers guide
- Science Notebooks
- Science Resources Book
- Assessment Materials per Investigation

## ***UNIT OVERVIEW***

**Content Area:** Science

**Unit Title:** Physical Science- Energy & Waves and Their Applications in Technologies for Information Transfer

**Target Course/Grade Level:** Grade 4

**Unit Summary:** This unit exposes students to physical science dealing with energy and change. Students will investigate electricity and magnetism as related effects and engage in engineering design while learning useful applications of electromagnetism in everyday life. Students will apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

Students will use evidence to construct explanations relating the speed of an object to the energy of that object and make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

**Approximate Length of Unit:** About 14 weeks

## ***LEARNING TARGETS***

### **NJ Student Learning Standards:**

#### **Science:**

- 4-PS3-1.** Use evidence to construct an explanation relating the speed of an object to the energy of that object.
- 4-PS3-2.** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
- 4-PS3-3.** Ask questions and predict outcomes about the changes in energy that occur when objects collide.
- 4-PS3-4.** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
- 4-PS4-1.** Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
- 4-PS4-2.** Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
- 4-PS4-3.** Generate and compare multiple solutions that use patterns to transfer information.

#### **Career Readiness, Life Literacies, and Key Skills:**

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

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- 9.4.5.IML.3:** Represent the same data in multiple visual formats in order to tell a story about the data.

## **Interdisciplinary Connections and Standards:**

### **ELA Literacy:**

- RI.4.1.** Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
- RI.4.2.** Determine the main idea of a text and explain how it is supported by key details; summarize the text.
- RI.4.3.** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
- NJSLSA.W1.** Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
- NJSLSA.W7.** Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.
- NJSLSA.W8.** Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
- NJSLSA.W9.** Draw evidence from literary or informational texts to support analysis, reflection, and research.

### **Mathematics:**

- 4.OA.A.3:** Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
- 4.G.A.1:** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

### **Mathematical Practices:**

- 4.MP.4:** Model with mathematics

### **Unit Understandings:**

*Students will understand that...*

- the speed of an object is related to the energy of that object.
- energy can be transferred from place to place by sound, light, heat, and electric currents.
- a change in energy will occur when objects collide.
- there are patterns in waves in terms of amplitude and wavelength.
- waves can cause objects to move.
- light that reflects from objects that then enters the eye allows objects to be seen.
- different solutions need to be tested in order to determine which one of them best solves the problem, given the criteria and the constraints.
- possible solutions to a problem are limited by available materials and resources.

- the success of a designed solution is determined by considering the desired features of a solution.
- different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.

**Unit Essential Questions:**

- What is energy?
- What is the difference between kinetic and potential energy?
- When do objects have more or less energy?
- What are the various forms of energy?
- How does energy shift between kinetic and potential?
- How does energy transfer among the various forms of energy?
- How does a collision transfer energy or force?
- What is the law of conservation of energy?
- What is force and how does it relate to energy?
- What is direct and indirect force?

**Knowledge and Skills:**

*Students will know...*

- Energy is an objects' ability to do work.
- Energy can be kinetic or potential, and has many different forms.
- Energy shifts between kinetic and potential.
- Energy is not created or destroyed.
- Energy is transferred among its various forms.
- Force is a way that energy can be transferred.

*Students will be able to...*

- Predict how changes in speed affect an object's energy.
- Observe how energy can be transferred among its various forms and explain what is happening using scientific vocabulary.
- Predict changes in energy that will occur as a result of objects colliding.
- Test and refine devices that convert energy from one form to another.

