REVISED SUMMER 2014

Grade Level / Content Area: 6th Grade Science

Length of Course: (HS/MS ONLY) One Year Course

Curriculum

Course Description:

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. 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 specific topics that will be covered are as follows:

Engineering Design and Scientific Practices
Metrics
Matter and its Properties
Water Cycle
Cell Structure and Function
Interdependence of Biotic and Abiotic Factors in Ecosystems
Rocks and Minerals
Plate Tectonics

UNIT ONE: Engineering Design and Scientific Processes

MS-ETS1 Engineering Design **5.1.A Science Practices**
Big Ideas: *Course Objectives / Content Statement(s)* In this unit, students will be introduced to scientific and engineering practices and careers.

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 practices do scientists and engineers follow when investigating problems?	Students will understand that… ● Scientists and Engineers engage in specific

2. What type of careers are available in the fields of science and engineering? 3. What steps do scientists and engineers follow when investigating problems and designing solutions?	ways of thinking and observing in order to add to the body of scientific knowledge. ● Science and engineering are used in a variety of different career paths. ● Scientists and Engineers follow a pathway to design, create, analyze, and edit their products.
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: *(Enter NJCCCS or Common Core CPI's here)*	**Examples, Outcomes, Assessments** *(see note below about the content of this section)*
NJCCCS: **5.1.A Science Practices**: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science. CPI: 5.1.8.A.1-A.3 CPI: 5.1.8.B.1-B.4 CPI: 5.1.8.C.1-C.3 CPI: 5.1.8.D.1-D.4 **Standard MS-ETS1-2** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. **Grade 6 Technology Standards** **CPI A. Technology Operations and Concepts** Students will use technology and digital tools with knowledge, and appropriate use, of operations and related applications. **CPI E. Research and Information Literacy**	Instructional Focus: ● Science and Engineering Careers ● Three types of Science (Life, Physical, Earth) ● Observation and Inference ● Science and Engineering Design Process Sample Assessments: ● Quiz ● Want Ad for Careers Instructional Strategies: ● Demos ● Mini Lessons ● Interactive Websites ● Library Media Center Research Interdisciplinary Connections: ● Engineering ● E.L.A, Art, Math, Civics Technology Integration: ● Library Media Center Resources ● Interactive Websites Global Perspectives: ● Scientists all over the world use scientific and engineering practices and design pathways. ● Science and Engineering careers are now

Students will effectively use digital tools to assist in gathering and managing information.	moving into a global market . Culturally Responsive Teaching: ● Science and Engineers must be aware of cultural norms when interacting with other professionals in their field and/or the countries that they work in.

UNIT TWO: Metrics

MS-ETS1 Engineering Design
Big Ideas: *Course Objectives / Content Statement(s)* In this unit, students 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. How can the design process be used to develop the best possible solution to a given problem? 2. What are the 3 main units used in the metric system and what do they measure? 3. How do scientists use tools to accurately measure properties of matter?	Students will understand that… The metric system is a universal system of measurement used by scientists. Specific tools are used to measure mass, volume, and length. Be able to 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	**Examples, Outcomes, Assessments**

(Cumulative Progress Indicators) Students will: *(Enter NJCCCS or Common Core CPI's here)*	*(see note below about the content of this section)*
NJCCCS: **5.1.A Science Practices**: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science. CPI: 5.1.8.A.1-A.3 CPI: 5.1.8.B.1-B.4 CPI: 5.1.8.C.1-C.3 CPI: 5.1.8.D.1-D.4 **Standard 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. **Standard MS-ETS1-2** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. **Grade 6 Technology Standards** **CPI A. Technology Operations and Concepts** Students will use technology and digital tools with knowledge, and appropriate use, of operations and related applications. **CPI E. Research and Information Literacy** Students will effectively use digital tools to assist in gathering and managing information.	Instructional Focus: ● Metric System ● Measurement Practices ● Design Process ● Working successfully in collaborative groups Sample Assessments: ● Metric Pre-Assessment ● Mini assessments (Mass, Length, Volume) ● iDon't Want to Break my iPad Problem-Based Learning Unit ● Metric Quiz (Written and Practical) Instructional Strategies: ● Videos and readings on Measuring Mass, Length, and Solid Volume ● Stations for hands-on, individual learning of measuring Mass, Length, and Solid Volume ● Mini-Lessons for Mass, Length, and Solid Volume, as needed ● STEAM: (iDon't Want to Break my iPad) Brainstorming, designing, and applying metric knowledge and engineering practices in groups to build a structure with material constraints. Interdisciplinary Connections: ● Math ● Engineering ● Media Literacy Technology Integration: ● Trackstar and/or Google website for content-rich videos and interactive websites ● Google Forms for Mini Assessments ● Ability to maintain full usage of iPad technology through a student-designed protective case Global Perspectives: ● Metric System is universally used to avoid errors in calculations and designs

