

**CURRICULUM**

**FOR**

**SCIENCE**

**GRADE 5**

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.

**Sharmaine Bunion**

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

Subject/Course Title:  
**Science**  
**Grade 5**

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

# RAHWAY PUBLIC SCHOOLS CURRICULUM

Science: Grade 5

## *PACING GUIDE*

<b>Unit</b>	<b>Title</b>	<b>Pacing</b>
1	Earth Science: Earth and the Universe, Earth Systems, Human Impact on Earth	14 weeks
2	Ecosystem Dynamics	12 weeks
3	Matter and its Interactions	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: a. Earth and Universe, b. Earth's Systems, c. Human Impact on Earth

**Target Course/Grade Level:** 5

**Unit Summary:** In this unit, students explore the uniqueness of Earth through several of its systems and address the NJSL and NGSS for fifth grade Earth Science. Specifically students will know that: the solar system consists of the sun (a star) and 8 planets; that each planet has its characteristics (including size and distance from the sun) by which it can be described, and Earth is the only one with water. Students will also know that water on the Earth allows for life to exist; that the water cycles through living and nonliving components of the environment; that the water cycle is a major basis of weather which is the condition of the air around us. Through the development of a model using an example, students are able to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. They describe and graph data to provide evidence about the distribution of water on Earth. Students develop an understanding of the idea that plants get the materials they need for growth chiefly from air and water. Using models, students can describe the movement of matter among plants, animals, decomposers, and the environment and that energy in animals' food was once energy from the sun. Students are expected to develop an understanding of patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. The Unit is presented to students through a series of investigations, experiments, active learning experiences, questions, and assessments.

**Approximate Length of Unit:** 14 weeks

## ***LEARNING TARGETS***

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

#### **Science:**

- **5-ESS1-1** Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. [Assessment Boundary: Assessment is limited to relative distances, not sizes of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, stage).]
- **5-ESS1-2** Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. [Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.] [Assessment Boundary: Assessment does not include causes of seasons.]
- **5-ESS2-1** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interacts. [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]
- **5-ESS2-2** Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. [Assessment Boundary: Assessment is limited to oceans, lakes, rivers,

glaciers, ground water, and polar ice caps, and does not include the atmosphere.]. • **5-ESS3-1** Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources, environment, and address climate change issues.

## **Crosscutting Concepts**

### **Patterns**

Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. (5-ESS1-2)

### **Scale, Proportion, and Quantity**

Natural objects exist from the very small to the immensely large. (5-ESS1-1)

Standard units are used to measure and describe physical quantities such as weight and volume. (5-ESS2-2)

### **Systems and System Models**

A system can be described in terms of its components and their interactions. (5-ESS2-1, 5-ESS3-1)

## **Connections to Nature of Science**

### **Science Addresses Questions About the Natural and Material World.**

Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)

## **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:**

### **English Language Arts**

**RI.5.1** Quote accurately from a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text. (5-ESS1-1)

- RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-ESS1-1)
- RI.5.8** Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). (5-ESS1-1)
- RI.5.9** Integrate and reflect on (e.g. practical knowledge, historical/cultural context, and background knowledge) information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS1-1)
- W.5.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-ESS1-1)
- W.5.8** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-ESS3-1)
- W.5.9** Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-ESS3-1)
- SL.5.5** Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-ESS1-2)

### **Mathematics**

- MP.2** Reason abstractly and quantitatively. (5-ESS1-1),(5-ESS1-2)
- MP.4** Model with mathematics. (5-ESS1-1),(5-ESS1-2)
- 5.NBT.A.2** Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. (5-ESS1-1)
- 5.G.A.2** Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (5-ESS1-2)

### **Unit Understandings**

*Students will understand that...*

- The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. (5-ESS1-1)
- The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. (5-ESS1-1)
- Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1)
- Nearly all of Earth's available water is in the ocean. Most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2)
- Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)

### **Unit Essential Questions:**

- How does relative distance affect the brightness of a star?
- What causes night and day?
- Why are some constellations only visible during certain times of the year?



- Why do shadows appear larger at certain times of the day, and shorter at other times?
- What impacts, both positive and negative, do humans have on the Earth?
- How can humans reduce their impacts on Earth?
- What are the four major systems that make up our Earth and how do they interact?
- What are the components of our atmosphere and how is the atmosphere affected by animals and plants?
- Where is the water on Earth located? How much of this water is usable by humans?
- What effect does ocean water have on the nearby land?

