Ocean Academy Charter School
Curriculum Guide
Grade 5 - Science

Original Adoption:	August 2025
Created by:	Amy LaBarca and Dariaknna Yencer

OCEAN ACADEMY CHARTER SCHOOL **Science Curriculum**	
Content Area: Science	
Course Title: Science	
Grade Level: Grade 5	
Unit Title	**Pacing Guide in Days**
Unit Plan 1: Structure and Properties of Matter	30 Days
Unit Plan 2: Matter and Energy in Organisms and Ecosystems	30 Days
Unit Plan 3: Earth and the Space Around It	30 Days

OCEAN ACADEMY CHARTER SCHOOL **Unit 1 Overview**	
Content Area: Science	
Unit Title: Structure and Properties of Matter	**Duration:** 30 Days
Target Course/Grade Level: Grade 5	
Introduction/Unit Focus: In this fifth grade science unit, students explore the foundational concepts of matter and its transformations. Through a series of hands-on labs, investigations, and inquiry-based activities, students begin to answer key questions such as: *What happens to matter when it changes? Does its weight change? Can new substances be created by combining others?*	

Students develop models to represent that matter is made up of particles too small to be seen, building their understanding of the structure of matter. As they engage in experiments, they investigate both physical and chemical changes, observing what happens when substances are mixed. Through these experiences, students learn that while matter may change form or appearance, the total weight of matter is conserved during both physical and chemical changes.

By the end of the unit, students will be able to determine whether combining two or more substances results in the formation of a new substance, using evidence to support their claims. They also deepen their ability to apply the concept of conservation of matter and recognize that changes in matter follow predictable patterns grounded in scientific principles.

Disciplinary Concepts for the Unit

Standard 9.1 Personal Financial Literacy
This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

Standard 9.2 Career Awareness, Exploration, Preparation and Training
This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Standard 9.4 Life Literacies and Key Skills
This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science
Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking
Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

Amistad Law: N.J.S.A. 18A 52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocide in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

Diversity and Inclusion: C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

The instruction shall:

(1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;

(2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and

(3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLS) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

"Twenty-first century themes and skills" means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy."

Focus Standards (Major Standards) https://www.nj.gov/education/cccs

Content Standards: New Jersey Student Learning Standards for Science

5-PS1-1 Develop a model to describe that matter is made of particles too small to be seen

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

5-PS1-3 Make observations and measurements to identify materials based on their properties

5-PS1-4 Conduct an investigation to determine whether the mixing of two or more substances results in a new substance		
Science and Engineering Practices	**Disciplinary Core Ideas/Unit Enduring Understandings**	**Crosscutting Concepts**
Developing and Using Models Build and revise simple models and use models to represent events and design solutions. Use models to describe phenomena.	Structure and Properties of 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. (Air in a balloon) The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. Measurements of a variety of properties can be used to identify materials.	Cause and Effect-identify cause and effect relationships and use them to explain changes in matter

New Jersey Student Learning Standards: Interdisciplinary Connections
https://www.nj.gov/education/cccs

ELA/Literacy

RI.MF.5.6. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on web pages) and explain how the information contributes to an understanding of the text in which it appears.

L.VL.5.2. Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies.

A. Use context (e.g., cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase.
B. Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., photograph, photosynthesis).
C. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.

RI.PP.5.5. Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent and how that may influence the reader's interpretation.

W.IW.5.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

A. Introduce a topic clearly to provide a focus and group related information logically; include text features such as headings, illustrations, and multimedia when useful to aid in comprehension.
B. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.
C. Link ideas within paragraphs and sections of information using words, phrases, and clauses (e.g., in contrast, especially).
D. Use precise language and domain-specific vocabulary to inform about or explain the topic.
E. Provide a conclusion related to the information of explanation presented.

Mathematics
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.

New Jersey Student Learning Standards: Career Readiness, Life Literacies, and Key Skills	
Core Ideas	**Performance Expectations (Identified with Standard Number and statement)**
Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills	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).
Digital identities must be managed in order to create a positive digital footprint.	9.4.5.DC.5: Identify the characteristics of a positive and negative online identity and the lasting implications of online activity

New Jersey Student Learning Standards: Computer Science and Design Thinking	
Core Ideas	**Performance Expectations (Identified with Standard Number and Statement)**
Data can be organized, displayed, and presented to highlight relationships.	8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.
Programs can be broken down into smaller parts to facilitate their design, implementation, and review. Programs can also be created by incorporating smaller	8.1.5.AP.4: Break down problems into smaller, manageable sub-problems to facilitate program development. 8.1.5.AP.5: Modify, remix, or incorporate pieces of existing programs into one's own work to add additional features or create a new program.

portions of programs that already exist	
New Jersey Student Learning Standards: Climate Change Mandate	
Core Ideas	**Performance Expectations (Identified with Standard Number and Statement)**
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. 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: 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.

Knowledge and Skills

Unit Learning Targets (Objectives):
Students will be able to…

- ➢ Conduct investigations to determine whether mixing substances leads to the formation of new materials with different properties.
- ➢ Make accurate observations and measurements to identify materials based on observable properties.
- ➢ Develop a model to show that matter is made of particles too small to be seen.
- ➢ Measure and graph quantities to provide evidence that matter is conserved, even when it changes form through heating, cooling, or mixing.
- ➢ Define a simple design problem that includes clear criteria for success and specific constraints related to time, materials, or cost.
- ➢ Plan and conduct fair tests with controlled variables to identify and improve aspects of a model or prototype.
- ➢ Generate and evaluate multiple possible solutions to a problem based on how effectively they meet established criteria and constraints.

