Grade 5 Science Curriculum Overview

Content Area: **Science**
Course(s):
Time Period:
Length: **Full Year**
Status: **Published**

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Unit 5 - Earth's Place in the Universe

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Unit 7 - Earth & Human Activity (Human Impact)

Summary of the Unit

The 5th Grade Science Curriculum spans a variety of topics covered under the Physical, Life, and Earth Science standards. Students will begin the year by learning about matter and forces. In these units, students will define key terms such as states of matter, physical and chemical properties, and mass. Students will be able to understand the differences between mixtures and solutions and be able to tell when a physical or chemical change has occurred. The forces unit will cover topics such as friction, gravity, and motion. Students will participate in a variety of hands-on activities to experience Newton's Laws of Motion in action. There will also be a variety of texts, videos, and activities to further expand their knowledge on these ideas. Next, students will explore the world of animals and plants through learning about how animals and plants receive their energy and the dynamics of various ecosystems. Students will describe the difference between cellular respiration and photosynthesis and how the two forms of receiving energy are related. Students will continue to expand their knowledge on energy in plants and animals by learning more about carnivores, omnivores, herbivores, decomposers, and the different levels of consumers. Students will create food webs and food chains and be able to tell the difference between the two. Students will conclude their studies with learning about topics related to Earth science. Students will discover Earth's place in the universe by researching its place in the Solar System and learning about the different moon phases, seasonal changes and more. Earth is a part of four major systems including the geosphere, atmosphere, biosphere, and hydrosphere. Students will explore the depth of each of these systems by being able to describe the components of each and how each are connected. The Earth science unit will conclude with discussing the ways that humans impact each of Earth's systems. Students will research how humans have impacted these systems and discover ways that humans can have a positive impact on their environment.

Unit 1: Matter and Its Interactions

Content Area: **Science**
Course(s): **SCIENCE**
Time Period: **1st Trimester**
Length: **3-4 Weeks**
Status: **Published**

Summary of the Unit

In this unit, students will expand their knowledge of matter and its interactions. Students will define key terms related to matter such as state of matter, physical and chemical change, and mass. Students will determine how matter changes through its different states. Students will be able to describe the different physical properties of matter. This unit will elaborate on the differences between mixtures and solutions as well as how to identify when a physical or chemical change has occurred.

Enduring Understandings

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

Essential Questions

- What is matter and what is it made of?
- How can the volume and mass of different types of matter be measured?
- How do particles move differently in solids, liquids, and gasses?
- What happens to the mass of water as it goes through its different forms (solid, liquid, gas)?
- What are the identifiable properties of a substance?
- When two substances are mixed together, is something completely new and different always made?
- How do physical and chemical changes differ?

Summative Assessment and/or Summative Criteria

- Performance based assessments
    - Mystery Science Lesson Assessments
    - Mystery Science Unit Assessments
- Carolina Science
    - Carolina Science Labs
    - Carolina Science Summative Assessment
- NJCTL - Lesson Quizzes & Unit Assessment

Resources

- Vocabulary:

- boiling point
- buoyancy
- chemical change
- condensation
- constant
- density
- dissolve
- evaporation
- filter
- filtration
- freezing point
- gas
- hardness
- liquid
- magnetism
- mass
- matter
- melting point
- mesh
- metric system
- mixture
- physical change
- physical property
- sieve
- solid
- solubility
- solute
- solution
- solvent
- viscosity
- volume

- Optional Activities:
    - STEM Activity: Carolina Science Activity 6: Designing and Testing a Filtration System
    - Create a Z-Chart using one of the following articles from Discovery Education:
        - "Properties of Matter", "What is Matter?", "Different States of Matter", "Matter Changing States"

- Websites
    - Brain Pop
    - Achieve 3000 Articles: “Everyone Loves Playing Outside”, “As Good as Ice Cream?”
    - Carolina Science
    - Discovery Education
    - Mystery Science
    - Mr. Parr Matter Song as Instruction: https://www.youtube.com/watch?v=vDZhUkp30tE
    - https://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=1048
    - https://www.youtube.com/watch?v=l9szOanq7Pg
- Optional Related Texts (can be found in Teacher Resource Room):
    - PrimeScience: Foundations of Matter by Christine Caputo
    - PrimeScience: Interactions of Matter by Christine Caputo

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
What is Matter? 4 Days	*Create a definition for the term “matter”. *Differentiate among solids, liquids and gasses. *Define volume and mass. Demonstrate when volume changes and solve for measurements	*Brain Pop video: States of Matter *Carolina Science Teachers Guide pgs 4-12 *Carolina Science Student Activity A: Mass & Volume	*Brain Pop: States of Matter Quiz *Carolina Science Lab Responses *Vocabulary Quiz *NJCTL - What is Matter? Quiz	*5-PS1-1: Develop a model to describe that matter is made up of particles too small to be seen.

	of mass. *Understand that an invisible gas has both volume and mass.	*Carolina Science Student Activity B: Balloon Balance *Carolina Science - Take Home Science Activity *Discovery Education Exploration - Different States of Matter		
How Can Matter Change State? 4 days	*Understand that matter is made up of tiny particles and that the distance between them determines if the object is a solid, liquid, or gas. *Recognize that matter can change its state from a solid, to a liquid, to a gas. *Describe how change of state is related to a	* Carolina Science Teacher Guide pgs 27-34 *Carolina Science Student Activity 2A: States of Matter Lab *Carolina Science Student Activity 2B: Evaporation and Condensation Lab *Brain Pop	*Carolina Science Lab Responses *Vocabulary Quiz *Brain Pop Video: Matter Changing States Quiz *NJCTL: Conservation of Mass Quiz	*5-PS1-1: Develop a model to describe that matter is made of particles too small to be seen. *5-PS1-2: Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of

	change in temperature. *Identify melting, evaporation, and condensation as phase changes.	Video: Matter Changing States *Discovery Education Video: States of Matter *Discovery Education: What's the Matter? *Discovery Education: Changing States		matter is conserved.
What are Physical Properties of Matter? 4 Days	*Identify physical properties of matter including buoyancy, hardness, magnetism, and viscosity. *Investigate ways to observe, measure, and describe physical properties of matter.	*Mystery Science Activity: Acids, Reactions & Properties *Mystery Science Activity: Dissolving & Particulate Nature of Matter *Carolina Science Teacher's Guide pgs 43-51 *Carolina	*Mystery Science: Acids, Reactions, & Properties Assessment *Mystery Science: Dissolving & Particulate Nature of Matter Assessment *Vocabulary Quiz *Carolina Science Lab Responses *NJCTL: Observable Properties of Matter Quiz	*5-PSI-3: Make observations and measurements to identify materials based on their properties.

