

**Lakewood Public School District Curriculum Guide**

<b>Grade: 5</b>	<b>Content Area: Science</b>
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<p><b>Original Adoption:</b> Original Adoption: 2023 NJSLS English Language Arts and English as a Second Language (8-21-24); Math NJSLS Mathematics (8-21-24); 2020 NJSLS Science, Social Studies, Career Readiness, Life Literacies &amp; Key Skills, Computer Design &amp; Thinking, Visual &amp; Performing Arts, World Language, Comprehensive Health and Physical Education (5-11-22)</p>
<p><b>Created By:</b></p>

<b>Recommended Pacing Guide</b>	
<b>Unit 1:</b> Patterns of Earth and Sky	45 days
<b>Unit 2:</b> Modeling Matter	45 days
<b>Unit 3:</b> The Earth System	45 days
<b>Unit 4:</b> Ecosystem Restoration	45 days

<b>Alignment with State Mandates</b>
<p>The following colors are used throughout this document to indicate areas in which the curriculum is aligned with the following NJSA requirements:</p> <ul style="list-style-type: none"> <li>● <span style="background-color: #f0f0f0;">Holocaust and genocides</span> (<a href="#">N.J.S.A. 18A:35-28</a>)</li> <li>● <span style="background-color: #ffffcc;">History and contributions of African-Americans</span> (Amistad Law) (<a href="#">N.J.S.A. 18A:35-4.43</a>)</li> <li>● <span style="background-color: #d9ead3;">Highlight and promote diversity and inclusion</span> (Diversity &amp; Inclusion Law) (<a href="#">N.J.S.A. 18A:35-4.36a</a>)</li> <li>● <span style="background-color: #d9ead3;">History of disabled and LGBT persons</span> included in middle and high school curriculum (<a href="#">Section 18A:35-4.35</a>)</li> <li>● <span style="background-color: #d9ead3;">Climate Change</span> - to prepare students to understand how and why climate change happens, the impact it has on our local and global communities and to act in informed and sustainable ways. Please <a href="#">click here</a> for specific examples (by subject).</li> </ul>

<b>Unit 1: Patterns of Earth and Sky</b>	<b>Duration: 45 days</b>
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<b>New Jersey Student Learning Standards</b>	
<b>5-ESS1-1</b>	Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.

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

Science and Engineering Practices	Discipline Core Ideas/Unit Enduring Understandings	Crosscutting Concepts
<p><b>Practice 1: Asking Questions</b></p> <ul style="list-style-type: none"> <li>Students ask questions that can be investigated about which stars are visible at different times. They use daily and yearly patterns to make predictions about which stars would be visible at particular times.</li> </ul> <p><b>Practice 2: Developing and Using Models:</b></p> <ul style="list-style-type: none"> <li>Students receive explicit instruction and opportunities to practice using and creating a variety of models throughout the unit, both physical models that represent phenomena as well as the use of a digital modeling tool with which students create and communicate their mental models. The use of models is key to students' understanding of scale, spatial relationships between objects in space, and the movements of Earth.</li> </ul> <p><b>Practice 3: Planning and Carrying Out Investigations:</b></p> <ul style="list-style-type: none"> <li>Students conduct various investigations using the Patterns of Earth and Sky Simulation in order to gather evidence about why different stars are visible at different times. They use this information as they work to understand and explain the</li> </ul>	<p><b>ESS1.A: The Universe and Its Stars:</b></p> <ul style="list-style-type: none"> <li>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)</li> </ul> <p><b>ESS1.B: Earth and the Solar System:</b></p> <ul style="list-style-type: none"> <li>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)</li> </ul> <p><b>PS2.B: Types of Interactions:</b></p> <ul style="list-style-type: none"> <li>The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5-PS2-1)</li> </ul>	<p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>Cause and effect relationships are routinely identified and used to explain change. (5-PS2-1)</li> </ul> <p><b>Patterns</b></p> <ul style="list-style-type: none"> <li>Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. (5-ESS1-2)</li> <li>Scale, Proportion, and Quantity Natural objects exist from the very small to the immensely large. (5-ESS1-1)</li> </ul>

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daily and yearly patterns of stars that can be observed from Earth.

**Practice 4: Analyzing and Interpreting Data.**

- Students have numerous opportunities to collect and analyze data from the Patterns of Earth and Sky Simulation. Students analyze data from their investigations of when different stars are visible from Earth in order to look for annual patterns and, ultimately, to understand what causes the patterns they have observed.

**Practice 5: Using Mathematics and Computational Thinking:**

- Throughout their investigations in the Patterns of Earth and Sky Simulation, students collect and review data in order to reveal patterns. As students gather more data, they begin to develop an understanding of the relationships between Earth's movement and what we observe in the sky at different times.

**Practice 6: Constructing Explanations:**

- Students learn about scientific explanations and have multiple opportunities to write increasingly complex explanations over the course of the unit, describing phenomena (e.g., Earth's spin and orbit) that are not easy to observe directly.

**Practice 7: Engaging in Argument from Evidence**

- As students work to explain the significance of images on the artifact and figure out what images might have been

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<p>on the missing piece, they engage in talk with their peers, discussing possible claims and supporting those claims with evidence.</p> <p><b>Practice 8: Obtaining, Evaluating, and Communicating Information</b></p> <ul style="list-style-type: none"> <li>Throughout the unit, students refer to informational texts and a reference book in order to gather evidence to support their developing ideas about the astronomical phenomena they observe in the Patterns of Earth and Sky Simulation.</li> </ul>		
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**New Jersey Social and Emotional Competencies and Sub-Competencies**

<b>Self-Awareness</b>	<ul style="list-style-type: none"> <li>Recognize one’s feelings and thoughts.</li> <li>Recognize the impact of one’s feelings and thoughts on one’s own behavior.</li> <li>Recognize one’s personal traits, strengths, and limitations.</li> <li>Recognize the importance of self-confidence in handling daily tasks and challenges.</li> </ul>
<b>Self-Management</b>	<ul style="list-style-type: none"> <li>Understand and practice strategies for managing one’s own emotions, thoughts, and behaviors.</li> <li>Recognize the skills needed to establish and achieve personal and educational goals.</li> <li>Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one’s goals.</li> </ul>
<b>Social Awareness</b>	<ul style="list-style-type: none"> <li>Recognize and identify the thoughts, feelings, and perspectives of others.</li> <li>Demonstrate an awareness of the differences among individuals, groups, and others’ cultural backgrounds.</li> <li>Demonstrate an understanding of the need for mutual respect when viewpoints differ.</li> <li>Demonstrate an awareness of the expectations for social interactions in a variety of settings.</li> </ul>
<b>Responsible Decision Making</b>	<ul style="list-style-type: none"> <li>Develop, implement, and model effective problem-solving and critical thinking skills.</li> <li>Identify the consequences associated with one’s actions in order to make constructive choices.</li> <li>Evaluate personal, ethical, safety, and civic impact of decisions.</li> </ul>
<b>Relationship Skills</b>	<ul style="list-style-type: none"> <li>Establish and maintain healthy relationships.</li> <li>Utilize positive communication and social skills to interact effectively with others.</li> <li>Identify ways to resist inappropriate social pressure.</li> </ul>

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	<ul style="list-style-type: none"> <li>Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways.</li> <li>Identify who, when, where, or how to seek help for oneself or others when needed.</li> </ul>
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<u><a href="#">Interdisciplinary Connections</a></u>
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<b>ELA Standards</b>
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<b>RI.CR.5.1</b>	Quote accurately from an informational text when explaining what the text says explicitly and make relevant connections when drawing inferences from the text.
<b>RI.CI.5.2</b>	Determine the central idea of an informational text and explain how it is supported by key details; summarize the text.
<b>RI.MF.5.6</b>	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.
<b>RI.AA.5.7</b>	Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).
<b>W.IW.5.2</b>	<p>Write informative/explanatory texts to examine a topic and convey ideas and information clearly.</p> <ul style="list-style-type: none"> <li><b>B.</b> Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.</li> <li><b>D.</b> Use precise language and domain-specific vocabulary to inform about or explain the topic.</li> </ul>
<b>W.WR.5.5</b>	Establish a central idea about a topic, investigation, issue or event and use several sources to support the proposed central idea.
<b>W.SE.5.6</b>	Gather relevant information from multiple valid and reliable print and digital sources; summarize or paraphrase information in notes and finished work, making note of any similarities and differences among ideas presented; and provide a list of sources.
<b>W.RW.5.7</b>	Write routinely over extended time frames (time for research and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
<b>SL.PE.5.1</b>	<p>Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.</p> <ul style="list-style-type: none"> <li><b>B.</b> Follow agreed-upon rules for discussions and carry out assigned roles.</li> <li><b>D.</b> Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.</li> </ul>

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<b>SL.II.5.2</b>	Summarize a written text read aloud or information presented in diverse media and formats (e.g., visually, quantitatively, and orally).
<b>L.RF.5.3</b>	Know and apply grade-level phonics and word analysis skills in decoding and encoding words; use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.
<b>L.RF.5.4</b>	Read with sufficient accuracy and fluency to support comprehension. <b>A.</b> Read grade-level text with purpose and understanding. <b>B.</b> Read grade-level text orally with accuracy, appropriate rate, and expression. <b>C.</b> Use context to confirm or self-correct word recognition and understanding, rereading as necessary.
<b>L.KL.5.1</b>	Use knowledge of language and its conventions when writing, speaking, reading, or listening. <b>A.</b> Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.
<b>L.VL.5.2</b>	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. <b>A.</b> Use context (e.g., cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase. <b>B.</b> Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., photograph, photosynthesis). <b>C.</b> 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.
<b>Mathematics Standards</b>	
<b>MP1</b>	Make sense of problems and persevere in solving them.
<b>MP2</b>	Reason abstractly and quantitatively.
<b>MP4</b>	Model with mathematics.
<b>MP5</b>	Use appropriate tools strategically.
<b>MP6</b>	Attend to precision.
<b>5.NBT.1</b>	Understand the place value system. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
<b>5.NBT.2</b>	Understand the place value system. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in

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	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.
<b>5.NBT.3</b>	Understand the place value system. Read, write, and compare decimals to thousandths.
<b>5.NBT.3a</b>	Read and write decimals to thousandths using base-ten numerals, number names, and expanded form.
<b>5.NBT.3b</b>	Compare two decimals to thousandths based on meanings of the digits in each place, using $>$ , $=$ , and $<$ symbols to record the results of comparisons.
<b>5.NBT.5</b>	Perform operations with multi-digit whole numbers and w
<b>5.M.1</b>	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.

<b>Computer Science &amp; Design Thinking</b>	
<b>8.1.5.IC.2:</b>	Identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users.
<b>8.1.5.DA.1:</b>	Collect, organize, and display data in order to highlight relationships or support a claim.
<b>8.1.5.DA.3:</b>	Organize and present collected data visually to communicate insights gained from different views of the data.
<b>8.1.5.DA.4:</b>	Organize and present climate change data visually to highlight relationships or support a claim.
<b>8.2.5.ED.2:</b>	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.
<b>8.2.5.ED.3:</b>	Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
<b>8.2.5.ED.4</b>	Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).

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<b>8.2.5.ED.5</b>	Describe how specifications and limitations impact the engineering design process.
<b>8.2.5.ED.6</b>	Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process
<b>8.2.5.ITH.4</b>	Describe a technology/tool that has made the way people live easier or has led to a new business or career.
<b>8.2.5.NT.4</b>	Identify how improvement in the understanding of materials science impacts technologies
<b>8.2.5.ETW.2</b>	Describe ways that various technologies are used to reduce improper use of resources.
<b>8.2.5.EC.1</b>	Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.

<u>Career Readiness, Life Literacies &amp; Key Skills</u>	
<b>9.1.5.CR.1</b>	Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
<b>9.2.5.CAP.4</b>	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.
<b>9.4.5.CI.1</b>	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3, 7.1.NM.IPERS.6).
<b>9.4.5.CT.1</b>	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).
<b>9.4.5.CT.3</b>	Describe how digital tools and technology may be used to solve problems
<b>9.4.5.CT.4</b>	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).
<b>9.4.5.IML.6</b>	Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM.IPRET.5).

