Summit Public Schools
Summit, New Jersey
Grade Level: 6th/ Content Area: Integrated Science

Overview:

The 6th grade science program will provide students with a thorough, relevant, and engaging standards-based curriculum that focuses on implementing the scientific and engineering practices as well as the cross-cutting concepts based on the core ideas of the Next Generation Science Standards. It will emphasize problem-based learning experiences, 21st century skills, and engineering design processes in a supportive, challenging environment for all students. Classroom activities will include scientific investigations, application of research, and analyzing and interpreting data.

The units that will be covered in 6th grade are as follows:

1. Introduction to Scientific Practices
2. Matter and its Properties
3. Water as a Natural Resource
4. Cell Structure and Function
5. Interdependence of Biotic and Abiotic Factors in Ecosystems
6. Properties of Earth's Materials
7. Earth's Geological Events

Unit 1: Introduction to Scientific Practices	
Big Ideas: *Course Objectives/Content Statement(s)* ● In this unit, students will be introduced to scientific and engineering practices. They will use metric measurements and tools to design and solve an engineering problem.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1. What are the 3 main types of science? 2. How do scientists use observations and inferences when investigating problems? 3. What practices do scientists and engineers follow when investigating problems? 4. What steps do scientists and engineers follow when designing solutions? 5. How can the design process be used to develop the best possible solution to a given problem? 6. What are the 3 main units used in the metric system and what do they measure? 7. How do scientists use tools to accurately measure properties of matter?	**Students will understand that:** ● The 3 main types of science are Life, Physical, and Earth science. ● Scientists and Engineers engage in specific ways of thinking and observing in order to add to the body of scientific knowledge. ● Scientists and Engineers follow a pathway to design, create, analyze, and edit their products. ● The metric system is a universal system of measurement used by scientists. ● Specific tools are used to measure mass, volume, and length. ● Scientists and Engineers can create or use models to help illustrate a concept. ● The development of technology influences scientific knowledge and scientific knowledge influences the development of technology. ● The design process is used to solve problems based on scientific explanations.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **MS-ETS1-1** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	**Lesson 1:** Evaluate the differences between the three types of science (Life, Physical, Earth). ● Science Career Research ● Scientist Instagram **Lesson 2:** Develop skills for observing scientific evidence and constructing inferences. ● What a Blast! Lab Demonstration

MS-ETS1-2
Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

Career-Ready Practices
CRP1: Act as a responsible and contributing citizen and employee.
CRP2: Apply appropriate academic and technical skills.
CRP3: Attend to personal health and financial well-being.
CRP4: Communicate clearly and effectively and with reason.
CRP5: Consider the environmental, social and economic impacts of decisions.
CRP6: Demonstrate creativity and innovation.
CRP7: Employ valid and reliable research strategies.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9: Model integrity, ethical leadership and effective management.
CRP10: Plan education and career paths aligned to personal goals.
CRP11: Use technology to enhance productivity.
CRP12: Work productively in teams while using cultural global competence.

- Disney Shorts Activity
- Private I's Activity

Lesson 3: Analyze the relationship between metric sizes and familiar objects.

- Metric Sizes and Comparisons
- Metric Meets the Inchworm Video
- Engage in argument from evidence about the idea of the U.S. not using the metric system. (Famous Oops)

Lesson 4: Develop skills for measuring in the metric system.

- Measurement labs for Mass, Length, and Solid Volume

Lesson 4: Plan and construct a solution to the need for a functional iPad case with limited materials by using developed skills and successful collaboration.

