Moonachie School District
Science Curriculum:
Grade 5

New Jersey Student Learning Standards for Science

Born On: August 23, 2022
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Unit 1 Overview	
Unit 1: Properties of Matter	
Grade: 5	
Content Area: Physical Science	
Pacing: 15 days	
Essential Question	
When matter changes, does its weight change?	
Student Learning Objectives (Performance Expectations)	
5-PS1-3. Make observations and measurements to identify materials based on their properties.	
5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen.	
Unit Summary	
In this unit of study, students describe that matter is made of particles too small to be seen by developing a model. The crosscutting concept of scale, proportion, and quantity is called out as an organizing concept for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in developing and using models, planning and carrying out investigations, and use these practices to demonstrate understanding of the core ideas.	
Technical Terms	
reflectivity, electrical conductivity, thermal conductivity, magnetic forces, solubility,matter,mass, minerals, powders, conductors,classification, physical properties, chemical properties, particles, phenomenon	
Formative Assessment Measures	
Part A: How can properties be used to identify materials?	
Students who understand the concepts can: • Measure and describe physical quantities such as weight, time, temperature, and volume. • Make observations and measurements to produce data that can serve as the basis for evidence for an explanation of a phenomenon. • Make observations and measurements to identify materials based on their properties. Examples of materials to be identified could include: Baking soda and other powders Metals Minerals Liquids Examples of properties could include: Color Hardness Reflectivity Electrical conductivity Thermal conductivity Response to magnetic forces Solubility	
Part B: What kind of model would best represent/describe matter as made of particles that are too small to be seen?	
Students who understand the concepts can: Students who understand the concepts can: • Develop a model to describe phenomena. • Develop a model to describe that matter is made of particles too small to be seen. (Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.) Examples of evidence could include: Adding air to expand a basketball Compressing air in a syringe Dissolving sugar in water Evaporating salt water	
Interdisciplinary Connections	
NJSLS- ELA	**NJSLS- Mathematics**

RI.MF.5.6. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on web pages) and explain how the information contributes to an understanding of the text in which it appears W.IW.5.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly W.SE.5.6. 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 SL.PE.5.1. 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	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. 5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. 5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. 5.M.B.2 Recognize volume as an attribute of solid figures and understand concepts of volume measurement. 5.M.B.3 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft., and improvised units.
Core Instructional Materials	Textbooks Series, Lab Materials, etc.
Career Readiness, Life Literacies and Key Skills	9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). 9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images, graphics, or symbols.
Computer Science and Design Thinking	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. 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data. 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models. 8.2.5.ED.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).

Modifications				
Multilingual Learners	**Special Education**	**At Risk for School Failure**	**Gifted and Talented**	**504**

Scaffolding Word walls Sentence/paragraph frames Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aides Modeling Cognates	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast	Teacher tutoring Peer tutoring Study guides Graphic organizers Extended time Parent communication Modified assignments Counseling	Curriculum compacting Challenge assignments Enrichment activities Tiered activities Independent research/inquiry Collaborative teamwork Higher level questioning Critical/Analytical thinking tasks Self-directed activities	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast Parent communication Modified assignments Counseling

Grade 5 Unit 1: Properties of Matter		
5-PS1-3 Matter and its Interactions		
5-PS1-3. Make observations and measurements to identify materials based on their properties.		
Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.		
Assessment Boundary: Assessment does not include density or distinguishing mass and weight.		
Evidence Statements: 5-PS1-3		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.	**PS1.A: Structure and Properties of Matter** Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.)	**Scale, Proportion, and Quantity** Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.
Connections to other DCIs in this grade-band: N/A		

Articulation of DCIs across grade-bands: 2.PS1.A ; MS.PS1.A	
5E Model	
5-PS1-3. Make observations and measurements to identify materials based on their properties.	
Engage **Anticipatory Set**	Crash Course Kids: What Is Matter? In this episode of Crash Course Kids, Sabrina talks about what matter is and the three states of matter: Solid, Liquid, and Gas. She also does a quick experiment that you can do at home to prove that air is matter. https://www.youtube.com/watch?v=ELchwUIlWa8 Crash Course Kids: Hunting for Properties In this episode of Crash Course Kids, Sabrina talks about what properties are and how we can measure them to tell us more about an object https://www.youtube.com/watch?v=ZZYnERZe3Cg Crash Course Kids: What's My Property What exactly can we tell about an unknown substance by its properties. We already know that a substance is matter that's made of one kind of atom or molecule, and that has specific properties and that some substances are elements, which means they can't be broken down into other substances through physical changes or chemical reactions. We also know that we can group substances and elements by their properties like we found that all of the metal things from the bottom of my backpack were shiny and attracted to a magnet. So metals have high reflectivity and magnetivity. What else do we know about metals? https://www.youtube.com/watch?v=nlSemv2fLN8
Exploration **Student Inquiry**	Mystery Matter Lesson Plan In this lesson, students learn about physical and chemical properties. Then, they will observe and measure the physical properties of a mystery item. At the end, students describe the properties of their mystery matter while the class tries to guess what it is! http://betterlesson.com/lesson/641976/mystery-matter Mineral Identification In this lesson, student will identify minerals by observing and testing the physical properties of each mineral. http://www.earthsciweek.org/classroom-activities/mineral-identification Using Properties to Classify Students will investigate items in a basket to determine how they are similar and different to help classify them into groups. http://betterlesson.com/lesson/617757/using-properties-to-classify Using Properties to Classify White Powders Students observe physical and chemical properties of white powders and then use those initial observations to help them identify these powders when presented without labels. http://betterlesson.com/lesson/630483/using-properties-to-identify-white-powders Unit: Structures and Properties of Matter http://www.mccracken.kyschools.us/Downloads/5th%20Grade%20Structures%20and%20Properties%20of%20Matter.pdf

Explanation Concepts and Practices	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): PS1.A: Structure and Properties of Matter Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.)
Elaboration Extension Activity	Additional Lessons and Resources http://ngss.nsta.org/DisplayStandard.aspx?view=pe&id=103
Evaluation Assessment Tasks	Assessment Tasks Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. Assessment Task A: Mystery Matter Assessment: Students will explain their mystery matter and students will use clues to identify items. Completed lapbooks and observations papers will be used to assess standard.Assessment Task B: Students will complete Mineral Worksheet after completing Mineral Identification Worksheet. Assessment Task C: After completing the Using Properties to Classify lesson, students will complete 'How do scientists use classification in the real world?' reflection sheet. Assessment Task D: After completing the Using Properties to Classify White Powders lesson, students will be able to answer the following questions: 1. Why did they test the mystery powders? If we have stopped after testing each powder originally, they would not have had the opportunity to use the properties for identification purposes. Students were able to explain this to me. 2. If we already tested the properties and knew how the substances would react, why didn't we just stop there? (students should be able to make the connection that they were applying what they learned to an actual test, similar to what scientists might do in the real world.) 3. If students stopped after testing each powder originally, would they have the opportunity to use the properties for identification purposes.