Evidence of Student Learning	
<b>Formative Tasks:</b> <ul style="list-style-type: none"> <li>● Teacher observations</li> <li>● Class discussions</li> <li>● Whiteboard/Communicators</li> <li>● On-the-Fly Assessments</li> </ul>	<b>Alternative Assessments:</b> <ul style="list-style-type: none"> <li>● Oral Assessments</li> </ul>

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<ul style="list-style-type: none"> <li>• Daily classwork</li> <li>• Checks for understanding</li> <li>• Clipboard Assessment Tool</li> <li>• Critical Juncture Assessment</li> <li>• Crosscutting Concept Tracker</li> </ul>	
<b>Summative Assessments:</b> <ul style="list-style-type: none"> <li>• End of Unit</li> </ul>	<b>Benchmark Assessments:</b> <ul style="list-style-type: none"> <li>• Benchmark 5A</li> </ul>

<b>Knowledge &amp; Skills</b>	
<b>Enduring Understandings:</b> <ul style="list-style-type: none"> <li>• Stars are very far away from Earth in every direction. (1.4)</li> <li>• The sun is the only star in our solar system. Other stars are far outside our solar system. (1.4)</li> <li>• The sun looks bigger and brighter because it is much closer to Earth than other stars. (1.6)</li> <li>• The sun is the only star we can see in the daytime because the sun looks so bright. (1.6)</li> <li>• Scientists plan investigations to answer their questions. They think about what they will observe and record, as well as what they will change and what they will keep the same. (2.2)</li> <li>• Earth spins once each day. We face the sun in daytime, and we face away from the sun at nighttime. (2.3)</li> <li>• Earth pulls objects down toward the ground with the force of gravity, so up is away from the ground, anywhere on Earth. (2.5)</li> <li>• Throughout the year, we see different stars. But every year on the same date, we see the same stars. (3.1)</li> <li>• Earth orbits the sun as it spins. (3.3)</li> <li>• Earth's position in its yearly orbit determines which stars we see in the night sky. (3.4)</li> </ul>	<b>Essential Questions:</b> <ul style="list-style-type: none"> <li>• Why do we see different stars at different times?</li> <li>• Why don't we see a lot of stars during the daytime?</li> <li>• Where are the stars in space?</li> <li>• If the stars are all around us, why can't we always see them?</li> <li>• Why is the sun up sometimes, but not other times?</li> <li>• What causes the daily pattern of when we see the sun and other stars?</li> <li>• If Earth is spinning, which way is up?</li> <li>• Why do we see different stars at different times of year?</li> <li>• Do we see different stars at different times of year?</li> <li>• What causes the yearly pattern of stars that we see?</li> <li>• How can we investigate why we see different stars on different nights?</li> </ul>
<b>Content</b> <i>Students will know...</i> <ul style="list-style-type: none"> <li>• Reflecting on what you do and don't understand allows you to prepare for learning new things.</li> <li>• Astronomers are scientists who study stars, planets, and other objects in space.</li> </ul>	<b>Skills</b> <i>Students will be able to ...</i> <ul style="list-style-type: none"> <li>• Reflect on what they understand and what they do not yet understand in order to prepare for learning new science ideas.</li> <li>• Use reference books and informational texts to locate scientific information.</li> </ul>



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| <ul style="list-style-type: none"><li>• Scientists support their explanations with ideas from investigations and text.</li><li>• There is a daily pattern in which the sun is visible in daytime, and the stars are visible during nighttime.</li><li>• When scientists have new ideas about answers for their questions, they plan investigations and gather evidence to see if their ideas are supported.</li><li>• Scientists plan investigations to answer their questions. They think about what they will observe and record, as well as what they will change and what they will keep the same.</li><li>• A day is a period of time that is 24 hours long and includes daytime and nighttime.</li><li>• Earth's spin can be inferred by seeing the sun and other stars appear to move across the sky, and observed directly by seeing images of Earth from space.</li><li>• Earth spins once each day. We face the sun in daytime, and we face away from the sun at nighttime.</li><li>• Earth pulls objects, including people, down toward the ground with the force of gravity.</li><li>• Because of gravity, people all over Earth experience the same perception of up and down, even though Earth is a sphere and spins.</li><li>• One way to visualize while reading is to use the text and diagrams to make a movie in your mind.</li><li>• Basic laws of nature are the same everywhere in the universe.</li><li>• Earth pulls objects down toward the ground with the force of gravity, so up is away from the ground, anywhere on Earth.</li><li>• At the same time, people who are at different locations on Earth may experience different objects when they look up.</li><li>• The motion of the Moon around Earth results in the Moon sometimes being on the same side of Earth as the sun, and sometimes being on the opposite side of Earth.</li><li>• The Earth's spin results in the Moon appearing to rise and set each day, just like the sun.</li><li>• A scientific explanation uses scientific language and is written for an audience.</li><li>• Models can help people reflect on new science ideas.</li><li>• Science assumes consistent patterns in natural systems.</li></ul> | <ul style="list-style-type: none"><li>• Plan investigations by identifying what will be observed, what will be changed, and what will be kept the same.<ul style="list-style-type: none"><li>• Collect, record, and organize data using appropriate tools and methods.</li><li>• Revise investigation plans when problems occur during data collection.</li><li>• Use patterns in data to make predictions about natural phenomena.</li><li>• Explain that some scientific investigations can have more than one reasonable answer.</li><li>• Use data to answer new scientific questions.</li><li>• Share and discuss investigation results with others to improve understanding.</li><li>• Provide and use feedback to improve investigation plans and explanations.</li><li>• Explain that scientific explanations describe how natural events happen.</li><li>• Support scientific explanations with evidence from investigations and texts.</li><li>• Explain that scientific findings are based on recognizing patterns and using evidence.</li><li>• Explain that scientists revise their methods and ideas as they gather new evidence</li></ul></li></ul> |
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- Throughout the year, we see different stars. But every year on the same date, we see the same stars.
- Reflecting on a poorly planned investigation can help us do a better job of planning our own systematic investigations.
- A year is the length of time it takes for Earth to orbit the sun once.
- To orbit is to move in a regular path around something. The Earth orbits the sun.
- Stars are visible in the night sky when we are on the side of Earth that is facing away from the sun.
- Earth orbits the sun at the same time as it spins.
- Earth's position in its yearly orbit determines which stars we see in the night sky.
- People long ago observed the stars and used yearly star patterns to help them track different times of year.
- Visualizing when you read can help you understand things that are difficult to observe.
- Patterns can help scientists make predictions.
- Sometimes investigations are not limited to a single correct response—there are multiple answers that would be both reasonable and possible.
- Scientists choose questions to investigate that can be answered through measurement and observation.
- Scientists can sometimes use the same data to answer new questions.
- Reading about the work of scientists can help students plan their own investigations.
- Scientists use a variety of methods, tools, and techniques when they conduct investigations.
- Science findings are based on recognizing patterns.
- Science uses tools and technologies to make accurate measurements and observations.
- Science findings are limited to what can be answered with evidence.
- Scientists carefully plan their investigations, including how they will record their data.
- Scientists often revise their investigation plans in order to improve them.
- Scientists offer feedback to their peers as a way of improving their plans.
- The methods scientists use are determined by the questions they are investigating.

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- During an investigation, scientists revise their data collection methods when they encounter problems.
- Scientists share and discuss their initial results in order to help them understand the data they are collecting.

### Core Instructional & Supplemental Materials

#### Suggested Activities/Resources:

- Books in This Unit
  - How Big Is Big? How Far Is Far?
  - Which Way Is Up?
  - Dog Days of Summer
  - Star Scientist, Gibor Basri
  - Handbook of Stars and Constellations

#### Supplemental Materials

- Digital Resources included in each unit
  - Accessing the Patterns of Earth and Sky Apps
- Multi-language glossary
- Stars of the Night: The Courageous Children of the Czech Kindertransport, written by Caren Stelson and illustrated by Selina Alko
- Hands-On Flextension:
  - Shadow Patterns
  - Making Artifacts

### Suggested Accommodations

#### English Language Learners:

- Multi-sensory instruction
- Flexible grouping
- Small group instruction
- Provide peer tutoring
- Use a strong student as a “buddy” (does not necessarily have to speak the primary language)
- Chunking information
- Scaffolded questioning
- Academic language support
- Vocabulary support
- Co-Constructed Word Banks
- Anchor charts
- Gradual release model
- Visual models
- Native language support when possible (Multi-language glossary)
- Sheltered English Instruction Strategies
- Sentence starters

#### Special Education/Students with Disabilities:

- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Follow all IEP modifications
- Calculators

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- Manipulatives/concrete models
- Directions repeated, clarified, and reworded
- Breakdown task into manageable parts

### **504 Plans:**

- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Calculators
- Manipulatives/concrete models
- Follow all 504 modifications

### **Gifted and Talented:**

- Higher level questioning
- Enriched assignments
- Tiered assignments
- Choice board to extend learning

### **Students at Risk of Failure:**

- Provide peer tutoring
- Use a strong student as a “buddy”
- Allow extra time to complete assignments or tests
- Work in a small group
- One on one instruction
- Provide immediate praise and feedback
- Create a nurturing environment
- Provide visuals
- Be flexible with assignments and time frames
- Provide needed academic resources
- Chunking information
- Scaffolded questioning
- Tiered activities
- Manipulatives/concrete models
- Modified assignments
- Brain breaks

### **Economically Disadvantaged:**

- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge

### **Culturally Diverse:**

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- Create an emotionally positive classroom climate.
- Create effective communication
- Model and teach cultural respect
- Build relationships with students by interviewing students to understand their background

<b>Unit 2: Modeling Matter</b>	<b>Duration: 45 days</b>
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New Jersey Student Learning Standards	
<b>5-PS1-1</b>	Develop a model to describe that matter is made of particles too small to be seen.
<b>5-PS1-2</b>	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.
<b>5-PS1-3</b>	Make observations and measurements to identify materials based on their properties.
<b>5-PS1-4</b>	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Science and Engineering Practices	Discipline Core Ideas/Unit Enduring Understandings	Crosscutting Concepts
<p><b>Practice 1: Asking Questions</b></p> <ul style="list-style-type: none"> <li>● When students use the Modeling Matter Simulation, they are asking questions they can investigate and predicting reasonable outcomes based on patterns and cause-and-effect relationships.</li> </ul> <p><b>Practice 2: Developing and Using Models:</b></p> <ul style="list-style-type: none"> <li>● Students receive explicit instruction and opportunities to practice using models and developing and revising models by 1) creating models of molecules at the nanoscale</li> </ul>	<p><b>PS1.A: Structure and Properties of Matter:</b></p> <ul style="list-style-type: none"> <li>● 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 boiling water, the inflation and shape of a balloon, and the effects of air on larger particles or objects. (5-PS1-1)</li> </ul>	<p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>● Cause and effect relationships are routinely identified, tested, and used to explain change. (5-PS1-4)</li> </ul> <p><b>Scale, Proportion, and Quantity</b></p> <ul style="list-style-type: none"> <li>● Natural objects exist from the very small to the immensely large. (5-PS1-1)</li> <li>● Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-2), (5-PS1-3)</li> </ul>

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<p>to explain what they observed on an observable scale, and 2) using physical models to show how properties of molecules affect interactions between and among different kinds of molecules.</p> <p><b>Practice 3: Planning and Carrying Out Investigations:</b></p> <ul style="list-style-type: none"> <li>● Students conduct various hands-on investigations to test substances in order to gather evidence about the observable-scale properties and interactions of various substances. They use this information as they work to understand and explain the related nanoscale phenomena. Students also carry out investigations about what is happening at the nanoscale, using the Modeling Matter Simulation and the Modeling Matter Diagramming Tool.</li> </ul> <p><b>Practice 4: Analyzing and Interpreting Data.</b></p> <ul style="list-style-type: none"> <li>● While students are investigating substances, they are making observations to help draw conclusions about phenomena at the nanoscale.</li> </ul> <p><b>Practice 5: Using Mathematics and Computational Thinking:</b></p> <ul style="list-style-type: none"> <li>● Students look for patterns in a data set to determine whether more drops of water or more drops of oil fit on a penny.</li> </ul> <p><b>Practice 6: Constructing Explanations:</b></p> <ul style="list-style-type: none"> <li>● Students learn about scientific explanations and have multiple opportunities to write increasingly complex explanations over the course of the unit, learning that they must make inferences about</li> </ul>	<ul style="list-style-type: none"> <li>● The amount of mass in matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2)</li> <li>● Measurements of a variety of properties can be used to identify materials. (5-PS1-3)</li> </ul> <p><b>PS1.B: Chemical Reactions:</b></p> <ul style="list-style-type: none"> <li>● When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4)</li> </ul>	<p><b>Connections to Nature of Science</b></p> <p><b>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</b></p> <ul style="list-style-type: none"> <li>● Science assumes consistent patterns in natural systems. (5-PS1-2)</li> </ul>
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<p>phenomena too small to be seen, based on evidence.</p> <p><b>Practice 7: Engaging in Argument from Evidence</b></p> <ul style="list-style-type: none"> <li>Throughout the unit, students evaluate one another's models claims.</li> </ul> <p><b>Practice 8: Obtaining, Evaluating, and Communicating Information</b></p> <ul style="list-style-type: none"> <li>Just as students focus on making inferences in science, students receive explicit instruction and have multiple opportunities to use the reading comprehension strategy of making inferences as they engage with the informational texts in the unit. They gather evidence through firsthand and secondhand sources, as well as participate in various discourse routines that help them communicate about and make sense of science ideas, using key vocabulary.</li> </ul>		
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New Jersey Social and Emotional Competencies and Sub-Competencies	
<b>Self-Awareness</b>	<ul style="list-style-type: none"> <li>Recognize one's feelings and thoughts.</li> <li>Recognize the impact of one's feelings and thoughts on one's own behavior.</li> <li>Recognize one's personal traits, strengths, and limitations.</li> <li>Recognize the importance of self-confidence in handling daily tasks and challenges.</li> </ul>
<b>Self-Management</b>	<ul style="list-style-type: none"> <li>Understand and practice strategies for managing one's own emotions, thoughts, and behaviors.</li> <li>Recognize the skills needed to establish and achieve personal and educational goals.</li> <li>Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals.</li> </ul>
<b>Social Awareness</b>	<ul style="list-style-type: none"> <li>Recognize and identify the thoughts, feelings, and perspectives of others.</li> <li>Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds.</li> </ul>

