Manhattan Center for Science and Math High School

Science Department Curriculum

Content/Discipline	Earth Science
http://mcsmportal.net	
Marking Period / Unit 1	
Topic and Essential Question	
How are measurements utilized in science to visual Earth's features? How do topographic maps represent landscape? How can gradient be calculated? How is a map profile drawn? What are some common landscape features? What causes some landscape features to form?	
Unit/Topics:	Unit 1: Maps & measurements Topics: Density, Mass, Volume, percent error, water displacement, reading cylinders & rulers Graphing & relationships (direct, indirect, linear, cyclic, exponential) Latitude & longitude Topography (gradient, profile, River flow)
SWBAT/Objectives	Utilize various scientific tools to obtain measurements Create & analyze topographic maps Calculate gradient and design profiles Graph data
Vocabulary/Key Terms	Atmosphere; contour line; coordinate system; crust; elevation; equator; field; gradient; isoline; latitude; lithoscope; longitude; meridian of latitude; prime meridian; profile; topographic map
Assessments:	**Formative Assessments:** Diagram processing, Notebook processing, Graphic organizers, Quick Writes, Lab analysis questions, Regent question explanations, discussions, quizzes, classwork, homeworks, misconception checks, exit tickets, & entrance slips **Summative Assessment:** Unit test, Projects, & presentations Throughout the year students produce work which allows the instructor to interpret their achievement. Daily homework assignments combined with class work demonstrate the grasp that students have on theories, concepts, and problem solving skills. Laboratory reports demonstrate interpretations of theories through observations, deductions, critical analysis, and reasoning skills. Exams, quizzes, in-class assignments, and projects provide the basis for assessment. Student's grades are calculated based on the following: 60% Exams/quizzes 20% Laboratory reports 15% Homework assignments 5% Class participation This course culminates in a Regents exam which is a standardized assessment given to all students in New York State. Failure of this exam results in students not being able to obtain an Advanced Regents Diploma.
Common Core	**Common Core Standards:**

Standards:	**Reading** R.ST.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
Differentiated Instruction:	R.ST.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text R.ST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9– 10 texts and topics.
ELLs:	R.ST.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
SWDs:	R.ST.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
High-Achievers:	**Writing** W.HST.1 Write arguments focused on discipline specific content. W.HST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. W.HST.9 Draw evidence from informational textsto support analysis, reflection, and research. **Math** F-IF. 6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. F-BF. 3. Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs **New York State Standards**: 1.E.1 Engineering design is an iterative process involving modeling and optimization (finding the best solution within given constraints); this process is used to develop technological solutions to problems within given constraints. 1.M.1 Abstraction and symbolic representation are used to communicate mathematically. 1.S.3 The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena. 1.1c Earth's coordinate system of latitude and longitude, with the equator and prime meridian as reference lines, is based upon Earth's rotation and our observation of the Sun and stars. 1.1d Earth rotates on an imaginary axis at a rate of 15 degrees per hour. To people on Earth, this turning of the planet makes it seem as though the Sun, the moon, and the stars are moving around Earth once a day. Rotation provides a basis for our system of local time; meridians of longitude are the basis for time zones. 1.1f Earth's changing position with regard to the Sun and the moon has noticeable effects. Earth revolves around the Sun with its rotational axis tilted at 23.5 degrees to a line perpendicular to the plane of its orbit, with the North Pole aligned with Polaris. 1.1i Approximately 70 percent of Earth's surface is covered by a relatively thin layer of water, which responds to the gravity 1.2c Our solar system formed about five billion years ago from a giant cloud of gas and debris. Gravity caused Earth and the other planets to become layered according to density differences in their materials. The characteristics of the planets of the solar system are affected by each planet's location in relationship to the Sun.The terrestrial planets are small, rocky, and dense. The Jovian planets are large, gaseous, and of low density

