

**FAIRFIELD TOWNSHIP SCHOOL
Science Curriculum Guide Grade 6**

Key:

Climate

Equity and Inclusion

SEL

Holocaust

Amistad

Career Readiness, Life Literacies, and Key Skills

Subject: Science	Grade Level:6 Uni1 1
Unit 1:Introduction to Earth's Systems; Weather in the Atmosphere; Minerals and Rocks in the Geosphere	Pacing: 8 Weeks
Essential Questions	Enduring Understandings
What are the different components of the Earth system?	All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (MS-ESS2-1)
What are the sources of energy for the processes that affect earth?	Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (MS-ESS2-4)
How can you model the cycling of matter in the earth system?	The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. (MS-ESS2-5)

<p>What are the different landforms found on earth?</p>	<p>Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6)</p>
<p>What forces and energy make the different landforms?</p>	<p>Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MSESS2-6)</p>
<p>Where is water found on earth?</p>	<p>Because these patterns are so complex, weather can only be predicted probabilistically. (MSESS2-5)</p>
<p>How does water cycle through earth's systems?</p>	<p>The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6)</p>
<p>What is the composition and structure of earth's atmosphere?</p>	<p>Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2)</p>
<p>How does energy from the sun affect earth's atmosphere?</p>	<p>Gasses and liquids are made of molecules or inert atoms that are moving about relative to each other. (MS-PS1-4)</p>
<p>What processes make up the water cycle?</p>	<p>In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (MS-PS1-4)</p>
<p>How does energy drive the processes of the water cycle?</p>	<p>The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4)</p>

How does the water cycle affect weather?

How do global patterns affect air masses?

How do air masses interact to form fronts and cause changes in weather?

How do meteorologists forecast changes in weather?

How are weather maps used?

How does severe weather affect human life?

How do humans protect themselves from severe weather?

What are the different layers of the earth?

What are the characteristics and

<p>properties of minerals?</p> <p>How are minerals formed?</p> <p>What are the 3 major types of rocks and how are they formed?</p>	
<p>NJSL Standards</p>	<p>Classroom Applications</p>
<p>• MS-ESS2-1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process</p> <p>• 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.</p> <p>MS-ESS2-5 Collect data to provide evidence for how the motions and complex</p>	<p><u>Science activities and Quests:</u></p> <p>Students will compare and contrast Lake Mead from its past to its present</p> <p>Students will create a model of landforms</p> <p>Students will model the water cycle and/or a watershed</p> <p>Students will study and record data on the Aral Sea</p> <p>Students will construct a circle graph depicting the gasses that make up the air</p> <p>Students will classify all forms of precipitation according to type and temperature</p> <p>Students will compare and contrast types of air masses and fronts</p> <p>Students will study the technology used to predict weather</p> <p>Students will study the career of a Meteorologist</p> <p>Students will create a model showing the formation of a thunderstorm, hurricane, or tornado</p> <p>Students will build a model of earth and label its layers</p>

interactions of air masses result in changes in weather conditions.

• MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

• 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-PS1-4 Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when

Students will identify minerals according to their pyrite properties

Students will describe, compare, and contrast rocks

Vocabulary: atmosphere, geosphere, hydrosphere, cryosphere, biosphere, energy, topography, landform, mountain, coastline, dune, river, delta, surveying, water cycle, evaporation, transpiration, condensation, precipitation, watershed, aquifer, well, air pressure, altitude, wind, water cycle, dew point, humidity, relative humidity, air mass, jet stream, front, cyclone, anticyclone, meteorologist, storm, hurricane, tornado, storm surge, flood, drought, seismic wave, crust, mantle, outer core, inner core, mineral, crystal, crystallization, rock cycle

Elevate Science text/workbook

Lesson Structure: Anticipatory Set, Mini-Lesson, Whole Group, Small Group, Independent Work, Closure

Strategies: Think-Pair-Share, Read Aloud, Jigsaw, Investigations, Guided Explorations, Projects

Materials: Mentor Texts, DVDs, Internet, Technology (Smart Board, student computers/laptops, PowerPoint, Websites, etc.), supplemental books, visual aids, manipulatives, supplemental materials for investigations

Differentiation Strategies/Modifications

SWD/ Students at risk of failure: 1:1 teacher redirect / re-teach, peer helper, visual aids, modified tests/quizzes, modified homework

Gifted/Enrichment: computer-based research, high level task, class presentation

thermal energy is added or removed.