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	<ul style="list-style-type: none"> <li>• Demonstrate an understanding of the need for mutual respect when viewpoints differ.</li> <li>• Demonstrate an awareness of the expectations for social interactions in a variety of settings.</li> </ul>
<b>Responsible Decision Making</b>	<ul style="list-style-type: none"> <li>• Develop, implement, and model effective problem-solving and critical thinking skills.</li> <li>• Identify the consequences associated with one's actions in order to make constructive choices.</li> <li>• Evaluate personal, ethical, safety, and civic impact of decisions.</li> </ul>
<b>Relationship Skills</b>	<ul style="list-style-type: none"> <li>• Establish and maintain healthy relationships.</li> <li>• Utilize positive communication and social skills to interact effectively with others.</li> <li>• Identify ways to resist inappropriate social pressure.</li> <li>• Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways.</li> <li>• Identify who, when, where, or how to seek help for oneself or others when needed.</li> </ul>

<u>Interdisciplinary Connections</u>	
ELA Standards	
<b>RI.CR.5.1</b>	Quote accurately from an informational text when explaining what the text says explicitly and make relevant connections when drawing inferences from the text.
<b>RI.IT.5.3</b>	Analyze the impact of two or more individuals and events throughout the course of a text, explaining the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific evidence in the text.
<b>RI.PP.5.5</b>	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.
<b>RI.MF.5.6</b>	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.
<b>W.IW.5.2</b>	<p>Write informative/explanatory texts to examine a topic and convey ideas and information clearly.</p> <ul style="list-style-type: none"> <li><b>A.</b> 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.</li> <li><b>B.</b> Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.</li> </ul>

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	<ul style="list-style-type: none"> <li><b>D.</b> Use precise language and domain-specific vocabulary to inform about or explain the topic.</li> <li><b>E.</b> Provide a conclusion related to the information or explanation presented.</li> </ul>
<b>W.SE.5.6</b>	Gather relevant information from multiple valid and reliable print and digital sources; summarize or paraphrase information in notes and finished work, making note of any similarities and differences among ideas presented; and provide a list of sources.
<b>SL.PE.5.1</b>	<p>Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others’ ideas and expressing their own clearly.</p> <ul style="list-style-type: none"> <li><b>B.</b> Follow agreed-upon rules for discussions and carry out assigned roles.</li> <li><b>C.</b> Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.</li> <li><b>D.</b> Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.</li> </ul>
<b>SL.II.5.2</b>	Summarize a written text read aloud or information presented in diverse media and formats (e.g., visually, quantitatively, and orally).
<b>L.RF.5.3</b>	Know and apply grade-level phonics and word analysis skills in decoding and encoding words; use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.
<b>L.RF.5.4</b>	<p>Read with sufficient accuracy and fluency to support comprehension.</p> <ul style="list-style-type: none"> <li><b>A.</b> Read grade-level text with purpose and understanding.</li> <li><b>B.</b> Read grade-level text orally with accuracy, appropriate rate, and expression.</li> <li><b>C.</b> Use context to confirm or self-correct word recognition and understanding, rereading as necessary.</li> </ul>
<b>L.KL.5.1</b>	<p>Use knowledge of language and its conventions when writing, speaking, reading, or listening.</p> <ul style="list-style-type: none"> <li><b>A.</b> Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.</li> </ul>
<b>L.VL.5.2</b>	<p>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.</p> <ul style="list-style-type: none"> <li><b>A.</b> Use context (e.g., cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase.</li> <li><b>B.</b> Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., photograph, photosynthesis).</li> <li><b>C.</b> 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.</li> </ul>

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Mathematics Standards	
MP1	Make sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP5	Use appropriate tools strategically.
MP6	Attend to precision.
MP7	Look for and make use of structure.
5.NBT.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.NBT.3a	Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$ .
5.G.4	Classify two-dimensional figures into categories based on their properties. Classify two-dimensional figures in a hierarchy based on properties.

Computer Science & Design Thinking	
8.1.5.IC.2:	Identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users.
8.1.5.DA.1:	Collect, organize, and display data in order to highlight relationships or support a claim.
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.4:	Organize and present climate change data visually to highlight relationships or support a claim.
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.ED.3:	Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
8.2.5.ED.4	Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).
8.2.5.ED.5	Describe how specifications and limitations impact the engineering design process.

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<b>8.2.5.ED.6</b>	Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process
<b>8.2.5.ITH.4</b>	Describe a technology/tool that has made the way people live easier or has led to a new business or career.
<b>8.2.5.NT.4</b>	Identify how improvement in the understanding of materials science impacts technologies
<b>8.2.5.ETW.2</b>	Describe ways that various technologies are used to reduce improper use of resources.
<b>8.2.5.EC.1</b>	Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.

<u><b>Career Readiness, Life Literacies &amp; Key Skills</b></u>	
<b>9.1.5.CR.1</b>	Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
<b>9.2.5.CAP.4</b>	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.
<b>9.4.5.CI.1</b>	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
<b>9.4.5.CT.1</b>	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).
<b>9.4.5.CT.3</b>	Describe how digital tools and technology may be used to solve problems
<b>9.4.5.CT.4</b>	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).
<b>9.4.5.IML.6</b>	Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM.IPRET.5).

<b>Evidence of Student Learning</b>	
<p><b>Formative Tasks:</b></p> <ul style="list-style-type: none"> <li>● Teacher observations</li> <li>● Class discussions</li> <li>● Whiteboard/Communicators</li> <li>● On-the-Fly Assessments</li> <li>● Daily classwork</li> <li>● Checks for understanding</li> </ul>	<p><b>Alternative Assessments:</b></p> <ul style="list-style-type: none"> <li>● Oral Assessments</li> </ul>

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<ul style="list-style-type: none"> <li>● Clipboard Assessment Tool</li> <li>● Critical Juncture Assessment</li> <li>● Crosscutting Concept Tracker</li> </ul>	
<b>Summative Assessments:</b> <ul style="list-style-type: none"> <li>● End of Unit</li> </ul>	<b>Benchmark Assessments:</b> <ul style="list-style-type: none"> <li>● Benchmark 5B</li> </ul>

<b>Knowledge &amp; Skills</b>
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<b>Enduring Understandings:</b> <ul style="list-style-type: none"> <li>● All molecules of one substance are exactly the same, and they are different from molecules of any other substance. (1.4)</li> <li>● Different molecules have different properties. (1.5)</li> <li>● The properties of a substance are determined by the properties of its molecules. (1.8)</li> <li>● Some solids dissolve in water, and others do not. (2.1)</li> <li>● When the molecules of a solid are attracted to the molecules of a liquid, they spread apart and mix together evenly. (2.4)</li> <li>● When the molecules of a solid aren't attracted to the molecules of a liquid, they stay clustered together as a solid. (2.4)</li> <li>● Some liquid mixtures stay mixed, and others separate into layers over time. (3.1)</li> <li>● Some liquids hold together more than others. (3.1)</li> <li>● The more a liquid's molecules are attracted to one another, the more the liquid will hold together. (3.3)</li> <li>● When the molecules of two different liquids are attracted to one another, they cluster together and become evenly distributed in the mixture. (3.3)</li> <li>● Molecules of an emulsifier attract the molecules of two liquids that do not typically mix, allowing the molecules of the emulsifier and of the liquids to mix. (3.6)</li> </ul>	<b>Essential Questions:</b> <ul style="list-style-type: none"> <li>● What happens when two substances are mixed together?</li> <li>● Why did the food coloring separate into different dyes?</li> <li>● How are different substances different?</li> <li>● How are different kinds of molecules different? How are molecules similar?</li> <li>● How do differences in molecules cause substances to separate?</li> <li>● Why do some salad dressings have sediments, and others do not?</li> <li>● What happens when you mix a solid into a liquid?</li> <li>● What happens to the molecules of a solid and the molecules of a liquid when you mix them together?</li> <li>● Why can salad-dressing ingredients separate again after being mixed?</li> <li>● What happens when you mix a liquid into a liquid?</li> <li>● What happens to the molecules of two liquids when you mix them together?</li> <li>● Why does adding an emulsifier allow two liquids that don't typically mix to stay mixed?</li> </ul>
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<b>Content</b> <i>Students will know...</i> <ul style="list-style-type: none"> <li>● Reflecting on what you understand and don't understand allows you to prepare for learning new things.</li> <li>● Food scientists create new foods and understand the science behind why things</li> </ul>	<b>Skills</b> <i>Students will be able to ...</i> <ul style="list-style-type: none"> <li>● Reflect on what they understand and do not yet understand in order to prepare for learning new scientific ideas.</li> <li>● Describe the work of food scientists and explain how science is used to create and improve food mixtures.</li> </ul>
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happen the way they do when creating mixtures.

- Scientists use a variety of methods, tools, and techniques when they conduct investigations.
- Scientists use tools and technologies to make accurate measurements and observations.
- Science affects everyday life.
- A property is what you can observe or measure about something that helps you identify or describe it.
- A mixture is made of more than one substance.
- Different substances have different observable properties.
- All matter is made of atoms, the smallest pieces of matter.
- Molecules are groups of atoms joined together.
- Atoms and molecules are tiny nanoscale particles that are too small to see at the observable scale.
- Diagrams, photos, and captions in informational text provide important information about key ideas.
- Water molecules are highly attracted to one another and to many other kinds of molecules.
- Substances are made of only one kind of molecule.
- All molecules of one substance are exactly the same, and they are different from molecules of any other substance.
- Chromatography is a technique that scientists use to separate mixtures into their component substances.
- Different molecules have different properties (size, weight, shape, attraction to one another).
- Models help us understand things that we cannot directly observe.
- Inferences are conclusions that we can draw from what is known and observable.
- Scientists make inferences about the world by using models.
- Creating models helps scientists work out their ideas.
- Scientists get new ideas by looking at one another's models.
- Models can be changed and improved.
- Scientists check one another's models to see if the models make sense and fit with observations.
- Scientific diagrams have features such as keys, labels, and arrows that help explain what the diagrams show.
- Most things are mixtures.

- Use a variety of tools, methods, and techniques to conduct scientific investigations.
- Use scientific tools and technologies to make accurate measurements and observations.
- Explain how science affects everyday life.
- Identify and describe observable and measurable properties of substances.
- Explain that a mixture is made of more than one substance.
- Compare different substances based on their observable properties.
- Explain that all matter is made of atoms.
- Explain that molecules are groups of atoms joined together.
- Recognize that atoms and molecules are extremely small and cannot be seen directly.
- Use diagrams, photographs, and captions to gather information from informational texts.
- Explain that water molecules are strongly attracted to one another and to some other molecules.
- Explain that a substance is made of only one kind of molecule.
- Explain that all molecules of one substance are the same and different from molecules of other substances.
- Describe chromatography as a method scientists use to separate mixtures.
- Explain that different molecules have different properties, such as size, shape, mass, and attraction.
- Use models to understand things that cannot be directly observed.
- Make inferences by combining observations with prior knowledge.
- Explain how scientists use models to make inferences about the world.
- Create models to represent scientific ideas.
- Explain how scientists use and revise models to improve understanding.
- Evaluate models to determine whether they fit observations and evidence.
- Interpret scientific diagrams using features such as labels, keys, and arrows.
- Identify examples of mixtures in everyday life.
- Explain why separating mixtures is important in science.
- Describe how mixtures can be separated using differences in properties.
- Make inferences while reading by combining text evidence with what they already know.
- Explain that the properties of a substance depend on the properties of its molecules.