Grade 5 Unit 1: Properties of Matter
5-PS1-1 Matter and its Interactions
5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen.
Clarification Statement: Examples of evidence supporting a model could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.
Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.
Evidence Statements: 5-PS1-1

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. Use models to describe phenomena.	**PS1.A: Structure and Properties of Matter** Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.	**Scale, Proportion, and Quantity** Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

Connections to other DCIs in this grade-band: N/A

Articulation of DCIs across grade-bands: 2.PS1.A ; MS.PS1.A

5E Model

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

Engage **Anticipatory Set**	Crash Course Kids: Particles of Your World In this episode, Sabrina talks to us about matter and particles and that all matter is made up of particles. Also, she shows us how matter can change states from a solid to a liquid, a liquid to a gas, a gas to a solid, or a liquid to a solid. https://www.youtube.com/watch?v=npv74D2MO6Q
Exploration **Student Inquiry**	Now You See It, Now You Don't: Dissolving Matter In this lesson, students will demonstrate that some matter may seem to have disappeared when it is dissolved, but it is still there. http://betterlesson.com/lesson/636182/now-you-see-it-now-you-don-t-dissolving-matter Is It Really There?...Proving Salt Is In The Water In this two day activity, students will collect evidence to prove salt is really in the water. Students will use evidence from their investigation to construct a scientific explanation that salt is really in the water. http://betterlesson.com/lesson/638103/day-1-is-it-really-there-proving-salt-is-in-the-water http://betterlesson.com/lesson/639003/day-2-is-it-really-there-proving-salt-is-in-the-water
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): PS1.A: Structure and Properties of Matter Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.
Elaboration **Extension Activity**	Additional Related Lessons and Resources http://ngss.nsta.org/DisplayStandard.aspx?view=pe&id=99

Evaluation Assessment Tasks	Assessment Task A: Use models to describe phenomena. After engaging in the 'Now You See It, Now You Don't: Dissolving Matter' lesson, students are asked to draw conclusions based upon the observations from the investigations. Students can use the paragraph frame to help create a paragraph summarizing conclusions. Assessment Task B: After students complete day 1 and 2 of the Is It Really There? Proving Salt Is In The Water lessons, students will create an explanation following the investigation. Teacher should assess student writing using the Scientific Explanation Rubric.

Unit 2 Overview
Unit 2: Changes to Matter
Grade: 5
Content Area: Physical Science
Pacing: 15 days
Essential Question
If I have a frozen water bottle that weighs 500 mg, how much will it weigh if the water melts?
Student Learning Objectives (Performance Expectations)
5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.
Unit Summary
In this unit of study, students develop an understanding of the idea that regardless of the type of change that matter undergoes, the total weight of matter is conserved. Students determine whether the mixing of two or more substances results in new substances. The crosscutting concepts of cause and effect and scale, proportion, and quantity are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations and using mathematics and computational thinking. Students are expected to use these practices to demonstrate understanding of the core ideas.
Technical Terms
compounds, mixtures, physical changes, reactive changes, chemical change, atomic change, atoms, molecules, heterogeneous mixture, homogeneous mixture, compounds, solutions, chemical reactions, conserved, phase changes, water vapor, Celsius, Fahrenheit, sublimation
Formative Assessment Measures
Part A: How can we make slime?
Students who understand the concepts are able to: • Identify, test, and use cause-and-effect relationships to explain change. • Conduct an investigation collaboratively to produce data that can serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials is considered. • Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
Part B: How can baking soda and vinegar burst a zip-lock bag?

Students who understand the concepts are able to:
• Measure and describe physical quantities such as weight, time, temperature, and volume.
• Measure and graph quantities such as weight to address scientific and engineering questions and problems.
• Measure and graph quantities to provide evidence that regardless of the type of change that occurs when substances are heated, cooled, or mixed, the total weight is conserved.
• Examples of reactions or changes could include: Phase changes Dissolving Mixing

Interdisciplinary Connections

NJSLS- ELA	NJSLS- Mathematics
W.SE.5.6. 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. SL.PE.5.1. 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 W.WR.5.5. Establish a central idea about a topic, investigation, issue or event and use several sources to support the proposed central idea.	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5Use appropriate tools strategically. 5.M.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems.

Core Instructional Materials	Textbooks Series, Lab Materials, etc.
Career Readiness, Life Literacies and Key Skills	9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6). 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). 9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data. 9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings. 9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include

	appropriate images, graphics, or symbols.
Computer Science and Design Thinking	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.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data. 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.

Modifications				
Multilingual Learners	**Special Education**	**At Risk for School Failure**	**Gifted and Talented**	**504**
Scaffolding Word walls Sentence/paragraph frames Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aides Modeling Cognates	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast	Teacher tutoring Peer tutoring Study guides Graphic organizers Extended time Parent communication Modified assignments Counseling	Curriculum compacting Challenge assignments Enrichment activities Tiered activities Independent research/inquiry Collaborative teamwork Higher level questioning Critical/Analytical thinking tasks Self-directed activities	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast Parent communication Modified assignments Counseling

Grade 5 Unit 2: Changes to Matter		
5-PS1-4 Matter and its Interactions		
5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.		
Clarification Statement: N/A		
Assessment Boundary: N/A		
Evidence Statements: 5-PS1-4		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations	**PS1.B: Chemical Reactions** When two or more different substances are mixed, a new substance with different properties may be formed.	**Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.

that control variables and provide evidence to support explanations or design solutions. Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.		

Connections to other DCIs in this grade-band: N/A

Articulation of DCIs across grade-bands: 2.PS1.B ; MS.PS1.A ; MS.PS1.B

5E Model

5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Engage **Anticipatory Set**	BrainPOP: Compounds and Mixtures https://www.brainpop.com/science/matterandchemistry/compoundsandmixtures/ Why Don't Oil and Water Mix? http://ed.ted.com/lessons/why-don-t-oil-and-water-mix-john-pollard#watch Crash Course Kids: Kitchen Chemical Change In this episode of Crash Course Kids, Sabrina talks to us about how to tell if you have a chemical change on your hands. https://www.youtube.com/watch?v=37pir0ej_SE
Exploration **Student Inquiry**	Changing Matter: Day 1 What is a mixture? What is a solution? How do you tell the difference between the two? Students actively mix, filter, and evaporate, to add to their growing wealth of knowledge about the properties of matter. http://betterlesson.com/lesson/629780/changing-matter-day-one-of-nahari-has-the-solution Changing Matter: Day 2 How do scientists use the properties of matter to identify substances? Students identify the crystals that result from their evaporation test, and use their knowledge of the properties of matter to try to categorize a new substance. http://betterlesson.com/lesson/629553/changing-matter-day-two-of-nahari-has-the-solution
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): PS1.B: Chemical Reactions When two or more different substances are mixed, a new substance with different properties may be formed.
Elaboration **Extension Activity**	Additional Related Activities http://ngss.nsta.org/DisplayStandard.aspx?view=pe&id=104

	Chemistry for Kids (free resource) https://www.teacherspayteachers.com/Product/Chemistry-for-Kids-Aligns-with-NGSS-5-PS1-4-science-1062828
Evaluation **Assessment Tasks**	Assessment Task A: Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. Using the sentence stems (day 2), students will reflect after their investigation, using evidence from data collected to support findings.