- Design Blueprints
- Build iPad Case
- Test, Redesign, and Rebuild
- Final Test

Differentiation	Assessments
Interdisciplinary Connections ● STEAM: Brainstorming, designing, and applying metric knowledge and engineering practices in groups to build an iPad Case with material constraints. ● Math: calculate prices of iPad Cases ● ELA: create marking pitches and write product reviews of iPad cases **Technology Integration** ● Interactive Websites and Games	**Formative Assessments:** ● Metric Pre-Assessment ● Google forms to assess Metric Skills during labs **Summative Assessments, Projects, and Celebrations:** ● Scientist Instagram ● Branches of Science and Observation vs. Inference Quiz ● Metric Quiz (Written and Practical) ● Unit Test ● iDon't Want to Break my iPad Design & Build

- Content-rich videos
- Google Forms for formative assessments
- Google Slides & Peardeck presentations
- Google slides for design drawings

Media Literacy Integration

- Advertising and marketing skills to promote the "sale" of their iPad cases
- Metric Mistakes Activity: Students analyze news articles of the mistakes made in communication between countries using the metric system versus the English system of measurement.
- Debate of the application of the Metric Conversion Act of 1975 to the current state of metrics in the USA.

Global Perspectives

- Scientists all over the world use scientific and engineering practices and design pathways.
- Scientists and engineers must be aware of cultural norms when interacting with other professionals in their field and/or the countries that they work in.
- The metric system is universally used to avoid errors in calculations and designs because scientists in different countries collaborate to solve problems.
- Input from families from metric-based nations and how they transition to the US system of measurement.

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups

Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 2: Matter and its Properties	
Big Ideas: *Course Objectives/Content Statement(s)* ● In this unit, students will investigate matter, its chemical and physical properties, and the atoms and compounds which compose matter. Students will use the properties of matter to identify and differentiate between different types of matter.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1. What is matter, how is it classified, and how does it behave? 2. What are the physical and chemical properties of matter? 3. How does gravity affect the mass and weight of an object? 4. How do the properties of matter determine their use? 5. How do the smallest, simplest pieces of matter combine to form other types of matter? 6. How can scientists separate mixtures using physical properties?	**Students will understand that:** ● Matter is anything that has mass and volume. ● All matter has specific physical and chemical properties that determine its use. ● Mass is a constant property of matter whereas weight can change relative to the position of matter in the solar system. ● Atoms are the smallest unit of matter. ● Matter can be found on Earth as pure substances, such as elements and compounds, or as mixtures. ● Mixtures are made of pure substances that are not chemically combined and can be separated by physical means.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **MS-PS1-1** Develop models to describe the atomic composition of simple molecules and extended structures. **MS-PS1-2** Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	**Lesson 1:** Analyze and evaluate the different physical and chemical properties of matter. ● Matter and Properties Notes ● I Spy ● Properties Match ● Property Bins Station Lab **Lesson 2:** Explore the difference between mass and weight through labs.

MS-PS2-4
Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

Career-Ready Practices
CRP1: Act as a responsible and contributing citizen and employee.
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CRP4: Communicate clearly and effectively and with reason.
CRP5: Consider the environmental, social and economic impacts of decisions.
CRP6: Demonstrate creativity and innovation.
CRP7: Employ valid and reliable research strategies.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9: Model integrity, ethical leadership and effective management.
CRP10: Plan education and career paths aligned to personal goals.
CRP11: Use technology to enhance productivity.
CRP12: Work productively in teams while using cultural global competence.

- Mass vs. Weight Lab
- Mass vs. Weight Gizmo
- Archimedes Gold Crown Gizmo

Lesson 3: Create demonstrational videos modeling the properties of matter.

- Choose properties
- Film demonstrations
- Share videos with class

Lesson 4: Model pure substances (atoms, molecules, and compounds) and mixtures using familiar materials.

- Classifying Matter
- Building Molecular Models
- Atoms & Molecules Games
- Pure Substances vs. Mixtures
- Classifying Mixtures (Nuts and Bolts)

Lesson 5: Apply concepts of properties and types of matter to separate mixtures.