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- Separating mixtures is an important part of many scientists' work.
- Mixtures can be separated by using the properties of the different substances in the mixtures.
- Readers make inferences as they read by putting together what they already know with evidence from the text.
- The properties of a substance are determined by the properties of its molecules.
- Scientists evaluate models and revise them when the models don't fit with what they know.
- One way that scientists use models is to share their ideas with the scientific community.
- A scientific explanation is written for an audience.
- A scientific explanation answers a question about how something works or why something happens.
- Scientists support their explanations with evidence.
- Scientific explanations are written with an audience in mind.
- Scientists often have different explanations for the same results. When this happens, scientists look for more evidence to support one explanation or the other.
- Food scientists work to ensure that the products they develop have the desired properties.
- When you mix a solid into a liquid until you cannot see it anymore, it has dissolved.
- Though a substance may no longer be visible after it dissolves, it is still present in the liquid.
- Some solids dissolve in water, and others do not.
- The level of attraction between molecules affects how they interact with each other.
- If a substance is soluble, it means that it can dissolve in water or that the substance's molecules are attracted to water.
- If a substance is not soluble, it means that it cannot dissolve in water or that the substance's molecules are not attracted to water.
- Readers use the images as well as the text in order to make inferences about what they read.
- Models show things that are too small to observe but can help explain what is observable.
- When the molecules of a solid are attracted to the molecules of a liquid, they spread apart
  - Explain how scientists share ideas using models and explanations.
    - Write a scientific explanation that answers a question about how or why something happens.
    - Support scientific explanations with evidence from investigations and texts.
    - Write scientific explanations with an audience in mind, including a clear topic sentence and conclusion.
    - Compare different explanations and explain why additional evidence may be needed.
    - Explain how food scientists design products with specific properties in mind.
    - Describe dissolving as a process in which a solid spreads evenly through a liquid.
    - Explain that a substance can still be present in a liquid even if it is no longer visible.
    - Identify examples of solids that dissolve in water and solids that do not.
    - Explain how attraction between molecules affects whether substances dissolve.
    - Define solubility as a measure of how well a substance dissolves in water.
    - Explain that substances can be more soluble or less soluble.
    - Use images and text together to make inferences while reading.
    - Use models to explain nanoscale processes that affect what is observed.
    - Explain what dissolving looks like at the molecular level.
    - Explain what not dissolving looks like at the molecular level.
    - Explain that some liquid mixtures stay mixed while others separate over time.
    - Describe factors that affect whether liquids mix or separate.
    - Explain how attraction between molecules of the same substance and different substances affects mixtures.
      - Define an emulsifier and explain how it helps liquids that do not normally mix stay mixed.
      - Identify examples of stable mixtures.
      - Explain how emulsifier molecules interact with different liquids.
      - Revise models and explanations when new evidence is available.
      - Use reference books and text features to efficiently locate information.
      - Explain that scientific findings are based on recognizing patterns.
      - Explain that scientific theories are supported by evidence collected over time.

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and mix together evenly. This is what dissolving looks like at the nanoscale.

- When the molecules of a solid aren't attracted to the molecules of a liquid, they stay clustered together as a solid. This is what NOT dissolving looks like at the nanoscale.
- Solubility is the word we use when we talk about whether the molecules of substances are attracted to the molecules of other substances.
- Scientific explanations begin with a topic sentence and end with a concluding sentence.
- Reference books use text features (such as the table of contents, headings, and an index) to indicate how the information is organized. This helps readers find information efficiently.
- There is a continuum of solubility—ingredients can be more soluble or less soluble.
- Scientific explanations can be evaluated based on how clearly they are written and the accuracy of the scientific information they contain.
- Some liquid mixtures stay mixed, and others separate into layers over time.
- Some liquids hold together better than others.
- Many scientists study things that can't be seen by making inferences based on evidence.
- Science findings are based on recognizing patterns.
- Science theories are based on a body of evidence and many tests.
- Men and women from all cultures and backgrounds choose careers as scientists and engineers.
- Science is a way of knowing that is used by many people.
- The more a liquid's molecules are attracted to one another, the more the liquid will hold together.
- When the molecules of two different liquids are attracted to one another, they cluster together and become evenly distributed in the mixture.
- It is the combination of attraction to self and attraction to other that determines what happens to liquids on the observable scale.
- An emulsifier is an ingredient that allows normally unmixable liquids to stay mixed.
- A stable mixture is one that does not separate.
- Molecules in an emulsifier (such as lecithin) attract and hold together molecules of liquids that don't normally mix (such as oil molecules and vinegar molecules).

- Recognize that people of all backgrounds can be scientists and engineers.

- Explain that science is a way of knowing used by many people.
- Strengthen scientific explanations by using evidence from multiple sources.

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- Scientists revise models when they get additional evidence that helps explain how something works or why something happens.
- Reference books can be used to look up specific information or answer questions.
- Scientific explanations are stronger when they are based on evidence from more than one source. This evidence can come from firsthand investigations and from text.

### Core Instructional & Supplemental Materials

**Suggested Activities/Resources:**

- Books in This Unit
  - Made of Matter
  - Break It Down
  - Solving Dissolving
  - Science You Can't See by Chin, Saade, & El Gabaly
  - Food Scientist's Handbook

**Supplemental Materials**

- Digital Resources included in each unit
  - Accessing the Modeling Matter Apps
- Multi-language glossary

### Suggested Accommodations

**English Language Learners:**

- Multi-sensory instruction
- Flexible grouping
- Small group instruction
- Provide peer tutoring
- Use a strong student as a "buddy" (does not necessarily have to speak the primary language)
- Chunking information
- Scaffolded questioning
- Academic language support
- Vocabulary support
- Co-Constructed Word Banks
- Anchor charts
- Gradual release model
- Visual models
- Native language support when possible (Multi-language glossary)
- Sheltered English Instruction Strategies
- Sentence starters

**Special Education/Students with Disabilities:**

- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Follow all IEP modifications
- Calculators

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- Manipulatives/concrete models
- Directions repeated, clarified, and reworded
- Breakdown task into manageable parts

### **504 Plans:**

- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Calculators
- Manipulatives/concrete models
- Follow all 504 modifications

### **Gifted and Talented:**

- Higher level questioning
- Enriched assignments
- Tiered assignments
- Choice board to extend learning

### **Students at Risk of Failure:**

- Provide peer tutoring
- Use a strong student as a “buddy”
- Allow extra time to complete assignments or tests
- Work in a small group
- One on one instruction
- Provide immediate praise and feedback
- Create a nurturing environment
- Provide visuals
- Be flexible with assignments and time frames
- Provide needed academic resources
- Chunking information
- Scaffolded questioning
- Tiered activities
- Manipulatives/concrete models
- Modified assignments
- Brain breaks

### **Economically Disadvantaged:**

- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge

### **Culturally Diverse:**

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| <ul style="list-style-type: none"> <li>• Create an emotionally positive classroom climate.</li> <li>• Create effective communication</li> <li>• Model and teach cultural respect</li> <li>• Build relationships with students by interviewing students to understand their background</li> </ul> |
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<b>Unit 3: The Earth System</b>	<b>Duration: 45 days</b>
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<b>New Jersey Student Learning Standards</b>	
<b>5-ESS2-1</b>	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
<b>5-ESS2-2</b>	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.
<b>5-ESS3-1</b>	Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.
<b>5-PS1-1.</b>	Develop a model to describe that matter is made of particles too small to be seen.
<b>5-PS1-2</b>	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.
<b>5-PS1-3</b>	Make observations and measurements to identify materials based on their properties.
<b>5-PS1-4</b>	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
<b>5-LS2-1</b>	Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

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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	Discipline Core Ideas/Unit Enduring Understandings	Crosscutting Concepts
<p><b>Practice 1: Asking Questions</b></p> <ul style="list-style-type: none"> <li>Students spend the first chapter of the unit defining the problem they will investigate for the remainder of the unit: a water shortage in the fictional city of East Ferris. Students ask questions and think about how their questions can be answered when reading informational text, analyzing data, conducting firsthand investigations, and testing and analyzing designs for collecting freshwater from salt water.</li> </ul> <p><b>Practice 2: Developing and Using Models:</b></p> <ul style="list-style-type: none"> <li>Students receive explicit instruction and opportunities to practice using models and developing and revising models by 1) creating models of water molecules in the atmosphere at the nanoscale to explain what they observed on an observable scale, 2) using physical models to show how a mountain can redirect wind and how water condenses high in the atmosphere where it is cold, and 3) creating diagrams showing how the hydrosphere, atmosphere, and geosphere interact to</li> </ul>	<p><b>ESS2.A: Earth Materials and Systems:</b></p> <ul style="list-style-type: none"> <li>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)</li> </ul> <p><b>ESS2.C: The Roles of Water in Earth’s Surface Processes:</b></p> <ul style="list-style-type: none"> <li>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)</li> </ul> <p><b>ESS3.C: Human Impacts on Earth Systems:</b></p> <ul style="list-style-type: none"> <li>Human activities in agriculture, industry, and everyday life have had major effects on the land,</li> </ul>	<p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>Cause and effect relationships are routinely identified, tested, and used to explain change. (5-PS1-4)</li> </ul> <p><b>Scale, Proportion, and Quantity</b></p> <ul style="list-style-type: none"> <li>Natural objects exist from the very small to the immensely large. (5-PS1-1)</li> <li>Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-2), (5-PS1-3)</li> <li>Standard units are used to measure and describe physical quantities such as weight and volume. (5-ESS2-2)</li> </ul> <p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>A system can be described in terms of its components and their interactions. (5-LS2-1)</li> <li>A system can be described in terms of its components and their interactions. (5-ESS2-1)</li> <li>A system can be described in terms of its components and their interactions. (5-ESS3-1)</li> </ul>

