Totowa Public Schools

Science

Grade 5

Aligned to NJSLS 2020 Standards

BOE Adopted: 08/31/2022

Revised: 12/14/22

Units of Study & Pacing Guide

Unit of Study	Timeline	Notes
Unit 1: Matter and it's Interactions	8 Weeks	
Unit 2: Matter and Energy in Organism and Ecosystems	10 Weeks	Lessons in this unit satisfy the Climate Change Mandate
Unit 3: Earth's Systems	8 Weeks	
Unit 4: Human Impact on the Earth	5 Weeks	Lessons in this unit satisfy the Climate Change Mandate
Unit 5: Space Systems – Stars and the Solar System	5 Weeks	
		Curricular Mandate List

Title	Matter and it's Interactions
Unit Duration	8 Weeks
Unit Summary & Rationale	***Students will learn to recognize that all objects are made of matter and identify the three most common states of matter: solid, liquids, and gasses. Students will be able to explain that all matter is made of particles too small to be seen. Through planning and carrying out investigations, students will demonstrate how to measure matter, including length, weight, and volume. Students will also learn about the properties of matter, mixtures, and solutions. They gather evidence about the formation of solutions and analyze information about size, proportion, rate, and ratios. They will also apply math and use models in the properties of matter. Students will study a number of processes to learn which changes in properties represent physical changes and which represent chemical changes. They find that both kinds of changes are consistent with the law of conservation of matter and with the particle model of matter.***
Unit Goals	
Essential Questions	• What is the difference between types of matter? • What happens when matter changes form? • How can we identify a material based on its properties? • What happens when two or more chemicals are mixed together? • What are the differences between a physical and a chemical change? • What is gravitational force?
Enduring Understandings	• Matter comes in three different states: solids, liquids, and gases. • When matter changes form, the amount of matter is conserved. • When two or more chemicals are mixed together, a new substance may be formed with different properties than the original substance. • A physical change only changes the appearance of matter, while a chemical change makes different matter. • Materials can be identified based on a list of their properties: hardness, magnetism, electrical conductivity, thermal conductivity, solubility, heating, cooling, etc.
Learning Outcomes	• Develop a model to describe that matter is made of particles too small to be seen.

- 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.
- Make observations and measurements to identify materials based on their properties.
- Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
- Support an argument that the gravitational force exerted by Earth on objects is directed down.
- Define matter as having mass and taking up space.
- Describe matter as consisting of particles.
- Compare and contrast the properties of solids, liquids, and gases.
- Infer that a solution contains particles too small to see.
- Develop a model to describe that matter is made of particles too small to be seen.
- Construct and test a model.
- Evaluate the validity of a model.
- Use a model to successfully communicate a concept.
- Identify seven physical properties of matter.
- Describe hardness.
- Order the degrees of hardness of various materials.
- Determine the hardness order of minerals by performing scratch tests.
- Describe magnetism.
- Identify substances that are attracted to a magnet.
- Explain how the property of magnetism can be tested.
- Classify matter based on its ability to conduct or insulate electrical energy.
- Identify materials that conduct and do not conduct electricity.
- Classify matter based on its ability to conduct or insulate thermal energy.
- Determine the solubility in water of various materials.
- Define the boiling and melting points of matter.
- Identify the boiling and melting points of water.
- Describe how boiling affects the state of water.
- Define condensation.
- Describe how the cooling of water can change its state.
- Determine whether matter is conserved during a change in state.
- Describe changes in the physical properties of matter that occur during changes in state.

- Determine whether matter is conserved when one material is mixed with another material.
- Find evidence that supports the Law of Conservation of Matter.
- Plan and conduct an investigation.
- Organize, analyze, and interpret data.
- Express a scientific generalization.
- Define and describe a chemical change.
- Compare and contrast chemical changes and physical changes.
- Distinguish between a chemical change and a chemical reaction.
- Identify the signs of a chemical change.
- Demonstrate that matter is conserved though changed during a chemical reaction.
- Distinguish materials based on an analysis of their physical and chemical properties.
- Identify the goal of research scientist Albert Yu-Min Lin and the tools he employs to reach that goal.
- Examine/research the career of a chemical engineer.

Assessment Evidence	
Formative	Teacher observations, Class discussions, Lab Activities, Key concepts and vocabulary quizzes, Science Starter's/Do Nows, Open Ended Responses, Modeling, Simulations, Innovators Monthly Research, Lab Activities, Vocabulary Responses, Exit Questions, Interactive Digital Assessments embedded in Exploring Science Digital Book
Summative	Projects, Tests, Quizzes, lab skills demonstrations, projects, and vocabulary quizzes.
Alternative and Benchmark	Alternative - Read to the student and chart oral responses. Word banks, sentence frames, oral responses, graphic organizers, observations, portfolios of student work, orally administered assessments, and anecdotal notes. Benchmark – LinkIt Benchmark Assessment, Teacher Generated Assessments Formative, Summative, Alternative and Benchmark Assessments
Resources to Promote Learning	
Resources & Equipment Needed	Smartboard, Computers, Websites and digital interactives/models, Multi-media presentations, Video Streaming, Brain Pop, Middle School Science, Generation Genius Digital Curriculum, Mystery Science

	Digital Curriculum, Amplify Digital Curriculum, Microsoft 365, Primary and Secondary Source Documents, Assorted lab materials. Approved Class Resource List

Content & Interdisciplinary Standards

NJ 2020 SLS: Science

Standards

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.