- Separating Mixtures Lab

Differentiation	Assessments
Interdisciplinary Connections ● STEAM: design a solution to separate the mixture using specific tools provided ● Math: graphing with mass vs. weight relationships **Technology Integration** ● Interactive Websites and Games ● Content-rich videos ● Google forms for formative assessments ● Google Slides & Peardeck presentations ● Screencastify voice recording for video projects	**Formative Assessments:** ● Pre-Assessment ● Check for Understanding Google Forms **Summative Assessments, Projects, and Celebrations:** ● Properties of Matter Quiz ● Types of Matter Quiz ● Unit Test ● Mass vs. Weight Lab ● Mixture Separation Lab ● Properties of Matter Project

Media Literacy Integration

- Students take advantage of using video as a platform to demonstrate their knowledge of matter.

Global Perspectives

- Elements combine together to create all matter on Earth
- Elements' symbols are often named using roots from other languages.

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations

Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 3: Water as a Natural Resource	
Big Ideas: *Course Objectives/Content Statement(s)* ● In this unit, students will describe and investigate physical changes, states of matter, and phase changes within the water cycle. They will also discuss the issue of human impact and climate change on water sources and construct solutions to improve water access and quality.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1. How does water impact our lives? 2. Why is it important to preserve our sources and quality of water? 3. What are the specific physical properties of water? 4. How does water cycle through Earth Systems? 5. How does thermal energy affect water's physical properties and drive the water cycle? 6. How can we take saltwater, which makes up 97% of water on Earth, and turn it into usable freshwater?	**Students will understand that:** ● All living things need access to clean freshwater to survive, but don't always have enough access to it. ● Water has specific physical properties such as volume and density. ● Scientists can use water to measure irregular objects. ● The density of matter is constant (e.g. water is 1.00 gm/mL). ● Matter exists in three states (solid, liquid, and gas). ● The water cycle involves changes in the state of matter. ● Changes of state are caused by changes in thermal energy which affect the movement of matter's particles.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **MS-ESS2-4** Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. **MS-ESS3-3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the	**Lesson 1:** Analyze the importance of water on Earth and personal usage of water. ● Water distribution on Earth ● Water Usage Survey & Graph ● Water on Earth Discussion **Lesson 2:** Develop skills for measuring liquids and irregular objects using liquid.

environment. **MS-PS1-4** Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. **MS-PS3-3** Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. **MS-ETS1-1** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. **MS-ETS1-2** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. **MS-ETS1-3** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. **MS-ETS1-4** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. **Career-Ready Practices** **CRP1**: Act as a responsible and contributing citizen and employee.	● Liquid Volume Lab ● Volume by Displacement Lab ● Volume by Displacement Gizmo **Lesson 3:** Apply skills to determine the density of liquids. ● Density Videos ● Density Gizmo ● Density CER **Lesson 4:** Evaluate models of the states of matter changing from solid to liquid to gas. ● States of Matter Notes ● Kinetic Molecular Theory ● Phase Change Activities ● Phase Change Gizmo **Lesson 5:** Design, construct, and test a prototype to desalinate water. ● Design blueprint ● Build desalination device ● Test, redesign, and rebuild ● Final Test **Lesson 6:** Develop a model of the water cycle demonstrating thermal energy changes. ● Water Cycle Notes ● Water Cycle Journey Game ● Design water cycle model ● Film water cycle journey ● Present videos

CRP2: Apply appropriate academic and technical skills. **CRP3**: Attend to personal health and financial well-being. **CRP4**: Communicate clearly and effectively and with reason. **CRP5**: Consider the environmental, social and economic impacts of decisions. **CRP6**: Demonstrate creativity and innovation. **CRP7**: Employ valid and reliable research strategies. **CRP8**: Utilize critical thinking to make sense of problems and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management. **CRP10**: Plan education and career paths aligned to personal goals. **CRP11**: Use technology to enhance productivity. **CRP12**: Work productively in teams while using cultural global competence.	
Differentiation	**Assessments**
Interdisciplinary Connections ● Social Studies: civilizations usually started within a close proximity to water ● STEAM: brainstorming, designing, and applying knowledge of matter in groups to create a desalination device prototype ● Math: using graduated cylinders for measuring volume and analyzing water usage data with graphs **Technology Integration** ● Interactive Websites and Games ● Content-rich videos ● Google forms for formative assessments ● Google Slides & Peardeck presentations ● Screencastify voice recording for water cycle journey project **Media Literacy Integration** ● Students read articles and watch videos on current water issues that are affecting people and other	**Formative Assessments:** ● Pre-Assessment ● Check for Understanding Google Forms **Summative Assessments, Projects, and Celebrations:** ● Water Properties (Volume & Density) Quiz ● States of Matter Quiz ● Water Cycle Quiz ● Unit Test ● Measuring Volume Labs ○ Liquid Volume ○ Displacement ● Density CER ● Water Cycle Journey Model ● Water Desalination STEAM build