Unit Enduring Understandings:
Students will know…

- ➢ Matter is composed of tiny particles too small to see, and this helps explain why matter is conserved during physical and chemical changes.

- ➢ When substances undergo changes like heating, cooling, or mixing, the total amount (weight) of matter remains the same.
- ➢ Mixing different substances may result in a chemical reaction that produces a new substance with properties different from the original materials.
- ➢ Physical and chemical properties such as color, hardness, reflectivity, solubility, magnetism, and conductivity help identify materials.
- ➢ The conservation of mass applies even when substances appear to change or disappear, such as during phase changes or chemical reactions.
- ➢ New materials can be engineered by applying knowledge of material properties and how they interact under different conditions.

Unit Essential Questions:

- ➢ What evidence can we use to prove that matter is made up of particles too small to be seen?
- ➢ Why does the total weight of matter stay the same, even when it changes form or seems to vanish?
- ➢ How can we use a material's observable properties to identify it accurately?
- ➢ How can mixing two or more substances result in a new substance, and what changes in properties help us identify that change?
- ➢ In what ways can we design, test, and improve solutions to problems using what we know about matter and its properties?

Instructional Plan

Students will engage in a science framework that enables them to investigate phenomena, design solutions to problems, make sense of evidence to construct arguments, and critique and discuss those arguments. This is a model to support students through mastery of the Next Generation Science Standards. Science Resources

5 E Instructional Model provides opportunities for students to engage, explore, explain, elaborate and evaluate science content.

The Science block will consist of the following components:

Engage: Raise a question and use compelling storytelling and visuals to introduce students to a scientific phenomenon and get them excited to investigate. Activate prior knowledge and prepare students for the day's learning. This is also known as an advance organizer, hook, or set induction.

- ➢ **Resources:**
  - Mystery Science - Anchor Phenomenon (Argument from Evidence: Disappearing Gargoyles)

- See, Think, Wonder Chart
- Activity and Discussion

Explore: Students experience key concepts through a collaborative hands-on, inquiry activity. They test predictions, share ideas and record observations. Teachers act as a facilitator, supporting students in establishing relationships and communicating their experience and ideas. This could be done through read alouds, videos, experiments, STEM/STEAM challenges and projects.

➢ **Resources:**

- Mystery Science - Chemical Magic: Chemical Reactions & Properties of Matter
  - Lesson 1: Chemistry and Conservation of Matter (Test like an Alchemist)
  - Lesson 2: Dissolving and particulate nature of matter (The King's Sword)
  - Lesson 3: Acids, Reactions, and Properties of Matter (Acid Test)
  - Lesson 4: Chemical Reactions (The Great Goo Experiment)
  - Lesson 5: Gases and Particle Models (Bag of Bubbles)

Explain: Students have frequent opportunities to connect their prior knowledge to new concepts. They share their thinking and build explanations. Post-activity questions encourage students to engage in sense-making, linking their findings to the Mystery question. Video exploration can build upon the student discussion and provide scientific explanation

➢ **Resources:**

- Mystery Science:
  - Performance Task: Particle Model & Argumentation: What happened to the stone gargoyle over time?

Elaborate: Opportunity for students to apply their learning to a similar or new situation. Project ideas and readings can help extend the learning

➢ **Resources:**

- Mystery Science:
  - Performance Task: Particle Model & Argumentation: What happened to the stone gargoyle over time?

Unit Review and Activity

- Reading Extensions:
  - Lesson 1: "Can You Turn Iron into Gold?"
  - Lesson 2: The Penny Experiment
  - Lesson 3: Chemical Weathering of Rocks
  - Lesson 4: Weird Science: The Accidental Invention of Silly Putty
  - Lesson 5: The engine of a car uses a series of small explosions

Evaluate: Assess student understanding of learning objective

➢ **Resources:**
- Mystery Science:
  - Lesson 1: Chemistry and Conservation of Matter (Test like an Alchemist) Assessment
  - Lesson 2: Dissolving and particulate nature of matter (The King's Sword) Assessment
  - Lesson 3: Acids, Reactions, and Properties of Matter (Acid Test) Assessment
  - Lesson 4: Chemical Reactions (The Great Goo Experiment) Assessment
  - Lesson 5: Gases and Particle Models (Bag of Bubbles) Assessment
  - Chemical Reactions & Properties of Matter Unit Assessment

Evidence of Student Learning

Formative Assessments:
- ➢ Graphic Organizers & Guided Note Taking
- ➢ Directed Reading
- ➢ Cooperative Group Learning
- ➢ Homework
- ➢ Journal Entries

Summative Assessments
- ➢ Mystery Science Unit Assessments
- ➢ Projects

Benchmark Assessments:
- ➢ (Include performance tasks that demonstrate students meeting the standards.)
- ➢ RST- Research Simulation Task
- ➢ Associated Unit tests, quizzes
- ➢ Labs and engineering based projects

Alternative Assessments
- ➢ Projects

Performance Tasks:
- ➢ Mystery Science Experiments
- ➢ Teacher created activities/projects

Suggested Options for Differentiation and Modifications

Special Education

- ➢ Follow all IEP modifications.
- ➢ Use visuals, graphic organizers, and hands-on models.