Connections to other content areas, including Career Readiness, Life Literacies, and Key Skills :

Connections to NJSL – English Language Arts

- SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-ESS2-1)
- RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS2-2), (MS-ESS2-3), (MS-ESS2-5)
- RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (MS-ESS2-3), (MS-ESS2-5)
- WHST.6-8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-ESS2-5)
- RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-ESS3-2)

Connections to NJSL – Mathematics

- MP.2 Reason abstractly and quantitatively. (MS-ESS2-2), (MS-ESS2-3), (MS-ESS2-5)
- 6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (MS-ESS2-5)(MS-PS1-4)
- 6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (MS-ESS3-1), (MS-ESS3-2), (MS-ESS3-3), (MS-ESS3-4), (MS-ESS3-5)
- 7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems by reasoning about the quantities. (MS-ESS3-1), (MS-ESS3-2), (MS-ESS3-3), (MS-ESS3-4), (MS-ESS3-5)

Career Readiness, Life Literacies, and Key Skills –

9.4.2.CI.1: Demonstrate openness to new ideas and perspectives.

9.4.2.CI.2: Demonstrate originality and inventiveness in work .

9.4.2.CT.1: Gather information about an issue, such as climate change and collaboratively brainstorm ways to solve the problem.

9.4.2.CT.2- Identify possible approaches and resources to execute a plan.

9.4.2.CT.3- Use a variety of types of thinking to solve problems (e.g. inductive, deductive).

Climate change activity:

<https://mysteryscience.com/lessons?query=climate>

Climate change lessons:

<https://www.brainpop.com/science/weather/climatechange/>

Holocaust

Amistad

African American & Differently abled/LGBTQ Scientists:

<https://www.brainpop.com/search/?keyword=scientists>

10 famous scientists with disabilities

- Thomas Edison. Born in 1847, Thomas Edison lost much of his hearing by his early twenties. ...
- Temple Grandin. ...
- Ralph Braun. ...
- Sang-Mook Lee. ...
- Stephen Hawking. ...
- Geerat Vermeij. ...
- Farida Bedwei. ...
- Richard Mankin.

<https://royalsociety.org/topics-policy/diversity-in-science/scientists-with-disabilities/>

<https://www.discovery.com/science/LGBT-Scientists-Who-Changed-World>

PRIDE Day STEM Activity:

<https://prideinstem.org/lgbtstemday/>

Unit Resources:

Savvas Elevate Science for 6th Grade, Topic 1 : Introduction to Earth's Systems p.1-43

Topic 2: Weather in the Atmosphere p. 44-101

Topic 3: Minerals and Rocks in the Geosphere p.102-151

STEM Quest PBL

Websites:

<https://www.fs.usda.gov/ccrc/index.php/>

<http://strandmaps.nsdl.org/?id=SMS-MAP-1332>

Science Refreshers

<http://nsdl.org/refreshers/science/>

Science Kids <http://www.sciencekids.co.nz/gamesactivities/gases.html>

<http://archive.fossweb.com/modulesK-2/SolidsandLiquids/activities/changeit.swf>

http://coolsciencelab.com/ice_cream.htm

Unit Assessment Opportunities:

- Journal Entries and Response Sheets
- Observations, Questioning, and discussions
- Comprehension Checks in literature
- Class Webs
- Presentations
- Collaboration
- Projects
- Rubrics (<http://www.nextgenscience.org/resources>)

- Unit Test
- Lesson Check
- Lesson Quiz
- Performance Expectations Activities
- Topic Tests

Subject: Science	Grade Level: 6
Unit 2: Plate Tectonics, Earth's Surface Systems; Distribution of natural resources	Pacing: 8 weeks
Essential Questions	Enduring Understandings
<p>What processes change the earth's surface?</p> <p>What evidence supports the hypothesis of continental drift?</p> <p>What roles do ocean ridges and trenches play in the movement of plates?</p> <p>How do earth's plates move?</p> <p>How do plate movement create new landforms?</p> <p>What are earthquakes and tsunamis and what are their effects?</p>	<p>Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches.</p> <p>The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. (MS-ESS2-2)</p> <p>Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart. (MS-ESS2-3)</p> <p>Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. (MS-ESS2-2)</p> <p>Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2)</p> <p>Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. (MS-ESS3-1)</p> <p>Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to</p>

How are plate tectonics connected to volcanic eruptions and landforms and shaping earth's surface?