2.1b The transfer of heat energy within the atmosphere, the hydrosphere, and Earth's interior results in the formation of regions of different densities. These density differences result in motion.
2.1g Weather variables can be represented in a variety of formats including radar and satellite images, weather maps (including station models, isobars, and fronts), atmospheric cross-sections, and computer models.
2.1j Properties of Earth's internal structure (crust, mantle, inner core, and outer core) can be inferred from the analysis of the behavior of seismic waves (including velocity and refraction). Analysis of seismic waves allows the determination of the location of earthquake epicenters, and the measurement of earthquake magnitude; this analysis leads to the inference that Earth's interior is composed of layers that differ in composition and states of matter.
2.1l The lithosphere consists of separate plates that ride on the more fluid asthenosphere and move slowly in relationship to one another, creatingconvergent, divergent, and transform plate boundaries. These motions indicate Earth is a dynamic geologic system. These plate boundaries are the sites of most earthquakes, volcanoes, and young mountain ranges. Compared to continental crust, ocean crust is thinner and denser. New ocean crust continues to form at mid-ocean ridges. Earthquakes and volcanoes present geologic hazards to humans. Loss of property, personal injury, and loss of life can be reduced by effective emergency preparedness.
2.1q Topographic maps represent landforms through the use of contour lines that are isolines connecting points of equal elevation. Gradients and profiles canbe determined from changes in elevation over a givendistance
6.2 Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design. For example: draw a simple contour map of a model landform, design a 3-D landscape model from a contour map, construct and interpret a profile based on an isoline map, use flowcharts to identify rocks and minerals
6.3 The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems. For example: develop a scale model to represent planet size and/or distance, develop a scale model of units of geologic time, use topographical maps to determine distances and elevations
7.2 Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results. For example: collect, collate, and process data concerning potential natural disasters (tornadoes, thunderstorms, blizzards, earthquakes, tsunamis, floods, volcanic eruptions, asteroid impacts, etc.) in an area and develop an emergency action plan using a topographic map, determine the safest and most efficient route for rescue purposes

Differentiation-Scaffolding/ Adaptation for ELLs/SWDs:
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-Modeled activity
-Modified class work& assessment
-Graphic organizers
-Coloring & underlining
-Copy of PowerPoint
-Calculators
-Additional time
-Peer assisted learning; grouping consisted of students with varying English language and academic abilities in order to facilitate

	peer-to-peer interaction. -Provide ELLs with appropriate resources to support this such as a science dictionary. Translations & dictionaries will be provided if needed. Note: Modifications, scaffolding, and adaptations will be provided as needed by student and as recommended on IEP.
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Homework: Per Teacher

Manhattan Center for Science and Math High School

Science Department Curriculum

Content/Discipline Earth Science

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Marking Period / Unit 2

Topic and Essential Question How do we use particular characteristics to identify rocks? How can seismic waves help us infer properties of earth's internal structure? How can an earthquake epicenter be determined? What causes the lithosphere to move? What are some of the major types of plate boundaries? Why do most earthquakes, volcanoes, and young mountains form at plate boundaries? How does continental crust differ from oceanic crust? How can loss of life and property associated with earthquakes and volcanoes be reduced?

Unit/Topics	Unit 2: Dynamic Earth Earth's Interior Structure Convection cells Earthquakes Location Earthquakes Plate tectonics Plate Boundaries Fault & stresses Volcanoes Tsunami
SWBAT/Objectives	Describe dynamic processes that occur inside and outside Earth Produce model of the layers of the Earth Compare & contrast plate boundaries Locate earthquakes' epicenter
Vocabulary/Key Terms	Asthenosphere; continental crust; convergent plate boundary; crust; divergent plate boundary; earthquake; epicenter; faulted; folded; hot spot; inner core; island arc; lithosphere; lithospheric plate; mantle; midoceanridge; Moho; oceanic crust; ocean trench; outer core; plate; plate tectonic theory; P-waves; seismic wave; subduction; S-waves; tectonic plate; transform plate boundary; tsunami; uplifted; volcanic eruption; volcano; young mountains
Assessments:	**Formative Assessments:** Diagram processing, Notebook processing, Graphic organizers, Quick Writes, Lab analysis questions, Regent question explanations, discussions, quizzes, classwork, homeworks, misconception checks, exit tickets, & entrance slips **Summative Assessment:** Unit test, Projects, & presentations Throughout the year students produce work which allows the instructor to interpret their achievement. Daily homework assignments combined with class work demonstrate the grasp that students have on theories, concepts, and problem solving skills. Laboratory reports demonstrate interpretations of theories through observations, deductions, critical analysis, and