- Pre-teach and review vocabulary and scientific concepts.
- Provide outlines, word banks, and study guides.
- Use leveled texts and simplified resources when needed.
- Provide small-group or one-on-one instruction.
- Assign peer tutors or lab partners for support.
- Read aloud directions and model scientific procedures.
- Offer preferential seating near teacher or materials.
- Give extra time for labs, projects, and tests.
- Accept oral or dictated responses instead of written work.
- Modify or reduce the number of questions on assignments.
- Provide access to large-print, Braille, or digital text with audio tools.
- Use scribes or augmentative communication devices when required.

Students with 504 Plans

- Follow the 504 plan.
- Provide extended time for labs, projects, and assessments.
- Offer small-group or quiet testing environments.
- Accept oral or dictated responses.
- Provide large-print, Braille, or digital text with audio features.
- Allow use of a scribe or communication device.

Students at Risk of School Failure

- Use visuals, real objects, and demonstrations for science concepts.
- Pre-teach vocabulary and connect it to real-life examples.
- Provide step-by-step directions and frequent check-ins.
- Offer small-group instruction with guided practice.
- Break down experiments and projects into smaller tasks.
- Assign peer support for collaborative activities.
- Provide preferential seating and structured routines.
- Give frequent feedback and encouragement.

Gifted and Talented

- Ask open-ended questions to promote higher-order thinking.
- Encourage independent investigations and research projects.
- Provide enrichment tasks, such as STEM challenges or experiments beyond grade-level.
- Offer advanced reading materials and videos on science topics.
- Group flexibly for inquiry projects and debates.

- Allow choice in projects, reports, or presentations.
- Provide opportunities for cross-curricular connections (e.g., math in data analysis, ELA in lab reports).
- Encourage reflection and presentation of findings to peers.

Multilingual Learners

- Collaborate with ESL/MLL teachers.
- Provide small-group instruction and partner learning.
- Pre-teach and revisit vocabulary with visuals and realia (objects, pictures).
- Use bilingual glossaries or picture dictionaries.
- Provide sentence frames and discussion stems for lab work.
- Scaffold writing with graphic organizers and labeled diagrams.
- Allow extended time and oral responses.
- Use recorded directions, audio supports, or captioned videos.

Diversity and Inclusion

- Respect and include cultural traditions and perspectives in science examples.
- Provide alternative formats for assignments (oral, visual, or hands-on projects).
- Use visuals, diagrams, and clear, direct language.
- Avoid slang and idioms; use precise science vocabulary.
- Collaborate with support staff and cultural liaisons.
- Create an inclusive, respectful classroom environment.
- Provide sufficient wait time before calling on students.
- Build positive relationships with families and invite them into science learning.

Supplemental Resources

Instructional Materials

- Mystery Science www.mysteryscience.com

Supplemental Materials

- BrainPop
- Nearpod
- EdPuzzle
- ReadWorks
- Fundamentals
- Pebble Go Next

Intervention Materials

- Mystery Science Extension Materials
  - Vocabulary
  - Reading extensions
  - Mini-Lessons
  - Transcripts

Teacher Notes

OCEAN ACADEMY CHARTER SCHOOL Unit 2 Overview	
Content Area: Science	
Unit Title: Matter and Energy in Organisms and Ecosystems	**Duration:** 30 Days
Target Course/Grade Level: Grade 5	

Introduction/Unit Focus:

In fifth grade, students investigate essential questions about the cycling of matter through ecosystems and the origin and use of energy in living organisms. They learn that plants obtain the materials they need for growth primarily from air and water, rather than solely from soil. This understanding challenges common misconceptions and emphasizes the crucial role of air and water in plant development. Using models, students explore how matter moves continuously among plants, animals, decomposers, and the environment, illustrating the interconnectedness of living and nonliving components in an ecosystem.

Additionally, students discover that the energy animals receive from their food originally comes from the sun, underscoring the fundamental role of sunlight as the primary energy source for most life on Earth. By tracing the flow of energy from sunlight to plants and then to animals, students gain a deeper appreciation of how ecosystems sustain life. This unit provides a foundation for understanding the dynamic processes that support survival and growth in ecosystems, preparing students to think critically about environmental relationships and the balance of natural systems.

Disciplinary Concepts for the Unit

Standard 9.1 Personal Financial Literacy

This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

Standard 9.2 Career Awareness, Exploration, Preparation and Training
This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Standard 9.4 Life Literacies and Key Skills
This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science
Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking
Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

Amistad Law: N.J.S.A. 18A 52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocide in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

Diversity and Inclusion: C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

The instruction shall:

(1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;

(2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and

(3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLS) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

"Twenty-first century themes and skills" means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy."

Focus Standards (Major Standards) https://www.nj.gov/education/cccs

Content Standards: New Jersey Student Learning Standards for Science

5-PS3-1 Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

5-LS1-1 Support an argument that plants get the materials they need for growth chiefly from air and water.

5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

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	Disciplinary Core Ideas/Unit Enduring Understandings	Crosscutting Concepts
➢ Build and revise simple models and use models to represent events and design solutions. ➢ Use models to describe phenomena.	➢ 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).	➢ A system can be described in terms of its components and their interactions. ➢ Matter is transported into, out of, and within systems.

➢ Develop a model to describe phenomena. ➢ Support an argument with evidence, data, or a model. ➢ Science explanations describe the mechanisms for natural events.	➢ 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. ➢ Plants acquire their material for growth chiefly from air and water. ➢ 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. ➢ 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,	➢ Energy can be transferred in various ways and between objects.

	liquid, or solid) back into the environment.	