	• Scientists in different countries collaborate to solve problems • Application of the Metric Conversion Act of 1975 to current state of metrics in USA (Debate form) Culturally Responsive Teaching: • Metric Mistakes Activity: Students look at the mistakes made in communication between countries using the metric system versus the English System of Measurement • Pre-assessment/survey of students' background related to the use of the Metric System. • Considerations of immigrant families from metric-based nations and how they transition to the US system of measurement

UNIT THREE: Matter and its Properties

MS-PS1 Structure and Properties of Matter
Big Ideas: *Course Objectives / Content Statement(s)* In this unit, students will investigate matter, its characteristic properties, and the ratios of atoms and compounds which compose it. Students will use characteristic 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 properties of matter? 3. How do the properties of materials	Students will understand that… Matter is anything that has mass and volume and exists in 3 states on earth. Each type of matter has specific properties. Mass is a constant property of matter whereas weight can change relative to the position of matter in the solar system.

determine their use? 4. What are the smallest, simplest pieces of matter? 5. How can we combine atoms to form new types of matter?	Density is a physical property that incorporates the relationship between mass and volume. Atoms are the smallest unit of matter. Matter can be found as elements, compounds, or mixtures through different combinations of atoms.
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: *(Enter NJCCCS or Common Core CPI's here)*	**Examples, Outcomes, Assessments** *(see note below about the content of this section)*
5.1.A Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science. CPI: 5.1.8.A.1-A.3 CPI: 5.1.8.B.1-B.4 CPI: 5.1.8.C.1-C.3 CPI: 5.1.8.D.1-D.4 **5.2 Physical Science:** All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science. CPI: 5.2.8.A.1 CPI: 5.2.8.A.2 CPI: 5.2.6.A.3 CPI: 5.2.6.A.5 CPI: 5.2.6.A.6 CPI: 5.2.6.A.7 CPI: 5.2.6.B.1	Instructional Focus: ● Working successfully in collaborative groups ● Matter and its properties ● Mass vs. Weight ● Density as a ratio of mass to weight ● Atoms, elements, molecules, compounds ● Pure substances vs. Mixtures Sample Assessments: ● Pre-Assessment ● Properties of Matter Hands-on Assessment ● Mini Assessments online ● Sentences with Connection to L.A. ● Mass vs. Weight Comic Strip ● Elements in Real-World ● Liquid Volume Practical ● Unit Test Instructional Strategies: ● Videos and Readings ● Interactive Websites ● Mini-Lessons ● Demonstrations of Density ● Hands on Labs (Mass and Weight, Dunkin' for Density, Molecular Model Kits, Classifying Matter)

Standard MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures.	• Library Media Center Research on Elements Interdisciplinary Connections • Engineering • Social Studies- how civilizations have used natural resources (elements) • Math Technology Integration • Library Media Resources • Interactive Websites • Trackstar and/or Google website for content-rich videos • Google forms for mini assessments • Prezi and Nearpod presentations • Textbook Digital Lessons Global Perspectives • How civilizations have used available natural resources to shape their development. Culturally Responsive Teaching: • Elements' symbols are often named using roots from other languages.

UNIT FOUR: Water Cycle

MS-PS1 Structure and Properties of Matter **MS-ESS2 History of Earth and Weather and Climate** **MS-ESS3 Human Impacts** **MS-ETS1 Engineering Design**
Big Ideas: *Course Objectives / Content Statement(s)* In this unit, students will describe and investigate physical changes, states of matter, and phases changes within the water cycle as well as human impact on water sources.