Grade 5 Unit 2: Changes to Matter		
5-PS1-2 Matter and its Interactions		
5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.		
Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances.		
Assessment Boundary: Assessment does not include distinguishing mass and weight.		
Evidence Statements: 5-PS1-2		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Using Mathematics and Computational Thinking Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions. Measure and graph quantities such as weight to address scientific and engineering questions and problems.	**PS1.A: Structure and Properties of Matter** The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. **PS1.B: Chemical Reactions** 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.)	**Scale, Proportion, and Quantity** Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. Connections to Nature of Science Scientific Knowledge Assumes an Order and Consistency in Natural Systems Science assumes consistent patterns in natural systems.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: 2.PS1.A ; 2.PS1.B ; MS.PS1.A ; MS.PS1.B		
5E Model		
5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.		
Engage **Anticipatory Set**	This lesson can be introduced using any of the following videos: http://studyjams.scholastic.com/studyjams/jams/science/matter/changes-of-matter.htm https://www.brainpop.com/science/matterandchemistry/propertychanges/ https://www.brainpop.com/science/matterandchemistry/matterchangingstates/	

Exploration **Student Inquiry**	Physical vs. Chemical Changes (Day 1) Students conduct six different investigations to distinguish physical and chemical changes in matter. http://betterlesson.com/lesson/638994/day-1-physical-vs-chemical-changes Physical vs. Chemical Changes (Day 2) Students will construct scientific explanations that demonstrate their understanding of physical and chemical changes. http://betterlesson.com/lesson/638996/day-2-physical-vs-chemical-changes Chemical Reactions In this lesson, students examine how mixing baking soda and vinegar results in new substances. They also discover that the beginning and ending mass of this chemical reaction remains the same. http://betterlesson.com/lesson/644772/chemical-reactions
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): PS1.A: Structure and Properties of Matter The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. PS1.B: Chemical Reactions 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.)
Elaboration **Extension Activity**	Additional Related Lessons and Resources https://www.opened.com/search?standard=5.PS1.2
Evaluation **Assessment Tasks**	Assessment Task A: Measure and graph quantities such as weight to address scientific and engineering questions and problems. After completing the measuring and graphing task, students will complete the following assessment tasks: 1. Evidence and Claims worksheet 2. Chemical change/physical change foldable 3. Exit Ticket Assessment Task B: Students will complete the chemical reactions lesson. Following the lesson, students will complete the chemical reactions student investigation, law of conservation poster, and writing prompt.

Unit 3 Overview
Unit 3: Energy and Matter in Ecosystems
Grade: 5
Content Area: Life Science
Pacing: 15 Days
Essential Question

What happens to the matter and energy that are part of each organism?

Student Learning Objectives (Performance Expectations)

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

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

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

Unit Summary

In this unit of study, students develop an understanding of the idea that plants get the materials they need for growth chiefly from air and water. Using models, students can describe the movement of matter among plants, animals, decomposers, and the environment, and they can explain that energy in animals' food was once energy from the sun. The crosscutting concepts of energy and matter and systems and system models are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in developing and using models and engaging in argument from evidence. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Technical Terms

ecosystems, fertilization process, pollen, stamen, pistil, seed, ovary, xylem, phloem, annuals, perennials, solar energy, germinate, photosynthesis, hydroponics, organisms, decomposers, food chains, food web ,nutrients, energy transfer, microbes, energy pyramid, autotrophic organisms,heterotrophic organism, plankton, herbivores, carnivores

Formative Assessment Measures

Part A: Where do plants get the materials they need for growth?

Students who understand the concepts are able to:
- Describe how matter is transported into, out of, and within systems.
- Support an argument with evidence, data, or a model.
- Support an argument that plants get the materials they need for growth chiefly from air and water.

Part B: How does matter move among plants, animals, decomposers, and the environment?

Students who understand the concepts are able to:
- Describe a system in terms of its components and interactions.
- Develop a model to describe phenomena
- Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Emphasis is on the idea that matter that is not food—such as air, water, decomposed materials in soil—is changed into matter that is food. Examples of systems could include: Organisms Ecosystems Earth

Part C: How can energy in animals' food be traced to the sun?

Students who understand the concepts are able to:
- Describe how energy can be transferred in various ways and between objects.
- Use models to describe phenomena.
- 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.
- Examples of models could include: Diagrams Flowcharts

Interdisciplinary Connections

NJSLS- ELA	NJSLS- Mathematics

RL.CR.5.1. Quote accurately from a literary text when explaining what the text says explicitly and make relevant connections when drawing inferences from the text RI.MF.5.6. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on web pages) and explain how the information contributes to an understanding of the text in which it appears IRL.CT.5.8. Compare and contrast the authors' approaches across two or more literary texts within the same genre or about the same or similar topics W.AW.5.1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information W.SE.5.6. 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	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. 5.M.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

Core Instructional Materials	Textbooks Series, Lab Materials, etc.
Career Readiness, Life Literacies and Key Skills	9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6). 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7). 9.4.5.IML.1: Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., Social Studies Practice - Gathering and Evaluating Sources). 9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data. 9.4.5.IML.6: 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). 9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images, graphics, or symbols.
Computer Science and Design Thinking	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. 8.2.5.ED.1: Explain the functions of a system and its subsystems. 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.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).

	8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system. 8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems.

Modifications				
Multilingual Learners	**Special Education**	**At Risk for School Failure**	**Gifted and Talented**	**504**
Scaffolding	Word walls	Teacher tutoring	Curriculum compacting	Word walls
Word walls	Visual aides	Peer tutoring	Challenge assignments	Visual aides
Sentence/paragraph frames	Graphic organizers	Study guides	Enrichment activities	Graphic organizers
Bilingual dictionaries/translation	Multimedia	Graphic organizers	Tiered activities	Multimedia
Think alouds	Leveled readers	Extended time	Independent research/inquiry	Leveled readers
Read alouds	Assistive technology	Parent communication	Collaborative teamwork	Assistive technology
Highlight key vocabulary	Notes/summaries	Modified assignments	Higher level questioning	Notes/summaries
Annotation guides	Extended time	Counseling	Critical/Analytical thinking tasks	Extended time
Think-pair- share	Answer masking		Self-directed activities	Answer masking
Visual aides	Answer eliminator			Answer eliminator
Modeling	Highlighter			Highlighter
Cognates	Color contrast			Color contrast
				Parent communication
				Modified assignments
				Counseling

Grade 5 Unit 3: Energy and Matter in Ecosystems		
5-LS1-1 From Molecules to Organisms: Structures and Processes		
5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.		
Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.		
Assessment Boundary: N/A		
Evidence Statements: 5-LS1-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Engaging in Argument from Evidence Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). Support an argument with evidence, data, or a model.	**LS1.C: Organization for Matter and Energy Flow in Organisms** Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary)	**Energy and Matter** Energy can be transferred in various ways and between objects.
Connections to other DCIs in this grade-band: 5.PS1.A		
Articulation of DCIs across grade-bands: K.LS1.C ; 2.LS2.A ; 4.PS3.A ; 4.PS3.B ; 4.PS3.D ; MS.PS3.D ; MS.PS4.B ; MS.LS1.C ; MS.LS2.B		