What are the hazards of volcanoes?

How does erosion and weathering change the earth's surface?

How does soil form?

How does groundwater change the earth?

How do glaciers and waves change the earth's surface?

What are nonrenewable and renewable energy resources?

What are mineral resources and how are they distributed on earth?

Earth's environments can have different impacts (negative and positive) for different living things. (MS-ESS3-3)

Typically, as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3-3), (MS-ESS3-4)

SEL -

<https://www.brainpop.com/social-emotional-learning/>

SEL Biographies: <https://www.brainpop.com/social-emotional-learning/>

How is water used as a resource?	
NJSL Standards	Classroom Applications
<ul style="list-style-type: none"> • 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 	<p>Science Classroom Activities/Quests:</p> <p>Students will Develop a model of how the earth's continents are linked together</p> <p>students will create a map showing the volcanoes that make up the “RING of Fire”</p> <p>students will classify plate boundaries</p> <p>Students will analyze data on epicenters</p> <p>Students will design a building that can withstand natural forces</p> <p>Students will compare and contrast volcanic formations</p> <p>Students will build a volcano</p> <p>Students will model sea-floor spreading</p> <p>Students will analyze slopes at certain mathematical degrees to predict landslides</p> <p>Students will compare types and rates of weathering</p> <p>Students will study the career of Civil Engineers</p> <p>Students will describe and model water erosion</p> <p>Students will compare the thickness of glaciers</p> <p>Students will compare and contrast nonrenewable and renewable energy resources</p>

development of technologies to mitigate their effects

• 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.

• MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

• MS-ESS3-4 Construct an argument supported by evidence for how

Vocabulary: Mid-ocean ridge, sea floor, subduction, ocean trench, divergent boundary, convergent boundary, transform boundary, stress, tension, compression, shearing, fault, earthquake, magnitude, tsunami, volcano, magma, lava, hotspot, extinct, dormant, erosion, weathering, soil, humus, sediment, deposition, mass movement, deflation, sand dune, loess, runoff, stream, tributary, flood plain, delta, alluvial fan, groundwater, glacier, ice age, plucking, till, longshore drift, natural resource, nonrenewable resource, fossil fuels, nuclear fission, renewable resource, ore, crystallize, desalination,

Teaching Strategies/Materials:

Lesson Structure: Anticipatory Set, Mini-Lesson, Whole Group, Small Group, Independent Work, Closure

Strategies: Think-Pair-Share, Read Aloud, Jigsaw, Investigations, Guided Explorations, Projects

Materials: Mentor Texts, DVDs, Internet, Technology (Smart Board, s Quests:student computers/laptops, PowerPoint, Websites, etc.), supplemental books, visual aids, manipulatives, supplemental materials for investigations

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increases in human population and per-capita consumption of natural resources impact Earth's systems.

Connections to other content areas, including Career Readiness, Life Literacies, and Key Skills.

Connections to NJSLS – English Language Arts

- RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS2-2), (MS-ESS2-3), (MS-ESS2-5)
- RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-ESS2-3)
- RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (MS-ESS2-3), (MS-ESS2-5)
- WHST.6-8.2 Write informative /explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-ESS2-2)
- SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-ESS2-1), (MS-ESS2-2)
- WHST.6-8.1 Write arguments focused on discipline content. (MS-ESS3-4)
- WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-ESS3-3)
- WHST.6-8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-ESS3-3)
- WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research. (MS-ESS3-1),(MS-ESS3-4)

Connections to NJSLS – Mathematics

- MP.2 Reason abstractly and quantitatively. (MS-ESS2-2), (MS-ESS2-3)
- 6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or

mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (MS-ESS2-2), (MS-ESS2-3)

- 7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (MS-ESS2-2), (MS-ESS2-3)
- 6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (MS-ESS3-3), (MS-ESS3-4)
- 7.RP.A.2 Recognize and represent proportional relationships between quantities. (MS-ESS3-3), (MS-ESS3-4)

Career Readiness, Life Literacies, and Key Skills –

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9.4.2.CT.2- Identify possible approaches and resources to execute a plan.

9.4.2.CT.3- Use a variety of types of thinking to solve problems (e.g. inductive, deductive).

