FTSD Gr 6 Science Curriculum Guide

Subject: Science	Grade Level: 6
Unit 1: Earth's Place in the Universe	Pacing: 9 weeks
Essential Questions	Enduring Understandings (DCI)
• What is the universe, and what is Earth's place in it? (ESS1.A) • What are the predictable patterns caused by Earth's movement in the solar system? (ESS1.B) • How do people reconstruct and date events in Earth's planetary history? (ESS1.C)	ESS1.A: The Universe and Its Stars • 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) • Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. (MS-ESS1-2) ESS1.B: Earth and the Solar System • 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), (MS-ESS1-3) • 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) • The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. (MS-ESS1-2) ESS1.C: The History of Planet Earth • 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) ETS1.A: Defining and Delimiting Engineering Problems • The more precisely a design task's criteria and constraints can be defined, the more

	likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1) ETS1.B: Developing Possible Solutions • A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4) • There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-2), (MS-ETS1-3) • Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3) • Models of all kinds are important for testing solutions. (MS-ETS1-4) ETS1.C: Optimizing the Design Solution • Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design. (MS-ETS1-3) • The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (MS-ETS1-4) Patterns • Patterns can be used to identify cause-and-effect relationships. (ESS1-1) Scale, Proportion, and Quantity • Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (ESS1-3), (ESS1-4)

	System and Systems Models • Models can be used to represent systems and their interactions. (ESS1-2) Interdependence of Science, Engineering, and Technology • Engineering advances have led to important discoveries in virtually every field of science and scientific discoveries have led to the development of entire industries and engineered systems. (MS-ESS1-3)
NGSS Standards	Classroom Applications

MS-ESS1 Earth's Place in the Universe	Objectives:
	• Develop and use a model of the Earth-sun-moon system to describe the cyclical patterns of lunar phases, eclipses of the sun and moon, and seasons. (MS-ESS1-1)
	  • Compare and contrasts revolution and rotation, and explain the connect to the changing seasons
	  • Describe the apparent motions and positions of Earth, stars, and other planets throughout the year
	  • Explain what causes the cycle of seasons on Earth
	  • Explain phenomena caused by the moon (eclipses, tides, phases)
	
	• Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system (MS-ESS1-2)
	  • Describe two factors that keep the moon and Earth in orbit
	  • Identify the strength of gravity between two objects
	• Analyze and interpret data to determine scale properties of objects in the solar system. (MS-ESS1-3)
	• 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-ESS1-4) • Describe how and why the geologic time scale is used to show Earth's history • Describe how geologists determine the relative age of rocks • 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-ETS1-1) • Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (MS-ETS1-2) • 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-ETS1-3) • Develop a model to generate for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. (MS-ETS1-4) 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 (i.e. ESL, Special Education, Gifted & Talented):

	Extra Support: 1:1 teacher redirect / re-teach, peer helper, visual aids, modified tests/quizzes, modified homework Enrichment: computer-based research, high level task, class presentation Limited English Proficiency: vocabulary support, word/picture association, visual aids

Unit Resources: (related websites, reference materials, etc.)

Reference Materials: Dependent upon district resources

www.thesciencequeen.net
www.sciencespot.net
www.sanandreasfault.org
http://astro.unl.edu/naap/lps/animations/lps.swf
http://www.need.org
www.internet4classrooms.com
www.smartexchange.com
http://ngss.nsta.org/Classroom-Resources.aspx
http://www.earthsciweek.org/for-teachers
http://education.usgs.gov/index.html

Unit Assessment Opportunities:

- Journal Entries and Response Sheets
- Observations, Question, and discussions
- Comprehension Checks in literature
- Class Webs
- Presentations
- Collaboration
- Projects
- Rubrics (http://www.nextgenscience.org/resources)
- Lab Investigations
- Quizzes
- Unit Test