5E Model	
5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.	
Engage **Anticipatory Set**	BrainPop: Plant Growth https://www.brainpop.com/science/cellularlifeandgenetics/plantgrowth/ Crash Course Kids: Who Needs Dirt? So... do plants need dirt? The truth might shock you. In this episode of Crash Course kids, Sabrina talks about how plants get energy and how that energy is transported around them. Also, she talks about dirt. https://www.youtube.com/watch?v=eCSIrlk0GTs
Exploration **Student Inquiry**	Where Do Plants Get The Materials They Need? In this two day lesson, students will work through the steps of the scientific method to set up and control variables in three experiments. They will collect evidence through these experiments to support their claim that plants get their energy from the sun, water, soil, or air. http://betterlesson.com/lesson/633008/where-do-plants-get-the-materials-they-need-day-1-gathering-evidence-to-support-your-claim http://betterlesson.com/lesson/633945/where-do-plants-get-the-materials-they-need-day-2-presenting-your-findings The Function of Plant Structures Students identify the functions of plant substructures and examine how these plant substructures help plants get what they need to grow. The class will also investigate what will happen if plants only have light, water, and/or air. http://betterlesson.com/lesson/631762/the-function-of-plant-structures Do Plants Need Soil? In this lesson, students will be investigating whether or not plants can grow without soil by watching a video on hydroponics gardening and completing three simple investigations. http://betterlesson.com/lesson/631758/do-plants-need-soil
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): LS1.C: Organization for Matter and Energy Flow in Organisms Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary)
Elaboration **Extension Activity**	Additional Related Lessons and Resources https://www.oercommons.org/browse?f.ngss_alignment=NGSS.5.LS1.1
Evaluation **Assessment Tasks**	Assessment Task A: Support an argument with evidence, data, or a model. Students will support their argument with evidence by completing the graph template. (air, water, soil, sunlight).

Grade 5 Unit 3: Energy and Matter in Ecosystems
5-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

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

Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.

Assessment Boundary: Assessment does not include molecular explanations.

Evidence Statements: 5-LS2-1

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
Developing and Using Models Modeling in 3–5 builds on K–2 models and progresses to building and revising simple models and using models to represent events and design solutions. Develop a model to describe phenomena. Connections to the Nature of Science Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena Science explanations describe the mechanisms for natural events.	**LS2.A: Interdependent Relationships in Ecosystems** The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. **LS2.B: Cycles of Matter and Energy Transfer in Ecosystems** Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment.	**Systems and System Models** A system can be described in terms of its components and their interactions.

Connections to other DCIs in this grade-band: 5.ESS2.A ; 5.PS1.A

Articulation of DCIs across grade-bands: 2.PS1.A ; 2.LS4.D ; 4.ESS2.E ; MS.LS1.C ; MS.LS2.A ; MS.LS2.B

5E Model

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

Engage **Anticipatory Set**	Introduction Videos https://www.brainpop.com/science/ecologyandbehavior/foodchains/ http://studyjams.scholastic.com/studyjams/jams/science/ecosystems/food-chains.htm Crash Course Kids: Food Chains This video will discuss how we get energy. And how one animal gets energy from another animal, or a plant. It's all about food chains and food webs in this Crash Course Kids Compilation. https://www.youtube.com/watch?v=CZhE2p46vJk Informational Display: Decomposers http://www.nhptv.org/natureworks/nwep11b.htm

Exploration **Student Inquiry**	What is an Ecosystem? In this activity, students will explore the parts of an ecosystem and identify the transfer of energy and movement of matter amongst plants, animals, decomposers within their environment. https://betterlesson.com/lesson/631075/what-is-an-ecosystem Producers, Consumers and Decomposers In this activity, students will explore the interactions between organisms to find patterns to label organisms (producers, consumers, decomposers). http://betterlesson.com/lesson/631349/producers-consumers-decomposers Food Web - Energy Transfer Students will learn and explore how energy and nutrients are passed from one organism to another organism through chains and webs. http://ccber.ucsb.edu/sites/default/files/Food%20Web%20Lesson%20Plan%20NGSS.doc
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): LS2.A: Interdependent Relationships in Ecosystems The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. LS2.B: Cycles of Matter and Energy Transfer in Ecosystems Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment.
Elaboration **Extension Activity**	Unit: Matter and Energy in Ecosystems http://scholarworks.gvsu.edu/cgi/viewcontent.cgi?article=1271&context=honorsprojects Do the Rot Thing: A Teacher's Guide to Compost Activities http://www.cvswmd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvswmd1.pdf Food Chain Game http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm
Evaluation **Assessment Tasks**	Assessment Task A: Develop a model to describe phenomena. After creating the food web model, students should describe the movement of matter by answering the following questions: 1. What plants do you see around here?

	2. What do you think would like to eat the grass out here, what animal would think grass was tasty? 3. What do you think might like to eat the bunnies? 4. What happens to the coyote's body? (wait to see if someone can tell you, if not, prompt with) Does it get eaten by anything or decompose? 5. What would happen if humans ate all of the primary consumers? What would happen to the food chain? 6. What would happen to the food chain?

Grade 5 Unit 3: Energy and Matter in Ecosystems		
5-PS3-1 Energy		
5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.		
Clarification Statement: Examples of models could include diagrams, and flowcharts.		
Assessment Boundary: N/A		
Evidence Statements: 5-PS3-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Developing and Using Models Modeling in 3–5 builds on K–2 models and progresses to building and revising simple models and using models to represent events and design solutions. Develop a model to describe phenomena.	**PS3.D: Energy in Chemical Processes and Everyday Life** The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). **LS1.C: Organization for Matter and Energy Flow in Organisms** Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary)	**Energy and Matter** Matter is transported into, out of, and within systems.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: K.LS1.C; 2.LS2.A; 4.PS3.A; 4.PS3.D; MS.PS3.D; MS.PS4.B; MS.LS1.C; MS.LS2.B		
5E Model		
5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.		
Engage **Anticipatory Set**	BrainPOP: Energy Pyramid https://www.brainpop.com/science/energy/energypyramid/ Crash Course Kids: Fabulous Food Chains Everyone eats, right? But how does that food get the energy to power you? In this episode of Crash Course Kids, Sabrina talks about the way energy moves, or flows, through an ecosystem and how that movement forms Food Chains! https://www.youtube.com/watch?v=MuKs9o1s8h8	

Exploration **Student Inquiry**	How Do Animals Obtain Energy? In this lesson, students will identify that animals get their energy (food) from other animals or plants, which originates from energy from the sun. http://betterlesson.com/lesson/631761/how-do-animals-obtain-energy Why Do Animals Need Energy? In this lesson, students learn about the four basic ways animals use energy to survive. Students will then apply this understanding by researching how specific animals use energy. http://betterlesson.com/lesson/632181/why-do-animals-need-energy
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): PS3.D: Energy in Chemical Processes and Everyday Life The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). LS1.C: Organization for Matter and Energy Flow in Organisms Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary)
Elaboration **Extension Activity**	Food Chain/Energy Transfer Game https://www.uwsp.edu/cnr-ap/KEEP/Documents/Activities/Food_Chain_Game.pdf
Evaluation **Assessment Tasks**	Assessment Task A: Develop a model to describe phenomena. Students will create a poster to model that energy in animals' food was once energy from the sun. Assessment Task B: Students will use Google Drawing to create an Animal Research Web.