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<p>create the rain shadow effect.</p> <p><b>Practice 3: Planning and Carrying Out Investigations:</b></p> <ul style="list-style-type: none"> <li>Students conduct various investigations to construct understanding of rainfall patterns and chemical reactions at both the nanoscale and the observable scale. They use hands-on models to investigate condensation at the observable scale. Students then carry out investigations about what is happening at the nanoscale, using The Earth System Simulation. Finally, students investigate how combining substances differently can control the results of a chemical reaction.</li> </ul> <p><b>Practice 4: Analyzing and Interpreting Data.</b></p> <ul style="list-style-type: none"> <li>While students investigate rain formation, they make observations and analyze quantitative data to help draw conclusions about this phenomenon at the nanoscale and observable scale.</li> </ul> <p><b>Practice 5: Using Mathematics and Computational Thinking:</b></p> <ul style="list-style-type: none"> <li>Students collect quantitative data of water molecules in gas and liquid forms and create line graphs representing how the molecules change based on their position in the atmosphere. Students use this data to help them think about where condensation occurs and why it occurs higher in the atmosphere</li> </ul> <p><b>Practice 6: Constructing Explanations:</b></p> <ul style="list-style-type: none"> <li>Students learn about scientific</li> </ul>	<p>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)</p> <p><b>PS1.A: Structure and Properties of Matter:</b></p> <ul style="list-style-type: none"> <li>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)</li> <li>The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2)</li> </ul> <p><b>PS1.B: Chemical Reactions:</b></p> <ul style="list-style-type: none"> <li>When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4)</li> <li>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)</li> </ul> <p><b>ETS1.A: Defining and Delimiting Engineering Problems:</b></p> <ul style="list-style-type: none"> <li>Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed</li> </ul>	<p><b>Connections to Nature of Science</b></p> <p><b>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</b></p> <ul style="list-style-type: none"> <li>Science assumes consistent patterns in natural systems. (5-PS1-2)</li> </ul> <p><b>Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena</b></p> <ul style="list-style-type: none"> <li>Science explanations describe the mechanisms for natural events. (5-LS2-1)</li> </ul> <p><b>Science Addresses Questions About the Natural and Material World.</b></p> <ul style="list-style-type: none"> <li>Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)</li> </ul> <p><b>Connections to Engineering, Technology, and Applications of Science</b></p> <p><b>Influence of Engineering, Technology, and Science on Society and the Natural World</b></p> <ul style="list-style-type: none"> <li>People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1)</li> <li>Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)</li> </ul>
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<p>explanations and have multiple opportunities to write increasingly complex explanations of a water shortage on a fictional island over the course of the unit, synthesizing ideas from a variety of sources. Students are also challenged to design solutions to the water shortage. Students design, build, test, and iterate on systems that can collect freshwater from salt water.</p> <p><b>Practice 7: Engaging in Argument from Evidence</b></p> <ul style="list-style-type: none"> <li>● Students have multiple opportunities to engage with each other as they use evidence to support their claims throughout the unit. One example of this is when they use evidence of the effectiveness of their freshwater collection devices to argue for specific design features.</li> </ul> <p><b>Practice 8: Obtaining, Evaluating, and Communicating Information</b></p> <ul style="list-style-type: none"> <li>● Students receive explicit instruction and have multiple opportunities to use the reading comprehension strategy of synthesizing as they engage with the informational texts in the unit. They gather evidence through firsthand and secondhand sources, as well as participate in various discourse routines that help them communicate about and make sense of science ideas, using key vocabulary.</li> </ul>	<p>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)</p> <p><b>ETS1.B: Developing Possible Solutions:</b></p> <ul style="list-style-type: none"> <li>● 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)</li> <li>● 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)</li> <li>● 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)</li> </ul> <p><b>ETS1.C: Optimizing the Design Solution:</b></p> <ul style="list-style-type: none"> <li>● 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)</li> </ul> <p><b>PS1.A: Structure and Properties of Matter:</b></p> <ul style="list-style-type: none"> <li>● Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished,</li> </ul>	
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	<p>and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3)</p> <p><b>LS2.B: Cycles of Matter and Energy Transfer in Ecosystems:</b></p> <ul style="list-style-type: none"> <li>• 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)</li> </ul>	
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New Jersey Social and Emotional Competencies and Sub-Competencies	
<b>Self-Awareness</b>	<ul style="list-style-type: none"> <li>• Recognize one’s feelings and thoughts.</li> <li>• Recognize the impact of one’s feelings and thoughts on one’s own behavior.</li> <li>• Recognize one’s personal traits, strengths, and limitations.</li> <li>• Recognize the importance of self-confidence in handling daily tasks and challenges.</li> </ul>
<b>Self-Management</b>	<ul style="list-style-type: none"> <li>• Understand and practice strategies for managing one’s own emotions, thoughts, and behaviors.</li> <li>• Recognize the skills needed to establish and achieve personal and educational goals.</li> <li>• Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one’s goals.</li> </ul>
<b>Social Awareness</b>	<ul style="list-style-type: none"> <li>• Recognize and identify the thoughts, feelings, and perspectives of others.</li> <li>• Demonstrate an awareness of the differences among individuals, groups, and others’ cultural backgrounds.</li> <li>• Demonstrate an understanding of the need for mutual respect when viewpoints differ.</li> <li>• Demonstrate an awareness of the expectations for social interactions in a variety of settings.</li> </ul>
<b>Responsible Decision Making</b>	<ul style="list-style-type: none"> <li>• Develop, implement, and model effective problem-solving and critical thinking skills.</li> <li>• Identify the consequences associated with one’s actions in order to make constructive choices.</li> <li>• Evaluate personal, ethical, safety, and civic impact of decisions.</li> </ul>
<b>Relationship Skills</b>	<ul style="list-style-type: none"> <li>• Establish and maintain healthy relationships.</li> </ul>

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	<ul style="list-style-type: none"> <li>● Utilize positive communication and social skills to interact effectively with others.</li> <li>● Identify ways to resist inappropriate social pressure.</li> <li>● Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways.</li> <li>● Identify who, when, where, or how to seek help for oneself or others when needed.</li> </ul>
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<u>Interdisciplinary Connections</u>	
ELA Standards	
<b>RI.CR.5.1</b>	Quote accurately from an informational text when explaining what the text says explicitly and make relevant connections when drawing inferences from the text.
<b>RI.IT.5.3</b>	Analyze the impact of two or more individuals and events throughout the course of a text, explaining the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific evidence in the text.
<b>RI.MF.5.6</b>	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.
<b>RI.AA.5.7</b>	Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).
<b>RI.CT.5.8</b>	Compare and contrast the authors' approaches across two or more informational texts within the same genre or about texts on the same or similar topics.
<b>W.IW.5.2</b>	<p>Write informative/explanatory texts to examine a topic and convey ideas and information clearly.</p> <p style="padding-left: 20px;">B. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.</p> <p style="padding-left: 20px;">D. Use precise language and domain-specific vocabulary to inform about or explain the topic.</p>
<b>W.WR.5.5</b>	Establish a central idea about a topic, investigation, issue or event and use several sources to support the proposed central idea.
<b>W.SE.5.6</b>	Gather relevant information from multiple valid and reliable print and digital sources; summarize or paraphrase information in notes and finished work, making note of any similarities and differences among ideas presented; and provide a list of sources.

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<b>W.RW.5.7</b>	Write routinely over extended time frames (time for research and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
<b>SL.5.1</b>	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
<b>SL.5.1.A</b>	Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.
<b>SL.5.1.B</b>	Follow agreed-upon rules for discussions and carry out assigned roles.
<b>SL.5.1.C</b>	Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.
<b>SL.5.1.D</b>	Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
<b>SL.5.2</b>	Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
<b>L.RF.5.3</b>	Know and apply grade-level phonics and word analysis skills in decoding and encoding words; use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.
<b>L.RF.5.4</b>	Read with sufficient accuracy and fluency to support comprehension. <b>A.</b> Read grade-level text with purpose and understanding. <b>B.</b> Read grade-level text orally with accuracy, appropriate rate, and expression. <b>C.</b> Use context to confirm or self-correct word recognition and understanding, rereading as necessary.
<b>L.KL.5.1</b>	Use knowledge of language and its conventions when writing, speaking, reading, or listening. <b>A.</b> Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.
<b>L.VL.5.2</b>	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. <b>A.</b> Use context (e.g., cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase. <b>B.</b> Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., photograph, photosynthesis).

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	<b>C.</b> 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.
<b>Mathematics Standards</b>	
<b>MP1</b>	Make sense of problems and persevere in solving them.
<b>MP2</b>	Reason abstractly and quantitatively.
<b>MP4</b>	Model with mathematics.
<b>MP5</b>	Use appropriate tools strategically.
<b>MP7</b>	Look for and make use of structure.
<b>5.NBT.1</b>	Understand the place value system. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
<b>5.NBT.2</b>	Understand the place value system. 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.
<b>5.G.2</b>	Graph points on the coordinate plane to solve real-world and mathematical problems. 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.

<b>Computer Science &amp; Design Thinking</b>	
<b>8.1.5.IC.2:</b>	Identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users.
<b>8.1.5.DA.1:</b>	Collect, organize, and display data in order to highlight relationships or support a claim.
<b>8.1.5.DA.3:</b>	Organize and present collected data visually to communicate insights gained from different views of the data.
<b>8.1.5.DA.4:</b>	Organize and present climate change data visually to highlight relationships or support a claim.
<b>8.2.5.ED.2:</b>	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.

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<b>8.2.5.ED.3:</b>	Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
<b>8.2.5.ED.4</b>	Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).
<b>8.2.5.ED.5</b>	Describe how specifications and limitations impact the engineering design process.
<b>8.2.5.ED.6</b>	Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process
<b>8.2.5.ITH.4</b>	Describe a technology/tool that has made the way people live easier or has led to a new business or career.
<b>8.2.5.NT.4</b>	Identify how improvement in the understanding of materials science impacts technologies
<b>8.2.5.ETW.2</b>	Describe ways that various technologies are used to reduce improper use of resources.
<b>8.2.5.EC.1</b>	Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.

<b>Career Readiness, Life Literacies &amp; Key Skills</b>	
<b>9.1.5.CR.1</b>	Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
<b>9.2.5.CAP.4</b>	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.
<b>9.4.5.CI.1</b>	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
<b>9.4.5.CT.1</b>	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).
<b>9.4.5.CT.3</b>	Describe how digital tools and technology may be used to solve problems
<b>9.4.5.CT.4</b>	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).
<b>9.4.5.IML.6</b>	Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM.IPRET.5).

<b>Evidence of Student Learning</b>
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<p><b>Formative Tasks:</b></p> <ul style="list-style-type: none"> <li>● Teacher observations</li> <li>● Class discussions</li> <li>● Whiteboard/Communicators</li> <li>● On-the-Fly Assessments</li> <li>● Daily classwork</li> <li>● Checks for understanding</li> <li>● Clipboard Assessment Tool</li> <li>● Critical Juncture Assessment</li> <li>● Crosscutting Concept Tracker</li> </ul>	<p><b>Alternative Assessments:</b></p> <ul style="list-style-type: none"> <li>● Oral Assessments</li> </ul>
<p><b>Summative Assessments:</b></p> <ul style="list-style-type: none"> <li>● End of Unit</li> </ul>	<p><b>Benchmark Assessments:</b></p> <ul style="list-style-type: none"> <li>● Benchmark 5C</li> </ul>

<b>Knowledge &amp; Skills</b>
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<p><b>Enduring Understandings:</b></p> <ul style="list-style-type: none"> <li>● Almost all of Earth’s water is salt water in the ocean. The limited amount of freshwater is mostly in glaciers and groundwater. (1.1)</li> <li>● The amount of available freshwater decreases when people use more than the amount that flows into their area. (1.3)</li> <li>● Drops of water can form when enough water vapor gets cold and condenses into liquid water. (2.2)</li> <li>● Water molecules are far apart in water vapor and close together in liquid water. (2.3)</li> <li>● Raindrops can form when enough water vapor gets cold and condenses into liquid water. (2.3)</li> <li>● Water vapor in the air comes from liquid water that has evaporated. (2.5)</li> <li>● When water changes from gas to liquid or liquid to gas, water molecules are not created or destroyed. (2.6)</li> <li>● Water vapor condenses as it moves higher, to where the atmosphere is colder.</li> <li>● When the wind blows toward a mountain, the mountain can direct the wind upward, moving water vapor higher in the atmosphere.(4.2)</li> <li>● Iterating allows engineers to improve their solutions to problems. (4.5)</li> <li>● In a chemical reaction, substances are mixed and at least one new substance with different properties is formed. (5.2)</li> <li>● In chemical reactions, matter is not created or destroyed. (5.3)</li> </ul>	<p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>● What can determine how much water is available for human use?</li> <li>● Why is East Ferris running out of water while West Ferris is not?</li> <li>● Where is water on Earth?</li> <li>● How can people affect how much freshwater is available?</li> <li>● Why does more rain form over West Ferris than East Ferris?</li> <li>● How do drops of water form?</li> <li>● How do raindrops form?</li> <li>● Where does water vapor in the air come from?</li> <li>● Why is more water vapor getting cold over West Ferris than East Ferris?</li> <li>● Where in the atmosphere does water vapor condense?</li> <li>● Why is there more water vapor high up over West Ferris than East Ferris?</li> <li>● How does water vapor move to different areas in the atmosphere?</li> <li>● How can East Ferris turn wastewater into clean freshwater?</li> <li>● How do new substances form?</li> <li>● How can engineers control the results of a chemical reaction?</li> </ul>
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<ul style="list-style-type: none"> <li>● By choosing which substances to combine, engineers can control the results of a chemical reaction. (5.4)</li> <li>● People can design solutions to protect Earth's resources. (5.6)</li> </ul>	
<p><b>Content</b> <i>Students will know...</i></p> <ul style="list-style-type: none"> <li>● Reflecting on what you understand and don't understand allows you to prepare for learning new things.</li> <li>● An engineer is a person who uses science knowledge to design something in order to solve a problem.</li> <li>● Almost all of Earth's water is salt water in the ocean. The limited amount of freshwater is mostly in glaciers and groundwater.</li> <li>● There is a limited amount of water available to people because people only use freshwater.</li> <li>● Droughts, overuse, and pollution can cause water shortages.</li> <li>● When people use water, there is less clean freshwater available to use.</li> <li>● Synthesizing can help readers understand informational text.</li> <li>● Science affects everyday life.</li> <li>● The amount of available freshwater decreases when people use more than the amount that flows into their area.</li> <li>● Making explanations is an important practice in science.</li> <li>● A scientific explanation answers a question about how or why something happens.</li> <li>● A scientific explanation is based on ideas from investigations and text.</li> <li>● A scientific explanation is written for an audience.</li> <li>● The Earth system is made of different parts that interact.</li> <li>● Drops of water can form on cold surfaces.</li> <li>● For water drops to form on a cup, it must be cold.</li> <li>● Water drops that form on a cup do not come from water or ice inside the cup.</li> <li>● There is water vapor in the air.</li> <li>● Water vapor in the air is the source of the water drops that form on the outside of a cold cup.</li> <li>● Drops of water can form when enough water vapor gets cold and condenses into liquid water.</li> </ul>	<p><b>Skills</b> <i>Students will be able to ...</i></p> <ul style="list-style-type: none"> <li>● Reflect on what they understand and do not yet understand in order to prepare for learning new science ideas.</li> <li>● Explain what an engineer is and how engineers use science knowledge to solve problems.</li> <li>● Explain that most of Earth's water is salt water and that only a small amount of freshwater is available for people to use.</li> <li>● Explain why freshwater is limited and why water shortages can occur.</li> <li>● Identify causes of water shortages, including droughts, overuse, and pollution.</li> <li>● Explain how increased water use reduces the amount of clean freshwater available.</li> <li>● Use synthesizing strategies to understand informational science texts.</li> <li>● Explain how science affects everyday life.</li> <li>● Explain how the balance between water use and water supply affects freshwater availability.</li> <li>● Write scientific explanations that answer questions about how or why something happens.</li> <li>● Support scientific explanations with evidence from investigations and texts.</li> <li>● Write scientific explanations using appropriate scientific language and with an audience in mind.</li> <li>● Explain that Earth is a system made of interacting parts.</li> <li>● Explain how drops of water form on the outside of a cold surface.</li> <li>● Explain that water droplets on a cold cup come from water vapor in the air, not from inside the cup.</li> <li>● Explain that water vapor is present in the air.</li> <li>● Describe condensation as the process in which water vapor cools and turns into liquid water.</li> <li>● Explain how raindrops form when water vapor cools and condenses.</li> <li>● Explain that water molecules are farther apart in water vapor and closer together in liquid water.</li> <li>● Explain that when water changes between liquid and gas, matter is not created or destroyed.</li> <li>● Describe nanoscale as a scale too small to observe directly.</li> <li>● Use models to explain processes that cannot be directly observed.</li> </ul>