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 physical changes affect the properties, identities, and interactions of matter? 2. How does water impact our lives? 3.Why is it important to preserve our sources and quality of water? 4. How does water cycle through Earth Systems?	Students will understand that… Physical changes are changes in physical properties. Matter exists in three states (solids, liquids, and gases). The water cycle involves phase changes of matter. All living things need high quality water. The water cycle provides water to all living things and the earth and is responsible for physical changes to the earth.
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: *(Enter NJCCCS or Common Core CPI's here)*	**Examples, Outcomes, Assessments** *(see note below about the content of this section)*
5.1.A Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science. CPI: 5.1.8.A.1-A.3 CPI: 5.1.8.B.1-B.4 CPI: 5.1.8.C.1-C.3 CPI: 5.1.8.D.1-D.4 **5.2 Physical Science:** All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science. CPI: 5.2.6.A.3 **5.4 Earth Systems Science:** All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.	Instructional Focus: ● States of Matter and Phase Changes ● Water Cycle ● Temperature ● Physical Changes Sample Assessments: ● Water Cleaning Lab with Scientific Process ● Mini Assessments online ● Entrance and Exit Cards ● Quizzes on States of Matter, Physical Changes, and Water Cycle ● Unit Test Instructional Strategies: ● Water Cleaning Lab ● States of Matter Problem-Based Activity ● Water Cycle Game ● Graphic Organizers ● Nearpod Presentations ● Analyze and Graph Data of Water Usage Interdisciplinary Connections ● Social Studies connection to civilization proximity to water ● Engineering ● Math

CPI: 5.4.8.F.3 **Standard 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. **Standard MS-ESS2-1.** Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. **Standard 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. **Standard 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.	Technology Integration: ● Nearpod Presentations ● Google Forms for Mini Assessments ● Textbook Digital Lessons ● Google Drive Documents Global Perspectives: ● Clean water is a global issue ● Scientists and engineers from different countries design ways to clean and distribute water Culturally Responsive Teaching: ● Discussion of water usage, availability, and scarcity around the world.

UNIT FIVE: Cell Structure and Function

MS-LS1 Structure, Function, and Information Processing
Big Ideas: *Course Objectives / Content Statement(s)* In this unit, students will investigate the structure and function of cells and how they 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 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 do cells reproduce and multiply? 4. How has technology changed what we know about the microscopic world?	Students will understand that… Unicellular organisms share the same needs and characteristics as multicellular organisms. 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. Cells reproduce through mitotic division. Microscopes are used to study organisms too small for the naked eye.
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: *(Enter NJCCCS or Common Core CPI's here)*	**Examples, Outcomes, Assessments** *(see note below about the content of this section)*
5.1.A Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science. CPI: 5.1.8.A.1-A.3 CPI: 5.1.8.B.1-B.4 CPI: 5.1.8.C.1-C.3 CPI: 5.1.8.D.1-D.4 **5.3 Life Science:** All students will understand that life science principles are powerful conceptual tools for making	Instructional Focus: ● Needs and Characteristics of Living Things ● Levels of Organization ● Cell parts and Functions ● Mitosis ● Microscope Use Sample Assessments: ● Microbe Murder Mystery Lab ● Animal and Plant Cell Compare and Contrast ● Microscope Labs ● Mini Assessments online ● Quizzes ● Unit Test Instructional Strategies: ● Develop and use a model of a cell (NGSS-

sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics CPI: 5.3.6.A.2 CPI: 5.3.8.A.1 CPI: 5.3.8.A.2 CPI: 5.3.6.D.1 **Standard MS-LS1-3.** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. **Standard 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. **Standard 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. **Standard 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.	Analogy Map) ● Analogies ● Graphic Organizers ● Nearpod Presentations ● Foldables ● Microscope Labwork Interdisciplinary Connections ● Engineering ● Math ● Criminology Technology Integration: ● Student Microscopes ● Teacher Digital Microscopes ● Google Forms for assessments ● Nearpod presentations Global Perspectives: ● Microbes in water can be harmful or beneficial to human health. Culturally Responsive Teaching: ● Microscopic ecosystem are an important factor in all parts of the world.

UNIT SIX: Interdependence of Biotic and Abiotic Factors in Ecosystems

MS-ESS2 Earth Systems **MS-LS2 Matter and Energy in Organisms and Ecosystems**

MS-LS2 Interdependent Relationships in Ecosystems
Big Ideas: *Course Objectives / Content Statement(s)* In this unit, students will investigate the relationships between living and nonliving components of ecosystems and the impact of manmade and natural changes to 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? Why is sunlight essential to life on Earth? 3. How are matter and energy transferred/transformed in living and nonliving systems? 4. How do properties of soil in different ecosystem support specific living things? 5. How does energy move through an ecosystem?	Students will understand that… 1. 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. 2. Animals eat plants or other animals that have eaten plants. Animals obtain energy and materials for body repair and growth from food. 3. 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. 4. An organism has dependent and independent relationships in an ecosystem. 5. Dead plants and animals are broken down by decomposers. 6. Organisms are categorized within an ecosystem according to the function they serve as producers, consumers, or decomposers. 7. Properties of soil differ based on pH, location, particle size, and composition.
Areas of Focus: Proficiencies (Cumulative Progress Indicators)	**Examples, Outcomes, Assessments** *(see note below about the content of this section)*