	reasoning skills. Exams, quizzes, in-class assignments, and projects provide the basis for assessment. Student's grades are calculated based on the following: 60% Exams/quizzes 20% Laboratory reports 15% Homework assignments 5% Class participation This course culminates in a Regents exam which is a standardized assessment given to all students in New York State. Failure of this exam results in students not being able to obtain an Advanced Regents Diploma.
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focusing on addressing what is most significant for a specific purpose and audience.
W.HST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
W.HST.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
W.HST.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
W.HST.9 Draw evidence from informational texts to support analysis, reflection, and research.
W.HST.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences
New York State Standards Addressed:
1.2j Geologic history can be reconstructed by observing sequences of rock types and fossils to correlate bedrock at various locations. The characteristics of rocks indicate the processes by which they formed and the environments in which these processes took place. Fossils preserved in rocks provide information about past environmental conditions. Geologists have divided Earth history into time units based upon the fossil record. Age relationships among bodies of rocks can be determined using principles of original horizontality, superposition, inclusions, crosscutting relationships, contact metamorphism, and unconformities. The presence of volcanic ash layers, index fossils, and meteoritic debris can provide additional information. The regular rate of nuclear decay (half-life time period) of radioactive isotopes allows geologists to determine the absolute age of materials found in some rocks.
2.1b The transfer of heat energy within the atmosphere, the hydrosphere, and Earth's interior results in the formation of regions of different densities. These density differences result in motion.
2.1j Properties of Earth's internal structure (crust, mantle, inner core, and outer core) can be inferred from the analysis of the behavior of seismic waves (including velocity and refraction). Analysis of seismic waves allows the determination of the location of earthquake epicenters, and the measurement of earthquake magnitude; this analysis leads to the inference that Earth's interior is composed of layers that differ in composition and states of matter.
2.1k The outward transfer of Earth's internal heat drives convective circulation in the mantle that moves the lithospheric plates comprising Earth's surface.

Differentiation-Scaffolding/ Adaptation for ELLs/SWDs:
-Explicit (verbal & written) instructions
-Visuals (photos, animations, videos) with subtitles
-Modeled activity
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-Graphic organizers
-Coloring & underlining
-Copy of PowerPoint

	-Calculators -Additional time -Peer assisted learning; grouping consisted of students with varying English language and academic abilities in order to facilitate peer-to-peer interaction. -Provide ELLs with appropriate resources to support this such as a science dictionary. Translations & dictionaries will be provided if needed. Note: Modifications, scaffolding, and adaptations will be provided as needed by student and as recommended on IEP.
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Homework: Per Teacher

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Content/Discipline Earth Science

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Marking Period / Unit 3

Topic and Essential Questions:

How do we test for mineral properties to identify minerals? How are different types of rocks formed? How are the physical properties of minerals determined? What properties can help us identify minerals? How do minerals form? How are rocks classified? What does a rock's mineral content and texture tell us about conditions that existed when it formed? How is land usage influenced by the properties of rocks?

Unit/Topics	Unit 3: Rocks & Minerals Atoms Crystals Minerals Rocks: Igneous, Sedimentary, & Metamorphic Weathering & Erosion Mining & Natural resources
SWBAT/Objectives	Identify rocks and mineral Annotate observations about physical and chemical characteristics of minerals and rocks Utilize the Earth Science Reference Table as a resource to name minerals and rocks
Vocabulary/Key Terms	Sedimentary rocks; cleavage; crystal structure; extrusive & intrusive igneous rocks; fossil; fracture; hardness; luster: magma; metamorphic rocks; mineral; precipitation; rock cycle; streak; texture.
Assessments:	**Formative Assessments:** Diagram processing, Notebook processing, Graphic organizers, Quick Writes, Lab analysis questions, Regent question explanations, discussions, quizzes, classwork, homeworks, misconception checks, exit tickets, & entrance slips **Summative Assessment:** Unit test, presentations, Projects: Rocks & minerals around our neighborhood project &Minerals Throughout the year students produce work which allows the instructor to interpret their achievement. Daily homework assignments combined with class work demonstrate the grasp that students have on theories, concepts, and problem solving skills. Laboratory reports demonstrate interpretations of theories through observations, deductions, critical analysis, and reasoning skills. Exams, quizzes, in-class assignments, and projects provide the basis for assessment. Student's grades are calculated based on the following: 60% Exams/quizzes 20% Laboratory reports 15% Homework assignments