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Science and Engineering Practices

Developing and Using Models - Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Use models to describe phenomena. (5-PS1-1)

Planning and Carrying Out Investigations - Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (5-PS1-4)
- Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (5-PS1-3)

Using Mathematics and Computational Thinking - Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.

- Measure and graph quantities such as weight to address scientific and engineering questions and problems. (5-PS1-2)

Asking Questions and Defining Problems - Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1)

Planning and Carrying Out Investigations - Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-5-ETS1-3)

Constructing Explanations and Designing Solutions - Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)

Disciplinary Core Ideas (DCI)

PS1.A: Structure and Properties of Matter

- 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)

PS1.B: Chemical Reactions

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)

ETS1.A: Defining and Delimiting Engineering Problems

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). 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. (3-5-ETS1-1)

ETS1.B: Developing Possible Solutions

- Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2)
- At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2)
- Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3)

ETS1.C: Optimizing the Design Solution

- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)

Crosscutting Concepts	
Cause and Effect	• Cause and effect relationships are routinely identified 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)
Scientific Knowledge Assumes an Order and Consistency in Natural Systems	• Science assumes consistent patterns in natural systems. (5-PS1-2)
Influence of Science, Engineering, and Technology on Society and the Natural World	• People's needs and wants change over time, as do their demands for new and improved technologies. (3- 5-ETS1-1) • Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2

NJ: 2016 SLS: 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.
- 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.
- RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

- W.5.7, Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
- 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.
- W.5.9, Draw evidence from literary or informational texts to support analysis, reflection, and research.
- L.5.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).

NJ: 2016 SLS: Mathematics

- MP2 Reason abstractly and quantitatively
- MP4 Model with mathematics.

- MP5 Use appropriate tools strategically.
- 3-5.OA Operations and Algebraic Thinking
- 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.NF.B.7, Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
- 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.MD.C.3, Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
- 5.MD.C.4: Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.
- 5.MD.C.5: Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. ○ a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
- 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.NF.B.7: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

2020 SLS: Computer Science & Design Thinking

NJSLS Performance Expectations (By the end of 5th Grade)

- 8.1.5.IC.1: Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.
- 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.
- 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
- 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
- 8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems.
- 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.

2020 SLS: Career Readiness, Life Literacies, and Key Skills	
NJSLS Performance Expectations (By the end of 5th Grade)	
• 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process • 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global. • 9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations. • 9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g. life guards, child care, medicine, education) and examples of those requirements. • 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. • 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. • 9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings.	
Interdisciplinary/21st Century Connections	
21st Century Connections	• Creativity and Innovation • Information and Media Literacy • Critical Thinking and Problem Solving • Technology Literacy
SEL	• Relationship Skills - Establish and maintain healthy relationships • Self-Management - Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals

Title	Matter and Energy in Organism and Ecosystems
Unit Duration	8 Weeks
Unit Summary & Rationale	***Throughout this unit, students are introduced to the inner workings of their environment. 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.***

	Through studies of the Galapagos Islands, students will understand that each piece of our environment is connected. Changing one piece of an environment can damage other organisms.
Unit Goals	
Essential Questions	• What does a plant need to grow? • How does energy enter and move through an ecosystem? • What happens if one piece of the ecosystem is changed? • How do energy and nutrients cycle through an ecosystem? • What happens if an organisms needs are not being met in an ecosystem?
Enduring Understandings	• Plants need carbon dioxide, sunlight, and water to grow and thrive. • Energy enters the ecosystem through producers. As producers are eaten, energy moves from consumer to consumer through the environment. • When one piece of an ecosystem is changed, the entire ecosystem can be thrown off balance. • Energy and nutrients cycle through ecosystems through decomposers, as well as interactions between plants and animals. • If an organism's needs are not being met in an ecosystem, the organism will either move, adapt, or die out. • Human activities are impacting the climate system. • Life on Earth depends on, is shaped by, and affects climate.
Learning Outcomes	• List the three main things that plants need to live and grow. • Use models to describe that energy in animals' food was once energy from the sun. • Support an argument that plants get the materials they need for growth chiefly from air and water. • Identify the source of the energy that plants use to make the food they need to survive. • Explain that the energy that plants use to live and grow was once energy from the sun. • Describe the process of photosynthesis. • Explain that plants get the materials they need for growth chiefly from air and water. • Identify some of the conditions that make it difficult to grow enough food for all the people on Earth. • Describe hydroponics and explain how its use can help increase the supply of food for humans. • Conduct an investigation to determine if plants can grow without soil. • Use evidence to support the argument that plants get the material they need for growth chiefly from air and water.