living things around the world.
- Students take advantage of using animation and narration as a platform to demonstrate their knowledge of the water cycle.

Global Perspectives

- Clean water is a global issue that affects all living things.
- Scientists and engineers from different countries are designing ways to clean and distribute water.
- Discussion of water usage, availability, and scarcity around the world.

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**

Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 4: Cell Structure and Function

Big Ideas: *Course Objectives/Content Statement(s)*

- In this unit, students will develop microscopy skills to investigate the structure and function of cells and their organelles. They will model how the organelles work together in unicellular living things and how cells work together in multicellular living things.

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1. How do scientists classify our world into living and nonliving categories? 2. How are the needs and characteristics of unicellular organisms similar to multicellular organisms? 2. How is an organism the sum of all of its parts? 3. How are animal cells and plant cells similar and different? 4. How has technology changed what we know about the microscopic world?	**Students will understand that:** ● Living organisms have specific characteristics. ● Unicellular organisms share the same needs and characteristics as multicellular organisms. ● Living organisms have structures with specific functions to help that organism meet all of its needs to survive. ● The cell has many structures to serve different needs within the cell as a whole. ● Animal and plant cells share similarities and differences in their structures and functions. ● Microscopes are used to study organisms too small for the naked eye.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **MS-LS1-1** Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. **MS-LS1-2** Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. **MS-LS1-3**	**Lesson 1:** Classify items as living, nonliving, and dead and defend classifications based on knowledge of characteristics and needs of living things. ● Characteristics & Needs Notes ● Virus Debate **Lesson 2:** Model the functions of different structures within living things. ● Levels of Organization Notes ● Cell Parts Analogies ● Cell Gizmo ● Plant vs. Animal Cells ● Cell Parts Activities

Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. **Career-Ready Practices** **CRP1**: Act as a responsible and contributing citizen and employee. **CRP2**: Apply appropriate academic and technical skills. **CRP3**: Attend to personal health and financial well-being. **CRP4**: Communicate clearly and effectively and with reason. **CRP5**: Consider the environmental, social and economic impacts of decisions. **CRP6**: Demonstrate creativity and innovation. **CRP7**: Employ valid and reliable research strategies. **CRP8**: Utilize critical thinking to make sense of problems and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management. **CRP10**: Plan education and career paths aligned to personal goals. **CRP11**: Use technology to enhance productivity. **CRP12**: Work productively in teams while using cultural global competence.	**Lesson 3:** Develop microscopy skills to study real (prepared and live) cells and their structures. ● Virtual Microscope ● Letter "e" Lab ● Prepared Slides Exploration **Lesson 4:** Apply microscopy skills to solve a microscopic murder mystery. ● Forensic Mystery ○ Live protists
Differentiation	**Assessments**
Interdisciplinary Connections ● STEAM: learning the parts of the microscope and their functions ● Art: designing and analyzing cell parts and images ● Criminology: science careers **Technology Integration** ● Interactive Websites and Games ● Content-rich videos ● Google forms for formative assessments ● Google Slides & Peardeck presentations ● Student Microscopes ● Teacher Digital Microscopes	**Formative Assessments:** ● Pre-Assessment ● Check for Understanding Google Forms **Summative Assessments, Projects, and Celebrations:** ● Introduction to Living Things Quiz ● Cells and Microscopes Quiz ● Unit Test ● Letter "e" Lab ● Forensic Mystery Lab

Media Literacy Integration

- Students will view real forensic microbiology video clips and read articles on how unicellular organisms can be used as evidence in criminology.