Students will: *(Enter NJCCCS or Common Core CPI's here)*	
5.1.A Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science. CPI: 5.1.8.A.1-A.3 CPI: 5.1.8.B.1-B.4 CPI: 5.1.8.C.1-C.3 CPI: 5.1.8.D.1-D.4 **5.3 Life Science**: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics. CPI: 5.3.6.B.2 CPI: 5.3.8.B.1 CPI: 5.3.8. B.2 CPI: 5.3.6.C.1 CPI: 5.3.6.C.2 CPI: 5.3.6.C.3 CPI :5.3.8.C.1 **5.4 Earth Systems Science**: All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe. CPI: 5.4.6.C.1 CPI: 5.4.6.G.2 CPI: 5.4.6.G.3 CPI: 5.4.8.G.2 **Standard MS-ESS3-3.** Apply scientific principles to design a method for monitoring	Instructional Focus: ● Food chains and food webs ● Energy pyramid ● Ecosystems ● Properties of Soil Sample Assessments: ● Pre-assessment ● Groups develop a Google Presentation of an ecosystem model and revise based on a simulated impact ● Food Chain Diagram ● Food Web Diagram ● Quizzes ● Mini Assessments online ● Unit Test ● Entrance and Exit Cards Instructional Strategies: ● Videos and Readings ● Interactive Websites ● Mini-Lessons ● Demonstrations ● Outdoor Population Simulation ● Food web magnets ● Graphic Organizers ● Library Media Research Interdisciplinary Connections ● Math - percentages ● Social Studies Technology Integration ● Google Presentations ● Library Media resources ● Interactive Websites ● Nearpod, Educreations, Inspiration Maps (iPad apps) Global Perspectives ● Ecosystems are being destroyed in various parts of the world both by

and minimizing a human impact on the environment. **Standard MS-LS2-3** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. **Standard MS -LS2-2** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. **Standard MS-LS2-5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services. **Standard MS-ESS2-1** Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	man-made and natural events. ● All ecosystems depend on interactions between biotic and abiotic factors. Culturally Responsive Teaching: ● Expose students to the Earth's ecosystems' similarities and differences.

UNIT SEVEN: Rocks and Minerals

MS-Properties of Earth's Materials
Big Ideas: *Course Objectives / Content Statement(s)* In this unit, students will use physical properties to classify and identify minerals and rocks. Students will investigate the types of rocks and the rock cycle.

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 can we identify the three major groups	Students will understand that… 1. Minerals have certain characteristics and are classified based on the properties of luster, color, hardness, streak and cleavage.

of rocks and their subclassifications? 3. How do rocks change into other types of rocks? 4. How do weathering and erosion occur and what effect do they have on landforms? 5. How does mining for natural resources impact the environment?	2. There are three basic types of rocks that are subclassified according to their texture and composition. 3. Physical properties can be used to identify different rocks and minerals. 4. Rocks undergo changes to form different rock types during the rock cycle. 5. Natural processes change physical characteristics of rocks. 6. Mining can have a major impact on the environment and should be done responsibly.
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: *(Enter NJCCCS or Common Core CPI's here)*	**Examples, Outcomes, Assessments** *(see note below about the content of this section)*
5.1.A Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science. CPI: 5.1.8.A.1-A.3 CPI: 5.1.8.B.1-B.4 CPI: 5.1.8.C.1-C.3 CPI: 5.1.8.D.1-D.4 **5.4 Earth Systems Science:** All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe. CPI:5.4.6.C.2 CPI:5.4.8.C.2 CPI:5.4.6.D.2 CPI: 5.4.6.G.3 CPI:5.4.8.G.2	Instructional Focus: ● Characteristics of minerals ● Types of rocks ● Rock cycle ● Weathering and Erosion ● Natural Resources Sample Assessments: ● Pre-Assessment ● Rock Storybook ● Cookie Mining Portfolio ● Mini Assessments online ● Quizzes ● Unit Test Instructional Strategies: ● Mineral and Rock Labs ● Rock Cycle Game ● Nearpod Presentations ● Dichotomous Keys ● Interactive Websites ● Graphic Organizer ● Foldables Interdisciplinary Connections ● Math and Finances

Standard 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 **Standard MS-ESS3-3.** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	Technology Integration ● Interactive Websites ● Google Forms for mini assessments ● Inspiration Maps App ● Photos ● Nearpod Presentations 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. Culturally Responsive Teaching: ● Natural resources should be mined from the Earth and used with minimal destruction of the environment.