		Science Student Activity 3A: Buoyancy, Hardness, and Magnetism Lab *Carolina Science Student Activity 3B: Liquid Race Lab		
What are Mixtures & Solutions? 4 Days	*Compare the behaviors of solids and liquids when they are mixed. *Determine the solubility by examining the behavior of a solid when it is mixed with water. *Explain the difference between a solution and a mixture. *Recognize different ways mixtures can be separated.	*Mystery Science Activity: Chemistry & Conservation of Matter *Discovery Education Science Interactive: "All Mixed Up" *Carolina Science Teacher's Guide pgs 61-70 *Carolina Science Student Activity 4A: Mixture of Solids Lab	*Mystery Science Activity: Chemistry & Conservation of Matter Assessment *Carolina Science Lab Responses *Vocabulary Quiz *NJCTL: Mixing Substances Quiz	*5-PSI-4: Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

	*Participate in activities that demonstrate that the weight of a substance will not change when it changes state, regardless of events that occur when materials are mixed together.	*Carolina Science Student Activity 4B: Mixtures & Solutions Lab *Carolina Science Student Activity 4C: Separating Mixtures & Solutions Lab		
What are Physical and Chemical Changes? 4 Days	*Differentiate between physical and chemical changes. *Describe characteristics of a chemical change. *Observe that chemical reactions can happen when substances are mixed together *Demonstrate that the total weight of materials mixed together will not change regardless of	*Mystery Science: Gasses & Particle Models Activity *Mystery Science: Chemical Reactions Activity *Brain Pop Video: Property Changes *Carolina Science Teacher's Guide pgs 85-92 *Carolina Science	*Mystery Science: Gasses & Particle Models Activity Assessment *Mystery Science: Chemical Reactions Activity Assessment *Brain Pop Video: Property Changes Quiz *Carolina Science Lab Responses *Vocabulary Quiz	*5-PSI-4: Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

	chemical or physical changes.	Activity 5A: Signs of Chemical Changes Lab *Carolina Science Activity 5B: Observing Chemical Changes Lab		

SCI.5-PS1-4	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
SCI.5-PS1-1	Develop a model to describe that matter is made of particles too small to be seen.
SCI.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.
SCI.5-PS1-3	Make observations and measurements to identify materials based on their properties.

ELA/Literacy

- RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
- W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
- W.5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
- W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

Mathematics

- MP.2 Reason abstractly and quantitatively.
- 5. NBT.A.1 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
- 5. NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
- 5. MD.A.1 Convert among different-sized standard measurement units within a given measurement

system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems.

- 5. MD.C.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
- 5.MD.C.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft., and improvised units.

Suggested Modifications for Special Education, ELL and Gifted Students

Consistent with individual plans, when appropriate.

Special Education & ELL Students

- Below-level learners can be provided with vocabulary cards, study guides, printed notes, and leveled readers and modified projects from choices provided.
- Below-level learners can be provided with graphic organizers, vocabulary cards, study guides, printed notes, and leveled readers. Projects can be modified or leveled as needed.
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Provide ELL students with multiple literacy strategies including websites with various language options.
- ELL students can create a 4-square graphic organizer on vocabulary words.

Gifted Students:

- The Mixture Kids: Create personifications (illustration and story) of solutions, heterogeneous mixtures, and colloids as if they were siblings. The story should include physical appearances as well as examples. Students research each type of mixture (or teacher provides handout with information) and then students illustrate each “mixture child”. Refer to this activity throughout the topic.
- Create a slogan, commercial, or article for the benefits of moon travel related to mass, volume, and weight.
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understanding.
- Use project-based science learning to connect science with observable phenomena. Structure the learning around explaining or solving a social or community-based issue.
- Collaborate with after-school programs or clubs to extend learning opportunities.

Suggested Technological Innovations/Use

Create a movie using the "Movie Maker" feature on Brain Pop on any of the videos related to this unit.

Cross Curricular/21st Century Connections

- 9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
- 9.2 21st Century Life and Career Skills: Personal Financial Literacy: All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.
- 9.3 21st Century Life and Career Skills: Career Awareness, Exploration, and Preparation: All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

Unit 2: Motion & Stability: Forces & Interactions

Content Area: **Science**
Course(s): **SCIENCE**
Time Period: **1st Trimester**
Length: **3 Weeks**
Status: **Published**

Summary of the Unit

In this unit, students will define key terms such as force, friction, gravity, motion as well as different forms of energy. Students will support an argument that the gravitational force exerted by Earth on objects is directed down. This unit will explore the relationship between speed, distance and time as well as how one's weight is determined by gravity and mass. Students will explore these topics through the use of texts, videos, and hands-on activities.

Enduring Understandings

- Speed is the relationship between distance and time.
- Motion is changed by unbalanced forces.
- Gravitational force occurs when two bodies physically attract each other by "pulling".
- Weight is defined as the force of gravity on an object.
- The greater the object's mass, the greater the force needed to move it, stop it or change its speed or direction.
- An object's mass does not influence the force of Earth's gravity on it.
- The Conservation of Mass states that matter can neither be created nor destroyed, it can only be transferred.

Essential Questions

- How is motion measured and speed calculated?
- What are contact forces (applied, frictional and normal) vs non-contact forces (magnetic)?
- How do you know if forces are balanced or unbalanced?
- Describe magnetic and electrical fields.
- How did scientists learn about gravitational force?

- How can you determine which object will hit the ground first when two objects are dropped?
- How does increasing the distance between two objects change the force of gravity between those objects?
- How does changing the mass of two objects change the force of gravity between those objects?

Summative Assessment and/or Summative Criteria

- Performance based assessments
    - Mystery Science Lesson Assessments
    - Mystery Science Unit Assessments
- Vocabulary Quizzes
- NJCTL - Lesson Quizzes & Unit Assessment

Resources

- Vocabulary:

- converts
- electrons
- fission
- force
- friction
- fulcrum
- fusion
- gravity
- input
- mechanical advantage
- molecules
- nucleus
- output
- pitch
- plane
- potential energy
- protons
- resists
- renewable
- rolling friction
- sliding friction
- static friction

- neutrons
- texture

- STEM:
    - Build a Catapult, Create a 2-Wheeled Car, Build a Toothpick Bridge (all can be found on pbskids.org)
- Optional Activities:
    - Create a Z-Chart using one of the following Discovery Education articles: “Force”, “Forces on the Court”, “Gravity and Weight”, “Let’s Play Catch”, and “Zamboni”