Unit 4 Overview
Unit 4: Water on the Earth
Grade: 5
Content Area: Earth and Space Science
Pacing: 15 days
Essential Question
How do individual communities use science ideas to protect Earth's resources and environment?
Student Learning Objectives (Performance Expectations)

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

5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources, environment [caused the rise in global temperatures] and address climate change issues.

Unit Summary

In this unit of study, students describe and graph data to provide evidence about the distribution of water on Earth. The crosscutting concepts of scale, proportion, quantity and systems, and systems models are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade appropriate proficiency in using mathematics and computational thinking and in obtaining, evaluating, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Technical Terms

hydrosphere, aquifers, reservoirs, purification, glaciers, irrevocable, water cycle, glaciers, biome, ecosystem ,consumption, fertilizers, salvageable, water treatment plant, water conservation

Formative Assessment Measures

Part A: Where is water found on the Earth? What percentage of the Earth's water is freshwater?

Students who understand the concepts are able to:
- Describe physical quantities, such as weight and volume, in standard units.
- Describe and graph quantities such as area and volume to address scientific questions.
- 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.

Part B: How do individual communities use science ideas to protect Earth's resources and environment?

Students who understand the concepts are able to:
- Describe a system in terms of its components and interactions.
- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.
- Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Interdisciplinary Connections

NJSLS- ELA	NJSLS- Mathematics
RL.CR.5.1. Quote accurately from a literary text when explaining what the text says explicitly and make relevant connections when drawing inferences from the text RL.CT.5.8. Compare and contrast the authors' approaches across two or more literary texts within the same genre or about the same or similar topics W.WR.5.5. Establish a central idea about a topic, investigation, issue or event and use several sources to support the proposed central idea RI.MF.5.6. Interpret information presented visually, orally, or	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics.

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 ISL.PE.5.1. 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	
Core Instructional Materials	Textbooks Series, Lab Materials, etc.
Career Readiness, Life Literacies and Key Skills	9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6). 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7). 9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). 9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1). 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3). 9.4.5.DC.8: Propose ways local and global communities can engage digitally to participate in and promote climate action (e.g., 6.3.5.GeoHE.1). 9.4.5.IML.1: Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., Social Studies Practice - Gathering and Evaluating Sources). 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). 9.4.5.IML.6: 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). 9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings. 9.4.5.TL.5: Collaborate digitally to produce an artifact (e.g., 1.2.5CR1d).
Computer Science and Design Thinking	8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim. 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim. 8.2.5.ED.1: Explain the functions of a system and its subsystems. 8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system. 8.2.5.ITH.4: Describe a technology/tool that has made the way people live easier or has led to a new business or career. 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. 8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the

	environment. 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change. 8.2.5.EC.1: Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.

Modifications				
Multilingual Learners	**Special Education**	**At Risk for School Failure**	**Gifted and Talented**	**504**
Scaffolding Word walls Sentence/paragraph frames Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aides Modeling Cognates	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast	Teacher tutoring Peer tutoring Study guides Graphic organizers Extended time Parent communication Modified assignments Counseling	Curriculum compacting Challenge assignments Enrichment activities Tiered activities Independent research/inquiry Collaborative teamwork Higher level questioning Critical/Analytical thinking tasks Self-directed activities	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast Parent communication Modified assignments Counseling

Grade 5 Unit 4: Water on Earth		
5-ESS2-2 Earth's Systems		
5-ESS2-2. Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.		
Clarification Statement: N/A		
Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.		
Evidence Statements: 5-ESS2-2		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Using Mathematics and Computational Thinking Mathematical and computational thinking in 3-5 builds on K-2 experiences and progresses to extending quantitative measurements to a variety	**ESS2.C: The Roles of Water in Earth's Surface Processes** Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or	**Scale, Proportion, and Quantity** Standard units are used to measure and describe physical quantities such as weight and volume.

of physical properties and using computation and mathematics to analyze data and compare alternative design solutions. Describe and graph quantities such as area and volume to address scientific questions.	underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere.	

Connections to other DCIs in this grade-band: N/A

Articulation of DCIs across grade-bands: 2.ESS2.C; MS.ESS2.C; MS.ESS3.A

5E Model

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

Engage **Anticipatory Set**	NASA: Show Me the Water https://www.youtube.com/watch?v=4HSFKwho7MQ BrainPop: Water Supply https://www.brainpop.com/science/earthsystem/watersupply/
Exploration **Student Inquiry**	Hydrosphere: Water on Earth Students will research how much water is available on Earth in various reservoirs and graph the quantities. http://betterlesson.com/lesson/638357/hydrosphere-water-on-earth The Distribution of Water on Earth Students will create a model and graph to illustrate the distribution of water on Earth. http://betterlesson.com/lesson/645625/the-distribution-of-water-on-earth
Explanation **Concepts and Practices**	In these lessons: Teachers Should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students Should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): ESS2.C: The Roles of Water in Earth's Surface Processes Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere.
Elaboration **Extension Activity**	Water, Water Everywhere https://populationeducation.org/sites/default/files/water_water_everywhere-elementary.pdf
Evaluation **Assessment Tasks**	Assessment Task A: Describe and graph quantities such as area and volume to address scientific questions. Students will create a research graph and pie chart using the Graphing Water on Earth worksheet. Assessment Task B: Students will analyze data to represent the distribution of water on Earth by completing the data table.

Grade 5 Unit 4: Water on Earth		
5-ESS3-1 Earth and Human Activity		
5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources, environment [caused the rise in global temperatures] and address climate change issues.		
Clarification Statement: N/A		
Assessment Boundary: N/A		
Evidence Statements: 5-ESS3-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 3-5 builds on K-2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.	**ESS3.C: Human Impacts on Earth Systems** Human activities in agriculture, industry, and everyday life have had major effects on land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments.	**Systems and System Models** A system can be described in terms of its components and their interactions. Connections to Nature and Science Science Addresses Questions About the Natural and Material World Science findings are limited to questions that can be answered with empirical evidence.
Articulation of DCIs across grade-bands: MS.ESS3.A; MS.ESS3.C; MS.ESS3.D		

5E Model	
5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources, environment [caused the rise in global temperatures] and address climate change issues.	
Engage **Anticipatory Set**	Crash Course Kids: Water Fix How can we fix water shortages? Well, we know that shortages are a problem and can cause fighting because water is a resource. When you limit a resource, things get scary. But, in this episode of Crash Course Kids, Sabrina talks about ways that we can help to fix problems like this. https://www.youtube.com/watch?v=UYROQW9IDIg Water Use It Wisely Website (lesson plans, games, tips, adventures) http://wateruseitwisely.com/kids/
Exploration **Student Inquiry**	Environmental Issues The following lessons provide students with an introduction to major environmental issues including: water pollution, global warming, deforestation and overfishing. In these lessons, students will continue and complete their "How Can Humans Help the Environment" big books. https://betterlesson.com/lesson/626413/study-of-environmental-issues-water-pollution http://betterlesson.com/lesson/633533/environmental-issues-global-warming http://betterlesson.com/lesson/633532/study-of-environmental-issues-deforestation http://betterlesson.com/lesson/633442/study-of-environmental-issues-overfishing

Explanation Concepts and Practices	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): ESS3.C: Human Impacts on Earth Systems Human activities in agriculture, industry, and everyday life have had major effects on land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments.
Elaboration Extension Activity	Water Footprint Calculator Students will learn about the water "hidden" in food, energy and the things you buy. Students then can play with answers to see how to lower the footprint. http://www.gracelinks.org/1408/water-footprint-calculator Water Conservation In this lesson, students study the availability of freshwater on Earth and the methods that can be used to purify and conserve it. They also assess how much water they and their families typically use and think about ways to reduce water usage. http://mass.pbslearningmedia.org/resource/ess05.sci.ess.watcyc.lp_waterconservation/water-conservation/
Evaluation Assessment Tasks	Assessment Task A: Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. How Can Humans Help the Environment Book: For this assignment, students will synthesize information gathered from their research to identify the problem, causes, impact and steps that can be taken to protect the environment water pollution, global warming, deforestation and overfishing.