New Jersey Student Learning Standards: Interdisciplinary Connections
https://www.nj.gov/education/cccs

ELA/Literacy

RI.MF.5.6. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on web pages) and explain how the information contributes to an understanding of the text in which it appears.

L.VL.5.2. Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies.

A. Use context (e.g., cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase.
B. Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., photograph, photosynthesis).
C. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.

RI.PP.5.5. Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent and how that may influence the reader's interpretation.

W.IW.5.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

A. Introduce a topic clearly to provide a focus and group related information logically; include text features such as headings, illustrations, and multimedia when useful to aid in comprehension.
B. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.
C. Link ideas within paragraphs and sections of information using words, phrases, and clauses (e.g., in contrast, especially).
D. Use precise language and domain-specific vocabulary to inform about or explain the topic.
E. Provide a conclusion related to the information of explanation presented.

SL.UM.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.

Mathematics

5.M.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)

New Jersey Student Learning Standards: Career Readiness, Life Literacies, and Key Skills	
Core Ideas	**Performance Expectations (Identified with Standard Number and statement)**
Individuals can choose to accept inevitable risk or take steps to protect themselves by avoiding or reducing risk.	9.2.5.CAP.8: Identify risks that individuals and households face. 9.2.5.CAP.9: Justify reasons to have insurance.
New Jersey Student Learning Standards: Computer Science and Design Thinking	
Core Ideas	**Performance Expectations (Identified with Standard Number and Statement)**
Technology innovation and improvement may be influenced by a variety of factors. Engineers create and modify technologies to meet people's needs and wants; scientists ask questions about the natural world.	8.2.5.NT.1: Troubleshoot a product that has stopped working and brainstorm ideas to correct the problem. 8.2.5.NT.2: Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies. 8.2.5.NT.3: Redesign an existing product for a different purpose in a collaborative team. 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies.
The technology developed for the human designed world can have unintended consequences for the environment. Technology must be continually developed and made more efficient to reduce the need for non-renewable resources.	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.2: Describe ways that various technologies are used to reduce improper use of resources. 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. 8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment. 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.

New Jersey Student Learning Standards: Climate Change Mandate

Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
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. 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: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Knowledge and Skills

Unit Learning Targets (Objectives):
Students will be able to…

- Develop a model to describe how matter moves among plants, animals, decomposers, and the environment.
- Use models to explain that the energy in animals' food, used for body repair, growth, motion, and maintaining body warmth, originally comes from the sun.
- Support an argument that plants obtain the materials they need for growth mainly from air and water.
- Define a simple design problem that reflects a need or want, including specific criteria for success and constraints related to materials, time, or cost.
- Generate and compare multiple possible solutions to a problem based on how well they meet the established criteria and constraints.

- ➢ Plan and conduct fair tests by controlling variables and considering potential failure points to improve a model or prototype.

Unit Enduring Understandings:
Students will know…

- ➢ Food provides animals with both the energy and materials necessary for body repair, growth, warmth, and motion.
- ➢ Plants acquire the materials they need for growth primarily from air and water, and capture energy from sunlight to support life processes.
- ➢ Almost all animal food chains trace back to plants; organisms are connected through food webs where some animals eat plants and others eat those animals, while decomposers return materials to the soil.
- ➢ Matter cycles continuously between air, soil, and living organisms as they live and die.
- ➢ Energy can be converted, used, or released by organisms; plants capture sunlight energy, which is then stored and transferred through ecosystems as food.

Unit Essential Questions:

- ➢ How does energy from the sun become the energy found in animals' food that supports body repair, growth, motion, and maintaining body warmth?
- ➢ How do plants primarily obtain the materials they need for growth from air and water?
- ➢ In what ways does matter move among plants, animals, decomposers, and the environment?

Instructional Plan

Students will engage in a science framework that enables them to investigate phenomena, design solutions to problems, make sense of evidence to construct arguments, and critique and discuss those arguments. This is a model to support students through mastery of the Next Generation Science Standards. Science Resources

5 E Instructional Model provides opportunities for students to engage, explore, explain, elaborate and evaluate science content.

The Science block will consist of the following components:

Engage: Raise a question and use compelling storytelling and visuals to introduce students to a scientific phenomenon and get them excited to investigate. Activate prior knowledge and prepare students for the day's learning. This is also known as an advance organizer, hook, or set induction.

- ➢ **Resources:**
  - Mystery Science- Anchor Phenomenon (Ice Board)
    - See, Think, Wonder Chart

- Activity and Discussion

Explore: Students experience key concepts through a collaborative hands-on, inquiry activity. They test predictions, share ideas and record observations. Teachers act as a facilitator, supporting students in establishing relationships and communicating their experience and ideas. This could be done through read alouds, videos, experiments, STEM/STEAM challenges and projects.

➢ **Resources:**

- Mystery Science - Web of Life (Ecosystems & the Food Web) Unit
  - Lesson 1: Food Chains, Predators, Herbivores & Carnivores (Why would a hawk move to New York City?)
  - Lesson 2: Plant Needs: Air & Water (What do plants eat?)
  - Lesson 3: Decomposers & Matter Cycle (Where do fallen leaves go?)
  - Lesson 4: Decomposers, Nutrients, & Matter Cycle (Do worms really eat dirt?)
  - Lesson 5: Ecosystems & Matter Cycle (Why do you have to clean a fish tank but not a pond?)
  - Lesson 6: Food Webs & Flow of Energy (Why did the dinosaurs go extinct?)