Websites

- Brain Pop
- Achieve 3000 Articles: “The Ice Slide”, “Mia Hamm: A Leader in Women’s Sports”, “Play Ball!”
- Discovery Education
- Mystery Science
- Motion/Forces/Gravity: https://drive.google.com/drive/folders/1g_-wEksayQOFe9YfKbYtGD3KMoVXrBGh
- Introduction to Forces: https://www.youtube.com/watch?v=9G1dhkRJ3ak&t=63s
- Introduction to Gravity: https://www.youtube.com/watch?v=4N0Lm1ULeg8

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
Lesson 1: Forces 1 Week	*Describe the relationship between speed, distance, and time. *Define the differences between contact and distant forces as well as balanced and unbalanced	*Brain Pop Videos: Forces, Distance, Rate & Time, Newton’s Laws of Motion *Mystery Science Activity: Flight & Forces *Discovery Education video: “Real World	*Brain Pop Quizzes *Vocabulary Quiz *Mystery Science Assessment on Activity *NJCTL Quiz: Motion & Forces	5-PS2-1

	forces. *Calculate net force. *Describe electrical forces and give examples. *Define Newton's Laws of Motion and the Law of Conservation of Mass.	Science: Forces" *Discovery Education Exploration: Changing Direction *NJCTL "Forces" Slides 4-108		
Lesson 2: Friction 1 Week	*Define and differentiate the 4 types of friction: static, kinetic, rolling and sliding. *Describe static electricity and give examples. *Determine what factors influence the amount of friction an object has.	*Watch and discuss the TrueFlix video on Friction. *Read through and Discuss the Friction text on TrueFlix. *Watch BrainPop video: Static Electricity *Discovery Education Exploration: Friction	*TrueFlix related activities to the text. *BrainPop Quiz *Vocabulary Quiz	5-PS2-1
Lesson 3: Gravity 1 Week	*Explain how the concept of gravity was observed throughout history.	* Watch and Discuss the TrueFlix video on Gravity.	*NJCTL Unit Test *phet.colorado.edu simulations through	5-PS2-1

	*Explain how mass and distance relate to the strength of gravity.	*Read through and Discuss the Gravity text on TrueFlix. *NJCTL "Forces" slides 109-158. *Discovery Education Exploration: Gravity *BrainPop Video: Gravity	NJCTL *Vocabulary Quiz *BrainPop video quiz	

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

ELA & Literacy

- RI.5.1, Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
- RI.5.9, Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.
- W.5.1, Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

Mathematics

- MP.2 Reason abstractly and quantitatively.

Suggested Modifications for Special Education, ELL and Gifted Students

· Consistent with individual plans, when appropriate.

ELL Students

- Provide ELL students with multiple literacy strategies including websites with various language options.
- Assign students articles on Achieve3000 that are translated into their native language and provide extra assistance.
- Create vocabulary cards to assist with learning.

Below-Level Learners

- Create vocabulary cards to assist with learning.
- Teachers can create study guides, printed notes. Provide leveled readers and modified instruction.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).

Gifted Students

- Design a simple activity to demonstrate understanding of relationships between force and motion (e.g. Newton's Laws).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understanding.
- Use project-based science learning to connect science with observable phenomena. Structure the learning around explaining or solving a social or community-based issue.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Group advanced learners with below-level learners and have them help others on activities together.

Suggested Technological Innovations/Use

- Create a BrainPop movie on Forces or Gravity.
- Further learning through the use of online labs using the phet.colorado.edu simulations through NJCTL.
- Demonstrate understanding by using the Board feature on Discovery Education. Create a board on Friction, Forces, Gravity or a related topic.

Cross Curricular/21st Century Connections

- 9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
- 9.2 21st Century Life and Career Skills: Personal Financial Literacy: All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.
- 9.3 21st Century Life and Career Skills: Career Awareness, Exploration, and Preparation: All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

Unit 3: From Molecules to Organisms: Structures and Processes (Energy in Organisms)

Content Area: **Science**
Course(s): **SCIENCE**
Time Period: **2nd Trimester**
Length: **2 weeks**
Status: **Published**

Summary of the Unit

In this unit, students will discover where humans and animals acquire their energy and how that energy is then used to survive. Students will be able to describe the process of cellular respiration. Students will learn how plants receive their energy in comparison to how animals receive their energy. Students will be able to describe the process of photosynthesis and compare and contrast it to cellular respiration. Students will understand the importance of sunlight, air, and water for all organisms. Lessons will be learned through the use of hands-on activities, videos, explorations, and texts.

Enduring Understandings

- The sun is the primary source of energy for both plants and animals.
- Plants get the materials they need for growth from the air and water.
- Food that animals consume provides energy for body growth, body repair, motion, and warmth.
- The process of photosynthesis is a chemical process that converts the energy of the sun into food for plants and animals.
- Animals and humans acquire their energy through the process of cellular respiration.

Essential Questions

- Where do animals get their energy?
- How does the sun contribute to the energy cycle?
- What is the process of photosynthesis?
- Where do plants get the materials they need for growth and development?
- Where does the energy in food come from?
- What is the process of cellular respiration?
- How do animals use the energy they get from food?

Summative Assessment and/or Summative Criteria

- Performance based assessments
    - Mystery Science Lesson Assessments
- Vocabulary Quizzes
- NJCTL - Lesson Quizzes & Unit Assessment
- NJCTL - Lab Assessments
- BrainPop Quizzes

Resources

- Vocabulary:

- energy
- kinetic energy
- potential energy
- stored energy
- chemical energy
- organism
- consume
- carbon dioxide
- cellular respiration
- photosynthesis
- reactants
- chloroplast
- chlorophyll
- molecule

- STEM:
    - Lab 1 - Examining Plant Growth (NJCTL)
    - Lab 2 - Pigments in Plants (NJCTL)
    - Lab 3 - Photosynthesis and Cellular Respiration (NJCTL)

Websites

- Brain Pop
- Achieve 3000 Articles: “A Plan to Plant a Trillion Trees”, “A New Way to Grow Food”, “What Plants Can Tell Us”, “ No Water? Grow Safflower?”
- Discovery Education
- Mystery Science
- Plants Reacting to the Sun’s Energy: https://youtu.be/DhITXtENPrU and https://youtu.be/w-adcjH-xyk

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
Energy Introduction and Energy Use in Animals/ 3 days	*Explain the differences between different types of energy. *Determine how animals receive energy and what that energy is used for. *Describe the process of cellular respiration.	*NJCTL Slides 4 - 30 *Brain Pop Video - Cellular Respiration *Discovery Education: Exploration - Cellular Respiration	*Lab 1 - Examining Plant Growth *Vocabulary Assessment * BrainPop Quiz *NJCTL Quiz - Energy in Animals	5-PS3-1