<b><i>EVIDENCE OF LEARNING</i></b>
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**Assessment:**

*What evidence will be collected and deemed acceptable to show that students truly "understand"?*


- **Common Unit Assessment: See assessment folder for links to assessments**
- **Common Unit Quizzes: See assessment folder for links to assessments**
- Notebook entries
- Response sheets
- Performance assessments throughout investigations
- Investigation I-Checks
- Survey/Post tests

## Investigations:

- Investigation 1: Energy and Circuits
  - Lighting a Bulb
  - Conductors and Circuits
  - Series and Parallel Circuits
- Investigation 2: The Force of Magnetism
  - Magnets and Materials
  - Magnetic Fields
  - Magnetic Force
- Investigation 3: Electromagnets
  - Building an Electromagnet
  - Changing the Strength
- Investigation 4: Energy Transfer
  - Presence of Energy
  - Rolling Balls Down Slopes

## *RESOURCES*

### Teacher Resources:

- ★ **Energy Unit Presentation:**  **Energy Presentation Grade 4.pptx**
- ★ Next Generation Science Standards (<https://www.nextgenscience.org/>)
- ★ FOSS Kit Energy Investigations Guide
- ★ FOSS Web Resources for the Soils, Rocks, and Landforms Module
- ★ Presentations- <https://njctl.org/materials/categories/science/>
- ★ Grades 3-5 resources:  
[https://ny.pbslearningmedia.org/collection/universe/grade/universe-3-5/?utm\\_source=Iterable&utm\\_medium=email&utm\\_campaign=campaign\\_%7BBUACILs6to12%7D](https://ny.pbslearningmedia.org/collection/universe/grade/universe-3-5/?utm_source=Iterable&utm_medium=email&utm_campaign=campaign_%7BBUACILs6to12%7D)
- ★ Generation Genius
- ★ Mystery Science
- ★ Edpuzzle
- ★ Discovery Education
- ★ Thinklink
- ★ Kahoot
- ★ Legends of Learning
- ★ pbskids.org
- ★ Readworks.org

### Equipment Needed:

- Smart Board or Interactive White Board
- Kit Materials—see materials needed per investigation (See Materials Section in Teachers Guide)
- Safety posters
- Laptops or computers/headphones

- White boards and markers
- Notebook Sheets
- FOSS Web Resources
- Word Wall materials
- Home/School Connections Materials
- Library books as specified in materials section of teachers guide
- Science Notebooks
- Science Resources Book
- Assessment Materials per Investigation

## *UNIT OVERVIEW*

**Content Area:** Science

**Unit Title:** Molecules to Organisms: Structure and Processes

**Target Course/Grade Level:** Grade 4

**Unit Summary:** This unit provides students with the opportunity to observe and describe the living and nonliving components in an ecosystem. Students will investigate the response of organisms to varying environmental factors. Students will create a freshwater aquarium with different kinds of fish, plants, and other organisms where they will monitor the environmental factors in the system and look for feeding interaction among the population. Students will learn about the role of producers, consumers, and decomposers in food chains and webs in terrestrial and aquatic systems, including a marine ecosystem. Students explore how animals receive information from their environment through their sensory system and use the information to guide their actions. Students will conduct controlled experiments by changing specific environmental conditions to determine the range of tolerance.

**Approximate Length of Unit:** About 14 weeks

## *LEARNING TARGETS*

### **NJ Student Learning Standards:**

#### **Science**

- 4-LS1-1** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- 4-LS1-2** Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
- 4-ESS3-1** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- 4-PS4-2:** Develop a model to describe that light reflecting from objects and entering the eyes allows objects to be seen.

### **Career Readiness, Life Literacies, and Key Skills:**

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



- 9.4.5.CT.1:** Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
- 9.4.5.CT.2:** Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).
- 9.4.5.CT.3:** Describe how digital tools and technology may be used to solve problems.
- 9.4.5.CT.4:** Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
- 9.4.5.DC.4:** Model safe, legal, and ethical behavior when using online or offline technology (e.g., 8.1.5.NI.2).
- 9.4.5.IML.2:** Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3).
- 9.4.5.IML.3:** Represent the same data in multiple visual formats in order to tell a story about the data.