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- Scientists synthesize what they learn from investigations with other sources of information to reach new understandings.
- Water molecules are far apart in water vapor and close together in liquid water.
- Raindrops can form when enough water vapor gets cold and condenses into liquid water.
- When water vapor turns into liquid water, water molecules that were spread apart come together.
- Nanoscale is a scale that is much too small to observe directly with our eyes.
- A model is something scientists and engineers make to answer questions about the real world.
- Water vapor can come from any body of water.
- Evaporation is when liquid water turns into water vapor.
- Ideas in science are based on evidence.
- When salt water evaporates, the salt is left behind.
- Water vapor in the air comes from liquid water that has evaporated.
- The water on Earth today is the same water that was on Earth hundreds of years ago.
- Synthesizing ideas from multiple sources can help answer questions.
- When water changes from gas to liquid or liquid to gas, water molecules are not created or destroyed.
- A scientific explanation often describes things that are not easy to observe directly.
- A scientific explanation uses scientific language.
- The hydrosphere and atmosphere interact when liquid water evaporates to form water vapor in the atmosphere and when water vapor condenses to form rain.
- The biosphere interacts with the hydrosphere when people use water. The biosphere interacts with the atmosphere when people breathe.
- Engineers use science knowledge to design solutions to problems.
- Engineers often work collaboratively.
- It is possible to separate freshwater from salt water.
- Engineers use the design cycle when they design solutions to a problem.
- Engineers iterate on their designs.
- Most scientists and engineers work in teams.
- Explain evaporation as the process in which liquid water turns into water vapor.
- Explain that water vapor can come from any body of water.
- Explain that when salt water evaporates, the salt remains behind.
- Explain that the water on Earth today is the same water that has existed for hundreds of years.
- Synthesize information from investigations and texts to develop a more complete understanding.
- Explain that scientific ideas are based on evidence.
- Explain how the hydrosphere and atmosphere interact through evaporation and condensation.
- Explain how the biosphere interacts with the hydrosphere when people use water.
- Explain how the biosphere interacts with the atmosphere when people breathe.
- Explain that engineers use scientific knowledge and the design process to create solutions.
- Describe the design cycle and explain how engineers test and improve solutions.
- Explain iteration as repeating and improving designs based on what is learned.
- Explain why testing solutions that do not work is an important part of engineering.
- Explain how engineers learn from collaboration and sharing ideas.
- Explain that freshwater can be separated from salt water.
- Explain that creativity and imagination are important in science and engineering.
- Explain that people of all cultures and backgrounds work as scientists and engineers.
- Explain how temperature changes in the atmosphere affect condensation.
- Explain how water vapor condenses as it rises into cooler parts of the atmosphere.
- Explain how wind and mountains affect the movement of water vapor.
- Explain how mountains can cause water vapor to rise, cool, and condense into rain.
- Explain the rain shadow effect and how it creates uneven rainfall patterns.
- Explain how the geosphere interacts with the atmosphere and hydrosphere.
- Explain how changes in one part of the Earth system can cause changes in other parts.
- Use examples to explain how interactions between Earth's systems can cause major changes.
- Explain how scientists and engineers work together to discuss and improve ideas.

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| <ul style="list-style-type: none"><li>• Men and women from all cultures and backgrounds choose careers as scientists and engineers.</li><li>• Creativity and imagination are important to science.</li><li>• In the part of the atmosphere where weather happens, the air is colder higher up.</li><li>• Wherever the atmosphere is cold enough, water vapor can condense.</li><li>• Water vapor condenses as it moves higher, to where the atmosphere is colder.</li><li>• When liquid water evaporates, water molecules do not disappear; they change to water vapor.</li><li>• Scientists and engineers graph data to help them visualize and recognize patterns.</li><li>• Scientists and engineers create models to show their thinking.</li><li>• Scientists use information they gain to create a more complete explanation.</li><li>• Scientists use scientific vocabulary to explain their ideas.</li><li>• Testing a solution to a design problem and learning that it does not work is an important part of the design process.</li><li>• Engineers can learn from sharing ideas with each other.</li><li>• Iterating allows engineers to learn from and improve upon initial designs.</li><li>• Wind and mountains affect the movement of water vapor in the atmosphere.</li><li>• When the wind blows toward a mountain, the mountain can direct the wind upward, moving water vapor higher in the atmosphere.</li><li>• When liquid water falls as rain, there is less water left in the atmosphere.</li><li>• The rain shadow effect is the uneven pattern of rain that occurs when wind blows from a body of water towards a mountain and creates a lot of rain on the windward side of the mountain and very little on the opposite side.</li><li>• The geosphere interacts with the atmosphere when water vapor in the atmosphere is redirected by a mountain.</li><li>• The geosphere interacts with the hydrosphere when a mountain redirects water vapor upward, where it condenses and falls as rain.</li><li>• Scientists and engineers often convene and discuss possible answers to the questions they are investigating.</li><li>• Changes in one part of the Earth system can cause changes in another part.</li></ul> | <ul style="list-style-type: none"><li>• Explain how wastewater treatment helps produce clean freshwater.</li><li>• Identify that substances have different properties.</li><li>• Explain that mixing substances can result in mixtures with new properties.</li><li>• Explain that a chemical reaction occurs when new substances with different properties form.</li><li>• Identify signs that may indicate a chemical reaction has occurred.</li><li>• Explain that atoms rearrange to form new molecules during a chemical reaction.</li><li>• Explain that matter is not created or destroyed in a chemical reaction.</li><li>• Explain how engineers can control chemical reactions by choosing which substances to combine.</li><li>• Plan fair tests by changing only one variable at a time.</li><li>• Explain how chemical reactions are used in wastewater treatment plants.</li><li>• Explain how people can design solutions to protect Earth's water and other natural resources.</li></ul> |
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<ul style="list-style-type: none"> <li>● Dinosaur extinction was caused by interactions between the parts of the Earth system.</li> <li>● The rain shadow effect is created by interactions between the parts of the Earth system.</li> <li>● Iterating allows engineers to improve their solutions to problems.</li> <li>● Engineers may iterate on their solutions multiple times.</li> <li>● In the wastewater treatment process, scientists treat water that has harmful substances in it to produce clean freshwater.</li> <li>● Different substances can have different properties.</li> <li>● When you mix substances, you sometimes end up with a mixture that has new properties.</li> <li>● In a chemical reaction, substances are mixed and at least one new substance with different properties is formed.</li> <li>● Physical changes such as changing color, producing light, or producing gas can be evidence of a chemical reaction.</li> <li>● We cannot always tell that a chemical reaction has happened based on physical evidence.</li> <li>● In a chemical reaction, the atoms in molecules that make up the substances recombine to make new molecules.</li> <li>● Matter is the stuff that things are made of.</li> <li>● In a chemical reaction, matter is not created or destroyed.</li> <li>● By choosing which substances to combine, engineers can control the results of a chemical reaction.</li> <li>● When scientists or engineers plan investigations, they use fair tests, changing only one thing at a time.</li> <li>● Wastewater treatment plants use chemical reactions to help them clean wastewater.</li> <li>● People can design solutions to protect Earth's resources.</li> </ul>	
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<b>Core Instructional &amp; Supplemental Materials</b>	
<p><b>Suggested Activities/Resources:</b></p> <ul style="list-style-type: none"> <li>● Books in This Unit                             <ul style="list-style-type: none"> <li>○ Water Shortages, Water Solutions</li> <li>○ Drinking Cleopatra's Tears</li> <li>○ Engineering Clean Water</li> <li>○ How the Earth System Explains Dinosaur Extinction</li> <li>○ Chemical Reactions Everywhere</li> </ul> </li> </ul>	<p><b>Supplemental Materials</b></p> <ul style="list-style-type: none"> <li>● Digital Resources included in each unit                             <ul style="list-style-type: none"> <li>○ Accessing the Earth System Apps</li> </ul> </li> <li>● Multi-language glossary</li> <li>● <a href="#">Eunice Foote</a></li> <li>● <a href="#">Heat Transfer</a></li> <li>● Hands-On Flexextension:                             <ul style="list-style-type: none"> <li>○ Modeling Water Movement</li> </ul> </li> </ul>

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○ Water Encyclopedia

○ Investigating Water Drop Formation

### Suggested Accommodations

#### English Language Learners:

- Multi-sensory instruction
- Flexible grouping
- Small group instruction
- Provide peer tutoring
- Use a strong student as a “buddy” (does not necessarily have to speak the primary language)
- Chunking information
- Scaffolded questioning
- Academic language support
- Vocabulary support
- Co-Constructed Word Banks
- Anchor charts
- Gradual release model
- Visual models
- Native language support when possible (Multi-language glossary)
- Sheltered English Instruction Strategies
- Sentence starters

#### Special Education/Students with Disabilities:

- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Follow all IEP modifications
- Calculators
- Manipulatives/concrete models
- Directions repeated, clarified, and reworded
- Breakdown task into manageable parts

#### 504 Plans:

- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Calculators
- Manipulatives/concrete models
- Follow all 504 modifications

#### Gifted and Talented:

- Higher level questioning
- Enriched assignments
- Tiered assignments
- Choice board to extend learning

#### Students at Risk of Failure:

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- Provide peer tutoring
- Use a strong student as a “buddy”
- Allow extra time to complete assignments or tests
- Work in a small group
- One on one instruction
- Provide immediate praise and feedback
- Create a nurturing environment
- Provide visuals
- Be flexible with assignments and time frames
- Provide needed academic resources
- Chunking information
- Scaffolded questioning
- Tiered activities
- Manipulatives/concrete models
- Modified assignments
- Brain breaks

**Economically Disadvantaged:**

- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge

**Culturally Diverse:**

- Create an emotionally positive classroom climate.
- Create effective communication
- Model and teach cultural respect
- Build relationships with students by interviewing students to understand their background

<b>Unit 4: Ecosystem Restoration</b>	<b>Duration: 45 days</b>
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<b>New Jersey Student Learning Standards</b>	
<b>5-LS1-1</b>	Support an argument that plants get the materials they need for growth chiefly from air and water.
<b>5-LS2-1</b>	Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
<b>5-PS1-1</b>	Develop a model to describe that matter is made of particles too small to be seen.

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<b>5-PS1-4</b>	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
<b>5-PS3-1</b>	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.
<b>5-ESS3-1</b>	Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
<b>3-5-ETS1-1</b>	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
<b>3-5-ETS1-2</b>	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.