- Identify how changes in the environment can affect populations around the world.
- Explain that food provides animals with the materials they need for growth and body repair, and the energy they need for motion and to maintain body warmth.
- Use a food chain to describe the flow of energy from the sun through the plants and animals in an ecosystem.
- What is global warming and its effects on ecosystems? What are ways to prevent global warming from happening?
- Use food chains to compare the pathway of energy from the sun through the organisms in two different environments.
- Use a model to describe that energy in animals' food was once energy from the sun.
- Describe the flow of energy from the sun through the organism in a food web.
- Describe the role of decomposers in food webs and in cycles of matter.
- Describe how matter cycles through an ecosystem and among the plants, animals, and microbes that live and die in the environment.
- Explain that organisms can survive only in environments in which their particular needs are met.
- Describe the levels of organism that make up an ecosystem.
- Observe the way organisms live and survive in their ecosystem by interacting with other organisms and nonliving elements.
- Describe the flow of energy derived from the sun through an ecosystem.
- Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- Describe how newly introduced species can damage the balance of an ecosystem.
- Describe how a newly introduced species is damaging the balance of an ecosystem.
- Explain how scientists are using another species to control the population of an invasive species.
- Describe how a conservationist studies the natural world and works with other people to save natural resources.
- Explore careers related to environmental science.

Assessment Evidence	
Formative	Teacher observations, Class discussions, Lab Activities, Key concepts and vocabulary quizzes, Science Starter's/Do Nows, Open Ended Responses, Modeling, Simulations, Innovators Monthly Research, Lab

	Activities, Vocabulary Responses, Exit Questions, Interactive Digital Assessments embedded in Exploring Science Digital Book
Summative	Projects, Tests, Quizzes, lab skills demonstrations, projects, and vocabulary quizzes.
Alternative and Benchmark	Alternative - Read to the student and chart oral responses. Word banks, sentence frames, oral responses, graphic organizers, observations, portfolios of student work, orally administered assessments, and anecdotal notes. Benchmark – LinkIt Benchmark Assessment, Teacher Generated Assessments Formative, Summative, Alternative and Benchmark Assessments
Resources to Promote Learning	
Resources & Equipment Needed	Smartboard, Computers, Websites and digital interactives/models, Multi-media presentations, Video Streaming, Brain Pop, Middle School Science, Generation Genius Digital Curriculum, Mystery Science Digital Curriculum, Amplify Digital Curriculum, Microsoft 365, Primary and Secondary Source Documents, Assorted lab materials. Approved Class Resource List
Content & Interdisciplinary Standards	
NJ 2020 SLS: Science	
Standards	
5-PS3-1., Use models to describe that energy in animals' food (used for body repair, growth, and motion and to maintain body warmth) was once energy from the sun. [Clarification Statement: Examples of models could include diagrams, and flow charts.] 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-LS2-1., 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.]	
Science and Engineering Practices	
Developing and Using Models - Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Use models to describe phenomena. (5-PS3-1)	

- Develop a model to describe phenomena. (5-LS2-1)
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Engaging in Argument from Evidence - Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Support an argument with evidence, data, or a model. (5-LS1-1)

Connections to the Nature of Science - Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

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

Disciplinary Core Ideas (DCI)

PS3.D: Energy in Chemical Processes and Everyday Life

- The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1)

LS1.C: Organization for Matter and Energy Flow in Organisms

- Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary to 5-PS3-1)
- Plants acquire their material for growth chiefly from air and water. (5-LS1-1)

LS2.A: Interdependent Relationships in Ecosystems

- 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)

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

- 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)

Crosscutting Concepts

Systems and Modules	• A system can be described in terms of its components and their interactions. (5-LS2-1)
Scale, Proportion, and Quantity	• Matter is transported into, out of, and within systems. (5-LS1-1) • Energy can be transferred in various ways and between objects. (5-PS3-1)

NJ: 2016 SLS: 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.
- 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.
- RI.5.9, Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.
- L.5.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).
- 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.
- W.5.1, Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-LS1-1)
- W.5.7, Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
- 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.
- W.5.9, Draw evidence from literary or informational texts to support analysis, reflection, and research.

NJ: 2016 SLS: Mathematics

- MP2 Reason abstractly and quantitatively
- MP4 Model with mathematics.
- MP5 Use appropriate tools strategically.
- 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.NF.B.7, Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

- 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.MD.C.3, Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
- 5.MD.C.4: Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.
- 5.MD.C.5: Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. ○ a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
- 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.NF.B.7: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

2020 SLS: Computer Science & Design Thinking

NJSLS Performance Expectations (By the end of 5th Grade)

- 8.1.5.IC.1: Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.
- 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.
- 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
- 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
- 8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems.
- 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.