Global Perspectives

- All organisms share the same characteristics and needs to survive.
- The microscopic ecosystem is an important factor in all parts of the world, including within our own bodies.
- Connections to epidemiology and virology.

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 5: Interdependence of Biotic and Abiotic Factors in Ecosystems	
Big Ideas: *Course Objectives/Content Statement(s)* ● In this unit, students will investigate the relationships between living and nonliving components of ecosystems. They will also analyze the impact manmade and natural changes have on these components.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1. How can change in one part of an ecosystem affect change in other parts of the ecosystem? 2. How do matter and energy link organisms to each other and their environment? 3. How are matter and energy transferred/transformed in living and nonliving systems? 4. How does energy move through an ecosystem? 5. How do living organisms depend on others for survival? 6. How do humans impact ecosystems and what are the results on the species that live there? 7. How can we help raise awareness for species in danger of extinction?	**Students will understand that:** ● All living organisms interact with the living and nonliving parts of their surroundings to meet their needs for survival. These interactions lead to a constant exchange of matter. ● Animals obtain energy and materials for body repair and growth from food. ● The sun is a source of energy that drives an ecosystem. The path of energy travels from the sun to the producers then to the consumer in the food chain and/or food web. ● Organisms gain 10% of the energy of the food they eat in a design called the Energy Pyramid. ● An organism has dependent and independent relationships in an ecosystem that follow a pattern. ● Organisms are categorized within an ecosystem according to the function they serve as producers, consumers, or decomposers. ● Endangered species are in danger of becoming extinct if their population numbers decline further.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **MS-ESS3-3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the	**Lesson 1:** Explore different ecosystems as well as the living and nonliving factors within them. ● Biome exploration ● Levels of the Environment Activities ● Abiotic & Biotic Research

environment. **MS-LS2-1** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. **MS-LS2-2** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. **MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. **MS-LS2-4** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. **MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services. **Career-Ready Practices** **CRP1**: Act as a responsible and contributing citizen and employee. **CRP2**: Apply appropriate academic and technical skills. **CRP3**: Attend to personal health and financial well-being. **CRP4**: Communicate clearly and effectively and with reason. **CRP5**: Consider the environmental, social and economic impacts of decisions. **CRP6**: Demonstrate creativity and innovation. **CRP7**: Employ valid and reliable research strategies. **CRP8**: Utilize critical thinking to make sense of problems and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management.	**Lesson 2:** Model how matter and energy move through an ecosystem. ● Food Chains and Food Webs ● Energy Pyramid ● Food Web Research **Lesson 3:** Demonstrate how populations are affected by resource availability and compare and contrast ecological trends. ● Population CER ● Prairie Gizmo **Lesson 4:** Evaluate research about an endangered species and its reason for endangerment. ● Endangered Species Research **Lesson 5:** Design and create a lesson plan to educate others on their endangered species and its ecosystem dynamics. ● Analyze Research ● Develop Awareness Website

CRP10: Plan education and career paths aligned to personal goals.
CRP11: Use technology to enhance productivity.
CRP12: Work productively in teams while using cultural global competence.

Differentiation

Interdisciplinary Connections

- Math: population percentages with graphing

Technology Integration

- Interactive Websites and Games
- Content-rich videos
- Google forms for formative assessments
- Google Slides & Peardeck presentations
- Google Sites for website creation

Media Literacy Integration

- Library research using books, online articles, databases, videos, and more to learn about their chosen endangered species and its ecosystem dynamics.

Global Perspectives

- Ecosystems are being destroyed in various parts of the world both by man-made and natural events.
- Species are affected by those events in various ways leading to the decline in their populations.
- Expose students to the Earth's varied ecosystems and their similarities and differences.
- Students become advocates by raising awareness of their endangered species and how we can make a difference both locally and globally.