Energy in Plants/ 3 days	*Describe the process of photosynthesis. *Define the terms chlorophyll and chloroplasts and how they relate to photosynthesis. *Determine two ways that plants use their energy.	*NJCTL - Slides 31 - 46 *Discovery Education: Exploration - Leaves *BrainPop Videos: Photosynthesis and Plant Growth *Mystery Science Activity: Plant Needs: Air & Water - "What do Plants Eat? "	*NJCTL Quiz - Energy in Plants *Vocabulary Assessment *BrainPop Quizzes *Mystery Science Activity Assessment *Lab 2 - Pigments in Plants (NJCTL)	5-LS1-1
Energy Flow/ 4 days	*Compare and contrast the processes of photosynthesis and cellular respiration. *Identify the steps of cellular respiration and photosynthesis.	*NJCTL Slides 48 - 52 *Discovery Education: Video - Comparing Photosynthesis and Cellular Respiration	*NJCTL Quiz - Energy Flow *Lab 3 - Photosynthesis and Cellular Respiration *Unit Review and NJCTL Unit Test	5-LS1-1

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

ELA & Literacy

- RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
- RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

- RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.
- W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
- SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Mathematics

- MP.2 Reason abstractly and quantitatively.
- MP4 Model with mathematics.
- MP.5 Use appropriate tools strategically.
- 5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

Suggested Modifications for Special Education, ELL and Gifted Students

Consistent with individual plans, when appropriate.

Special Education:

- Below-level learners can be provided with vocabulary cards, study guides, printed notes, and leveled readers and modified projects from choices provided.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide texts that can be differentiated based on students' reading levels.

ELL:

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among

various backgrounds and cultures (e.g. multiple representation and multimodal experiences).

- Provide ELL students with multiple literacy strategies including websites with various language options.

Gifted Students:

- Gifted students can create a Discovery Education Board explaining Energy Flow; conduct a 5th Grade Ecosystem Web Quest- https://sites.google.com/site/5thgradeecosystemswebquest/
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understanding.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Allow for opportunities for the gifted students to assist other students with learning and activities.

Suggested Technological Innovations/Use

- Discovery Education Explorations
- Create a BrainPop video on Photosynthesis or Cellular Respiration.
- Create a diagram of photosynthesis or cellular respiration using an online program such as Google Slides or PowerPoint.
- Create a Discovery Education board on the importance of the sun for human life and plant life.

Cross Curricular/21st Century Connections

- 9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
- 9.2 21st Century Life and Career Skills: Personal Financial Literacy: All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.
- 9.3 21st Century Life and Career Skills: Career Awareness, Exploration, and Preparation: All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

Unit 4: Ecosystems: Interactions, Energy & Dynamics

Content Area: **Science**
Course(s): **SCIENCE**
Time Period: **2nd Trimester**
Length: **4-5 Weeks**
Status: **Published**

Summary of the Unit

In this unit of study, students will develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. Students will discover that the food of almost any kind of animal can be traced back to plants. Students will learn about the dynamics of a food web where some animals rely on other animals or plants for food while plants produce their own food. Some organisms, such as fungi and bacteria, break down dead organisms and are known as decomposers. Decomposition eventually restores some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gasses and water from the environment and release waste matter back into the environment.

Enduring Understandings

- All organisms rely on the sun as a source of energy and for producers to create their own food.
- Energy is transferred as organisms are consumed.
- Decomposers take dead material and recycle it back into usable material.
- Ecosystems are fragile and require a perfect balance of predator and prey.
- Animals are known as consumers because they must consume other organisms to receive their energy.

Essential Questions

- How can a food web be used to observe interactions between organisms in an environment?
- What are biotic and abiotic things?
- What do biotic things need to survive?
- How does nitrogen cycle through the environment?
- What happens when one organism is removed from a food web?
- How can organisms be grouped based on the food they eat?

- How is matter transferred in an ecosystem?
- What factors can threaten a species?

Summative Assessment and/or Summative Criteria

- Performance based assessments
    - Mystery Science Lesson Assessments
    - Mystery Science Unit Assessments
- Carolina Science
    - Carolina Science Labs
    - Carolina Science Summative Assessment
- NJCTL - Lesson Quizzes & Unit Assessment

Resources

- Vocabulary:

- abiotic
- agriculture
- biotic
- carnivore
- condensation
- consumer
- cycle
- deforestation
- decomposer
- ecosystem
- evaporation
- food chain
- food web
- herbivore
- hydrosphere
- nitrogen cycle
- omnivore
- organic
- photosynthesis
- precipitation
- predator
- prey
- producer
- technology
- variable
- water cycle

- Optional Activities:

- STEM Activity: How Healthy is Your Ecosystem? (Discovery Education)
- Research project on different types of ecosystems
- Create a Z-Chart using one of the following articles from Discovery Education:
  - "What is an Ecosystem?", "The Balance of Ecosystems", "Changes in Ecosystems", " What Type of Ecosystem Do You Live In?"

- Websites
  - Brain Pop
  - Achieve 3000 Articles: "Eating the Invaders", "Giants are Real!", "A Plan to Plant a Trillion Trees", " Frozen in Time", "Saving Seeds of Cherokee Culture", "The Lives of Ants"
  - Carolina Science
  - Discovery Education
  - Mystery Science
  - Plants reacting to the sun's energy: https://youtu.be/DhITXtENPrU

https://youtu.be/w-adcjH-xyk

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
Energy for Life 4 Days	*Differentiate between living and nonliving things. *Use evidence to explain why living things need energy from the Sun. *Investigate the relationship between Earth and the energy	*Carolina Science Teacher Guide pgs 1-32 *Carolina Science Student Activity 1A: Sun Oven *Carolina Science Nitrogen Cycle	*Carolina Science Lab Responses * Mystery Science Activity Responses *Brain Pop video quiz *vocabulary quiz	5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

	from the Sun. *Model the cycling of nitrogen in the environment.	Activity *Mystery Science Activity: Why Would a Hawk Move to NYC? *Brain Pop video: Ecosystems *Discovery Science: Curiosity: Ecosystems (video), Parts of Ecosystems (Exploration), Population Changes (Exploration)		
Producers 4 days	*Draw conclusions about how plants get energy from the Sun. *Recognize that iodine causes a chemical reaction that indicates the presence of starch in a plant. *Use iodine to	*Carolina Science Teacher Guide pgs 33-50 *Carolina Science Student Activity 2 - Starch Factor *Mystery Science: What do Plants Eat?	*Carolina Science Lab Responses *Vocabulary Quiz *Mystery Science Activity Responses	5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