Subject: Science	Grade Level: 6
Unit 2: Earth's Systems	Pacing:18 weeks
Essential Questions	Enduring Understandings (DCI)

• How and why is Earth constantly changing? • How do Earth's major systems interact? (ESS2.A) • Why do the continents move, and what causes earthquakes and volcanoes? (ESS2.B) • How do the properties and movements of water shape Earth's surface and affect its systems? (ESS2.C) • What regulates weather and climate? (ESS2.D)	ESS1.C: The History of Planet Earth • Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. (HS. ESS1.C GBE), (secondary to MS-ESS2-3) ESS2.A: Earth's Materials and Systems • 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) • 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) ESS2.B: Plate Tectonics and Large-Scale System Interactions • 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) ESS2.C: The Roles of Water in Earth's Surface Processes • 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) • 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) • Global movements of water and its changes in form are propelled by sunlight and gravity. (MS-ESS2-4) • Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.

	(MS-ESS2-6) • 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) ESS2.D: Weather and Climate • 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. (MS-ESS2-6) • Because these patterns are so complex, weather can only be predicted probabilistically. (MS-ESS2-5) • 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) ETS1.A: Defining and Delimiting Engineering Problems • The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1) ETS1.B: Developing Possible Solutions • A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4) • There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-2), (MS-ETS1-3) • Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3) • Models of all kinds are important for testing

	solutions. (MS-ETS1-4) ETS1.C: Optimizing the Design Solution • Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design. (MS-ETS1-3) • The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (MS-ETS1-4) Patterns • Patterns in rates of change and other numerical relationships can provide information about natural systems. (MS-ESS2-3) Cause and Effect • Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS2-5) Scale Proportion and Quantity • Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (MS-ESS2-2) Systems and System Models • Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. (MS-ESS2-6) Energy and Matter • Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (MS-ESS2-4)

	Stability and Change • Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale. (MS-ESS2-1) Influence of Science, Engineering, and Technology on Society and the Natural World • All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ETS1-1) • The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (MS-ETS1-1)
NGSS Standards	Classroom Applications

MS-ESS2
Earth's Systems
	Objectives:
	• Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. (MS-ESS2-1)
	  • Define and explain how mineral are identified and how they form
	  • Identify the 3 major groups of rocks and their characteristics
	  • Describe the rock cycle
	• Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. (MS-ESS2-2)
	  • Explain the theory of plate tectonics
	  • Correlate the boundaries of plate tectonics to Earth's catastrophic events, such rapid landslides, volcanoes & earthquakes.
	  • Describe geoscience processes including weathering and deposition
	• 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-ESS2-3) • Define & describe mid-ocean ridges • Explain how sea-floor spreading affects Earth's crust • Explain deep-ocean trenches & the process of subduction • 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-ESS2-4) • Trace a drop of water as it changes state throughout the water cycle • Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. (MS-ESS2-5) • Describe how water moves to & from the atmosphere during the water cycle. • Describe humidity & how it is measured • Identify the common types of precipitation • 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-ESS2-6). • Identify factors that influence temperature & precipitation • Identify factors used to define climates • Describe the main climate regions • Identify natural factors that can cause climate change • 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-ETS1-1) • Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (MS-ETS1-2) • 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-ETS1-3) • Develop a model to generate for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. (MS-ETS1-4) 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 (SmartBoard, student computers/laptops, PowerPoint, Websites, etc.), supplemental books, visual aids, manipulatives, supplemental materials for investigations Differentiation Strategies/Modifications (i.e. ESL, Special Education, Gifted & Talented): Extra Support: 1:1 teacher redirect / re-teach, peer helper, visual aids, modified tests/quizzes, modified homework Enrichment: computer-based research, high level task, class presentation Limited English Proficiency: vocabulary support, word/picture association, visual aids

Connections to other content areas, including 21st Century Skills:

MS.PS1.A (MS-ESS2-1), (MS-ESS2-4), (MS-ESS2-5); MS.PS1.B (MS-ESS2-1), (MS-ESS2-2); MS.PS2.A (MS-ESS2-5), (MS-ESS2-6); MS.PS2.B (MS-ESS2-4); MS.PS3.A(MS-ESS2-4), (MS-ESS2-5); MS.PS3.B (MS-ESS2-1), (MS-ESS2-5), (MS-ESS2-6); MS.PS3.D (MS-ESS2-4); MS.PS4.B (MS-ESS2-6); MS.LS2.B (MS-ESS2-1), (MS-ESS2-2); MS.LS2.C (MS-ESS2-1); MS.LS4.B (MS-ESS2-3); MS. ESS1.B (MS-ESS2-1); MS. ESS3.C (MS-ESS2-1

Articulation of DCIs across grade-bands:

3.PS2.A (MS-ESS2-4),(MS-ESS2-6); 3.LS4.A (MS-ESS2-3); 3.ESS2.D (MS-ESS2-5),(MS-ESS2-6); 3.ESS3.B (MS-ESS2-3); 4.PS3.B (MS-ESS2-1),(MS-ESS2-4); 4.ESS1.C(MS-ESS2-

2),(MS-ESS2-3); 4.ESS2.A (MS-ESS2-1),(MS-ESS2-2); 4.ESS2.B (MS-ESS2-3); 4.ESS2.E (MS-ESS2-2); 4.ESS3.B (MS-ESS2-3); 5.PS2.B (MS-ESS2-4);5.ESS2.A (MS-ESS2-1),(MS-ESS2-2),(MS-ESS2-5),(MS-ESS2-6); 5.ESS2.C (MS-ESS2-4); HS.PS1.B (MS-ESS2-1); HS.PS2.B (MS-ESS2-4),(MS-ESS2-6); HS.PS3.B (MS-ESS2-1),(MS-ESS2-4),(MS-ESS2-6); HS.PS3.D (MS-ESS2-2),(MS-ESS2-6); HS.PS4.B (MS-ESS2-4); HS.LS1.C (MS-ESS2-1); HS.LS2.B (MS-ESS2-1),(MS-ESS2-2);HS.LS4.A (MS-ESS2-3); HS.LS4.C (MS-ESS2-3); HS.ESS1.B (MS-ESS2-6); HS.ESS1.C (MS-ESS2-2),(MS-ESS2-3); HS.ESS2.A (MS-ESS2-1),(MS-ESS2-2),(MS-ESS2-3),(MS-ESS2-4),(MS-ESS2-6); HS.ESS2.B (MS-ESS2-2),(MS-ESS2-3); HS.ESS2.C (MS-ESS2-1),(MS-ESS2-2),(MS-ESS2-4),(MS-ESS2-5); HS.ESS2.D (MS-ESS2-2),(MS-ESS2-4),(MS-ESS2-5),(MS-ESS2-6); HS.ESS2.E (MS-ESS2-1),(MS-ESS2-2); HS.ESS3.D (MS-ESS2-2)

Common Core State Standards Connections:
ELA/Literacy –

RST.6-8.1Cite 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)

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)

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)

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)

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)

Unit Resources: (related websites, reference materials, etc.)

Reference Materials: Dependent upon district resources

www.thesciencequeen.net
www.sciencespot.net
www.sanandreasfault.org
http://astro.unl.edu/naap/lps/animations/lps.swf
http://www.need.org
www.internet4classrooms.com
www.smartexchange.com
http://ngss.nsta.org/Classroom-Resources.aspx
http://www.earthsciweek.org/for-teachers
http://education.usgs.gov/index.html

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)
- Lab Investigations
- Quizzes
- Unit Test