	5% Class participation This course culminates in a Regents exam which is a standardized assessment given to all students in New York State. Failure of this exam results in students not being able to obtain an Advanced Regents Diploma.
Common Core Standards: **Differentiated Instruction:** **ELLs:** **SWDs:** **High-Achievers:**	**Common Core Standards:** **Reading** R.ST.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. R.ST.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. R.ST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9– 10 texts and topics. R.ST.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). R.ST.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. **Writing** W.HST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. W.HST.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. W.HST.9 Draw evidence from informational texts to support analysis, reflection, and research. **New York State Standards Addressed:** 1.1 Abstraction and symbolic representation are used to communicate mathematically. 2.1 Information technology is used to retrieve, process, and communicate information as a tool to enhance learning. 6.1 Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions. 6.2 Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design. 7.1 The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/ technology/society, consumer decision making, design, and inquiry into phenomena. 4.1.2j Geologic history can be reconstructed by observing sequences of rock types and fossils to correlate bedrock at various locations. The characteristics of rocks indicate the processes by which they formed and the environments in which these processes took place. Fossils preserved in rocks provide information about past environmental conditions. Geologists have divided Earth history into time units based upon the fossil record. Age relationships among bodies of rocks can be determined using principles of original horizontality, superposition, inclusions, crosscutting relationships, contact metamorphism, and unconformities. The presence of volcanic ash layers, index fossils, and meteoritic debris can provide additional information.

	The regular rate of nuclear decay (half-life time period) of radioactive isotopes allows geologists to determine the absolute age of materials found in some rocks. 4.2.1w Sediments of inorganic and organic origin often accumulate in depositional environments. Sedimentary rocks form when sediments are compacted and/or cemented after burial or as the result of chemical precipitation from seawater. 4. 3.1a Minerals have physical properties determined by their chemical composition and crystal structure. Minerals can be identified by well-defined physical and chemical properties, such as cleavage, fracture, color, density, hardness, streak, luster, crystal shape, and reaction with acid. Chemical composition and physical properties determine how minerals are used by humans. 4. 3.1b Minerals are formed inorganically by the process of crystallization as a result of specific environmental conditions. These include: Cooling and solidification of magma. Precipitation from water caused by such processes as evaporation, chemical reactions, and temperature changes. Rearrangement of atoms in existing minerals subjected to conditions of high temperature and pressure. **Differentiation-Scaffolding/ Adaptation for ELLs/SWDs:** -Explicit (verbal & written) instructions -Visuals (photos, animations, videos) with subtitles -Modeled activity -Modified class work & assessment -Graphic organizers -Coloring & underlining -Copy of PowerPoint -Calculators -Additional time -Peer assisted learning; grouping consisted of students with varying English language and academic abilities in order to facilitate peer-to-peer interaction. -Provide ELLs with appropriate resources to support this such as a science dictionary. Translations & dictionaries will be provided if needed. Note: Modifications, scaffolding, and adaptations will be provided as needed by student and as recommended on IEP.
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	http://regentsprep.org/regents/earthsci/earthsci.cfm http://reviewearthscience.com/pages/regents-review.php http://www.regentsearth.com/Interactive%20Regents/Interactive%20Regents.htm http://regentsearth.com/Tests/index.htm http://www.regentsearth.com/Regents%20Archive/Archive_Index.htm Note: Students will be provided with more resources during the school year

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Marking Period / Unit 4

Topic and Essential Question

What is weathering? What causes soils to form? What causes rock erosion? What causes precipitation to run off land or to infiltrate into the soil? What affects the amount of precipitation that runs off land or infiltrates into the soil? What causes certain landforms to arise? What are some natural agents of erosion? How does stream erosion take place? How do glaciers cause erosion? How does wave action cause erosion? How does wind cause erosion? What are mass movements? What causes certain patterns of deposition?

Unit/Topics	Unit 4: Landscapes Weathering, Erosion, & Deposition Particles Porosity, Permeability, & Capillarity Streams Deltas Soil Mudslide & Landslide Real World: Agriculture
SWBAT/Objectives	Hypothesize the settling rate of particles according to their physical characteristics. Predict weathering time according to chemical composition Create stream profiles of meandering rivers
Vocabulary/Key Terms	Weathering, erosion, infiltration, porosity, permeability, deltas, deposition, capillarity, grain size, soil, saturation, unsaturated, permeable, sorting, landslide
Assessments:	**Formative Assessments:** Diagram processing, Notebook processing, Graphic organizers, Quick Writes, Lab analysis questions, Regent question explanations, discussions, quizzes, classwork, homeworks, misconception checks, exit tickets, & entrance slips **Summative Assessment:** Unit test, Projects, & presentations Throughout the year students produce work which allows the instructor to interpret their achievement. Daily homework assignments combined with class work demonstrate the grasp that students have on theories, concepts, and problem solving skills. Laboratory reports demonstrate interpretations of theories through observations, deductions, critical analysis, and reasoning skills. Exams, quizzes, in-class assignments, and projects provide the basis for assessment. Student's grades are calculated based on the following: 60% Exams/quizzes 20% Laboratory reports 15% Homework assignments 5% Class participation This course culminates in a Regents exam which is a standardized assessment given to all students in New York State. Failure of this exam results in students not being able to obtain an Advanced Regents Diploma.