2020 SLS: Career Readiness, Life Literacies, and Key Skills

NJSLS Performance Expectations (By the end of 5th Grade)

- 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process
- 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.

• 9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations. ● 9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g. life guards, child care, medicine, education) and examples of those requirements.	
Interdisciplinary/21st Century Connections	
Connections and Skills	• Creativity and Innovation • Information and Media Literacy • Critical Thinking and Problem Solving • Technology Literacy
Social Studies	• 6.1.5.GeoPP.2: Describe how landforms, climate and weather, and availability of resources have impacted where and how people live and work in different regions of New Jersey and the United States. • 6.3.5.GeoGI.1: Use technology to collaborate with others who have different perspectives to examine global issues, including climate change and propose possible solutions.
SEL	Self-Awareness • Recognize the impact of one's feelings and thoughts on one's own behavior • Recognize one's personal traits, strengths, and limitations • Recognize the importance of self-confidence in handling daily tasks and challenge.

Title	Earth's Systems
Unit Duration	8 Weeks
Unit Summary & Rationale	***The Earth is made up of different systems called spheres. These spheres interact to help to make the Earth whole. The interactions are constantly changing the Earth's surface. Through the development of a model using an example, students are able to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.***
Unit Goals	
Essential Questions	• What are the systems of the Earth? • How do they interact? • Why is the ocean important to the Earth?

	• How do weather patterns form?
Enduring Understandings	• The geosphere, hydrosphere, atmosphere, and biosphere all interact to keep the Earth whole. • The ocean supports a variety of organisms and helps to shape the land. • Weather happens because of the interactions between systems, most specifically within the ocean.
Learning Outcomes	• Identify Earth's major systems. • Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. • Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. • 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. • Recognize that these systems interact and affect Earth's materials and processes. • Describe the geosphere, one of Earth's major systems. • Explain how the geosphere interacts with other Earth systems to affect Earth's surface materials and processes. • Describe the hydrosphere, one of Earth's major systems. • Explain how the hydrosphere interacts with other systems to affect Earth's surface materials and processes. • Describe the atmosphere, one of Earth's major systems. • Explain how the atmosphere interacts with other systems to affect Earth's surface materials and processes. • Describe the biosphere, one of Earth's major systems. • Explain how the biosphere interacts with other Earth systems to affect Earth's surface materials and processes. • Describe how interactions of Earth's systems result in weather patterns known as monsoons. • Model the interactions of Earth's major systems. • Describe how the geosphere, atmosphere, hydrosphere, and biosphere interact. • Describe the variety of ecosystems and organisms in the ocean. • Describe how the ocean shapes the land. • Explain the processes of erosion and deposition. • Describe how the ocean influences climate. • Explain the difference between weather and climate.

- Describe how winds and clouds in the atmosphere interact with landforms to determine patterns of weather.
- Explain how processes in Earth's atmosphere interact with and change the shape of landforms.
- Work with a group to develop a model that describes an interaction between two of Earth's systems, or spheres.
- Explain the interactions demonstrated in their model.
- What Climate Change is and ways that the geosphere, biosphere, hydrosphere, and/or atmosphere interact. (Geosphere (i.e solid and molten rock, soil, sediment, continents, mountains). Hydrosphere (i.e. water and ice in the form of rivers, lakes, glaciers). Atmosphere (i.e, wind,oxygen). Biosphere (i.e. plants, animals [including humans]).
- Explore careers related to environmental science.

Assessment Evidence	
Formative	Teacher observations, Class discussions, Lab Activities, Key concepts and vocabulary quizzes, Science Starter's/Do Nows, Open Ended Responses, Modeling, Simulations, Innovators Monthly Research, Lab Activities, Vocabulary Responses, Exit Questions, Interactive Digital Assessments embedded in Exploring Science Digital Book
Summative	Projects, Tests, Quizzes, lab skills demonstrations, projects, and vocabulary quizzes.
Alternative and Benchmark	Alternative - Read to the student and chart oral responses. Word banks, sentence frames, oral responses, graphic organizers, observations, portfolios of student work, orally administered assessments, and anecdotal notes. Benchmark – LinkIt Benchmark Assessment, Teacher Generated Assessments Formative, Summative, Alternative and Benchmark Assessments
Resources to Promote Learning	
Resources & Equipment Needed	Smartboard, Computers, Websites and digital interactives/models, Multi-media presentations, Video Streaming, Brain Pop, Middle School Science, Generation Genius Digital Curriculum, Mystery Science Digital Curriculum, Amplify Digital Curriculum, Microsoft 365, Primary and Secondary Source Documents, Assorted lab materials. Approved Class Resource List
Content & Interdisciplinary Standards	