### **Knowledge and Skills:**

*Students will know...*

- That a star's distance from Earth affects how bright it appears to be.
- That the length of shadows decrease during the day until they reach a certain point, then the shadows gradually start to get larger.
- That the rotation of Earth causes night and day.
- That the path of the sun changes from month to month.
- That the location of constellations change due to the rotation and revolution of Earth.
- How humans negatively impact Earth systems.
- How humans positively impact Earth systems.
- The impacts of human activities and consumption of natural resources

*Students will be able to...*

- Create an argument that relative brightness of the Sun compared to other stars is a function of the distance to those stars.
- Explain how day turns into night
- Explain why the sun casts different sized shadows.
- Explain that the location of constellation in the night sky appear in different locations due to the rotation and revolution of Earth
- Explain the four major systems of the Earth.
- Differentiate between the different layers of the Earth based on distinct characteristics.
- Explain the relationship between plants and animals when it comes to the production of oxygen and carbon dioxide.
- Describe how life on Earth would be different if the ozone layer continues to be depleted.
- Interpret and create graphs that represent the location of both salt and fresh water on Earth.
- Describe humans' impact on Earth systems
- Explain the impact that increasing human populations have on natural resources.
- Identify changes humans can make to lessen their impact on the Earth's systems.

## ***EVIDENCE OF LEARNING***

### **Common Assessments:**

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

- **End of Unit Common Assessment: See assessment folder for links to assessments**
- Formal and informal assessments
- Written and verbal assessments
- Teachers observations of independent assignments

- Unit Tests (Mosa Mack)
- Daily exit slips

### Learning Activities:

*What differentiated learning experiences and instruction will enable all students to achieve the desired results?*

- **Mosa Mack** (grade 5): Sun-Earth System & Solar System Gravity, Water Cycle, Earth's Spheres
- **FOSS:** Earth and Sun Investigations: 1 (parts 1,3); 2 (parts 2,4,5); 3 (parts 1,2); 5 (parts 1,2,3)

## **RESOURCES**

### Teacher Resources:

- **P** Earth & The Universe Grade 5 Presentation.pptx
- **P** Earth Systems Presentation Grade 5.pptx
- **P** Human Impacts on Earth Unit Presentation Grade 5.pptx
- **W** Human Impacts on Earth Unit Note Catcher Grade 5.doc
- **W** Water Graphing Activity Grade 5.docx
- **W** Carrying Capacity Lab ActivityGrade 5.docx
- **Generation Genius**
- **Mystery Science**
- **Edpuzzle** (various videos)
- **Discovery Education**
- **ThinkLink via Clever**
- **Kahoot** <https://kahoot.com/>
- **Legends of Learning**
- **pbskids.org**
- **Readworks.org**
- **Nearpod** (various lessons)
- [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)
- **PhET Simulations**  
<https://phet.colorado.edu/en/simulations/filter?subjects=earth-science&type=html.prototype>  
(My Solar System, Gravity and Orbits)
- **Brain Pop** (Earth's Atmosphere, Water Cycle, Sun)

### Equipment Needed:

- Projector with Computer, Whiteboard and High speed internet
- Laboratory equipment as specified for unit
- Online access to FOSS module (Earth and Sun) via ThinkLink
- Online access to Mosa Mack platform
- Online access to Nearpod platform
- Online access to PHET simulation
- Online access to BrainPop
- Online access to EdPuzzle

## *UNIT OVERVIEW*

**Content Area:** Science

**Unit Title:** Ecosystem Dynamics

**Target Course/Grade Level:** 5th

**Unit Summary:** In this unit, students explore the interconnectivity among organisms and energy within an ecosystem and address the NJSLS and NGSS for fifth grade Life Sciences. Students will be challenged to think about how organisms obtain and use energy, how the energy moves through an ecosystem, and what happens to an ecosystem when the environment is changed. Over the course of the unit, students will develop models that describe and represent the transfer of energy within an ecosystem. Students will also use the models to describe how a disruption can change the equilibrium of an entire ecosystem. The hope is that this unit helps students understand the delicate balance between organisms in an ecosystem and why conserving and protecting the environment is incredibly important. The Unit is presented to students through a series of investigations, experiments, active learning experiences, questions, and assessments.

**Approximate Length of Unit:** 12 weeks

## *LEARNING TARGETS*

**NJ Student Learning Standards:**

**Science:**

**5-LS1: From Molecules to Organisms: Structures and Processes**

• **5-LS1-1.** Support an argument that plants get the materials they need for growth chiefly from air and water. [Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.]

**5-LS2: Ecosystems: Interactions, Energy, and Dynamics**

• **5-LS2-1.** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. [Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.] [Assessment Boundary: Assessment does not include molecular explanations.]