	detect whether there is a difference in the presence of starch in a plant. *Interpret evidence that plants acquire their material for growth from air and water based on observations of plant structures.			
Consumers 4 Days	*Classify organisms by the types of food they eat. *Identify the patterns between food and energy. *Investigate how animals that eat the same food compete with one another. *Compare and relate the pattern of the amounts of energy an animal gets from the amount of food it needs to eat for	*Carolina Science Teacher Guide pgs 51-68 *Carolina Science Student Activity 3A - Food Chain Energy Pyramid *Carolina Science Student Activity 3B - Owls Eat WHAT? *Carolina Science Activity 3C - Consumer Report: Who	*Vocabulary Quiz *Carolina Science Lab Responses	5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

	survival.	Eats More? *Discovery Science - What's for Dinner (Exploration)		
Decomposers 4 Days	*Apply the concept of the flow of energy in an ecosystem to understand that decomposers get energy from the dead organic matter. *Construct a compost pile and observe the decomposition of organic matter. *Connect the contribution of decomposers to the nitrogen cycle.	*Carolina Science Teacher Guides pgs 69-80 *Carolina Science Take Home Science Activity: Growing Decomposers *Mystery Science Activity: Where do Fallen Leaves Go? and Do Worms Really Eat Dirt?	*Mystery Science Activity Assessments *Vocabulary Quiz *Carolina Science Take Home Science Responses	5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
Food Webs 4 Days	*Assemble a food chain energy pyramid that shows the flow of energy in an ecosystem in any given climate region. *Analyze the needs of living	*Carolina Science Teacher Guide pgs 81-104 *Carolina Science Activity 5A - Food Chain Energy	*Carolina Science Activity responses *BrainPop video quizzes *Mystery Science Activity assessments *Vocabulary Quiz	5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

	things in different types of environments. *Hypothesize the result of removing one type of organism from the food web, and devise a model to explain the possible consequence. *Draw conclusions that all organisms depend on other organisms in an ecosystem. *Apply concepts to design an ecosystem to explain how each organism depends on the others for survival.	Pyramids *Carolina Science Activity 5B - Making a Mini Ecosystem *BrainPop - Food Webs and Food Chains videos *Mystery Science Activities: Why did the dinosaurs go extinct? and Why do you have to clean a fish tank but not a pond? *Discovery Science - Interactions in Ecosystems (exploration)		
Human Impact 4 days	*Analyze the cause and effect relationship between human behaviors and the environment.	*Carolina Science Teacher Guide pgs 105-127 *Carolina Science Literacy and	* Carolina Science Activity responses *Carolina Science Summative Assessment *NJCTL Assessment	5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the

	*Develop possible solutions to human needs without affecting the environment. *Communicate information gained through research using technology.	Science Activites: Activity 6A - Human Impact: Factories Activity 6B - Human Impact: Fossil Fuels–Oil Activity 6C - Human Impact: Technology–Fast and Easy Activity 6D - Human Impact: Agriculture–Homes and Gardens Activity 6E - The Soft Eggshell Mystery *Discovery Education - Global Climate Change and Changes in Ecosystems Video	*Vocabulary Test	environment.

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

ELA/Literacy

- RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
- SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
- R.I.5.5 Compare and contrast the overall structure of events, ideas, concepts, or information in two or more texts.

Suggested Modifications for Special Education, ELL and Gifted Students

Special Education

- Below-level learners can be provided with vocabulary cards, study guides, printed notes, and leveled readers and modified projects from choices provided.
- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.

ELL

- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Provide ELL students with multiple literacy strategies including websites with various language options.

Gifted Students

- ·Create a Discovery Education Board teaching the importance of maintaining an ecosystem.
- Conduct research and present on an Ecosystem.
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understanding.
- Collaborate with after-school programs or clubs to extend learning opportunities.

Mathematics

- MP.2 Reason abstractly and quantitatively.
- MP.4 Model with mathematics.

Suggested Technological Innovations/Use

- Create a movie using the "Movie Maker" feature on Brain Pop on any of the videos related to this unit.
- Create a Google Slide Presentation on an ecosystem of their choosing.
- Create a Food Web/Chain using Google Slides or Google Docs with descriptions and images.

Cross Curricular/21st Century Connections

- 9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
- 9.2 21st Century Life and Career Skills: Personal Financial Literacy: All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.
- 9.3 21st Century Life and Career Skills: Career Awareness, Exploration, and Preparation: All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

Unit 5: Earth's Place in the Universe

Content Area: **Science**
Course(s): **SCIENCE**
Time Period: **3rd Trimester**
Length: **4 weeks**
Status: **Not Published**

Summary of the Unit

This unit will provide studies with a variety of experiences that allow students to explore how Earth is both part of a larger system and is itself composed of interconnected systems. Students will consider Earth's place in space. Students will examine the closest and furthest bodies to Earth and explore the observable effects that they have on Earth. Through a variety of hands-on activities, students will gain understanding through the use of modeling, scale and cause-and-effect relationships. Students will participate in activities that will further their understanding on gravity, moon phases, seasonal changes, and more.

Enduring Understandings

- A star's distance from Earth affects how bright it appears to be.
- The length of shadows decrease during the day until they reach a certain point, then the shadows gradually start to get larger.
- The rotation of Earth causes night and day.
- The path of the Sun changes from month to month.
- Location of constellations change due to the rotation and revolution of Earth.
- The Moon has different phases due to its rotation around the Earth.

Essential Questions

- Why does the Sun appear so much brighter than other stars?
- What can the relative brightness of a star tell us about its distance from Earth?
- What are ways Earth interacts with the Sun?
- What are ways Earth interacts with the Moon?
- What are ways the Sun, Moon and Earth interact?
- What kinds of cycles do Earth's movements around the Sun cause?

- How do the Moon's interaction with Earth and the Sun cause its phases?

Summative Assessment and/or Summative Criteria

- Performance based assessments
    - Mystery Science Lesson Assessments
    - Mystery Science Unit Assessments
- Carolina Science
    - Carolina Science Labs
    - Carolina Science Summative Assessment
- NJCTL - Lesson Quizzes & Unit Assessment

Resources

- Vocabulary:

- axis
- day
- diameter
- galaxy
- gravity
- model
- moon
- moon phase
- night
- orbit
- pattern
- planet
- revolution
- rotation
- scale model
- shadow
- solar system
- star
- Sun
- system
- universe

- Optional Activities:
    - STEM Activity: In the Shadows (Discovery Education)

- Research Project:
    - The Moon & Tides: What causes tides in Earth's oceans? What is the difference between a spring tide and a neap tide? If you were at the seashore and saw the Moon overhead, would the tide be high or low?
    - Constellations - Which are in our night sky? How do they change over time? Do some stars change more than others?
    - Seasons - How does Earth's tilt create seasons? What is a significant feature of the moon? Why is the moon important to life on Earth? What are seasons in the southern hemisphere like compared to seasons in the northern hemisphere? Why do slanted rays from the sun feel weaker than direct rays from the sun?
- Create a Z-Chart using one of the following articles from Discovery Education:
    - "The Sun: Our Star", "Stars & the Universe", "Land of the Midnight Sun", "A Huge Furnace"