NJ 2020 SLS: Science
Standards
5-PS2-1., Support an argument that the gravitational force exerted by Earth on objects is directed down. [Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth.] [Assessment Boundary: Assessment does not include mathematical representation of gravitational force.] 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 the 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.]
Science and Engineering Practices
Analyzing and Interpreting Data - Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. • Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. (5-ESS1-2) Engaging in Argument from Evidence - Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). • Support an argument with evidence, data, or a model. (5-PS2-1),(5-ESS1-1)
Disciplinary Core Ideas (DCI)
PS2.B: Types of Interactions • The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5-PS2-1) ESS1.A: The Universe and its Stars • 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) ESS1.B: Earth and the Solar System • 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-ESS1-2)	
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)
Cause and Effect	Cause and effect relationships are routinely identified and used to explain change. (5-PS2-1)
Scale, Proportion, and Quantity	Natural objects exist from the very small to the immensely large. (5-ESS1-1)

NJ: 2016 SLS: 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.
- W.5.7, Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
- 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.
- W.5.9, Draw evidence from literary or informational texts to support analysis, reflection, and research.
- Rl.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.
- L.5.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).

NJ: 2016 SLS: Mathematics

- MP2 Reason abstractly and quantitatively
- MP4 Model with mathematics.
- MP5 Use appropriate tools strategically.
- 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.NF.B.7, Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

- 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.MD.C.3, Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
- 5.MD.C.4: Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.
- 5.MD.C.5: Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. ○ a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
- 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.NF.B.7: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

2020 SLS: Computer Science & Design Thinking

NJSLS Performance Expectations (By the end of 5th Grade)

- 8.2.5.EC.1: Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.
- 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.

2020 SLS: Career Readiness, Life Literacies, and Key Skills

NJSLS Performance Expectations (By the end of 5th Grade)

- 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process
- 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.
- 9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations. ● 9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g. life guards, child care, medicine, education) and examples of those requirements.

Interdisciplinary/21st Century Connections

21st Century Connections	• Creativity and Innovation • Information and Media Literacy • Critical Thinking and Problem Solving

	• Technology Literacy
SEL	• Demonstrate an understanding of the need for mutual respect when viewpoints differ. • Demonstrate an awareness of the expectations for social interactions in a variety of settings.
Social Studies	• 6.1.5.GeoPP.2: Describe how landforms, climate and weather, and availability of resources have impacted where and how people live and work in different regions of New Jersey and the United States. • 6.3.5.GeoGI.1: Use technology to collaborate with others who have different perspectives to examine global issues, including climate change and propose possible solutions.

Title	Human Impact on Earth
Unit Duration	5 Weeks
Unit Summary & Rationale	***Humans impact the Earth with every action they make. Students will learn about renewable and nonrenewable resources, and how they impact the Earth. The amount of fresh water and salt water on Earth helps students to see that there is a finite amount of fresh water. They describe and graph data to provide evidence about the distribution of water on Earth. An investigation where students use solar energy to clean water will be used as a culminating activity to bring all of the concepts together.***
Unit Goals	
Essential Questions	• How do human activities impact the Earth? • Is there any way to fix the changes made to the Earth? • Where do we get fresh water from? Is there an endless supply? • Why is it important to conserve resources? • What are the differences between renewable and nonrenewable resources?
Enduring Understandings	• Human activities can change the Earth in a positive or a negative way. The negative changes are hard to reverse. • The amount of fresh water is finite and can be found in a variety of places. • Conserving resources helps to keep our planet healthy.

	• Renewable resources can be continually replaced, while nonrenewable are only used once and can run out. Finding ways to use renewable resources, including renewable energy sources, help to keep our Earth healthy.
Learning Outcomes	• Recognize that nearly all of Earth's available water is in the ocean. • Identify sources of fresh water on Earth: glaciers, underground streams, lakes, wetlands, and atmosphere. • Graph the amounts of percentages of salt water and fresh water on Earth. • Identify air, plants, water, animals, coal, oil, and natural gas as natural resources. • Classify air, plants, water, and animals as renewable resources, and coal, oil, and natural gas as nonrenewable resources. • Identify ways in which human activities affect the land. • Identify ways in which human activities affect vegetation. • Model the impact of human activity on various ecosystems. • Describe how acidic chemicals affect the growth of plants. • Identify ways that human activities impact water sources on Earth. • Identify ways that human activities impact air in Earth's atmosphere. • Describe ways that people are working together to clean up the air. • Identify ways in which human activities impact space. • Explain the importance of conserving Earth's resources and how recycling can help conserve resources. • Identify the benefits of trees in an urban environment. • Describe methods that engineers have developed for growing trees in crowded cities. • Describe the difference between nonrenewable and renewable energy sources. • Explain why it is important for humans to conserve energy resources. • Describe alternative energy resources, such as solar, wind, and hydroelectric energy. • Investigate how solar energy can be used to make water cleaner. • Work with a group to obtain information about ways individual communities use science ideas to protect Earth's resources and environment. • Combine information from their investigation to communicate their results to others. • Explore careers in science (climate, meteorology) • Propose ways local and global communities can engage digitally to participate in and promote climate action.