Unit 5 Overview
Unit 5: Earth Systems
Grade: 5
Content Area: Earth and Space Science
Pacing: 20 days
Essential Question
How do individual communities use science ideas to protect Earth's resources and environment?
Student Learning Objectives (Performance Expectations)
5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources, environment [caused the rise in global temperatures] and address climate change issues.
Unit Summary
In this unit of study, students are able to describe ways in which the geosphere, biosphere, hydrosphere, and atmosphere interact. The crosscutting concept of systems and system models is called out as an organizing concept for this disciplinary core idea. Students are expected to demonstrate grade-appropriate proficiency in developing and using models, obtaining, evaluating, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Technical Terms
geosphere, hydrosphere, atmosphere, biosphere, ecosystem, lithosphere, natural disaster, food chains, landforms
Formative Assessment Measures
Part A: In what ways do the geosphere, biosphere, hydrosphere, and/or atmosphere interact?
Students who understand the concepts are able to: • Describe a system in terms of its components and interactions. • Develop a model using an example to describe a scientific principle. • Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. • Examples could include: The influence of oceans on ecosystems, landform shape, and climate. The influence of the atmosphere on landforms and ecosystems through weather and climate. The influence of mountain ranges on the wind and clouds in the atmosphere
Part B: How do individual communities use science ideas to protect Earth's resources and environment?
Students who understand the concepts are able to: • Describe a system in terms of its components and interactions • Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. • Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Interdisciplinary Connections	
NJSLS- ELA	**NJSLS- Mathematics**
RL.CR.5.1. Quote accurately from a literary text when explaining what the text says explicitly and make relevant connections when drawing inferences from the text RI.MF.5.6. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on web pages) and explain how the information contributes to an understanding of the text in which it appears W.SE.5.6. 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 W.WR.5.5. Establish a central idea about a topic, investigation, issue or event and use several sources to support the proposed central idea. SL.PE.5.1. 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	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. 5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Core Instructional Materials	Textbooks Series, Lab Materials, etc.
Career Readiness, Life Literacies and Key Skills	9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6). 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7). 9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6). 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). 9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1). 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3). 9.4.5.DC.8: Propose ways local and global communities can engage digitally to participate in and promote climate action (e.g., 6.3.5.GeoHE.1). 9.4.5.IML.1: Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., Social Studies Practice - Gathering and Evaluating Sources). 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). 9.4.5.TL.4: Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a). 9.4.5.TL.5: Collaborate digitally to produce an artifact (e.g., 1.2.5CR1d).
Computer Science and Design Thinking	8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim. 8.2.5.ED.1: Explain the functions of a system and its subsystems. 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.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints). 8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system. 8.2.5.ITH.4: Describe a technology/tool that has made the way people live easier or has led to a new business or career. 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies. 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.

Modifications				
Multilingual Learners	**Special Education**	**At Risk for School Failure**	**Gifted and Talented**	**504**

Scaffolding Word walls Sentence/paragraph frames Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aides Modeling Cognates	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast	Teacher tutoring Peer tutoring Study guides Graphic organizers Extended time Parent communication Modified assignments Counseling	Curriculum compacting Challenge assignments Enrichment activities Tiered activities Independent research/inquiry Collaborative teamwork Higher level questioning Critical/Analytical thinking tasks Self-directed activities	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast Parent communication Modified assignments Counseling

Grade 5 Unit 5: Earth Systems		
5-ESS2-1 Earth's Systems		
5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.		
Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate and the influence of mountain ranges on winds and clouds in the atmosphere.		
Assessment Boundary: Assessment is limited to the interactions of two systems at a time.		
Evidence Statements: 5-ESS2-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Developing and Using Models Modeling in 3-5 builds on K-2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. Develop a model using an example to describe a scientific principle.	**ESS2.A: Earth Materials and Systems** 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 landforms to determine patterns of weather.	**Systems and System Models** A system can be described in terms of its components and their interactions.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: 2.ESS2.A; 3.ESS2.D; 4.ESS2.A; MS.ESS2.A; MS.ESS2.C; MS.ESS2.D		
5E Model		

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	
Engage **Anticipatory Set**	Prior to teaching how Earth's systems interact, introduction should focus on each system individually. The following resources provide introduction videos and lesson for each of Earth's systems: Geosphere, Atmosphere, Hydrosphere and Biosphere. Introduction Videos: Geosphere http://video.nationalgeographic.com/video/101-videos/tsunami-101 http://www.history.com/shows/how-the-earth-was-made/videos/the-krakatoa-volcano https://www.brainpop.com/science/earthsystem/earthsstructure/ Introduction Video & Lesson: Atmosphere www.westg.org/.../Atmosphere%20Virtual%20Lab.doc http://www.arm.gov/education/teacher-tools/lessons/amount-gas Introduction Videos: Hydrosphere https://www.youtube.com/watch?v=uXUudU3skMk https://www.schooltube.com/video/938131e2c9be409eb18a/Hydrosphere%20Affects%20Other%20Spheres https://www.schooltube.com/video/aa180d541f114c019778/Bill%20Nye%20Water%20Cycle A Big Ball of Life: Introduction to Biospheres http://www.geography4kids.com/files/land_intro.html Earth's Systems Interact The following video provides an introduction to Earth's four major systems and how they interact. https://www.youtube.com/watch?v=BnpF0ndXk-8
Exploration **Student Inquiry**	Overview of Earth's Systems In this this lesson, students will work in groups to research Earth's systems, becoming experts in that area to teach their peers. http://betterlesson.com/lesson/638120/overview-of-earth-s-systems The Earth's Systems In this lesson, students are provided with an overview of the four major systems on Earth. Students will then analyze how the four spheres are pictured in a photograph. http://betterlesson.com/lesson/634345/the-earth-s-systems Sphere Webquest The following webquest provides an introduction to Earth's spheres (Hydrosphere, Atmosphere, Cryosphere, Biosphere, Geosphere) and how these spheres interact to support life on our planet. At the end of the webquest, students create visual model of the four systems including information on how they systems connect and interact with each other. http://www.kyrene.org/cms/lib2/AZ01001083/Centricity/Domain/2038/SPHERES%20WEBQUEST.pdf