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SWDs:	R.ST.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
High-Achievers:	
	Writing W.HST.1 Write arguments focused on discipline specific content. W.HST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. W.HST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. W.HST.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. W.HST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically
	New York State Standards: 2.3 Information technology can have positive and negative impacts on society, depending upon how it is used. For example: discuss how early warning systems can protect society and the environment from natural disasters such as hurricanes, tornadoes, earthquakes, tsunamis, floods, and volcanoes 4.2.1p Landforms are the result of the interaction of tectonic forces and the processes of weathering, erosion, and deposition. 4.2.1s Weathering is the physical and chemical breakdown of rocks at or near Earth's surface. Soils are the result of weathering and biological activity over long periods of time. 4.2.1t Natural agents of erosion, generally driven by gravity, remove, transport, and deposit weathered rock particles. Each agent of erosion produces distinctive changes in the material that it transports and creates characteristic surface features and landscapes. In certain erosional situations, loss of property, personal injury, and loss of life can be reduced by effective emergency preparedness. 4. 2.1u The natural agents of erosion include: Streams (running water): Gradient, discharge, and channel shape influence a stream's velocity and the erosion and deposition of sediments. Sediments transported by streams tend to become rounded as a result of abrasion. Stream features include V-shaped valleys, deltas, flood plains, and meanders. A watershed is the area drained by a stream and its tributaries. Glaciers (moving ice): Glacial erosional processes include the formation of U-shaped valleys, parallel scratches, and grooves in bedrock. Glacial features include moraines, drumlins, kettle lakes, Finger Lakes, and outwash plains. Wave Action: Erosion and deposition cause changes in shoreline features, including beaches, sandbars, and barrier islands. Wave action rounds sediments as a result of abrasion. Waves approaching a shoreline move sand parallel to the shore within the zone of breaking waves. Wind: Erosion of sediments by wind is most common in arid climates and along shorelines. Wind-generated features include dunes and sandblasted

	bedrock. Mass Movement: Earth materials move downslope under the influence of gravity **Differentiation-Scaffolding/ Adaptation for ELLs/SWDs:** -Explicit (verbal & written) instructions -Visuals (photos, animations, videos) with subtitles -Modeled activity -Modified class work & assessment -Graphic organizers -Coloring & underlining -Copy of PowerPoint -Calculators -Additional time -Peer assisted learning; grouping consisted of students with varying English language and academic abilities in order to facilitate peer-to-peer interaction. -Provide ELLs with appropriate resources to support this such as a science dictionary. Translations & dictionaries will be provided if needed. Note: Modifications, scaffolding, and adaptations will be provided as needed by student and as recommended on IEP.
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Marking Period 3 / Unit 5

Topic and Essential Question

What can the principle of superposition and un-conformity tell us about the ages of bedrocks? How can we use rocks to date important geological events? How can we make correlations between bedrock and index fossils? How can we analyze and interpret the geological time scale?

Unit/Topics	Unit 5: Earth History Topics: Fossils Absolute Dating Vs. Relating Dating Stratigraphy Radio Active Decay
SWBAT/Objectives	Calculate radioactive decay Analyze the difference between absolute dating and relative dating Design stratigraphy models of rock layers to tell a story about Earth
Vocabulary/Key Terms	Absolute age, bedrock, carbon -14 dating, extrusion, fossil, geologic time scale, half-life, inclusion, correlation, intrusion, isotope, organic evolution, outgassing, radioactive dating, radioactive decay, species, unconformity, volcanic ash.
Assessments:	**Formative Assessments:** Diagram processing, Notebook processing, Graphic organizers, Quick Writes, Lab analysis questions, Regent question explanations, discussions, quizzes, classwork, homeworks, misconception checks, exit tickets, & entrance slips **Summative Assessment:** Unit test, Projects, & presentations Throughout the year students produce work which allows the instructor to interpret their achievement. Daily homework assignments combined with class work demonstrate the grasp that students have on theories, concepts, and problem solving skills. Laboratory reports demonstrate interpretations of theories through observations, deductions, critical analysis, and reasoning skills. Exams, quizzes, in-class assignments, and projects provide the basis for assessment. Student's grades are calculated based on the following: 60% Exams/quizzes 20% Laboratory reports 15% Homework assignments 5% Class participation This course culminates in a Regents exam which is a standardized assessment given to all students in New York State. Failure of this exam results in students not being able to obtain an Advanced Regents Diploma.
Common Core Standards:	**Common Core Standards:** **Reading** RST.1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