Explain: Students have frequent opportunities to connect their prior knowledge to new concepts. They share their thinking and build explanations. Post-activity questions encourage students to engage in sense-making, linking their findings to the Mystery question. Video exploration can build upon the student discussion and provide scientific explanation

➢ **Resources:**

- Mystery Science:
  - Performance Task: Ecosystem Argument (How could we grow food on Mars?) Unit Review and Activity

Elaborate: Opportunity for students to apply their learning to a similar or new situation. Project ideas and readings can help extend the learning

➢ **Resources:**

- Mystery Science:
  - Performance Task: Ecosystem Argument (How could we grow food on Mars?) Unit Review and Activity
  - Reading Extensions:
    - Lesson 1: Studies look at what happens when top predators become scarce.
    - Lesson 2: A Plant Puzzle: This reading
    - Lesson 3: Pet Cemetery.

- Lesson 4: Inside the Worm's Hole
- Lesson 5: the worldwide ecosystem
- Lesson 6: Did mammals sleep during the day

Evaluate: Assess student understanding of learning objective

➢ **Resources:**

- Mystery Science:
  - Lesson 1: Food Chains, Predators, Herbivores & Carnivores Assessment
  - Lesson 2: Plant Needs: Air & Water Assessment
  - Lesson 3: Decomposers & Matter Cycle Assessment
  - Lesson 4: Decomposers, Nutrients, & Matter Cycle Assessment
  - Lesson 5: Ecosystems & Matter Cycle Assessment
  - Lesson 6: Food Webs & Flow of Energy Assessment
  - Web of Life Unit Assessment

Evidence of Student Learning

Formative Assessments:

➢ Graphic Organizers & Guided Note Taking
➢ Directed Reading
➢ Cooperative Group Learning
➢ Homework
➢ Journal Entries

Summative Assessments

➢ Mystery Science Unit Assessments
➢ Projects

Benchmark Assessments:

➢ (Include performance tasks that demonstrate students meeting the standards.)
➢ RST- Research Simulation Task
➢ Associated Unit tests, quizzes
➢ Labs and engineering based projects

Alternative Assessments

➢ Projects

Performance Tasks:

➢ Mystery Science Experiments
➢ Teacher created activities/projects

Suggested Options for Differentiation and Modifications

Special Education

- Follow all IEP modifications.
- Use visuals, graphic organizers, and hands-on models.
- Pre-teach and review vocabulary and scientific concepts.
- Provide outlines, word banks, and study guides.
- Use leveled texts and simplified resources when needed.
- Provide small-group or one-on-one instruction.
- Assign peer tutors or lab partners for support.
- Read aloud directions and model scientific procedures.
- Offer preferential seating near teacher or materials.
- Give extra time for labs, projects, and tests.
- Accept oral or dictated responses instead of written work.
- Modify or reduce the number of questions on assignments.
- Provide access to large-print, Braille, or digital text with audio tools.
- Use scribes or augmentative communication devices when required.

Students with 504 Plans

- Follow the 504 plan.
- Provide extended time for labs, projects, and assessments.
- Offer small-group or quiet testing environments.
- Accept oral or dictated responses.
- Provide large-print, Braille, or digital text with audio features.
- Allow use of a scribe or communication device.

Students at Risk of School Failure

- Use visuals, real objects, and demonstrations for science concepts.
- Pre-teach vocabulary and connect it to real-life examples.
- Provide step-by-step directions and frequent check-ins.
- Offer small-group instruction with guided practice.
- Break down experiments and projects into smaller tasks.
- Assign peer support for collaborative activities.
- Provide preferential seating and structured routines.
- Give frequent feedback and encouragement.

Gifted and Talented

- Ask open-ended questions to promote higher-order thinking.
- Encourage independent investigations and research projects.
- Provide enrichment tasks, such as STEM challenges or experiments beyond grade-level.

- Offer advanced reading materials and videos on science topics.
- Group flexibly for inquiry projects and debates.
- Allow choice in projects, reports, or presentations.
- Provide opportunities for cross-curricular connections (e.g., math in data analysis, ELA in lab reports).
- Encourage reflection and presentation of findings to peers.

Multilingual Learners

- Collaborate with ESL/MLL teachers.
- Provide small-group instruction and partner learning.
- Pre-teach and revisit vocabulary with visuals and realia (objects, pictures).
- Use bilingual glossaries or picture dictionaries.
- Provide sentence frames and discussion stems for lab work.
- Scaffold writing with graphic organizers and labeled diagrams.
- Allow extended time and oral responses.
- Use recorded directions, audio supports, or captioned videos.

Diversity and Inclusion

- Respect and include cultural traditions and perspectives in science examples.
- Provide alternative formats for assignments (oral, visual, or hands-on projects).
- Use visuals, diagrams, and clear, direct language.
- Avoid slang and idioms; use precise science vocabulary.
- Collaborate with support staff and cultural liaisons.
- Create an inclusive, respectful classroom environment.
- Provide sufficient wait time before calling on students.
- Build positive relationships with families and invite them into science learning.