Explanation Concepts and Practices	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): ESS2.A: Earth Materials and Systems 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 landforms to determine patterns of weather.
Elaboration Extension Activity	Additional Resources Related to Earth's Systems https://www.opened.com/search?offset=0&standard=5.ESS2.1
Evaluation Assessment Tasks	Assessment Task A: Develop a model using an example to describe a scientific principle. Sphere Webquest: Students will create a visual poster model describing ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Grade 5 Unit 5: Earth Systems		
5-ESS3-1 Earth and Human Activity		
5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources, environment [caused the rise in global temperatures] and address climate change issues.		
Clarification Statement: N/A		
Assessment Boundary: N/A		
Evidence Statements: 5-ESS3-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 3-5 builds on K-2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.	**ESS3.C: Human Impacts on Earth Systems** Human activities in agriculture, industry, and everyday life have had major effects on land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments.	**Systems and System Models** A system can be described in terms of its components and their interactions. **Connections to Nature and Science** **Science Addresses Questions About the Natural and Material World** Science findings are limited to questions that can be answered with empirical evidence.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: MS.ESS3.A; MS.ESS3.C; MS.ESS3.D		
5E Model		

5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources, environment [caused the rise in global temperatures] and address climate change issues.	
Engage **Anticipatory Set**	Natural Resources of the Earth http://www.ecofriendlykids.co.uk/naturalresourcesearth.html BrainPOP: Humans and the Environment https://www.brainpop.com/science/ourfragileenvironment/humansandtheenvironment/
Exploration **Student Inquiry**	Environmental Policies Students will be able to describe how governments can guide the environmental practices of corporations and citizens through subsidies and green taxes. http://betterlesson.com/lesson/629418/environmental-policy Human Impact Poster Project Students will research a chosen topic on how humans are currently having an impact on the Earth and then create an educational, environmental poster/public service announcement. The posters will cover topics such as pollution, deforestation, eutrophication, poaching, global warming, invasive species, genetically modified organisms, and more. Posters should communicate the key issues and action steps in relation to your topic. http://lhsblogs.typepad.com/files/human-impact-poster-project.pdf
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): ESS3.C: Human Impacts on Earth Systems Human activities in agriculture, industry, and everyday life have had major effects on land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments.
Elaboration **Extension Activity**	The Responsible Package The following unit includes interactive science, engineering, and environmental lessons related to protecting Earth's resources and environment. http://theresponsiblepackage.org/docs/default-source/default-document-library/revised_trp_teacherguide_final664afc205b6468d593f8ff0000bd95ce.pdf?sfvrsn=2
Evaluation **Assessment Tasks**	Assessment Task A: Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. Human Impact Poster Project: Students will create an educational, environmental poster/public service announcement. The posters should cover topics such as pollution, deforestation, eutrophication, poaching, global warming, invasive species, genetically modified organisms, and more. The environmental poster should communicate the key issues and action steps in relation to the topic selected.

Unit 6 Overview
Unit 6: Interactions Within the Earth, Sun, and Moon System
Grade: 5
Content Area: Earth and Space Science
Pacing: 20 days
Essential Question
What patterns do we notice when observing the sky?
Student Learning Objectives (Performance Expectations)
5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.
5-ESS1-1. Support an argument that the apparent brightness of the sun and stars is due to their relative distance from the Earth.
5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.
Unit Summary
In this unit of study, students develop an understanding of patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. The crosscutting concepts of patterns, cause and effect, and scale, proportion, and quantity are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in analyzing and interpreting data and engaging in argument from evidence. Students are also expected to use these practices to demonstrate an understanding of the core ideas.
Technical Terms
Gravitational Force, Weight, Mass, Pushing Force, Pulling Force, Supersonic, Relative Distance, Stellar Nursery, Protostar, Nuclear Fusion, Astronomers, White Dwarf, Red Giant, Planetary Nebula, Supernova, Neutron Star, Pulsar Star, Singularity, Black Hole, Hydrogen, Helium, Carbon, Proton, Electron, Neutron, Constellations
Formative Assessment Measures
Part A: What effect does Earth's gravitational force have on objects?
Students who understand the concepts are able to: • Identify cause-and-effect relationships in order to explain change • Support an argument with evidence, data, or a model. • Support an argument that the gravitational force exerted by Earth on objects is directed down. ("Down" is a local description of the direction that points toward the center of the spherical Earth.)
Part B: What effect does the relative distance from Earth have on the apparent brightness of the sun and other stars?
Students who understand the concepts are able to: • Support an argument with evidence, data, or a model. • Support an argument that differences in the apparent brightness of the sun compared to that of other stars is due to their relative distances from Earth.
Part C: What patterns do we notice when observing the sky?
Students who understand the concepts are able to: • Sort, classify, communicate, and analyze simple rates of change for natural phenomena using similarities and differences in patterns. • Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. • 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. (Assessment does not include causes of seasons.) Examples of patterns could include: The position and motion of Earth with respect to the sun. Selected stars that are visible only in particular months.

Interdisciplinary Connections	
NJSLS- ELA	**NJSLS- Mathematics**
RL.CR.5.1. Quote accurately from a literary text when explaining what the text says explicitly and make relevant connections when drawing inferences from the text RI.MF.5.6. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on web pages) and explain how the information contributes to an understanding of the text in which it appears RI.AA.5.7. Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). RL.CT.5.8. Compare and contrast the authors' approaches across two or more literary texts within the same genre or about the same or similar topics W.AW.5.1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information SL.PE.5.1. 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	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. 5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole number exponents to denote powers of 10. 5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Core Instructional Materials	Textbooks Series, Lab Materials, etc.
Career Readiness, Life Literacies and Key Skills	9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6). 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3). 9.4.5.IML.1: Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., Social Studies Practice - Gathering

	and Evaluating Sources). 9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data. 9.4.5.IML.6: 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). 9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images, graphics, or symbols.
Computer Science and Design Thinking	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.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data. 8.2.5.ED.1: Explain the functions of a system and its subsystems. 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).

Modifications				
Multilingual Learners	**Special Education**	**At Risk for School Failure**	**Gifted and Talented**	**504**
Scaffolding Word walls Sentence/paragraph frames Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair- share Visual aides Modeling Cognates	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast	Teacher tutoring Peer tutoring Study guides Graphic organizers Extended time Parent communication Modified assignments Counseling	Curriculum compacting Challenge assignments Enrichment activities Tiered activities Independent research/inquiry Collaborative teamwork Higher level questioning Critical/Analytical thinking tasks Self-directed activities	Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast Parent communication Modified assignments Counseling

Grade 5 Unit 6: Interactions with the Earth, Sun and Moon System		
5-PS2-1 Motion and Stability: Forces and Interactions		
5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.		
Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth.		
Assessment Boundary: Assessment does not include mathematical representation of gravitational force.		
Evidence Statements: 5-PS2-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**