**Crosscutting Concepts**

**Energy and Matter**

Matter is transported into, out of, and within systems. (5-LS1-1)

**Systems and System Models**

A system can be described in terms of its components and their interactions. (5-LS2-1)

**Connections to Nature of Science**

**Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena**

Science explanations describe the mechanisms for natural events. (5-LS2-1)

### **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:**

#### **English Language Arts**

- RI.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-LS1-1)
- RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-LS1-1)
- RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-LS2-1)
- W.5.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-LS1-1)
- SL.5.5** Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-LS2-1)

#### **Mathematics**

- MP.2** Reason abstractly and quantitatively. (5-LS1-1)
- MP.4** Model with mathematics. (5-LS1-1)
- MP.5** Use appropriate tools strategically. (5-LS1-1)
- 5.MD.A.1** Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. (5-LS1-1)

#### **Unit Understandings:**

*Students will understand that...*

- Plants acquire their material for growth chiefly from air and water. (5-LS1-1)
- The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores

(recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2- 1)

- Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1)

#### **Unit Essential Questions:**

- How can a food web be used to help observe interactions between organisms in an environment?
- What are the roles of producers, consumers and decomposers and the Sun in an ecosystem?
- How is matter transferred through an ecosystem?
- How can an organism maintain its population in an ecosystem? What factors can threaten a species?
- How does an ecosystem change when the plants change?
- How can people benefit from growing food in ways that support plants and animals in the natural ecosystem?
- How have changes in our community affected what lives here?

#### **Knowledge and Skills:**

*Students will know...*

- All food webs rely on the sun for its energy source and producers to create their own food.
- Energy and mass are transferred from one organism to the next as it is eaten.
- Decomposers take dead material and recycle it back into usable material.
- Ecosystems are very fragile and require a perfect balance of predator and prey.

*Students will be able to...*

- Create a food web.
- Explain the importance of producers, consumers and decomposers in an ecosystem.
- Observe and analyze factors that aid decomposition.
- Describe the flow of energy and mass through a food web.
- Make conclusions about an ecosystem's chances for survival based on factors such as overpopulation or overhunting.

## ***EVIDENCE OF LEARNING***

#### **Assessment:**

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

- **End of Unit Assessment: See assessment folder for links to common assessments**
- Formal and informal assessments
- Written and verbal assessments
- Teachers observations of independent assignments
- Unit Tests (Mosa Mack)
- Daily exit slips

## Learning Activities:

*What differentiated learning experiences and instruction will enable all students to achieve the desired results?*

- **Mosa Mack** (grade 5): Food Webs
- **W** Build a Food Web Activity.docx
- **FOSS:** Living Systems Investigations: 1 (parts 1-4); 2 (parts 2 & 3); 4 (parts 1 & 4)

## RESOURCES

### Teacher Resources:

- **P** Ecosystem Dynamics Presentation Grade 5.pptx
- [NJCTL \(Ecosystem Dynamics\)](#)
- **Generation Genius**
- **Mystery Science**
- **Edpuzzle** (various videos)
- **Discovery Education**
- **ThinkLink via Clever**
- **Kahoot** <https://kahoot.com/>
- **Legends of Learning**
- **pbskids.org**
- **Readworks.org**
- **Nearpod** (various lessons)
- **Brain Pop** (Ecosystems, Food Webs)

### Equipment Needed:

- Projector with Computer, Whiteboard and High speed internet
- Laboratory equipment as specified for unit
- Online access to FOSS module (Living Systems) via ThinkLink
- Online access to Mosa Mack platform
- Online access to Nearpod platform
- Online access to PHET simulation
- Online access to BrainPop
- Online access to EdPuzzle

## *UNIT OVERVIEW*

**Content Area:** Science

**Unit Title:** Matter and its Interactions

**Target Course/Grade Level:** 5th

**Unit Summary:** In this unit students explore the various states of matter and the complex interactions of materials as aligned to the NJSL and NGSS for 5th grade Physical Sciences. This unit explores appropriate scientific equipment use, the concept of matter and the 3 forms that it can take (solid, liquid, and gas) as well as the chemical and physical reactions that allow for phase changes and other transformations. This unit also introduces the Law of Conservation of Matter, which states that the amount of matter stays the same, even when matter changes form. Throughout the course of this unit, students will encounter new vocabulary and scientific principles that help to form the basis for further scientific thought and inquiry. The lessons of this unit incorporate hands-on experiments, the use of technology, responding to journal prompts, recording data, and discussions with peers and teachers in order to facilitate the learning experience.