Assessment Evidence	
Formative	Teacher observations, Class discussions, Lab Activities, Key concepts and vocabulary quizzes, Science Starter's/Do Nows, Open Ended Responses, Modeling, Simulations, Innovators Monthly Research, Lab Activities, Vocabulary Responses, Exit Questions, Interactive Digital Assessments embedded in Exploring Science Digital Book
Summative	Projects, Tests, Quizzes, lab skills demonstrations, and vocabulary quizzes.
Alternative and Benchmark	Alternative - Read to the student and chart oral responses. Word banks, sentence frames, oral responses, graphic organizers, observations, portfolios of student work, orally administered assessments, and anecdotal notes. Benchmark – LinkIt Benchmark Assessment, Teacher Generated Assessments Formative, Summative, Alternative and Benchmark Assessments
Resources to Promote Learning	
Resources & Equipment Needed	Smartboard, Computers, Websites and digital interactives/models, Multi-media presentations, Video Streaming, Brain Pop, Middle School Science, Generation Genius Digital Curriculum, Mystery Science Digital Curriculum, Amplify Digital Curriculum, Microsoft 365, Primary and Secondary Source Documents, Assorted lab materials. Approved Class Resource List
Content & Interdisciplinary Standards	
NJ 2020 SLS: Science	
Standards	
5-ESS3-1., Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. 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.] 3-5-ETS1-1., Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	

3-5-ETS1-2., Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3., Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information - Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.

- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1)

Using Mathematics and Computational Thinking - Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.

- Describe and graph quantities such as area and volume to address scientific questions. (5-ESS2-2)

Asking Questions and Defining Problems- Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1)

Planning and Carrying Out Investigations - Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-5-ETS1-3)

Constructing Explanations and Designing Solutions - Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)

Disciplinary Core Ideas (DCI)

ESS3.C: Human Impacts on Earth Systems

- 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)

ESS2.C: The Roles of Water in Earth's Surface Processes

- Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2)

Crosscutting Concepts	
Systems and System Models	A system can be described in terms of its components and their interactions. (5-ESS2-1),(5-ESS3-1)
Scale, Proportion, and Quantity	Standard units are used to measure and describe physical quantities such as weight and volume. (5-ESS2-2)
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)

NJ: 2016 SLS: 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.
- W.5.7, Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
- 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.
- W.5.9, Draw evidence from literary or informational texts to support analysis, reflection, and research.
- Rl.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.
- L.5.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).

NJ: 2016 SLS: Mathematics

- MP2 Reason abstractly and quantitatively
- MP4 Model with mathematics.
- MP5 Use appropriate tools strategically.
- 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.NF.B.7, Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
- 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.MD.C.3, Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
- 5.MD.C.4: Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.
- 5.MD.C.5: Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. ○ a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
- 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.NF.B.7: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

2020 SLS: Computer Science & Design Thinking

NJSLS Performance Expectations (By the end of 5th Grade)

- 8.2.5.EC.1: Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.
- 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.

2020 SLS: Career Readiness, Life Literacies, and Key Skills

NJSLS Performance Expectations (By the end of 5th Grade)

- 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process
- 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.

• 9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations. ● 9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g. life guards, child care, medicine, education) and examples of those requirements.

Interdisciplinary/21st Century Connections	
21st Century Connections	• Creativity and Innovation • Information and Media Literacy • Critical Thinking and Problem Solving • Technology Literacy
SEL	• Responsible Decision-Making • Develop, implement, and model effective problem-solving and critical thinking skills. • Identify the consequences associated with one's actions in order to make constructive choices • Evaluate personal, ethical, safety, and civic impact of decisions
Social Studies	• 6.1.5.GeoPP.2: Describe how landforms, climate and weather, and availability of resources have impacted where and how people live and work in different regions of New Jersey and the United States. • 6.3.5.GeoGI.1: Use technology to collaborate with others who have different perspectives to examine global issues, including climate change and propose possible solutions.