Differentiated Instruction: **ELLs:** **SWDs:** **High-Achievers:**	RST.2. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. RST.3. Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. RST.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. RST.7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. RST.9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. RST.10. By the end of grade10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. **Writing** WHST.2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. WHST.9. Draw evidence from informational texts to support analysis, reflection, and research. **New York State Standards** 2d Asteroids, comets, and meteors are components of our solar system. Impact events have been correlated with mass extinction and global climatic change. Impact craters can be identified in Earth's crust. 1.2f Earth's oceans formed as a result of precipitation over millions of years. The presence of an early ocean is indicated by sedimentary rocks of marine origin, dating back about four billion years. 1.2h The evolution of life caused dramatic changes in the composition of Earth's atmosphere. Free oxygen did not form in the atmosphere until oxygen producing organisms evolved. 1.2i The pattern of evolution of life-forms on Earth is at least partially preserved in the rock record. Fossil evidence indicates that a wide variety of life-forms has existed in the past and that most of these forms have become extinct. Human existence has been very brief compared to the expanse of geologic time. 1.2j Geologic history can be reconstructed by observing sequences of rock types and fossils to correlate bedrock at various locations. The characteristics of rocks indicate the processes by which they formed and the environments in which these processes took place. Fossils preserved in rocks provide information about past environmental conditions. Geologists have divided Earth history into time units based upon the fossil record. Age relationships among bodies of rocks can be determined using principles of original horizontality, superposition, inclusions, crosscutting relationships, contact metamorphism, and unconformities. The presence of volcanic ash layers, index fossils, and meteoritic debris can provide additional information. The regular rate of nuclear decay (half-life time period) of radioactive isotopes allows geologists to determine the absolute age of materials found in some rocks. **Differentiation-Scaffolding/ Adaptation for ELLs/SWDs:** -Explicit (verbal & written) instructions -Visuals (photos, animations, videos) with subtitles -Modeled activity -Modified class work & assessment -Graphic organizers -Coloring & underlining -Copy of PowerPoint

	-Calculators -Additional time -Peer assisted learning; grouping consisted of students with varying English language and academic abilities in order to facilitate peer-to-peer interaction. -Provide ELLs with appropriate resources to support this such as a science dictionary. Translations & dictionaries will be provided if needed. Note: Modifications, scaffolding, and adaptations will be provided as needed by student and as recommended on IEP.
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Homework: Per Teacher

Manhattan Center for Science and Math High School

Science Department Curriculum

Content/Discipline Earth Science

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Marking Period / Unit 6

Topic and Essential Question:

How does the angle of insolation affect the intensity of insolation? How does latitude affect the angle of insolation and intensity of insolation? How is Earth tilted on its axis, and how does this tilt affect the distribution of sunlight on the Earth throughout its revolution? How does the parallelism of Earth's axis as it revolves lead to the cyclical changing of angles of insolation up and down the lines of latitude? How does the Sun's path across the New York sky change with the seasons? How does the duration of insolation change with the seasons? How do revolution, tilt of axis, and parallelism work together to cause the seasons?

Unit/Topics	Unit 6: Insolation Topics: Arc of the Sun Insolation Seasons Energy Reflection, Absorption, Scatter Light Electromagnetic Spectrum Specific Heat Wind Coriolis Effect
SWBAT/Objectives	Explain the importance of the Coriolis Effect on Earth Discuss how why are there seasons Describe how insolation affect Earth's systems
Vocabulary/Key Terms	Angle of incidence; deforestation; global warming; greenhouse gases; ice ages; insolation; ozone; sunspot; transpiration, coriolis effect, heat, waves, insolation, light, rotation, revolution, reflection, absorption, scatter
Assessments:	**Formative Assessments:** Diagram processing, Notebook processing, Graphic organizers, Quick Writes, Lab analysis questions, Regent question explanations, discussions, quizzes, classwork, homeworks, misconception checks, exit tickets, & entrance slips **Summative Assessment:** Unit test, Projects, & presentations Throughout the year students produce work which allows the instructor to interpret their achievement. Daily homework assignments combined with class work demonstrate the grasp that students have on theories, concepts, and problem solving skills. Laboratory reports demonstrate interpretations of theories through observations, deductions, critical analysis, and reasoning skills. Exams, quizzes, in-class assignments, and projects provide the basis for assessment. Student's grades are calculated based on the following: 60% Exams/quizzes 20% Laboratory reports 15% Homework assignments