**Approximate Length of Unit:** 14 weeks

## *LEARNING TARGETS*

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

#### **Science:**

- **5-PS1-1** Develop a model to describe that matter is made of particles too small to be seen. [Clarification Statement: Examples of evidence supporting a model could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.] [Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.]
- **5-PS1-2** Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. [Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances.] [Assessment Boundary: Assessment does not include distinguishing mass and weight.]
- **5-PS1-3** Make observations and measurements to identify materials based on their properties. [Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.] [Assessment Boundary: Assessment does not include density or distinguishing mass and weight.]
- **5-PS1-4** Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

### **Crosscutting Concepts**

#### **Cause and Effect**

Cause and effect relationships are routinely identified, tested, and used to explain change. (5-PS1-4)

## **Scale, Proportion, and Quantity**

Natural objects exist from the very small to the immensely large. (5- PS1-1)

Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-2), (5-PS1-3)

## **Connections to Nature of Science**

### **Scientific Knowledge Assumes an Order and Consistency in Natural Systems**

Science assumes consistent patterns in natural systems. (5- PS1-2)

## **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:**

### **English Language Arts**

**RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-PS1-1)

**W.5.7** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (5-PS1-2), (5-PS1-3), (5-PS1-4)

**W.5.8** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-PS1-2), (5- PS1-3), (5-PS1-4)

**W.5.9** Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-PS1-2), (5- PS1-3), (5-PS1-4)

### **Mathematics**

**MP.2** Reason abstractly and quantitatively. (5-PS1-1)

**MP.4** Model with mathematics. (5-PS1-1)



- 5.NBT.A.1** Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. (5-PS1-1)
- 5.NF.B.7** Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (5-PS1-1)
- 5.MD.C.3** Recognize volume as an attribute of solid figures and understand concepts of volume measurement. (5-PS1-1)
- 5.MD.C.4** Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. (5-PS1-1)

### **Unit Understandings:**

*Students will understand that...*

- Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. (5-PS1-1)
- The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2)
- Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3)
- When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4)
- No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) (5-PS1-2)

### **Unit Essential Questions:**

- What is matter and what is it made of?
- What happens to the mass of matter as it goes through its different forms (solid, liquid, gas)?
- What are the identifiable properties of a substance?
- When two substances are mixed together, is something completely new and different always made?

### **Knowledge and Skills:**

*Students will know...*

- Matter is a term that applies to all of the stuff around us and it is made of particles that are too small to see.
- When substances are heated, cooled, or mixed the total weight before and after is always the same.
- Substances can be identified based on observable and measurable properties.
- Sometimes when two substances are mixed, each of the substances keeps its original properties and sometimes a new substance is formed.

*Students will be able to...*

- Give an examples of what is matter

- Describe how gases are made from matter particles that are too small to be seen. (Ex: an inflated balloon)
- Measure and graph the weights of matter before and after being heated, cooled, or mixed.
- Identify materials based on various observable properties.
- Determine whether the mixing of two substances always results in the formation of new substances or not and provide examples.
- Identify the differences between soluble and insoluble solutions.

## ***EVIDENCE OF LEARNING***

### **Assessment:**

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

- **Common Assessment: See assessment folder for links to common assessments**
- Formal and informal assessments
- Written and verbal assessments
- Teachers observations of independent assignments
- Unit Tests (Mosa Mack)
- Daily exit slips
- I-Check (Foss)

### **Learning Activities:**

*What differentiated learning experiences and instruction will enable all students to achieve the desired results?*

- [W Mass of Air Lab Grade 5.docx](#)
- [W Describing Matter Activity Grade 5.docx](#)
- [W Mystery Substance Activity Grade 5.docx](#)
- [W Chemical Reactions Demo.docx](#)
- **Mosa Mack** (grade 5):
- **FOSS:** Mixtures and Solutions Investigations: 1 (parts 1-3), 2 (part 3), 3 (parts 1-4), 4 (parts 1-3), 5 (parts 1-3)

## ***RESOURCES***

### **Teacher Resources:**

- [P Matter & Interactions Presentation Grade 5.pptx](#)
- [NJCTL \(Matter and Its Interactions\)](#)
- **Generation Genius**

- **Mystery Science**
- **Edpuzzle** (various videos)
- **Discovery Education**
- **ThinkLink via Clever**
- **Kahoot** <https://kahoot.com/>
- **Legends of Learning**
- **pbskids.org**
- **Readworks.org**
- **Nearpod** (various lessons)
- **Brain Pop** (Matter Changing States, Compounds and Mixtures, States of Matter, Property Change, Conservation of Mass)
- **PhET Simulations** <https://phet.colorado.edu/en/simulations/energy-forms-and-changes>

**Equipment Needed:**

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