- Websites
    - Achieve 3000 Articles: "Eyes on the Skies", "Wally Funk Blasts off at Last", "Space Next", "Mae Jemison: Space Pioneer"
    - Brain Pop
    - Carolina Science
    - Discovery Education
    - Mystery Science
    - Lunar Phase Simulator - https://ccnmtl.github.io/astro-simulations/lunar-phase-simulator/
    - Phases/Order of the Moon Interactive - https://starchild.gsfc.nasa.gov/docs/StarChild/solar_system_level2/moonlight.html
    - Hubble Telescope to better understand light-years and distance in space https://www.brainpop.com/science/space/hubbles30thbirthday/
    - https://hubblesite.org/

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
What's Earth Place in the	*Contrast the distance between	*Carolina Science pgs 1-	*Carolina Science lab responses	5-ESS1-1

Universe? 6 days	Earth and the Sun with distances from Earth to other stars. *Calculate the size of Earth compared with the Sun. *Model the proportional size difference between Earth and the Sun.	19 *Carolina Science -Student Activity Sheet 1A: Comparing Stars *Carolina Science Sheet 1B - Modeling Earth & the Sun *Mystery Science 1) Why do the stars change with the seasons? 2) What are the wandering stars? *Discovery Science - Exploration: Our Star the Sun *TrueFlix: “Stars”, “Planet Earth”	*What’s Earth Place in the Universe? Quiz *Mystery Science lab responses	
How do the Sun, Earth & Moon Interact? 6 days	*Devise a scale model to represent the relationship of the sizes of Earth and the Moon as well as the distances between them.	*Carolina Science pgs 19-38 *Carolina Science -Student Activity Sheet 2A: Modeling Revolution in the Sun-Earth-	*Carolina Science Lab Responses *BrainPop video quiz *Discovery Education Exploration responses	5-ESS1-1

	*Examine how the shape of Earth and Earth's path around the Sun are caused by the constant pull of gravity. *Construct models to simulate the revolution of Earth around the Sun and the Moon around Earth. *Model how Earth's axis, combined with the planet's revolution around the Sun, cause seasons.	Moon-System *Carolina Science -Student Activity Sheet 2B: Modeling the Seasons *Mystery Science: How can the sun tell you the season? *Mystery Science: Why is gravity different on other planets? *BrainPop: "Tides" *Discovery Science: Gravity & Orbits (Exploration), Gravity (Exploration)	*Mystery Science Lab responses *Quiz on this lesson	
Patterns of Change 6 days	*Graph and analyze the change in number of daylight hours over a year, and relate this change to the position of the Earth in its orbit around the Sun	*Carolina Science pgs 39-64 *Carolina Science -Student Activity Sheet 3A: Graphing the Number of Daylight Hours	*Carolina Science Lab Responses *BrainPop quizzes *Mystery Science lab responses	5-ESS1-1

	(seasons). *Construct a model of the phases of the Moon based on the movement of the Moon around Earth and the location of the Sun. *Graph the change of a shadow throughout the day, and relate that change to Earth's rotation.	*Carolina Science -Student Activity Sheet 3B: Modeling the Phases of the Moon *Carolina Science -Student Activity Sheet 3C: Graphing Shadows *Mystery Science: 1. Why does the moon change shape? 2. Who set the 1st clock? 3. How fast does the Earth spin? *BrainPop: Moon Phases, Seasons *Discovery Education: Cycles in the Sky (Fun-damental)	*Unit Test	

SCI.5-ESS1-1 Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.

ELA/Literacy

- RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-ESS1-1)
- RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-ESS1-1)
- RI.5.8 Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). (5-ESS1-1)
- RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS1-1) W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-ESS1-1) SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-ESS1-2)

Mathematics

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

Suggested Modifications for Special Education, ELL and Gifted Students

Special Education

- Below-level learners can be provided with vocabulary cards, study guides, printed notes, and leveled readers and modified projects from choices provided.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).

- Structure the learning around explaining or solving a social or community-based issue.

Gifted Students

- Gifted students can predict what Earth will look like in 1 million years based on continental drift. They can also model what will be found in the layers of rock created in current times 1 million years in the future.
- Gifted students can create a Discovery Education Board teaching about the relationship between the Sun, Earth and Moon.
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understanding.
- Collaborate with after-school programs or clubs to extend learning opportunities.

ELL

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tools such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Use project-based science learning to connect science with observable phenomena.
- Provide ELL students with multiple literacy strategies including websites with various language options.
- Mystery Science has videos and assessments in Spanish if necessary.

Suggested Technological Innovations/Use

Create a movie using the "Movie Maker" feature on Brain Pop on any of the videos related to this unit.

Cross Curricular/21st Century Connections

- 9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking,

collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

- 9.2 21st Century Life and Career Skills: Personal Financial Literacy: All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.
- 9.3 21st Century Life and Career Skills: Career Awareness, Exploration, and Preparation: All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

Unit 6: Earth's Systems

Content Area: **Science**
Course(s): **SCIENCE**
Time Period: **3rd Trimester**
Length: **5 Weeks**
Status: **Not Published**

Summary of the Unit

In this unit of study, students will develop a model to describe ways the geosphere, biosphere, hydrosphere, and atmosphere interact. Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. In addition, students will 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. Nearly all of Earth's available water is in the ocean. Most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. The crosscutting concepts of systems and models, and scale, proportion, and quantity are called out as organizing concepts for these disciplinary core ideas.

Enduring Understandings

- Earth is made up of four systems: geosphere, atmosphere, biosphere, and hydrosphere.
- Earth’s geosphere is composed of four distinct layers.
- Animals and plants rely on each other to create the gasses needed for survival.
- The Ozone Layer protects us from the Sun’s harmful UV rays.
- The four systems interact with each other.

Essential Questions

- What are Earth’s four major systems, and how do they interact?
- What two types of water can be found commonly on Earth?
- How does the water cycle work?
- What are the layers of the Earth and what are the characteristics of each?
- What are the characteristics of the atmosphere? How is the atmosphere affected by plants and animals?

- Where is water located on Earth? How much of this water is usable by humans?