	5% Class participation This course culminates in a Regents exam which is a standardized assessment given to all students in New York State. Failure of this exam results in students not being able to obtain an Advanced Regents Diploma.
Common Core Standards: **Differentiated Instruction:** **ELLs:** **SWDs:** **High-Achievers:**	**Common Core Standards:** **Reading** R.ST.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. R.ST.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text R.ST.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. R.ST.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. R.ST.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. **Writing** W.HST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes W.HST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. W.HST.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. W.HST.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. W.HST.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. **New York State Standards:** *Key Idea 3:* Critical thinking skills are used in the solution of mathematical problems. For example, in a field, use isoclines to determine a source of pollution *Key Idea 5:* Identifying patterns of change is necessary for making predictions about future behavior and conditions. For example:graph and interpret the nature of cyclic change such as sunspots, tides, and atmospheric carbon dioxide Major Understandings: 4.1.1a Most objects in the solar system are in regular and predictable motion. These motions explain such phenomena as the day, the year, seasons, phases of the moon, eclipses, and tides. Gravity influences the motions of celestial objects. The force of gravity between two objects in the universe depends on their masses and the distance between them. 4.1.1f Earth's changing position with regard to the Sun and the moon has noticeable effects. Earth revolves around the Sun with its rotational axis tilted at 23.5 degrees to a line perpendicular to the plane of its orbit, with the North Pole aligned with Polaris. During Earth's one-year period of revolution, the tilt of its axis results in changes in the angle of incidence of the Sun's rays at a given latitude; these changes cause variation in the heating of the surface. This produces seasonal variation in weather.

	4.1.1h The Sun's apparent path through the sky varies with latitude and season. Heating of Earth's surface and atmosphere by the Sun drives convection within the atmosphere and oceans, producing winds and ocean currents. **Differentiation-Scaffolding/ Adaptation for ELLs/SWDs:** -Explicit (verbal & written) instructions -Visuals (photos, animations, videos) with subtitles -Modeled activity -Modified class work & assessment -Graphic organizers -Coloring & underlining -Copy of PowerPoint -Calculators -Additional time -Peer assisted learning; grouping consisted of students with varying English language and academic abilities in order to facilitate peer-to-peer interaction. -Provide ELLs with appropriate resources to support this such as a science dictionary. Translations & dictionaries will be provided if needed. Note: Modifications, scaffolding, and adaptations will be provided as needed by student and as recommended on IEP.
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Marking Period / Unit 7

Topic and Essential Question

What happens as a result of Earth's internal and external heat sources? What is the major consequence of the transfer of heat energy in the Earth? What are important weather variables associated with weather patterns? How are weather variables measured? How are temperature, humidity, air pressure, and precipitation related? What happens when air moves vertically in the atmosphere? What are the different formats used to represent weather variables? What are some of the observable patterns associated with some common weather? What are some measures that can be used to reduce loss due to severe weather? How can we explain seasonal weather changes? What causes incoming solar radiation to heat Earth's surface and atmosphere? How is heat energy transferred within the atmosphere, hydrosphere, and crust? How do convection currents produce wind and ocean currents? What factors influence a location's climate? What can cause temperature and precipitation patterns to be altered?

Unit/Topics	Unit 7: Meteorology Topics: Weather variables & technology Water Cycle Layers of the atmosphere Fronts Air masses Station models El Niño & la Niña Weather Maps
SWBAT/Objectives	Evaluate the relationship between weather variables and the daily weather Design weather maps Construct station models Explain the water cycle and describe how it affect Earth's systems
Vocabulary/Key Terms	Air mass; air pressure gradient; atmospheric, barometric & air pressure; barometer; cloud cover; cold front; cyclone; dew point; front; humidity; isobar; jet stream; occluded front; polar front; precipitation; psychrometers; radar; relative humidity; stationary front; troposphere; warm front; water vapor.
Assessments:	**Formative Assessments:** Diagram processing, Notebook processing, Graphic organizers, Quick Writes, Lab analysis questions, Regent question explanations, discussions, quizzes, classwork, homeworks, misconception checks, exit tickets, & entrance slips **Summative Assessment:** Unit test, Projects, & presentations Throughout the year students produce work which allows the instructor to interpret their achievement. Daily homework assignments combined with class work demonstrate the grasp that students have on theories, concepts, and problem solving skills. Laboratory reports demonstrate interpretations of theories through observations, deductions, critical analysis, and reasoning skills. Exams, quizzes, in-class assignments, and projects provide the basis for assessment. Student's grades are calculated based on the following: 60% Exams/quizzes