Title	Space Systems: Stars and the Solar System
Unit Duration	5 Weeks
Unit Summary & Rationale	***Within this unit, students will study the sky: Why do we see stars? Why does the moon change? How is our weather affected by our movement around the Sun? What causes day and night? Students will also study gravity and how it affects the movement of the Earth and moon. Through investigations, students will be able to understand our part in the universe.***
Unit Goals	

Essential Questions	• How does gravity affect objects? • How do lengths and directions of shadows or relative lengths of day and night change from day to day? • How does the appearance of some stars change in different seasons? • Why does the moon look different at different times of the month? • How do the seasons change?
Enduring Understandings	• Gravity pulls objects down towards the Earth. • The distance of stars varies, and the Sun is our closest star. Depending on the time of year and our revolution around the sun, some stars will seem closer to Earth than others. • Shadows change depending on the rotation of Earth and time of day. • The revolution of the moon around the Earth affects the way we see the moon each day. • The change in seasons depends on the revolution of the Earth around the Sun and the tilt of the Earth on its axis.
Learning Outcomes	• Describe the gravitational force of Earth acting on an object near Earth. • Gather data to support an argument that the gravitational force exerted by Earth on objects is directed down. • Describe how the Earth, sun, and moon move in space and as a system. • Relate gravitational force to the motions of Earth, the sun, and the moon in space. • Recognize that the sun is a star that appears larger and brighter than other stars because it is the star closest to Earth. • Understand that stars range greatly in their distance from Earth. • Investigate to show that the apparent brightness of a light-emitting object varies with distance from the observer. • Use data from the investigation to support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth. • Explain that Earth rotates on its axis once every 24 hours to cause the day/night cycle. • Demonstrate that Earth rotates on its axis once every 24 hours to cause the day/night cycle. • Explain what causes the apparent motion of the sun across the sky. • Demonstrate the different positions of the sun at different times of day. • Demonstrate that the rotation of the Earth about an axis causes observable changes in patterns of shadows over time. • Collect and record information using tools, including a meter stick and a clock.

- Recognize that the orbit of Earth around the sun causes observable patterns such as the sequence of seasons over time.
- Represent data in a graph to reveal patterns of seasonal changes in the length of day and night.
- Describe how Earth's orbit around the sun causes observable patterns in the positions of the stars at different times of the year.
- Represent data in a graphical display that reveals the patterns of change in the seasonal appearance of some stars in the night sky.
- Use the graphical display to describe patterns of stars.
- Describe the moon's motions, including rotation, orbiting of Earth, and apparent movement across the sky.
- Explain why moon phases occur.
- Describe the pattern of the moon's phases.
- Collect and analyze data to identify sequences and predict patterns of change in the observable appearance of the moon over time.
- Collect information about the moon's phases by making detailed observations.
- Explore carrers related to Earth Science.

Assessment Evidence	
Formative	Teacher observations, Class discussions, Lab Activities, Key concepts and vocabulary quizzes, Science Starter's/Do Nows, Open Ended Responses, Modeling, Simulations, Innovators Monthly Research, Lab Activities, Vocabulary Responses, Exit Questions, Interactive Digital Assessments embedded in Exploring Science Digital Book
Summative	Projects, Tests, Quizzes, lab skills demonstrations, projects, and vocabulary quizzes.
Alternative and Benchmark	Alternative - Read to the student and chart oral responses. Word banks, sentence frames, oral responses, graphic organizers, observations, portfolios of student work, orally administered assessments, and anecdotal notes. Benchmark – LinkIt Benchmark Assessment, Teacher Generated Assessments Formative, Summative, Alternative and Benchmark Assessments
Resources to Promote Learning	

Resources & Equipment Needed	Smartboard, Computers, Websites and digital interactives/models, Multi-media presentations, Video Streaming, Brain Pop, Middle School Science, Generation Genius Digital Curriculum, Mystery Science Digital Curriculum, Amplify Digital Curriculum, Microsoft 365, Primary and Secondary Source Documents, Assorted lab materials. Approved Class Resource List

Content & Interdisciplinary Standards

NJ 2020 SLS: Science

Standards

5-PS2-1., Support an argument that the gravitational force exerted by Earth on objects is directed down. [Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth.] [Assessment Boundary: Assessment does not include mathematical representation of gravitational force.]
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 the 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.]

Science and Engineering Practices

Analyzing and Interpreting Data - Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. (5-ESS1-2)

Engaging in Argument from Evidence - Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Support an argument with evidence, data, or a model. (5-PS2-1),(5-ESS1-1)

Disciplinary Core Ideas (DCI)

PS2.B: Types of Interactions

- The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5-PS2-1)

ESS1.A: The Universe and its Stars

- 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)

ESS1.B: Earth and the Solar System

- 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-ESS1-2)

Crosscutting Concepts

Cause and Effect	• Cause and effect relationships are routinely identified and used to explain change. (5-PS2-1)
Scale, Proportion, and Quantity	• Natural objects exist from the very small to the immensely large. (5-ESS1-1)
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)

NJ: 2016 SLS: 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.
- W.5.7, Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
- 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.
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- L.5.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).