### **Interdisciplinary Connections and Standards:**

#### **ELA Literacy:**

- RI.4.1.** Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
- RI.4.2.** Determine the main idea of a text and explain how it is supported by key details; summarize the text.
- RI.4.3.** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
- NJSLSA.W1.** Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
- NJSLSA.W7.** Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.
- NJSLSA.W8.** Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
- NJSLSA.W9.** Draw evidence from literary or informational texts to support analysis, reflection, and research.

#### **Mathematics:**

- 4.G.A.1:** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4-PS4-2)
- 4.G.A.3:** Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

### **Unit Understandings:**

*Students will understand that...*

- plants and animals have internal and external structures that function to support survival, growth, behavior and reproduction.
- animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
- energy and fuels are derived from natural resources and their uses affect the environment.
- analyzing and interpreting data from fossils will provide evidence of the organisms and the environments in which they lived long ago.
- variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
- when the environment changes, the types of plants and animals that live there may change in a particular habitat.

## Unit Essential Questions:

- How does an organism's structure fit its function?
- How do internal and external structures function to support the survival of plants and animals?
- How do senses function to help an animal's survival?
- How do animals react to their environments?
- How do plants react to their environments?

## Knowledge and Skills:

*Students will know...*

- The core 4 functions of organisms: growth, survival, behavior and reproduction.
- Examples of how plant and animal structures, both internally and externally, function to fulfill the core functions.
- How senses benefit animals in respect to how they respond to their environment.
- How animals use information processing and memory to guide their actions.
- How plants respond to their environments via tropisms.

*Students will be able to...*

- Analyze a plant or animal and explain how the internal and external features support their survival.
- Model information processing and understand how it helps animals to respond to their environments.
- Explain how information processing and memory guide the actions of animals.
- Describe several different tropisms through which plants react to their environments.

## ***EVIDENCE OF LEARNING***

## Assessment:

*What evidence will be collected and deemed acceptable to show that students truly “understand”?*

- **Structure & Function Unit Common Assessment: See assessment folder for links to assessments**
- **Structure & Functions Unit Quizzes: See assessment folder for links to assessments**
- Notebook entries
- Response sheets
- Performance assessments throughout investigations
- Investigation I-Checks
- Survey/Post tests

## RESOURCES

### Teacher Resources:

- ★ Structure & Functions Presentation: **P** Structure & Function Presentation Grade 4.pptx
- ★ **Teacher Demo Instructions:** **W** Demo What Is That Teacher Notes Grade 4.docx
- ★ **Bite into Structure Activity Presentation & Worksheet:**
  - P** Bite into Structure & Function Activity Grade 4.pptx
  - W** Bite into Structure & Function Activity Recording Sheet Grade 4.docx
- ★ Next Generation Science Standards (<https://www.nextgenscience.org/>)
- ★ Presentations- <https://njctl.org/materials/categories/science/>
- ★ Grades 3-5 resources:  
[https://ny.pbslearningmedia.org/collection/universe/grade/universe-3-5/?utm\\_source=Iterable&utm\\_medium=email&utm\\_campaign=campaign\\_%7BBUACILs6to12%7D](https://ny.pbslearningmedia.org/collection/universe/grade/universe-3-5/?utm_source=Iterable&utm_medium=email&utm_campaign=campaign_%7BBUACILs6to12%7D)
- ★ Generation Genius
- ★ Mystery Science
- ★ Edpuzzle
- ★ Discovery Education
- ★ Thinklink
- ★ Kahoot
- ★ Legends of Learning
- ★ pbskids.org
- ★ Readworks.org

### Equipment Needed:

- Smart Board or Interactive White Board
- Kit Materials—see materials needed per investigation (See Materials Section in Teachers Guide)
- Safety posters
- Laptops or computers/headphones
- White boards and markers
- Notebook Sheets
- FOSS Web Resources
- Word Wall materials
- Home/School Connections Materials
- Library books as specified in materials section of teachers guide
- Science Notebooks
- Science Resources Book
- Assessment Materials per Investigation