Unit Resources:

Savvas Elevate Science for 6th Grade Topic 3: Plate Tectonics p.152- 207

Savvas Elevate Science for 6th Grade Topic 4: Earth's Surface Systems p.208-259

Savvas Elevate Science for 6th Grade Topic 5: Distribution of natural resources p.260-307

Hands-on & Virtual Labs

STEM Quest PBL

List of books to be used:

*See media center for additional resources

Websites:

<https://www.fjs.usda.gov/ccrc/index.php/>

Education.com
Easyscienceforkids.org
Kidsgrowingstrong.org/Plant Needs
Ducksters.com/science/photosynthesis.php
Animalatlas.tv

Unit Assessment Opportunities:

- Journal Entries and Response Sheets
- Observations, Questioning, and discussions
- Comprehension Checks in literature
- Class Webs
- Presentations
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- Rubrics (<http://www.nextgenscience.org/resources>)
- Unit Test
- Lesson Check
- Lesson Quiz
- Performance Expectations Activities
- Topic Tests

Subject: Science	Grade Level: 6
Unit 3: Human Impacts on the environment; History of Earth; Energy in the atmosphere and ocean	Pacing: 8 weeks
Essential Questions	Enduring Understandings
<p>How has the human population changed over time?</p> <p>How is the consumption of natural resources by humans affected by changes in population size?</p> <p>What are the causes of air pollution?</p> <p>What are the long-term negative impacts of air pollution?</p> <p>What efforts are being made to decrease the levels of air pollution?</p>	<p>Typically, as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3-3), (MS-ESS3-4)</p> <p>The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. (MS-ESS1-4)</p> <p>Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6)</p> <p>Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MSESS2-6)</p> <p>The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6)</p>

What natural resources are obtained from the geosphere?

How do human activities affect land resources?

Why is fresh water a limited resource?

How do human activities cause water pollution?

How do geologists determine and describe the ages of rocks?

What is the purpose of the geologic time scale?

How did the earth change in each era?

How does energy move throughout earth's atmosphere and ocean?

<p>What causes winds and how do they redistribute energy around earth?</p> <p>What causes ocean currents and how do they redistribute earth's energy?</p>	
<p>NJSL Standards</p>	<p>Classroom Applications</p>
<p>• MS-ESS3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.</p> <p>• 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.</p>	<p>Science activities and quests:</p> <p>Students will design a plan to reduce trash output at school</p> <p>Students will predict and graph the expectancy of when the world's population will reach 9 billion people</p> <p>Students will create and label a model of the ozone layer</p> <p>Students will study and label the layers of soil</p> <p>Students will design a model for recycling wastewater</p> <p>Students will build a model soil erosion and record its data</p> <p>Students will study the career of a Paleontologist</p> <p>Students will create a Geologic Time Scale</p> <p>Students will draw a comic strip representing the events and stages that led to the extinction of dinosaurs</p> <p>Students will use a plastic bag to trap heat and record the results</p>

• MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates

Students will study, analyze, and explain wind chill factors

Students will build a windmill/wind turbine to produce electricity

Students will label a map showing ocean currents

Students will create a model that creates solar energy

Vocabulary: birth rate, death rate, exponential growth, pollution, overpopulation, conservation, sustainable use, natural resource, renewable resource, nonrenewable resource, deforestation, erosion, desertification, sustainable, sewage, sediment, thermal pollution, relative age, absolute age, law of superposition, fossil, unconformity, radioactive decay, radioactive dating, geologic time scale, era, period, invertebrate, vertebrate, amphibian, reptile, mass extinction, mammal, electromagnetic wave, greenhouse effect, thermal energy, convection, conduction, radiation, wind, sea breeze, land breeze, coriolis effect, jet stream, current, el nino, la nina,

Teaching Strategies/Materials:

Lesson Structure: Anticipatory Set, Mini-Lesson, Whole Group, Small Group, Independent Work, Closure

Strategies: Think-Pair-Share, Read Aloud, Jigsaw, Investigations, Guided Explorations, Projects

Materials: Mentor Texts, DVDs, Internet, Technology (Smart Board, student computers/laptops, PowerPoint, Websites, etc.), supplemental books, visual aids, manipulatives, supplemental materials for investigations

Differentiation Strategies/Modifications

	SWD/ Students at risk of failure: 1:1 teacher redirect / re-teach, peer helper, visual aids, modified tests/quizzes, modified homework Gifted/Enrichment: computer-based research, high level task, class presentation
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Connections to other content areas, including Career Readiness, Life Literacies, and Key Skills.