NJ: 2016 SLS: Mathematics

- MP2 Reason abstractly and quantitatively

- MP4 Model with mathematics.
- MP5 Use appropriate tools strategically.
- 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.NF.B.7, Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
- 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.MD.C.3, Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
- 5.MD.C.4: Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.
- 5.MD.C.5: Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. ○ a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
- 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.NF.B.7: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

2020 SLS: Computer Science & Design Thinking

NJSLS Performance Expectations (By the end of 5th Grade)

- 8.2.5.EC.1: Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.
- 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.

2020 SLS: Career Readiness, Life Literacies, and Key Skills

NJSLS Performance Expectations (By the end of 5th Grade)

- 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process
- 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.

• 9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations. ● 9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g. life guards, child care, medicine, education) and examples of those requirements.	
Interdisciplinary/21st Century Connections	
21st Century Connections	• Critical thinking • Collaboration and Teamwork • Problem Solving
SEL	• Responsible Decision-Making - Evaluate personal, ethical, safety, and civic impact of decisions

Accommodations & Modifications		
Special Education Students, 504 students, English Language Learners, Students at-Risk Based on Students' Individual Needs		
Time/General	**Processing**	**Comprehension**
• Allow extra time • Repeat and clarify directions • Provide breaks in between tasks • Have student verbalize directions • Provide timelines/due dates for reports and projects	• Provide extra response time • Have student verbalize steps • Repeat directions • Provide small group instruction • Include partner work	• Provide reading material on student's level • Have student underline important points • Assist student on how to use context clues to identify words/phrases • Ensure short manageable tasks
Tests/Quizzes/Grading	**Behavior/Attention**	**Organization**
• Provide extended time	• Establish classroom rules	

• Provide study guides • Limit number of responses	• Write a contract with the student specifying expected behaviors • Provide preferential seating • Re-focus student as needed • Reinforce student for staying on task	• Monitor the student and provide reinforcement of directions • Verify the accurateness of homework assignments • Display a written agenda

ELL, Enrichment, Gifted & Talented Strategies

Accommodations Based on Students' Individual Needs

ELL Strategies

- Provide explicit, systematic instruction in vocabulary.
- Ensure that ELLs have ample opportunities to talk with both adults and peers and provide ongoing feedback and encouragement.
- Expose ELLs to rich language input.
- Scaffolding for ELLs language learning.
- Encourage continued L1 language development.
- Alphabet knowledge
- Phonological awareness
- Print awareness
- Design instruction that focuses on all of the foundational literacy skills.
- Recognize that many literacy skills can transfer across languages.
- English literacy development by helping ELLs make the connection between what they know in their first language and what they need to know in English.
- Graphic organizers
- Modified texts
- Modified assessments
- Written/audio instruction
- Shorter paragraph/essay length
- Homogeneously grouped by level

Accommodations Based on Students' Individual Needs:

Enrichment Strategies

- Evaluate vocabulary
- Elevate Text Complexity
- Incorporate inquiry based assignments and projects
- Extend curriculum
- Balance individual, small group and whole group instruction
- Provide tiered/multi-level activities
- Include purposeful learning centers
- Provide open-ended activities and projects
- Offer opportunities for heterogeneous grouping to work with age and social peers as well as homogeneous grouping to provide time to work with individual peers
- Provide pupils with experiences outside the ‘regular’ curriculum
- Alter the pace the student uses to cover regular curriculum in order to explore topics of interest in greater depth/breadth within their own grade level
- Require a higher quality of work than the norm for the given age group
- Promote higher level of thinking and making connections.
- Focus on process learning skills such as brainstorming, decision making and social skills
- Use supplementary materials in addition to the normal range of resources.
- Encourage peer to peer mentoring
- Integrate cross-curricular lessons
- Incorporate real-world problem solving activities
- Facilitate student-led questioning and discussions

Gifted & Talented Strategies

- More elaborate, complex, and in-depth study of major ideas, problems, and themes that integrate knowledge within and across systems of thought.
- Development and application of productive thinking skills to enable students to reconceptualize existing knowledge and/or generate new knowledge.
- Explore constantly changing knowledge and information and develop the attitude that knowledge is worth pursuing in an open world.
- Encourage exposure to, selection, and use of appropriate and specialized resources.
- Promote self-initiated and self-directed learning and growth.
- Provide for the development of self-understanding and the understanding of one's relationship to persons, societal institutions, nature, and culture.
- Flexible pacing
- Use of more advanced or complex concepts, abstractions, and materials
- Encourage students to move through content areas at their own pace. If they master a particular unit, they need to be provided with more advanced learning activities, not more of the same activity.
- Questions that require a higher level of response and/or open-ended questions that stimulate inquiry, active exploration, and discovery.
- Encourage students to think about subjects in more abstract and complex ways
- Activity selection based on student interests, that encourage self-directed learning
- Group interaction and simulations
- Guided self-management
- Encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.
- Engage students in active problem-finding and problem-solving activities and research.
- Provide students opportunities for making connections within and across systems of knowledge by focusing on issues, themes, and ideas.