Science and Engineering Practices	Discipline Core Ideas/Unit Enduring Understandings	Crosscutting Concepts
<p><b>Practice 1: Asking Questions</b></p> <ul style="list-style-type: none"> <li>At multiple places across the unit, students learn new ideas, and then describe how those new ideas can help them solve the unit's focal problem.</li> </ul> <p><b>Practice 2: Developing and Using Models:</b></p> <ul style="list-style-type: none"> <li>Students receive explicit instruction and opportunities to create and use physical models to show how food matter, as well as energy, can be traced through an ecosystem. The Ecosystem Restoration Simulation and the Ecosystem Modeling Tool both provide extensive opportunities for students to engage with models and manipulate different parts of the ecosystem to determine and show the effects of a change.</li> </ul> <p><b>Practice 3: Planning and Carrying Out Investigations:</b></p> <ul style="list-style-type: none"> <li>Students use both hands-on investigation and a digital</li> </ul>	<p><b>LS1.C: Organization for Matter and Energy Flow in Organisms:</b></p> <ul style="list-style-type: none"> <li>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)</li> <li>Plants acquire their material for growth chiefly from air and water. (5-LS1-1)</li> </ul> <p><b>LS2.A: Interdependent Relationships in Ecosystems:</b></p> <ul style="list-style-type: none"> <li>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.</li> </ul>	<p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>Cause and effect relationships are routinely identified, tested, and used to explain change. (5-PS1-4)</li> </ul> <p><b>Scale, Proportion, and Quantity</b></p> <ul style="list-style-type: none"> <li>Natural objects exist from the very small to the immensely large. (5-PS1-1)</li> </ul> <p><b>Energy and Matter</b></p> <ul style="list-style-type: none"> <li>Matter is transported into, out of, and within systems. (5-LS1-1)</li> <li>Energy can be transferred in various ways and between objects. (5-PS3-1)</li> </ul> <p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>A system can be described in terms of its components and their interactions. (5-ESS3-1)</li> <li>A system can be described in terms of its components and their interactions. (5-LS2-1)</li> </ul>

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<p>simulation to make observations of the living and nonliving matter in an ecosystem.</p> <p><b>Practice 4: Analyzing and Interpreting Data.</b></p> <ul style="list-style-type: none"> <li>Students work with a variety of data sets that provide information about the restoration project area. Students must use what they have been learning to make sense of and interpret the data to help them understand what is happening in the project area.</li> </ul> <p><b>Practice 5: Using Mathematics and Computational Thinking:</b></p> <ul style="list-style-type: none"> <li>As students investigate with the Ecosystem Restoration Simulation, they describe and estimate quantities as they observe the changes that occur. These changes reveal patterns that suggest relationships between the number of organisms in a population and the matter available to a consumer, as well as illustrating the relationship between energy transfer and flow through an ecosystem</li> </ul> <p><b>Practice 6: Constructing Explanations:</b></p> <ul style="list-style-type: none"> <li>Students have multiple opportunities to discuss and write explanations over the course of the unit, learning that they must synthesize ideas from multiple sources in order to understand how matter and energy flows through ecosystems.</li> </ul> <p><b>Practice 7: Engaging in Argument from Evidence</b></p> <ul style="list-style-type: none"> <li>Throughout the unit, students engage with multiple</li> </ul>	<p>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)</p> <p><b>LS2.A: Interdependent Relationships in Ecosystems:</b></p> <ul style="list-style-type: none"> <li>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)</li> </ul> <p><b>ESS3.C: Human Impacts on Earth Systems:</b></p> <ul style="list-style-type: none"> <li>Human activities in agriculture, industry, and everyday life have had major effects on land, vegetation, streams, oceans, air, and even outer space. But individuals and communities are doing things to help</li> </ul>	<p><b>Connections to Nature of Science</b></p> <p><b>Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena</b></p> <ul style="list-style-type: none"> <li>Science explanations describe the mechanisms for natural events. (5-LS2-1)</li> </ul> <p><b>Science Addresses Questions About the Natural and Material World.</b></p> <ul style="list-style-type: none"> <li>Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)</li> </ul> <p><b>Influence of Engineering, Technology, and Science on Society and the Natural World</b></p> <ul style="list-style-type: none"> <li>People’s needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1)</li> <li>Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)</li> </ul>
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<p>examples of scientific arguments based on evidence. Students work with data from the restoration project area in order to make arguments about why the organisms in the ecosystem are not growing and thriving. The unit provides explicit instruction to help students link data with scientific ideas in order to support claims. Students read <i>Why Do Scientists Argue?</i> and discuss the critical role that argumentation plays in moving science forward.</p> <p><b>Practice 8: Obtaining, Evaluating, and Communicating Information</b></p> <ul style="list-style-type: none"> <li>Just as students focus on synthesizing ideas in science, they receive explicit instruction and have multiple opportunities to use the reading comprehension strategy of synthesizing as they engage with the informational texts in the unit. Students gather evidence through firsthand and secondhand sources, as well as participate in various discourse routines that help them communicate about and make sense of scientific ideas by using key vocabulary.</li> </ul>	<p>protect Earth’s resources and environments. (5-ESS3-1)</p> <p><b>PS1.A: Structure and Properties of Matter:</b></p> <ul style="list-style-type: none"> <li>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)</li> </ul> <p><b>PS3.D: Energy in Chemical Processes and Everyday Life:</b></p> <ul style="list-style-type: none"> <li>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)</li> </ul> <p><b>PS1.B: Chemical Reactions:</b></p> <ul style="list-style-type: none"> <li>When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4)</li> </ul>	
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<b>New Jersey Social and Emotional Competencies and Sub-Competencies</b>	
<b>Self-Awareness</b>	<ul style="list-style-type: none"> <li>Recognize one’s feelings and thoughts.</li> <li>Recognize the impact of one’s feelings and thoughts on one’s own behavior.</li> <li>Recognize one’s personal traits, strengths, and limitations.</li> <li>Recognize the importance of self-confidence in handling daily tasks and challenges.</li> </ul>
<b>Self-Management</b>	<ul style="list-style-type: none"> <li>Understand and practice strategies for managing one’s own emotions, thoughts, and behaviors.</li> <li>Recognize the skills needed to establish and achieve personal and educational goals.</li> </ul>

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	<ul style="list-style-type: none"> <li>Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals.</li> </ul>
<b>Social Awareness</b>	<ul style="list-style-type: none"> <li>Recognize and identify the thoughts, feelings, and perspectives of others.</li> <li>Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds.</li> <li>Demonstrate an understanding of the need for mutual respect when viewpoints differ.</li> <li>Demonstrate an awareness of the expectations for social interactions in a variety of settings.</li> </ul>
<b>Responsible Decision Making</b>	<ul style="list-style-type: none"> <li>Develop, implement, and model effective problem-solving and critical thinking skills.</li> <li>Identify the consequences associated with one's actions in order to make constructive choices.</li> <li>Evaluate personal, ethical, safety, and civic impact of decisions.</li> </ul>
<b>Relationship Skills</b>	<ul style="list-style-type: none"> <li>Establish and maintain healthy relationships.</li> <li>Utilize positive communication and social skills to interact effectively with others.</li> <li>Identify ways to resist inappropriate social pressure.</li> <li>Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways.</li> <li>Identify who, when, where, or how to seek help for oneself or others when needed.</li> </ul>

**Interdisciplinary Connections**

<b>ELA Standards</b>	
<b>RI.CR.5.1</b>	Quote accurately from an informational text when explaining what the text says explicitly and make relevant connections when drawing inferences from the text.
<b>RI.IT.5.3</b>	Analyze the impact of two or more individuals and events throughout the course of a text, explaining the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific evidence in the text.
<b>RI.PP.5.5</b>	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.
<b>RI.MF.5.6</b>	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.
<b>RI.AA.5.7</b>	Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).

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<b>W.IW.5.2</b>	<p>Write informative/explanatory texts to examine a topic and convey ideas and information clearly.</p> <ul style="list-style-type: none"> <li><b>A.</b> 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.</li> <li><b>B.</b> Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.</li> <li><b>D.</b> Use precise language and domain-specific vocabulary to inform about or explain the topic.</li> </ul>
<b>W.WR.5.5</b>	<p>Establish a central idea about a topic, investigation, issue or event and use several sources to support the proposed central idea.</p>
<b>W.SE.5.6</b>	<p>Gather relevant information from multiple valid and reliable print and digital sources; summarize or paraphrase information in notes and finished work, making note of any similarities and differences among ideas presented; and provide a list of sources.</p>
<b>W.RW.5.7</b>	<p>Write routinely over extended time frames (time for research and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.</p>
<b>SL.PE.5.1</b>	<p>Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.</p> <ul style="list-style-type: none"> <li><b>B.</b> Follow agreed-upon rules for discussions and carry out assigned roles.</li> <li><b>C.</b> Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.</li> <li><b>D.</b> Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.</li> </ul>
<b>SL.II.5.2</b>	<p>Summarize a written text read aloud or information presented in diverse media and formats (e.g., visually, quantitatively, and orally).</p>
<b>L.RF.5.3</b>	<p>Know and apply grade-level phonics and word analysis skills in decoding and encoding words; use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.</p>
<b>L.RF.5.4</b>	<p>Read with sufficient accuracy and fluency to support comprehension.</p> <ul style="list-style-type: none"> <li><b>A.</b> Read grade-level text with purpose and understanding.</li> <li><b>B.</b> Read grade-level text orally with accuracy, appropriate rate, and expression.</li> <li><b>C.</b> Use context to confirm or self-correct word recognition and understanding, rereading as necessary.</li> </ul>
<b>L.KL.5.1</b>	<p>Use knowledge of language and its conventions when writing, speaking, reading, or listening.</p>

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	<b>A.</b> Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.
<b>L.VL.5.2</b>	<p>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.</p> <p><b>A.</b> Use context (e.g., cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase.</p> <p><b>B.</b> Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., photograph, photosynthesis).</p> <p><b>C.</b> 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.</p>
<b>Mathematics Standards</b>	
<b>MP1</b>	Make sense of problems and persevere in solving them.
<b>MP2</b>	Reason abstractly and quantitatively.
<b>MP4</b>	Model with mathematics.
<b>MP5</b>	Use appropriate tools strategically.
<b>MP6</b>	Attend to precision.
<b>MP7</b>	Look for and make use of structure.
<b>5.OA.3</b>	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.
<b>5.NBT.1</b>	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
<b>5.NBT.3a</b>	Read and write decimals to thousandths using base-ten numerals, number names, and expanded form.
<b>5.M.B2</b>	Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
<b>5.M.B2a</b>	A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume.
<b>5.M.B2b</b>	A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of “n” cubic units.

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<b>5.M.B3</b>	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.
<b>5.M.B4</b>	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
<b>5.M.B4a</b>	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.
<b>5.M.B4b</b>	Apply the formulas $V = l*w*h$ and $V=B*h$ and for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.
<b>5.M.B4c</b>	Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

<b>Computer Science &amp; Design Thinking</b>	
<b>8.1.5.IC.2:</b>	Identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users.
<b>8.1.5.DA.1:</b>	Collect, organize, and display data in order to highlight relationships or support a claim.
<b>8.1.5.DA.3:</b>	Organize and present collected data visually to communicate insights gained from different views of the data.
<b>8.1.5.DA.4:</b>	Organize and present climate change data visually to highlight relationships or support a claim.
<b>8.2.5.ED.2:</b>	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.
<b>8.2.5.ED.3:</b>	Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
<b>8.2.5.ED.4</b>	Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).
<b>8.2.5.ED.5</b>	Describe how specifications and limitations impact the engineering design process.
<b>8.2.5.ED.6</b>	Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process
<b>8.2.5.ITH.4</b>	Describe a technology/tool that has made the way people live easier or has led to a

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	new business or career.
<b>8.2.5.NT.4</b>	Identify how improvement in the understanding of materials science impacts technologies
<b>8.2.5.ETW.2</b>	Describe ways that various technologies are used to reduce improper use of resources.
<b>8.2.5.EC.1</b>	Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.

<u><a href="#">Career Readiness, Life Literacies &amp; Key Skills</a></u>	
<b>9.1.5.CR.1</b>	Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
<b>9.2.5.CAP.4</b>	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.
<b>9.4.5.CI.1</b>	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
<b>9.4.5.CT.1</b>	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).
<b>9.4.5.CT.3</b>	Describe how digital tools and technology may be used to solve problems
<b>9.4.5.CT.4</b>	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).
<b>9.4.5.IML.6</b>	Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM.IPRET.5).