Connections to NJSLS – English Language Arts

Write arguments focused on discipline content. (MS-ESS3-4)

WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.(MS-ESS3-4)

• RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS1-3), (MS-ESS1-4)

• WHST.6-8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-ESS1-4)

• SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-ESS2-1), (MS-ESS2-2), (MS-ESS2-6)

Connections to NJSLS – Mathematics

• 6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (MS-ESS3-4)

• 7.RP.A.2 Recognize and represent proportional relationships between quantities.(MS-ESS3-4)

• 6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (MS-ESS3-1), (MS-ESS3-2), (MS-ESS3-3), (MS-ESS3-4), (MS-ESS3-5)

• 7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems by reasoning about the quantities. (MS-ESS3-1), (MS-ESS3-2), (MS-ESS3-3), (MS-ESS3-4), (MS-ESS3-5)

Readiness, Life Literacies, and Key Skills –

9.4.2.CI.1: Demonstrate openness to new ideas and perspectives.

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9.4.2.CT.3- Use a variety of types of thinking to solve problems (e.g. inductive, deductive).

Unit Resources:

Savvas Elevate Science for 6th Grade, Topic 7: Human Impacts on the environment p.308-361

Savvas Elevate Science for 6th Grade, Topic 8: History of Earth p.362-401

Topic 9: Energy in the atmosphere and ocean p.402-443

Hands-on & Virtual Labs

STEM Quest PBL

List of books to be used:

Websites:

<https://www.fs.usda.gov/ccrc/index.php/>

<http://strandmaps.nsd.org/?id=SMS-MAP-1332>

Science Refreshers

<http://nsdl.org/refreshers/science/>

<http://www.sciencekids.co.nz/earth.html>

<http://science.nationalgeographic.com/science/earth/>

Unit Assessment Opportunities:

- Journal Entries and Response Sheets
- Observations, Questioning, and Discussions
- Comprehension Checks in Literature
- Class Webs
- Presentations
- Collaboration
- Unit Test
- Lesson Check

- Lesson Quiz
- Performance Expectations Activities
- Topic Tests

FAIRFIELD TOWNSHIP SCHOOL
Science Curriculum Guide Grade 6 Unit 4

Subject: Science	Grade Level: 6
	Pacing: 8 weeks

<p>Unit 4:Climate; Earth-sun-moon system; solar system and the universe</p>	
<p>Essential Questions</p>	<p>Enduring Understandings</p>
<p>How have natural processes and human activities changed earth's climate?</p> <p>How and why do global temperatures change?</p> <p>How do changes in global temperatures impact earth?</p> <p>How do the sun and moon affect the earth?</p> <p>What objects can you see in the night sky?</p> <p>How does earth's motion affect the amount of daylight and the seasons?</p> <p>Why does the moon appear to change shape?</p> <p>What causes eclipses?</p>	<p>Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6)</p> <p>Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MSESS2-6)</p> <p>The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6)</p> <p>Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities. (MS-ESS3-5)</p> <p>Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models. (MS-ESS1-1)</p> <p>This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year. (MS-ESS1-1)</p>

<p>How do the sun and moon affect the tides?</p> <p>What kind of data and evidence help us to understand the universe?</p> <p>What are the characteristics of the planets, moons, and objects in the solar system?</p> <p>What is the role of gravity?</p> <p>How is technology used to learn about the universe?</p> <p>What are the properties of stars?</p> <p>How are stars classified?</p> <p>What makes up a galaxy?</p>	<p>Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. (MS-ESS1-2)</p> <p>The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. (MS-ESS1-2), (MSESS1-3)</p> <p>The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. (MS-ESS1-2)</p>
<p>NJSL Standards</p>	<p>Classroom Applications</p>
<p>• MS-ESS2-6 Develop and use a model to</p>	<p>Science Activities and quests:</p>