Supplemental Resources

Instructional Materials

- Mystery Science www.mysteryscience.com

Supplemental Materials

- BrainPop
- Nearpod
- EdPuzzle
- ReadWorks
- Fundamentals
- Pebble Go Next

Intervention Materials

- Mystery Science Extension Materials
  - Vocabulary
  - Reading extensions
  - Mini-Lessons
  - Transcripts

Teacher Notes

OCEAN ACADEMY CHARTER SCHOOL Unit 3 Overview	
Content Area: Science	
Unit Title: Earth and the Space Around It	**Duration:** 30 Days
Target Course/Grade Level: Grade 5	

Introduction/Unit Focus:

In this unit, students explore the distribution and movement of water on Earth, gaining a deeper understanding of where water is found and how it shapes our planet. They investigate the role of rainfall in shaping the land and influencing the types of plants and animals that thrive in different regions. Students will also learn about water stored in glaciers and oceans, and through developing models, they will describe how Earth's geosphere, biosphere, hydrosphere, and atmosphere interact with one another. By collecting and graphing data, students will provide evidence about how water is distributed across the Earth's surface. Additionally, they will examine the impact of human activities on land and water resources and learn about global warming and its effects on the environment.

The unit also addresses Earth's position in the solar system and how it affects daily and seasonal patterns observed from our planet. Students will explore questions such as how the length and direction of shadows change throughout the day and across seasons, why the length of day and night varies, and how the appearance of certain stars changes with the seasons. Through these investigations, students develop an understanding of the patterns of shadow movement, the cycle of day and night, and the seasonal changes in the night sky, connecting these observations to Earth's movement in space.

Disciplinary Concepts for the Unit

Standard 9.1 Personal Financial Literacy

This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

Standard 9.2 Career Awareness, Exploration, Preparation and Training
This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Standard 9.4 Life Literacies and Key Skills
This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science
Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking
Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

Amistad Law: N.J.S.A. 18A 52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocide in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

Diversity and Inclusion: C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

The instruction shall:

(1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;

(2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and

(3) encourage safe, welcoming, and inclusive environments for all students regardless

of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLS) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

"Twenty-first century themes and skills" means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy."

Focus Standards (Major Standards) https://www.nj.gov/education/cccs

Content Standards: New Jersey Student Learning Standards for Science

5-ESS2-1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

5-ESS2-2 Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

5-ESS3-1 Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

5-PS2-1 Support an argument that the gravitational force exerted by Earth on objects is directed down.

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.

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.

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	Disciplinary Core Ideas/Unit Enduring Understandings	Crosscutting Concepts
➢ Develop a model using an example to describe a scientific principle. ➢ Describe and graph quantities such as area and volume to address scientific questions. ➢ Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. ➢ Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. ➢ Support an argument with evidence, data, or a model. ➢	➢ 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. ➢ 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. ➢ 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	➢ Standard units are used to measure and describe physical quantities such as weight and volume. ➢ A system can be described in terms of its components and their interactions. ➢ Science findings are limited to questions that can be answered with empirical evidence. ➢ Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. ➢ Cause and effect relationships are routinely identified and used to explain change. ➢ Natural objects exist from the very small to the immensely large. ➢

	Earth's resources and environments. ➢ The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. ➢ 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. ➢ 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.	

New Jersey Student Learning Standards: Interdisciplinary Connections
https://www.nj.gov/education/cccs

ELA/Literacy

RI.MF.5.6. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on web pages) and explain how the information contributes to an understanding of the text in which it appears.

L.VL.5.2. Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies.

A. Use context (e.g., cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase.
B. Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., photograph, photosynthesis).
C. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key

words and phrases.

RI.PP.5.5. Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent and how that may influence the reader's interpretation.

W.IW.5.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

A. Introduce a topic clearly to provide a focus and group related information logically; include text features such as headings, illustrations, and multimedia when useful to aid in comprehension.
B. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.
C. Link ideas within paragraphs and sections of information using words, phrases, and clauses (e.g., in contrast, especially).
D. Use precise language and domain-specific vocabulary to inform about or explain the topic.
E. Provide a conclusion related to the information of explanation presented.

SL.UM.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.

Mathematics

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.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.

New Jersey Student Learning Standards: Career Readiness, Life Literacies, and Key Skills	
Core Ideas	**Performance Expectations (Identified with Standard Number and statement)**
Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills.	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).
An individual's passions, aptitude and skills can affect his/her employment and earning potential.	9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.

	9.2.5.CAP.2: Identify how you might like to earn an income. 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 these requirements.
The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.	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).
New Jersey Student Learning Standards: Computer Science and Design Thinking	
Core Ideas	**Performance Expectations (Identified with Standard Number and Statement)**
Societal needs and wants determine which new tools are developed to address real-world problems.	8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system.
Many factors influence the accuracy of inferences and predictions.	8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
Technology innovation and improvement may be influenced by a variety of factors. Engineers create and modify technologies to meet people's needs and wants;	8.2.5.NT.1: Troubleshoot a product that has stopped working and brainstorm ideas to correct the problem. 8.2.5.NT.2: Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies.

scientists ask questions about the natural world.	8.2.5.NT.3: Redesign an existing product for a different purpose in a collaborative team. 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies.
Technological choices and opportunities vary due to factors such as differences in economic resources, location, and cultural values.	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.

New Jersey Student Learning Standards: Climate Change Mandate	
Core Ideas	**Performance Expectations (Identified with Standard Number and Statement)**
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: Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Knowledge and Skills

Unit Learning Targets (Objectives):
Students will be able to…

- ➢ Develop and use models to describe how the geosphere, biosphere, hydrosphere, and atmosphere interact with one another.
- ➢ Describe and graph the distribution of water on Earth, including the amounts and percentages of saltwater and freshwater in various reservoirs.
- ➢ Gather and combine information about how communities use scientific knowledge to protect Earth's natural resources and environment.
- ➢ Support arguments explaining that Earth's gravitational force pulls objects downward.
- ➢ Explain why the sun appears brighter than other stars by considering their relative distances from Earth.