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**

Assessments

Formative Assessments:

- Pre-Assessment
- Check for Understanding Google Forms

Summative Assessments, Projects, and Celebrations:

- Ecology Vocabulary Quiz
- Food Chains and Food Webs Quiz
- Unit Test
- Energy and Population Labs
- Awareness website for chosen endangered species and its ecosystem dynamics.

Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
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Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
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Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 6: Properties of Earth's Materials	
Big Ideas: *Course Objectives/Content Statement(s)* ● In this unit, students will use physical properties to classify and identify rocks and minerals. Students will also model the cycling of these materials throughout the Earth.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1. What characteristics must a substance have to be considered a mineral or a rock? 2. How do scientists use physical and chemical properties to identify minerals? 3. How do scientists use physical and chemical properties to identify the three major groups of rocks and their subclassifications? 4. How do rocks change into other types of rocks? 5. How do weathering and erosion occur and what effect do they have on landforms? 6. How does human use of these natural resources impact the environment? 7. How do properties of soil in different ecosystems support specific living things?	**Students will understand that:** ● Rocks and minerals are naturally occurring resources that are usually inorganic and have specific compositions. ● Minerals have certain characteristics and are classified based on the properties of luster, color, hardness, streak, and cleavage. ● There are three basic types of rocks (Igneous, Metamorphic, and Sedimentary) that are subclassified according to their texture and composition. ● Physical and chemical properties can be used to identify different rocks and minerals. ● Rocks undergo changes caused by natural processes to form different rock types during the rock cycle. ● Scientists are looking at ways to replace nonrenewable resources (coal) with renewable resources (solar energy). ● Properties of soil differ based on pH, location, particle size, and composition and can affect the growth of different plant species.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will: **MS-ESS2-1** Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	**Lesson 1:** Compare soil characteristics and how they affect plant growth. ● Soil layers and components ● Soil Profile ● Weathering & Erosion

MS-ESS2-2
Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

MS-ESS3-1
Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

Career-Ready Practices
CRP1: Act as a responsible and contributing citizen and employee.
CRP2: Apply appropriate academic and technical skills.
CRP3: Attend to personal health and financial well-being.
CRP4: Communicate clearly and effectively and with reason.
CRP5: Consider the environmental, social and economic impacts of decisions.
CRP6: Demonstrate creativity and innovation.
CRP7: Employ valid and reliable research strategies.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9: Model integrity, ethical leadership and effective management.
CRP10: Plan education and career paths aligned to personal goals.
CRP11: Use technology to enhance productivity.
CRP12: Work productively in teams while using cultural global competence.

Lesson 2: Describe, compare, and identify rocks based on physical and chemical properties.
- Renewable and Nonrenewable Resources
- Rock Subclassifications

Lesson 3: Model the processes within the rock cycle physically and digitally.
- Rock ID Lab
    - Dichotomous key
- Rock Cycle Gizmo

Lesson 4: Describe, compare, and identify minerals based on physical and chemical properties.
- Properties of Minerals
- Mineral ID Lab
    - Dichotomous key
- Mineral Gizmo
- Special Properties of Minerals Lab

Differentiation	Assessments
Interdisciplinary Connections ● Social Studies: natural resources used by different countries **Technology Integration**	**Formative Assessments:** ● Pre-Assessment ● Check for Understanding Google Forms **Summative Assessments, Projects, and Celebrations:**

- Interactive Websites and Games
- Content-rich videos
- Google forms for formative assessments
- Google Slides & Peardeck presentations

Media Literacy Integration

- Students read articles and watch videos on current issues about sustaining our usage of natural resources and how scientists propose we move to more renewable types of resources.

Global Perspectives

- Students will have exposure to the variety of rocks that are mined around the globe and how this contributes to the supply, demand, and economics of a country.
- Natural resources mined from the Earth should be used with minimal destruction of the environment.