<p>describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.</p> <ul style="list-style-type: none"> • MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused climate change over the past century. • MS-ESS1-1 Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons • MS-ESS1-2 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. 	<p>Students will create a map of world climates</p> <p>Students will study and map out climate change</p> <p>Students will create a graph of the rising sea levels</p> <p>Students will design a beachfront house that can withstand the effects of the rising sea level</p> <p>Students will design an energy efficient house</p> <p>Students will identify and chart constellations</p> <p>Students will draw the phases of the moon</p> <p>Students will mode solar and/or lunar eclipses</p> <p>Students will study the career of an Astronomer</p> <p>Students will compare the sizes of earth and the other planets and create a model</p> <p>Students will create a model of the sun</p> <p>Students will draw a model of the solar system</p> <p>Students will build a rocket</p> <p>Vocabulary: climate, greenhouse gas, greenhouse effect, climate change, global warming, fossil fuel, cascade effect, alternative energy, satellite, start, planet, meteor, comet, constellation, geocentric, heliocentric, ellipse, axis, rotation, revolution, orbit, solstice, equinox, gravity, law of gravitation, inertia, phase, eclipse, umbra, penumbra, tide, spring tide, neap tide, solar system, astronomical unit, sun,</p>
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• MS-ESS1-3 Analyze and interpret data to determine scale properties of objects in the solar system.

planet, moon, asteroid, meteoroids, comets, electromagnetic radiation, visible light, spectrum, wavelength, telescope, nebula, protostar, white dwarf, supernova, apparent brightness, absolute brightness, galaxy, universe, light-year, big bang,

Teaching Strategies and Materials: Mentor Texts, DVDs, Internet, Technology (Smart Board, student computers/laptops, PowerPoint, Websites, etc.), supplemental books, visual aids, manipulatives, supplemental materials for investigations

Differentiation Strategies/Modifications

SWD/ Students at risk of failure: 1:1 teacher redirect / re-teach, peer helper, visual aids, modified tests/quizzes, modified homework

Gifted/Enrichment: computer-based research, high level task, class presentation

Connections to other content areas, including Career Readiness, Life Literacies, and Key Skills:

Connections to NJSL - English Language Arts

- SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-ESS2-1), (MS-ESS2-2), (MS-ESS2-6)
- RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS3-1), (MS-ESS3-2), (MS-ESS3-4), (MS-ESS3-5)
- RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-ESS1-3)

Connections to NJSL - Mathematics

- MP.2 Reason abstractly and quantitatively. (MS-ESS1-3)
- MP.4 Model with mathematics. (MS-ESS1-1), (MS-ESS1-2)
- 6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (MS-ESS3-1), (MS-ESS3-2), (MS-ESS3-3), (MS-ESS3-4), (MS-ESS3-5)
- 6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (MS-ESS1-1), (MS-ESS1-2), (MS-ESS1-3)

• 7.RP.A.2 Recognize and represent proportional relationships between quantities. (MS-ESS1-1), (MS-ESS1-2), (MS-ESS1-3)

Readiness, Life Literacies, and Key Skills –

9.4.2.CI.1: Demonstrate openness to new ideas and perspectives.

9.4.2.CI.2: Demonstrate originality and inventiveness in work .

9.4.2.CT.1: Gather information about an issue, such as climate change and collaboratively brainstorm ways to solve the problem.

9.4.2.CT.2- Identify possible approaches and resources to execute a plan.

9.4.2.CT.3- Use a variety of types of thinking to solve problems (e.g. inductive, deductive).

Unit Resources:

Savvas Elevate Science for 6th Grade, Topic 10: Climate p.444-487

Topic 11: Earth-sun-moon system p.488-531

Topic 12: Solar System and the Universe p. 532-587

Hands-on & Virtual Labs

STEM Quest PBL

List of Books to be read:

Websites:

<https://www.fs.usda.gov/ccrc/index.php/>

Education.com

Easyscienceforkids.org

Kidsgrowingstrong.org/Plant Needs

Ducksters.com/science/photosynthesis.php

Animalatlas.tv

Unit Assessment Opportunities:

- Journal Entries and Response Sheets
- Observations, Questioning, and discussions
- Comprehension Checks in literature

- Class Webs
- Presentations
- Collaboration
- Projects
- Rubrics (<http://www.nextgenscience.org/resources>)
- Unit Test
- Lesson Check
- Lesson Quiz
- Performance Expectations Activities
- Topic Tests

Technology

8.1.5.A.1 to 3 - Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.

- Understand and use technology systems.
- Select and use applications effectively and productively.

8.1.5.D.1 to 4 - Digital Citizenship : Students understand human, cultural, societal issues related to technology and practice legal and ethical behaviors

- Advocate and practice safe, legal, and responsible use of information and technology.
- Demonstrate personal responsibility for lifelong learning.
- Exhibit leadership for digital citizenship.

8.1.5.E.1 - Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.

- Plan strategies to guide inquiry.
- Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
- Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.