Summative Assessment and/or Summative Criteria

- Performance based assessments
    - Mystery Science Lesson Assessments
    - Mystery Science Unit Assessments
- Carolina Science
    - Carolina Science Labs
    - Carolina Science Summative Assessment
- NJCTL - Lesson Quizzes & Unit Assessment

Resources

- Vocabulary:

- atmosphere
- biosphere
- environment
- erosion
- evaporation
- freshwater
- geosphere
- glacier
- groundwater
- hydrosphere
- model
- pollution
- precipitation
- recycling
- resource
- runoff
- scale model
- system
- terrarium
- water cycle

- Optional Activities:
    - STEM Activity: “What’s in a system?”, “Oil spill clean up”, “Garbage in our oceans” (Discovery Education)
    - Graphic Organizer: Create a graphic organizer with each of Earth’s Four Systems. Students will

create four boxes on poster paper and label each with a different system. Students will describe each of the systems and draw pictures that describe each. This can be done at the end of the unit or worked on continuously throughout the unit.

- Research Project:
  - Carolina Science Activity Sheet 4A - Researching Earth's Major Systems
- Create a Z-Chart using one of the following articles from Discovery Education:
  - "It's Only Water", "Let's Give a Big Cheer"
- Create a 3D model of the inside of the Earth.
- Mystery Science Activity - "How can you keep a house from blowing away in a windstorm?"

- Websites
  - Achieve 3000 Articles: "Let There be Darkness?", "Where's the Rain?", "Breaking the Ice", "Closed for Repairs", "Going Green", "Water Worries", "The Deepest Ocean"
  - Brain Pop
  - Carolina Science
  - Discovery Education
  - Mystery Science

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
Geosphere 4 Days	*Identify the characteristics of the geosphere. *Differentiate between the different layers of the Earth based on distinct characteristics.	*Discuss components of the geosphere using NJCTL slides 1-28 *Begin creating the graphic organizer on Earth's Systems: http://betterlesson.com/lesson/634345/the-earth-s-systems *BrainPop Videos: "Earth", "Types of Rocks"	*Quiz on the Geosphere *BrainPop Video Quizzes	*5-ESS2-1

		*Discovery Education: Background Builder - Geosphere		
Atmosphere 4 days	*Identify the different gasses that make up the Earth's Atmosphere. *Describe the importance of the ozone layer to life on Earth.	*Discuss components of the atmosphere using NJCTL slides 29-47 *Continue working on the graphic organizer: http://betterlesson.com/lesson/634345/the-earth-s-systems *BrainPop Video - "Earth's Atmosphere" *Discovery Education: Video - "Characteristics of Earth's Atmosphere", Exploration - "The Atmosphere"	*Quiz on the Atmosphere *BrainPop Video Quiz	*5-ESS2-1
Hydrosphere 5 Days	*Identify locations where water can be found on Earth and what percentage of that water is usable by humans. *Apply computational thinking to determine the ratio of freshwater to saltwater on Earth. *Describe and graph the amounts of saltwater and freshwater in	*Discuss components of the Hydrosphere using NJCTL slides 48-78 *Carolina Science: Water on Earth in Earth & Space Systems Unit Book - pgs 81 - 102 *Carolina Science: Student Activity Sheet 5A - Graphing Earth's Water *Carolina Science: Student Activity Sheet 5B - Modeling the Water Cycle *Continue working on the graphic organizer: http://betterlesson.com/lesson/634345/the-earth-s-systems *Brain Pop Videos - "Oceans", "Water	*Quiz on the Hydrosphere * Carolina Science Lab Responses *BrainPop Video Quizzes *Mystery Science Lab Responses	*5-ESS2-1 *5-ESS2-2

	various reservoirs to provide evidence about the distribution of water on Earth. *Develop a model of the water cycle. *Analyze consequences to the environment resulting from the water cycle.	Cycle" *Mystery Science Activities: • "Where do clouds come from?" • "Why is the ocean salty?" • "Hydrosphere and the roles of water" • "When you turn on the faucet, where does the water come from?"		
Biosphere & Earth's Systems Interactions 4 Days	*Describe how animals and plants need each other for survival. *Explain the relationship between plants and animals when it comes to the production of oxygen and carbon dioxide. *Describe how each of Earth's four systems interact with each other.	*Discuss components of the hydrosphere and Earth's connected systems using NJCTL slides 79-99. *Finish working on the graphic organizer: http://betterlesson.com/lesson/634345/the-earth-s-systems *Discovery Education: Video - "How Earth's systems Interact", "What is the biosphere? *Mystery Science Activity - "Can we make it rain?"	*Quiz on the biosphere *Test on Earth's Systems from Carolina Science or NJCTL *Vocabulary assessment *Mystery Science Lab responses	*5-ESS2-1

SCI.5-ESS2-2	Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.
SCI.5-ESS2-1	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Suggested Modifications for Special Education, ELL and Gifted Students

Special Education

- Below-level learners can be provided with vocabulary cards, study guides, printed notes, and leveled readers and modified projects from choices provided.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Structure the learning around explaining or solving a social or community-based issue.

Gifted Students

- Create a Discovery Education Board explaining Earth's four major systems and their interactions and/or create a 3D ocean model.
- Gifted students can predict what Earth will look like in 1 million years based on continental drift. They can also model what will be found in the layers of rock created in current times 1 million years in the future.
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understanding.
- Collaborate with after-school programs or clubs to extend learning opportunities.

ELL

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tools such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).

- Use project-based science learning to connect science with observable phenomena.
- Provide ELL students with multiple literacy strategies including websites with various language options.
- Mystery Science has videos and assessments in Spanish if necessary.

ELA/Literacy

- RI.5.7: Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-ESS2-1) (5-ESS2-2)
- W.5.8: Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-ESS2-2)
- SL.5.5: Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-ESS2-1) (5-ESS2-2)

Mathematics

- MP.2: Reason abstractly and quantitatively. (5-ESS2-1) (5-ESS2-2)
- MP.4: Model with mathematics. (5-ESS2-1) (5-ESS2-2)
- 5.G.A.2: Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (5-ESS2-1)

Suggested Technological Innovations/Use

- Utilize Google Sheets by developing a pie graph/bar graph demonstrating the distribution of water on Earth.
- Complete graphic organizers, create a presentation, write a summary utilizing BrainPop Movie Creator or Google Sheets/Slides.
- Create a Discovery Education Board explaining Earth's major systems and their interactions.
- Complete a WebQuest on Earth’s Systems and/or use the internet to search for information on Earth’s Systems.

Cross Curricular/21st Century Connections

- 9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
- 9.2 21st Century Life and Career Skills: Personal Financial Literacy: All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.
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Unit 7: Earth & Human Activity

Content Area: **Science**
Course(s): **SCIENCE**
Time Period: **3rd Trimester**
Length: **5 Weeks**
Status: **Not Published**

Summary of the Unit

In this unit of study, students will obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. Individuals and communities are doing things to help protect Earth's resources and environments. The crosscutting concepts of systems and system models are 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 then use these practices to demonstrate understanding of the core ideas.