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language

- Soil and Minerals Quiz
- Rocks and Rock Cycle Quiz
- Unit Test
- Soil Characteristics Lab
- Mineral Labs
- Rock Labs

Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 7: Earth's Geological Events	
Big Ideas: *Course Objectives/Content Statement(s)* ● In this unit, students will investigate how the dynamic nature of the Earth accounts for major geological events that have shaped the features of the Earth over time.	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
1. How do scientists separate the layers of the Earth using physical properties and composition? 2. How does the theory of continental drift and plate tectonics explain the changes that occur on the Earth's surface? 3. How do Darwin's fossil discoveries help support the theory of continental drift? 4. How do geologic events occurring today provide insight into Earth's past? 5. To what extent does the exchange of energy within the Earth drive geologic events on the surface? 6. How does the location of tectonic plate boundaries determine the location of earthquakes and volcanoes? 7. How does the movement between two plates determine the type of plate boundary?	**Students will understand that:** ● The Earth is divided into 3 layers according to its composition and 5 layers according to its physical properties. ● The theory of continental drift explains that the location of the continents have changed in the past and are continuing to change today. ● Scientists discovered that the continents were once one large landmass, Pangaea, based on Darwin's fossil evidence. ● The theory of plate tectonics explains that the lithosphere is divided into plates that move due to the transfer of energy. ● Transfer of energy in the mantle causes convection currents within the Earth that cause tectonic plates to move leading to sea-floor spreading. ● There are 3 types of plate boundaries (convergent, divergent, and transform) that are classified according to what direction the plates move. ● The geologic structures that occur at plate boundaries are volcanoes, earthquakes, ridges, mountains, faults, rifts, and trenches. ● The Earth is not increasing in size because as new crust is formed, the old crust is being destroyed.
Areas of Focus: Proficiencies **(New Jersey Student Learning Standards)**	**Lessons**
Students will:	**Lesson 1:** Model the timeline of the Earth from its initial formation to Pangaea, from development of animal

MS-ESS1-4
Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

MS-ESS2-2
Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

MS-ESS2-3
Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

MS-ESS3-2
Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

MS-LS4-1
Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

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CRP8: Utilize critical thinking to make sense of problems kingdoms to mass extinctions, and everything in between.

- Timeline Activity

Lesson 2: Analyze the fossil record, the shape of continents, and other formations on Earth to show Earth's progresion to today.

- Pangaea and Continental Drift
- Pangea Puzzle

Lesson 3: Create analogous models of the different layers of the Earth.

- Layers of the Earth Notes
- Layers of the Earth Analogies

Lesson 4: Understand the different tectonic plates and their movements

- Tectonic Plate Theory
- Convection in the Mantle
- Plotting Earthquakes & Volcanoes
- *Supervolcano*

and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management. **CRP10**: Plan education and career paths aligned to personal goals. **CRP11**: Use technology to enhance productivity. **CRP12**: Work productively in teams while using cultural global competence.	
Differentiation	**Assessments**
Interdisciplinary Connections ● Social Studies: map reading with plate boundaries ● Math: plotting points on a graph ● STEAM: analyze earthquake-proof buildings and structures **Technology Integration** ● Interactive Websites and Games ● Content-rich videos ● Google forms for formative assessments ● Google Slides & Peardeck presentations **Media Literacy Integration** ● Analyze and interpret data for earthquake locations and their frequency around the world. ● Read articles about earthquake-proof buildings and structures in locations where these are more necessary. ● View *Supervolcano* film to analyze potential effects from volcanic eruptions. **Global Perspectives** ● Tectonic plates cover the Earth's surface and the effects of catastrophic events that occur can affect humans on a large scale. For example, ash from a volcanic eruption can travel across countries carried by global winds. ● Underwater earthquakes can cause tsunamis that can flood large areas as seen in our past news	**Formative Assessments:** ● Pre-Assessment ● Check for Understanding Google Forms **Summative Assessments, Projects, and Celebrations:** ● Layers of the Earth Quiz ● Plate Tectonics Quiz ● Earth Timeline Model ● Layers of the Earth Analogies

history.

- Earthquakes in undeveloped parts of the world can be devastating to communities without earthquake proof structures.

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