<b>Evidence of Student Learning</b>	
<p><b>Formative Tasks:</b></p> <ul style="list-style-type: none"> <li>● Teacher observations</li> <li>● Class discussions</li> <li>● Whiteboard/Communicators</li> <li>● On-the-Fly Assessments</li> <li>● Daily classwork</li> <li>● Checks for understanding</li> <li>● Clipboard Assessment Tool</li> <li>● Critical Juncture Assessment</li> <li>● Crosscutting Concept Tracker</li> </ul>	<p><b>Alternative Assessments:</b></p> <ul style="list-style-type: none"> <li>● Oral Assessments</li> </ul>

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<b>Summative Assessments:</b> <ul style="list-style-type: none"> <li>● End of Unit</li> </ul>	<b>Benchmark Assessments:</b> <ul style="list-style-type: none"> <li>● Benchmark 5D</li> </ul>
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<b>Knowledge &amp; Skills</b>
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<b>Enduring Understandings:</b> <ul style="list-style-type: none"> <li>● Everything is made of matter. Matter is made of molecules. (1.3)</li> <li>● Animals grow by changing food molecules into body molecules that can build their bodies. (1.5)</li> <li>● Animals use some food molecules to release energy for movement and growth. (1.5)</li> <li>● Food molecules in an ecosystem can always be traced back to plants. (1.7)</li> <li>● Plants use water molecules, carbon dioxide molecules from the air, and energy from the sun to make food. (2.3)</li> <li>● Animals and plants grow by changing food molecules into body molecules that can build their bodies. (2.3)</li> <li>● Animals and plants use some food molecules to release energy for movement and growth. (2.4)</li> <li>● Energy in an ecosystem can always be traced back to the sun. (2.5)</li> <li>● Scientists convince others that their claims are correct by using data and ideas as evidence. (2.6)</li> <li>● Decomposers release nutrients from dead plants and animals into the soil. (3.3)</li> <li>● Animals, plants, and decomposers grow by changing food molecules into body molecules that can build their bodies. (3.3)</li> <li>● Animals, plants, and decomposers use some food molecules to release energy for movement and growth. (3.3)</li> <li>● Plants need nutrients to help make food molecules for energy and body matter. (3.5)</li> </ul>	<b>Essential Questions:</b> <ul style="list-style-type: none"> <li>● How do organisms in an ecosystem get the matter and energy they need to grow and thrive?</li> <li>● Why aren't the jaguars and sloths growing and thriving?</li> <li>● How do animals grow?</li> <li>● Where do food molecules in an ecosystem come from?</li> <li>● Why aren't the cecropia trees growing and thriving?</li> <li>● Where do food molecules for plants come from?</li> <li>● Where does energy in an ecosystem come from?</li> <li>● How do scientists convince others that their claims are correct?</li> <li>● Why aren't the cecropia trees growing and thriving in the soil?</li> <li>● Why is the matter that makes up soil different in different places?</li> <li>● How do nutrients in the soil help plants grow?</li> <li>●</li> </ul>
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<b>Content</b> <i>Students will know...</i> <ul style="list-style-type: none"> <li>● An ecologist is a scientist who studies ecosystems.</li> <li>● Reflecting on what you understand and don't understand allows you to prepare for learning new things.</li> </ul>	<b>Skills</b> <i>Students will be able to ...</i> <ul style="list-style-type: none"> <li>● Explain what an ecologist is and describe how ecologists study ecosystems.</li> <li>● Reflect on what they understand and what they do not yet understand in order to prepare for new learning.</li> </ul>
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- Ecologists and other scientists often make and use simulations to study things that they cannot see or measure directly.
- An ecosystem is a community of organisms in an environment.
- There are many different kinds of ecosystems.
- A terrarium is a model ecosystem.
- Organisms are made of matter. Matter is made of molecules.
- Molecules are tiny bits of matter that are too small to be seen.
- Synthesizing can help readers understand informational text.
- Scientists make arguments that are supported with evidence.
- A scientific argument is a claim together with the evidence that supports it.
- Scientists make models to help them answer questions about the world.
- Animals get their food molecules from the body matter of plants or other animals.
- Animals use some food molecules to release energy for movement and growth.
- Synthesizing is a sense-making strategy that scientists use to come to a new understanding or to help them to answer a question.
- A system is a group of parts that work together. Each part in the system plays a role.
- An ecosystem is a system.
- There are many ways that organisms in an ecosystem get their food molecules—organisms eat a variety of things.
- A food web is a diagram that ecologists make to show what eats what in an ecosystem.
- Food molecules in an ecosystem can always be traced back to plants.
- Models are like the real world in some ways and different in other ways.
- Both data and scientific ideas are kinds of evidence that can be used to support a claim.
- Strong arguments link a scientific idea to data to help explain why the data supports the claim.
- Scientists discuss their arguments with one another in order to determine how evidence supports a claim.
- Plants' needs must be met in order for them to grow and thrive in an ecosystem.
- Air and water are made of matter.
- Sunlight is energy, not matter.
- Organisms need energy in order to move and grow.
- Explain how scientists use simulations and models to study things that cannot be directly seen or measured.
- Define an ecosystem as a community of organisms interacting with their environment.
- Identify and describe different kinds of ecosystems.
- Explain how a terrarium can be used as a model of an ecosystem.
- Explain that all organisms are made of matter and that matter is made of molecules.
- Describe molecules as tiny pieces of matter that are too small to see.
- Use synthesizing strategies to make sense of information from science texts and investigations.
- Explain what a scientific argument is and identify the claim and evidence in an argument.
- Use models to help answer questions about how ecosystems work.
- Explain that animals get food molecules by eating plants or other animals.
- Explain how animals use food molecules to release energy for movement and growth.
- Use synthesizing to combine ideas from multiple sources to reach new understandings.
- Explain that a system is made of parts that work together and that each part has a role.
- Explain that an ecosystem is a system.
- Describe different ways organisms in an ecosystem obtain food molecules.
- Interpret food webs as models that show feeding relationships in ecosystems.
- Explain that food molecules in ecosystems can be traced back to plants.
- Explain how models are similar to and different from the real systems they represent.
- Use data and scientific ideas as evidence to support claims.
- Explain how strong scientific arguments connect evidence to scientific ideas.
- Participate in discussions to explain how evidence supports or challenges claims.
- Explain the matter and energy needs of plants in order to grow and thrive.
- Explain that air and water are forms of matter.
- Explain that sunlight is energy, not matter.
- Explain that organisms need energy to move and grow.
- Explain how plants use sunlight, water, and carbon dioxide to make food molecules.
- Explain how plants use food molecules to build their bodies.

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- Plants use energy from sunlight to change water and carbon dioxide into food matter.
- Plants use water molecules, carbon dioxide molecules from the air, and energy from the sun to make food.
- Animals and plants grow by changing food molecules into body molecules that can build their bodies.
- Models show some things accurately and some things inaccurately.
- Animals and plants use some food molecules to release energy for movement and growth.
- Energy in an ecosystem can always be traced back to the sun.
- Human activities can have a negative impact on ecosystems; different communities are working to minimize that impact.
- Scientists convince others that their claims are correct by using data and ideas as evidence.
- Scientists don't always agree.
- Scientists use tools and technologies to make accurate measurements and observations.
- Scientific explanations can change based on new evidence.
- Scientific theories are based on a body of evidence and many tests.
- Most scientists and engineers work in teams.
- Science affects everyday life.
- Science findings are limited to what can be answered with evidence.
- Plants can fail to grow and thrive when they cannot get enough of the matter and energy they need from the environment.
- Scientific arguments are written for an audience.
- When presented with new information, scientists sometimes change their ideas.
- Soil can be different in different places.
- Everything in the environment can become part of soil.
- Soil is made of matter from living and nonliving things in the environment.
- Decomposers are organisms that break down dead matter.
- Soil scientists study soil and look for evidence of soil being formed.
- Decomposers and nutrients are made of matter.
- Decomposers release nutrients from dead plants and animals into the soil.
- Explain how animals and plants change food molecules into body molecules.
- Explain that models represent some features accurately and others less accurately.
- Explain that energy in an ecosystem can be traced back to the sun.
- Describe ways human activities can negatively affect ecosystems.
- Explain how people and communities can work to reduce negative impacts on ecosystems.
- Explain how scientists use evidence to convince others that their claims are valid.
- Explain that scientists do not always agree and may interpret evidence differently.
- Use scientific tools and technologies to make observations and measurements.
- Explain that scientific explanations and ideas can change when new evidence is discovered.
- Explain that scientific theories are supported by evidence collected over time.
- Explain that most scientists and engineers work in teams.
- Describe ways science affects everyday life.
- Explain that science is limited to questions that can be answered with evidence.
- Explain why plants may fail to grow when they lack needed matter or energy.
- Write scientific arguments that are appropriate for an audience and include a conclusion.
- Explain how scientists change their ideas when presented with new information.
- Identify that soils can differ in different locations.
- Explain that soil is made of matter from both living and nonliving things.
- Explain how decomposers break down dead plants and animals.
- Describe how soil scientists study soil and collect evidence of soil formation.
- Explain that decomposers and nutrients are forms of matter.
- Explain how decomposers release nutrients into the soil.
- Explain how plants, animals, and decomposers use food molecules for growth and energy.
- Compare nutrient-rich and nutrient-poor soils.
- Explain why plants need nutrients to make food molecules and grow properly.
- Use plant health as evidence to infer growing conditions.
- Explain why scientific arguments are stronger when evidence is clearly linked to claims.

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<ul style="list-style-type: none"> <li>● Animals, plants, and decomposers grow by changing food molecules into body molecules that can build their bodies.</li> <li>● Animals, plants, and decomposers use some food molecules to release energy for movement and growth.</li> <li>● One way in which soils can be different is that they can be nutrient rich or nutrient poor.</li> <li>● Plants do not make enough food molecules to grow and thrive when they don't have access to the nutrients they need.</li> <li>● Plants need nutrients to help make food molecules for energy and body matter.</li> <li>● The health of the plant provides a clue about its growing conditions.</li> <li>● Scientific arguments are stronger when they have data and evidence linked together to support a claim.</li> <li>● Scientific arguments end with a conclusion.</li> <li>● Scientists apply their understanding to solve problems.</li> <li>● While the organisms in ecosystems may vary, there are basic relationships that can be found in any ecosystem.</li> </ul>	<ul style="list-style-type: none"> <li>● Explain how scientists apply their understanding of ecosystems to solve problems.</li> <li>● Explain that although organisms differ among ecosystems, basic relationships are shared across ecosystems.</li> </ul>
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**Core Instructional & Supplemental Materials**

<p><b>Suggested Activities/Resources:</b></p> <ul style="list-style-type: none"> <li>● Books in This Unit             <ul style="list-style-type: none"> <li>○ Matter Makes It All Up</li> <li>○ Energy Makes It All Go</li> <li>○ Why Do Scientists Argue?</li> <li>○ Walk in the Woods</li> <li>○ Restoration Case Studies</li> </ul> </li> </ul>	<p><b>Supplemental Materials</b></p> <ul style="list-style-type: none"> <li>● Digital Resources included in each unit             <ul style="list-style-type: none"> <li>○ Ecosystem Restoration Simulation</li> </ul> </li> <li>● Multi-language glossary</li> <li>● Hands-On Flexextension:             <ul style="list-style-type: none"> <li>○ Soil Profile Test</li> <li>○ Investigating How Things Decompose</li> <li>○ Making Changes to Terrariums</li> </ul> </li> </ul>
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**Suggested Accommodations**

<p><b>English Language Learners:</b></p> <ul style="list-style-type: none"> <li>● Multi-sensory instruction</li> <li>● Flexible grouping</li> <li>● Small group instruction</li> <li>● Provide peer tutoring</li> <li>● Use a strong student as a “buddy” (does not necessarily have to speak the primary language)</li> <li>● Chunking information</li> <li>● Scaffolded questioning</li> <li>● Academic language support</li> <li>● Vocabulary support</li> </ul>
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- Co-Constructed Word Banks
- Anchor charts
- Gradual release model
- Visual models
- Native language support when possible (Multi-language glossary)
- Sheltered English Instruction Strategies
- Sentence starters

### **Special Education/Students with Disabilities:**

- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Follow all IEP modifications
- Calculators
- Manipulatives/concrete models
- Directions repeated, clarified, and reworded
- Breakdown task into manageable parts

### **504 Plans:**

- Allow extra time to complete assignments or tests
- Work in a small group
- Allow answers to be given orally or dictated
- Calculators
- Manipulatives/concrete models
- Follow all 504 modifications

### **Gifted and Talented:**

- Higher level questioning
- Enriched assignments
- Tiered assignments
- Choice board to extend learning

### **Students at Risk of Failure:**

- Provide peer tutoring
- Use a strong student as a “buddy”
- Allow extra time to complete assignments or tests
- Work in a small group
- One on one instruction
- Provide immediate praise and feedback
- Create a nurturing environment
- Provide visuals
- Be flexible with assignments and time frames
- Provide needed academic resources
- Chunking information
- Scaffolded questioning
- Tiered activities
- Manipulatives/concrete models
- Modified assignments
- Brain breaks

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**Economically Disadvantaged:**

- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Summarize as you go
- Preview lessons
- Graphic organizers
- Highlight key words
- Sentence starters
- Prompting and cueing
- Activate schema
- Build background knowledge

**Culturally Diverse:**

- Create an emotionally positive classroom climate.
- Create effective communication
- Model and teach cultural respect
- Build relationships with students by interviewing students to understand their background