Enduring Understandings

- Humans can negatively and positively impact the Earth and the environment.
- Industrialization brings an increased demand for and use of energy and other resources.
- There are a variety of negative impacts on the environment such as global warming, deforestation, ozone depletion, the greenhouse effect, destruction of habitats, and species extinction.
- There are many ways that humans can help positively impact the environment.

Essential Questions

- How have humans affected Earth's systems around them?
- How can communities use science to protect Earth's systems?
- What is climate change?
- How can humans reduce their negative impact on Earth?
- How can humans' impact affect plants and animals?

Summative Assessment and/or Summative Criteria

- Carolina Science
    - Carolina Science Labs
    - Carolina Science Summative Assessment
- NJCTL - Lesson Quizzes & Unit Assessment

Resources

- Vocabulary:

• anthropocene • atmosphere • biosphere • climate • deforestation • environment • erosion	• extinction • geosphere • global warming • greenhouse effect • habitat • human footprint • hydrosphere • nonrenewable resource	• ozone layer • pollution • recycling • renewable resource • resource • sustainability • waste • weathering

- Optional Activities:
-
    - Select books included in the Fountas and Pinnell Interactive Read Aloud Text Sets: "Caring for our World" and "Problem Solving and Resourcefulness" relate to this unit.
    - STEM Activity: Discovery Education - Green Changes
    - Research Project:
        - Carolina Science Activity Sheet 6A - Human Impact on Earth’s Systems
        - Research sustainable items that we use to help reduce our footprint
        - TrueFlix - Research different oil spills such as the BP Oil Spill and the Exxon Valdez

Oil Spill and describe their effects on the environment and Earth's Systems. TrueFlix has books on each of the spills.

- Research the Ozone Layer and answer the following questions:
  - What is it?
  - Where is it located?
  - How is it being depleted and by who?
  - What can we do to stop the depletion and why is it important?

- Create a Z-Chart using one of the following articles from Discovery Education:
  - "Populations & Pollutions", "Human Effects on Ecosystems", "Problems, Solutions, & More Problems"

- Websites
  - Achieve 3000 Articles: "Living Bridges are Evergreen", "Eat the Spoon", "Making a Difference for the Planet", "Towing for Turtles", "Despicable Disposables", "Last of the Lowland Kids"
  - Brain Pop
  - Carolina Science
  - Discovery Education
  - Mystery Science
  - Introduction to Global Warming: https://www.youtube.com/watch?v=C78KE5iGtg4

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
Human Impacts on Earth 4 Days	*Identify ways in which people have affected Earth's Systems. *Explain	*Discuss humans impact on Earth by using NJCTL slides 1-21. *Discovery Education video: "Human Activity & Climate Change" *Brain Pop videos: "Climate Change" and	*Quiz on Human Impact *BrainPop video Quizzes	*5-ESS3-1

	how humans depend on the environment. *Observe geological and chemical evidence of human impacts on Earth using various photos.	"Humans & the Environment"		
Ecological Footprint 4 days	*Create an anthropocene timeline illustrating progression of the era. *Define ecological footprint and compare ecological footprint to others around the world.	*Discuss ecological footprint by using NJCTL slides 22-36. *Determine your own footprint by using the following website as linked on Slide 25 of NJCTL: https://www.footprintnetwork.org/resources/footprint-calculator/ *Create a timeline that demonstrates the progress of the Anthropocene Era.	*Anthropocene Timeline Project *Ecological Footprint Quiz	*5-ESS3-1
Negative Human Impact 7 Days	*Describe and define ways that humans have a negative impact on the environment. *Explain resource depletion	*Discuss the various ways that humans negatively impact the Earth using NJCTL slides 36-111. *Optional Activities: 1)Research Project on the Ozone Layer 2)Research Project on BP Oil Spill and Exxon Oil Spill *Discovery Education: Video - Human Impact:	*Quiz on Negative Human Impact *Research Projects *BrainPop Quizzes	*5-ESS3-1

	and its two driving factors. *Identify the three main types of pollution: air, water, and land. *Explain deforestation and its impact on different ecosystems. *Describe global warming and provide examples of evidence of global warming. *Observe and explain the impact carbon dioxide levels have on the temperature of Earth. *Explain factors that impact a species risk of extinction.	Pollution in the Ocean *BrainPop: "Ozone Layer", "Greenhouse Effect"		

Positive Human Impacts & Methods of Reduction 4 Days	*Identify ways local communities protect Earth's Systems. *Demonstrate ways in which individuals can help protect Earth's resources and environments. *Create an advertisement justifying the benefits of upcycling. *Explain how to reduce human impact on Earth and the environment. *Compare and contrast renewable and nonrenewable resources.	*Discuss ways that humans can positively impact the environment by using NJCTL slides 112-142. *Discovery Education video: "Keeping our Environment Clean" and exploration: "Pollution Solution" *BrainPop videos: "Recycling", "Waste Management", "Conserving Energy" *Carolina Science Activity Sheet 6A: Human Impact on Earth's Systems *Optional Activities: 1. Research sustainable products. 2. Create an advertisement on the benefits of recycling and upcycling.	*Unit Test *Vocabulary Quiz *BrainPop Quizzes *Research Project and Advertisement assignment *Carolina Science Lab Assignment Questions	*5-ESS3-1

protect the Earth's resources, environment, and address climate change issues.

ELA/Literacy

- RI.5.1: Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-ESS3-1)
- RI.5.: Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-ESS3-1)
- RI.5.9: Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS3-1)
- W.5.8: Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-ESS3-1)
- W.5.9: Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-ESS3-1)

Mathematics

- MP.2: Reason abstractly and quantitatively. (5-ESS3-1)
- MP.4: Model with mathematics. (5-ESS3-1)

Suggested Modifications for Special Education, ELL and Gifted Students

Special Education

- Below-level learners can be provided with vocabulary cards, study guides, printed notes, and leveled readers and modified projects from choices provided.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Structure the learning around explaining or solving a social or community-based issue.

Gifted Students

- Gifted Learners can create a Discovery Education Board explaining the greenhouse effect or global

warming.

- Create a school wide campaign to promote and encourage upcycling and recycling.
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understanding.
- Collaborate with after-school programs or clubs to extend learning opportunities. Students may incorporate knowledge from their 4th grade TAG unit on sustainability and resourcefulness and be given assignments/activities to further this understanding.

ELL

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tools such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Use project-based science learning to connect science with observable phenomena.
- Provide ELL students with multiple literacy strategies including websites with various language options.
- Mystery Science has videos and assessments in Spanish if necessary.

Suggested Technological Innovations/Use

- Use Google programs to complete graphic organizers, create a presentation, write a summary on humans' impact on the environment.
- Complete a web quest on Global Warming.
- Create a Discovery Education Board explaining global warming or the greenhouse effect.

Cross Curricular/21st Century Connections

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