- Represent data in graphs to identify patterns related to daily changes in shadow length and direction, day and night cycles, and the seasonal visibility of certain stars.
- Define a simple design problem with clear criteria for success and constraints on materials, time, or cost.
- Generate, compare, and evaluate multiple solutions to a problem based on how well they meet established criteria and constraints.
- Plan and conduct fair tests by controlling variables and identifying failure points to improve models or prototypes.

Unit Enduring Understandings:
Students will know…

- Earth's four major systems—the geosphere, biosphere, hydrosphere, and atmosphere—constantly interact to shape our planet.
- Water is unevenly distributed on Earth, with most water in oceans and much freshwater stored in glaciers and underground.
- Rainfall influences the shaping of landforms and determines the types of living organisms in a region.
- Some natural and human events occur quickly, while others happen gradually over long periods.
- Human activities have significant impacts on Earth's land, water, atmosphere, and even outer space, but societies also work to protect natural resources.
- Continued increases in Earth's global mean temperature will affect humans and other organisms in various ways.
- The brightness of stars varies due to differences in size and their distances from Earth.
- Patterns such as day and night, shadow direction and length, and seasonal star appearances result from Earth's rotation, orbit, and the moon's orbit.

Unit Essential Questions:

- How is water distributed across Earth's various reservoirs, and how much is freshwater versus saltwater?
- In what ways do the geosphere, biosphere, hydrosphere, and atmosphere interact?
- How do communities apply science to conserve and protect Earth's resources and environment?
- What role does Earth's gravity play in our everyday lives?
- Why does the sun appear brighter than other stars in the sky?
- How does Earth's position relative to the sun influence the length of days and nights, the direction of shadows, and the changing appearance of stars throughout the seasons?

Instructional Plan

Students will engage in a science framework that enables them to investigate phenomena, design solutions to problems, make sense of evidence to construct arguments, and critique and discuss those arguments. This is a model to support students through mastery of the Next Generation Science Standards. Science Resources

5 E Instructional Model provides opportunities for students to engage, explore, explain, elaborate and evaluate science content.

The Science block will consist of the following components for Earth Systems:

Engage: Raise a question and use compelling storytelling and visuals to introduce students to a scientific phenomenon and get them excited to investigate. Activate prior knowledge and prepare students for the day's learning. This is also known as an advance organizer, hook, or set induction.

- **Resources:**
  - Mystery Science- Anchor Phenomenon (Dust Bowl Disaster)
    - See, Think, Wonder Chart
    - Activity and Discussion
  - Mystery Science- Anchor Phenomenon: Sky Patterns & Modeling (Star Trails)
    - See, Think, Wonder Chart
    - Activity and Discussion

Explore: Students experience key concepts through a collaborative hands-on, inquiry activity. They test predictions, share ideas and record observations. Teachers act as a facilitator, supporting students in establishing relationships and communicating their experience and ideas. This could be done through read-alouds, videos, experiments, STEM/STEAM challenges and projects.

- **Resources:**
  - Mystery Science- Water Cycle's & Earth Systems Unit
    - Lesson 1: Hydrosphere & The Roles of Water (Activity: Map the World's Water)
    - Lesson 2: Groundwater as a Natural Source (Activity: Wanted: A Well)
    - Lesson 3: Water Cycle (Activity: Make it Rain)
    - Lesson4: Natural Disaster & Engineering (Activity: Save the Beachtown)
  - Mystery Science- Spaceship Earth: Stars & the Solar System Unit
    - Lesson 1: Day, Night, & Earth's Rotation (Activity: Spinning Earth)
    - Lesson 2: Earth's Rotation & Daily Shadow Patterns (Activity: Make a Shadow Clock)
    - Lesson 3: Seasonal Changes & Shadow Length (Activity: Guess the Season)

- Lesson 4: Seasonal Patterns & Earth's Orbit (Activity: Universe-in-a-box)
- Lesson 5: Moon Phases, Lunar Cycle (Activity: Model the Moon's Phases)
- Lesson 6: Planets & Solar System (Activity: Running to Neptune)
- Lesson 7: Gravity (Activity: Gravity Jump)
- Lesson 8: Star Brightness & Habitable Planets (Activity: Star Explorer)

Explain: Students have frequent opportunities to connect their prior knowledge to new concepts. They share their thinking and build explanations. Post-activity questions encourage students to engage in sense-making, linking their findings to the Mystery question. Video exploration can build upon the student discussion and provide scientific explanation

➢ **Resources:**

- Mystery Science:
  - Performance Task: Interaction of Earth's Spheres and Argumentation Unit Review and Activity
- Mystery Science:
  - Performance Task: Night Sky (How can you tell time at night?) Unit Review and Activity

Elaborate: Opportunity for students to apply their learning to a similar or new situation. Project ideas and readings can help extend the learning

➢ **Resources:**

- Mystery Science:
  - Performance Task: Forces Engineering (Can you design an ice board?) Unit Review and Activity
  - Reading Extensions:
    - Lesson 1: Fishing for Forces
    - Lesson 2: Why that Bridge Collapsed
    - Lesson 3: Scientists Solve a Sticky Problem
    - Lesson 4: Hunting for Rocks from Outer Space and the Biggest Rock in the World
    - Lesson 5: Magnetism by Mari Schuh and Discovering Science: Playing with Magnets by Gary Gibson
- Mystery Science:
  - Performance Task: Night Sky (How can you tell time at night?) Unit Review and Activity
  - Reading Extensions:
    - Lesson 2: "What do A.M. and P.M. mean?"
    - Lesson 5: The Many Names for the Full Moon
    - Lesson 6: "Galileo"