UNIT EIGHT: Plate Tectonics

MS-ESS2 Earth Systems
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 shape the features of the Earth.

Essential Questions	**Enduring Understandings**

What provocative questions will foster inquiry, understanding, and transfer of learning?	*What will students understand about the big ideas?*
1. How are the layers of the Earth different from one another? 2. How does the theory of continental drift and plate tectonics explain the changes that occur on the Earth's surface? 3. How do geologic events occurring today provide insight to Earth's past? 4. To what extent does the exchange of energy within the Earth drive geologic events on the surface? 5. How does the location of tectonic plate boundaries determine the location of earthquakes and volcanoes? 6. How does the movement between two plates determine the type of plate boundary? 7. What geologic structures are formed as the result of the movement of tectonic plates?	Students will understand that… 1. The Earth is divided into 3 layers according to its composition and 5 layers according to its physical properties such as density, temperature, and its ability to flow. 2. The theory of continental drift explains that the location of the continents have changed in the past and are continuing to change today. 3. The theory of plate tectonics explains that the lithosphere is divided into plates that move due to the transfer of energy. 4. Transfer of energy causes convection currents within the Earth that cause tectonic plates to move. 5. The majority of earthquakes and volcanoes occur at plate boundaries. Some volcanoes form in the center of a tectonic plate. These are called hotspots. 6. There are 3 types of plate boundaries (convergent, divergent, and transform) that are classified according to what direction the plates move. 7. The geologic structures that occur at plate boundaries are volcanoes, earthquakes, ridges, mountains, faults, rifts, and trenches. 8. The Earth is not increasing in size because as new crust is formed, the old crust is being destroyed. 9. Scientists discovered that the continents were once one large landmass based on fossil evidence.
Areas of Focus: Proficiencies (Cumulative Progress Indicators) Students will: *(Enter NJCCCS or Common Core CPI's here)*	**Examples, Outcomes, Assessments** *(see note below about the content of this section)*
5.1.A Science Practices: All students will understand that science is both a body of knowledge and an evidence-based,	Instructional Focus: ● Layers of the Earth ● Continental Drift

model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science. CPI: 5.1.8.A.1-A.3 CPI: 5.1.8.B.1-B.4 CPI: 5.1.8.C.1-C.3 CPI: 5.1.8.D.1-D.4 **5.4 Earth Systems Science:** All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe. CPI: 5.4.6.D.1 CPI: 5.4.8.D.1 CPI: 5.4.8.D.2 CPI: 5.4.6.B.1 CPI: 5.4.6.B.2 **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 the effects.	● Plate tectonics and Sea-floor Spreading ● Convection Currents Sample Assessments: ● Pre-assessment ● Travel Brochure ● Mini Assessments ● Quizzes ● Unit Test ● STEAM: Building a structure that can survive an earthquake. Instructional Strategies: ● Videos and Readings ● Interactive Websites ● Mini-Lessons ● Demos ● Analyze and Interpret data for Earthquake locations and frequency ● Plotting Earthquakes and Volcanos on a tectonic plate map ● Foldable of Layers of the Earth ● Movie "Supervolcano" ● Pangaea Map Puzzle ● Rheoscopic Fluid Demo Interdisciplinary Connections ● Social Studies -maps ● Math - plotting points on a graph ● Engineering Technology Integration ● Library Media resources ● iPad use to see simulation of movement over time, movement of plate boundaries, real-time earthquake data ● Google Forms for Assessments ● Nearpod Presentations ● Flowboard App 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. Culturally Responsive Teaching: ● Earthquakes in undeveloped parts of the world can be devastating to communities without earthquake proof structures.

NOTE re: Examples, Outcomes and Assessments

The following skills and themes should be reflected in the design of units and lessons for this course or content area.

21st Century Skills:

Creativity and Innovation

Critical Thinking and Problem Solving

Communication and Collaboration

Information Literacy

Media Literacy

Life and Career Skills

21st Century Themes (as applies to content area):

Financial, Economic, Business, and Entrepreneurial Literacy

Civic Literacy

Health Literacy