Engaging in Argument from Evidence Engaging in argument from evidence in 3-5 builds on K-2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). Support an argument with evidence, data, or a model.	**PS2.B: Types of Interactions** The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.	**Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: 3.PS2.A; 3.PS2.B; MS.PS2.B; MS.ESS1.B; MS.ESS2.C		
5E Model		
5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.		
Engage **Anticipatory Set**	What Goes Up Must Come Down: Introductory Demonstration: (pg. 4-5) http://static.nsta.org/files/sc1403_26.pdf Tower Probe Worksheet (referenced in lesson) https://www.nsta.org/elementaryschool/connections/201411TTTB.pdf Felix Baumgartner's Supersonic Freefall Video (referenced in lesson) https://www.youtube.com/watch?v=FHtvDA0W34I Follow-Up Video: Interview with Felix Baumgartner https://www.youtube.com/watch?v=mUiy6PVND80	
Exploration **Student Inquiry**	Gravitational Force: Mini Unit This unit will explore gravity on earth and how it is exerted on objects. Students will discover that gravity exerts a downward force and that its pull is dependent on the mass of the object and the force on that object. https://sciencemethodsproject.wikispaces.com/file/view/Gravity+Unit.pdf Lesson 1: Isaac Newton and the Apple Lesson 2: The Apple Doesn't Fall Far From the Tree Lesson 3: Which One Falls Fastest?	
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): PS2.B: Types of Interactions The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.	
Elaboration **Extension Activity**	Egg Drop Engineering Project In this three day lesson, students will use the science and engineering processes to research and design the best way to drop a raw egg. They will design a container to hold the egg that will prevent the egg from breaking. http://betterlesson.com/lesson/638456/egg-drop-engineering-project-part-1	

	http://betterlesson.com/lesson/638835/egg-drop-engineering-project-part-2 http://betterlesson.com/lesson/638836/egg-drop-engineering-project-part-3
Evaluation **Assessment Tasks**	Assessment Task A: Support an argument with evidence, data, or a model. Writing Task: Write an opinion piece stating that the force of gravity exerted by Earth on objects is directed down. Use evidence from both text and real life experiences to support your claim. (use attached rubric to assess writing)

Grade 5 Unit 6: Interactions with the Earth, Sun and Moon System		
5-ESS1-1 Earth's Place in the Universe		
5-ESS1-1. Support an argument that the apparent brightness of the sun and stars is due to their relative distance from the Earth.		
Clarification Statement: N/A		
Assessment Boundary: Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, stage).		
Evidence Statements: 5-ESS1-1		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Engaging in Argument from Evidence Engaging in argument from evidence in 3-5 builds on K-2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers citing relevant evidence about the natural and designed world(s). Support an argument with evidence, data, or a model.	**ESS1.A: The Universe and its Stars** The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth.	**Scale, Proportion, and Quantity** Natural objects exist from the very small to the immensely large.
Connections to other DCIs in this grade-band: N/A		
Articulation of DCIs across grade-bands: MS.ESS1.A; MS.ESS1.B		

5E Model	
5-ESS1-1. Support an argument that the apparent brightness of the sun and stars is due to their relative distance from the Earth.	
Engage **Anticipatory Set**	Lifecycle of Stars https://www.brainpop.com/science/space/lifecycleofstars/ Crash Course Kids: Glow On So, have you ever wondered why some stars are brighter than others? You might think it's because they're closer to us, but that's not the whole story? In this episode of Crash Course Kids, Sabrina chats about how stars glow and how astronomers judge their brightness. Also, she talks about a really, really, really big star. https://www.youtube.com/watch?v=Zo-sKzMWYFA
Exploration **Student Inquiry**	Investigating Star Brightness & Distance In this lessons, students will use flashlights to investigate how distance impacts star brightness. http://betterlesson.com/lesson/635919/investigating-star-brightness-distance

	Investigating Star Brightness, Distance, Size, & Temperature Students will explain what causes stars to be brighter and what causes some stars to appear brighter than others. http://betterlesson.com/lesson/635920/investigating-star-brightness-distance-size-temperature
Explanation Concepts and Practices	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): ESS1.A: The Universe and its Stars The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth.
Elaboration Extension Activity	Additional Related Lessons and Resources http://ngss.nsta.org/DisplayStandard.aspx?view=pe&id=114 https://www.opened.com/search?standard=5.ESS1.1
Evaluation Assessment Tasks	Assessment Task A: Support an argument with evidence, data, or a model. After gathering data and evidence in the above activities, students will complete the Flashlight Investigation Findings activities to support the argument that the apparent brightness of the sun and stars is due to their relative distance from Earth.

Grade 5 Unit 6: Interactions with the Earth, Sun and Moon System		
5-ESS1-2 Earth's Place in the Universe		
5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.		
Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.		
Assessment Boundary: Assessment does not include causes of seasons.		
Evidence Statements: 5-ESS1-2		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Cross-Cutting Concepts**
Analyzing and Interpreting Data Analyzing data in 3-5 builds on K-2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships.	**ESS1.B: Earth and the Solar System** The orbits of Earth around the sun and of the moon around the 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.	**Patterns** Similarities and differences in patterns can be used to sort, classify, communicate, and analyze simple rates of change for natural phenomena.
Connections to other DCIs in this grade-band: N/A		

Articulation of DCIs across grade-bands: 1.ESS1.A; 1.ESS1.B; 3.PS2.A; MS.ESS1.A; MS.ESS1.B	
5E Model	
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.	
Engage **Anticipatory Set**	Sun Rise Table Using the following website, students can view a chart of the sunrise and sunset times for any location in the U.S. Using these charts, teachers should guide students in determining patterns in the data and lead a discussion as to why these patterns occur. http://aa.usno.navy.mil/data/docs/RS_OneYear.php Why Do Stars in the Night Sky Change With the Seasons? Planets, Comets, Constellations & More https://www.youtube.com/watch?v=tLPNawTZOSQ Daytime Shadows The following website includes an animation that how shadows change during the day in the northern hemisphere. Shadows are created when an object, such as the stick below, blocks out some of the Sun's light. The length of the resulting shadow depends on how low or high the Sun is in the sky. http://www.schoolsobservatory.org.uk/astro/esm/shadows
Exploration **Student Inquiry**	Why Does My Shadow Change? In this lessons, students will build a model to determine how a shadow changes throughout the day. http://betterlesson.com/lesson/639840/why-does-my-shadow-change-day-1 Constellations Are Seasonal Students will describe why we see some constellations all year round while others we can only see at certain times of the year. http://betterlesson.com/lesson/639841/constellations-are-seasonal
Explanation **Concepts and Practices**	In these lessons: Teachers should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): ESS1.B: Earth and the Solar System The orbits of Earth around the sun and of the moon around the 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.
Elaboration **Extension Activity**	Changing Shadows Giving students the opportunity to observe their shadows throughout the day gives them a chance to observe evidence of Earth's rotation firsthand. This experience will help students better connect to the text because they will have seen with their own eyes the pattern of changing shadows discussed in the text. https://www.nsta.org/publications/press/extras/files/nexttime/ChangingShadows.pdf

	Additional Related Lessons and Resources http://ngss.nsta.org/DisplayStandard.aspx?view=pe&id=115
Evaluation Assessment Tasks	Assessment Task A: Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. Students will represent data in a graphical display by completing the Shadow Investigation Sheet. Assessment Task B: Students will represent data in a graphical display by completing the Constellation Model assessment sheet.