- Lesson 7: What is gravity really?, What's It Like in Space?, Why Are All Planets Round?
- Lesson 8: TRAPPIST-1 star and the seven planets that orbit around it, our star, the Sun

Evaluate: Assess student understanding of learning objective

➢ **Resources:**

- Mystery Science:
  - Lesson 1: Hydrosphere & The Roles of Water Assessment
  - Lesson 2: Groundwater as a Natural Source Assessment
  - Lesson 3: Water Cycle Assessment
  - Lesson4: Natural Disaster & Engineering Assessment
  - Watery Planet Unit Assessment
- Mystery Science:
  - Lesson 1: Day, Night, & Earth's Rotation Assessment
  - Lesson 2: Earth's Rotation & Daily Shadow Patterns Assessment
  - Lesson 3: Seasonal Changes & Shadow Length Assessment
  - Lesson 4: Seasonal Patterns & Earth's Orbit Assessment
  - Lesson 5: Moon Phases, Lunar Cycle Assessment
  - Lesson 6: Planets & Solar System Assessment
  - Lesson 7: Gravity Assessment
  - Lesson 8: Star Brightness & Habitable Planets Assessment
  - Stars & the Solar System Unit Assessment

Evidence of Student Learning

Formative Assessments:

➢ Graphic Organizers & Guided Note Taking
➢ Directed Reading
➢ Cooperative Group Learning
➢ Homework
➢ Journal Entries

Summative Assessments

➢ Mystery Science Unit Assessments
➢ Projects

Benchmark Assessments:

➢ (Include performance tasks that demonstrate students meeting the standards.)
➢ RST- Research Simulation Task
➢ Associated Unit tests, quizzes
➢ Labs and engineering based projects

Alternative Assessments

- Projects

Performance Tasks:

- Mystery Science Experiments
- Teacher created activities/projects

Suggested Options for Differentiation and Modifications

Special Education

- Follow all IEP modifications.
- Use visuals, graphic organizers, and hands-on models.
- Pre-teach and review vocabulary and scientific concepts.
- Provide outlines, word banks, and study guides.
- Use leveled texts and simplified resources when needed.
- Provide small-group or one-on-one instruction.
- Assign peer tutors or lab partners for support.
- Read aloud directions and model scientific procedures.
- Offer preferential seating near teacher or materials.
- Give extra time for labs, projects, and tests.
- Accept oral or dictated responses instead of written work.
- Modify or reduce the number of questions on assignments.
- Provide access to large-print, Braille, or digital text with audio tools.
- Use scribes or augmentative communication devices when required.

Students with 504 Plans

- Follow the 504 plan.
- Provide extended time for labs, projects, and assessments.
- Offer small-group or quiet testing environments.
- Accept oral or dictated responses.
- Provide large-print, Braille, or digital text with audio features.
- Allow use of a scribe or communication device.

Students at Risk of School Failure

- Use visuals, real objects, and demonstrations for science concepts.
- Pre-teach vocabulary and connect it to real-life examples.
- Provide step-by-step directions and frequent check-ins.
- Offer small-group instruction with guided practice.

- Break down experiments and projects into smaller tasks.
- Assign peer support for collaborative activities.
- Provide preferential seating and structured routines.
- Give frequent feedback and encouragement.

Gifted and Talented

- Ask open-ended questions to promote higher-order thinking.
- Encourage independent investigations and research projects.
- Provide enrichment tasks, such as STEM challenges or experiments beyond grade-level.
- Offer advanced reading materials and videos on science topics.
- Group flexibly for inquiry projects and debates.
- Allow choice in projects, reports, or presentations.
- Provide opportunities for cross-curricular connections (e.g., math in data analysis, ELA in lab reports).
- Encourage reflection and presentation of findings to peers.

Multilingual Learners

- Collaborate with ESL/MLL teachers.
- Provide small-group instruction and partner learning.
- Pre-teach and revisit vocabulary with visuals and realia (objects, pictures).
- Use bilingual glossaries or picture dictionaries.
- Provide sentence frames and discussion stems for lab work.
- Scaffold writing with graphic organizers and labeled diagrams.
- Allow extended time and oral responses.
- Use recorded directions, audio supports, or captioned videos.

Diversity and Inclusion

- Respect and include cultural traditions and perspectives in science examples.
- Provide alternative formats for assignments (oral, visual, or hands-on projects).
- Use visuals, diagrams, and clear, direct language.
- Avoid slang and idioms; use precise science vocabulary.
- Collaborate with support staff and cultural liaisons.
- Create an inclusive, respectful classroom environment.
- Provide sufficient wait time before calling on students.
- Build positive relationships with families and invite them into science learning.

Supplemental Resources

Instructional Materials

- Mystery Science www.mysteryscience.com

Supplemental Materials

- BrainPop
- Nearpod
- EdPuzzle
- ReadWorks
- Fundamentals
- Pebble Go Next

Intervention Materials

- Mystery Science Extension Materials
  - Vocabulary
  - Reading extensions
  - Mini-Lessons
  - Transcripts

Teacher Notes