Subject: Science	Grade Level: 6
	Pacing: 9 weeks

Unit 3: Earth and Human Activity	
Essential Questions	Enduring Understandings (DCI)
• How do Earth's surface processes and human activities affect each other? (ESS3) • How do natural hazards affect individuals and societies? (ESS3.B) • How do humans change the planet? (ESS3.C) • How do people model and predict the effects of human activities on Earth's climate? (ESS3.D) • How do humans depend on Earth's resources? (ESS3.A)	ESS3.A: Natural Resources • 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 ESS3.B: Natural Hazards • 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) ESS3.C: Human Impacts on Earth Systems • Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to 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) ESS3.D: Global Climate Change • 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) ETS1.A: Defining and Delimiting Engineering Problems • The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1) ETS1.B: Developing Possible Solutions • A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4) • There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-2), (MS-ETS1-3) • Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3) • Models of all kinds are important for testing solutions. (MS-ETS1-4) ETS1.C: Optimizing the Design Solution • Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design. (MS-ETS1-3) • The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (MS-ETS1-4)

	Patterns • Graphs, charts, and images can be used to identify patterns in data. (MS-ESS3-2) Cause and Effect • Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation. (MS-ESS3-3) • Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS3-1), (MS-ESS3-4) Stability and Change • Stability might be disturbed either by sudden events or gradual changes that accumulate over time. (MS-ESS3-5) Influence of Science, Engineering, and Technology on Society and the Natural World • All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ESS3-1), (MS-ESS3-4) • The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. (MS-ESS3-2), (MS-ESS3-3) Connections to Nature of Science Science Addresses Questions About the Natural and Material World • Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-ESS3-4)

NGSS Standards	Classroom Applications

Students who demonstrate understanding can:
 	
MS - ESS3
Earth and Human Activity
	Objectives:
	• 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. (ESS3-1)
	  • Identify the origin of renewable & non-renewable resources
	  • Compare and contrast the benefits of renewable energy
	• Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. (ESS3-2)
	  • Use evidence to predict Earth's catastrophic events and severe weather
	• Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. (ESS3-3)
	  • Describe why soil management is important
	  • Design methods used to help control & reduce waste disposal, air pollution, water pollution
	• Construct an argument supported by evidence for how increase in human population and per-capita consumption of natural resources impact Earth's systems. (ESS3-4)
	  • Explain how the human population has grown
	  • Identify factors that affect the rate of human population growth
	• Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. (ESS3-5)
	• 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-ETS1-1) • Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (MS-ETS1-2) • 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-ETS1-3) • Develop a model to generate for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. (MS-ETS1-4) 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 (SmartBoard, student computers/laptops, PowerPoint, Websites, etc.), supplemental books, visual aids, manipulatives, supplemental materials for investigations Differentiation Strategies/Modifications (i.e. ESL, Special Education, Gifted & Talented): helper, visual aids, modified tests/quizzes, modified homework Enrichment: computer-based research, high level task, class presentation Limited English Proficiency: vocabulary support, word/picture association, visual aids
Connections to other content areas, including 21st Century Skills:	

Common Core State Standards Connections:

ELA/Literacy -

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-ESS3-2)

WHST.6-8.1 Write arguments focused on discipline content. (MS-ESS3-4)

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-ESS3-1)

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)

Mathematics -

MP.2 Reason abstractly and quantitatively. (MS-ESS3-2), (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-ESS3-3), (MS-ESS3-4)

7.RP.A.2 Recognize and represent proportional relationships between quantities. (MS-ESS3-3), (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)

Unit Resources: (related websites, reference materials, etc.)

Reference Materials: Dependent upon district resources

www.thesciencequeen.net
www.sciencespot.net
www.sanandreasfault.org
http://astro.unl.edu/naap/lps/animations/lps.swf
http://www.need.org
www.internet4classrooms.com
www.smartexchange.com
http://ngss.nsta.org/Classroom-Resources.aspx
http://www.earthsciweek.org/for-teachers
http://education.usgs.gov/index.html

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)
- Lab Investigations
- Quizzes
- Unit Test