	20% Laboratory reports 15% Homework assignments 5% Class participation This course culminates in a Regents exam which is a standardized assessment given to all students in New York State. Failure of this exam results in students not being able to obtain an Advanced Regents Diploma.
Common Core Standards: **Differentiated Instruction:** **ELLs:** **SWDs:** **High-Achievers:**	**Common Core Standards:** **Reading** R.ST.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. R.ST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9– 10 texts and topics. R.ST.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). R.ST.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. **Writing** W.HST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. W.HST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. W.HST.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. **New York State Standards:** Key Idea 2.1: Information technology is used to retrieve, process, and communicate information as a tool to enhance learning. For example: analyze weather maps to predict future weather events use library or electronic references to obtain information to support a laboratory conclusion Key Idea 2.3: Information technology can have positive and negative impacts on society, depending upon how it is used. For example: discuss how early warning systems can protect society and the environment from natural disasters such as hurricanes, tornadoes, earthquakes, tsunamis, floods, and volcanoes Key Idea 6.4: Equilibrium is a state of stability due either to a lack of change (static equilibrium) or a balance between opposing forces (dynamic equilibrium). For example: analyze the interrelationship between gravity and inertia and its effects on the orbit of planets or satellites Key Idea 6.5: Identifying patterns of change is necessary for making predictions about future behavior and conditions. For example: graph and interpret the nature of cyclic change such as sunspots, tides, and atmospheric carbon dioxide based on present data of plate movement, determine past and future positions of land masses using given weather data, identify the interface between air masses, such as cold fronts, warm fronts, and stationary fronts Key Idea 7.2: Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results. For example: collect, collate, and process data concerning potential natural disasters (tornadoes, thunderstorms, blizzards, earthquakes, tsunamis, floods, volcanic eruptions, asteroid impacts, etc.) in an area and develop an emergency action plan using a topographic map, determine the safest and most efficient route for rescue purposes

4.1.1f Earth's changing position with regard to the Sun and the moon has noticeable effects. Earth revolves around the Sun with its rotational axis tilted at 23.5 degrees to a line perpendicular to the plane of its orbit, with the North Pole aligned with Polaris. During Earth's one-year period of revolution, the tilt of its axis results in changes in the angle of incidence of the Sun's rays at given latitude; these changes cause variation in the heating of the surface. This produces seasonal variation in weather.
4.1.1g Seasonal changes in the apparent positions of constellations provide evidence of Earth's revolution.
4.2.1b The transfer of heat energy within the atmosphere, the hydrosphere, and Earth's interior results in the formation of regions of different densities. These density differences result in motion.
4.2.1c Weather patterns become evident when weather variables are observed, measured, and recorded. These variables include air temperature, air pressure, moisture (relative humidity and dewpoint), precipitation (rain, snow, hail, sleet, etc.), wind speed and direction, and cloud cover.
4.2.1d Weather variables are measured using instruments such as thermometers, barometers, psychrometers, precipitation gauges, anemometers, and wind vanes.
4.2.1e Weather variables are interrelated. For example: temperature and humidity affect air pressure
and probability of precipitation air pressure gradient controls wind velocity
4.2.1f Air temperature, dewpoint, cloud formation, and precipitation are affected by the expansion and contraction of air due to vertical atmospheric movement.
4.2.1g Weather variables can be represented in a variety of formats including radar and satellite images, weather maps (including station models, isobars, and fronts), atmospheric cross-sections, and computer models.
4.2.1h Atmospheric moisture, temperature and pressure distributions; jet streams, wind; air masses and frontal boundaries; and the movement of cyclonic systems and associated tornadoes, thunderstorms, and hurricanes occur in observable patterns. Loss of property, personal injury, and loss of life can be reduced by effective emergency preparedness.
4.2.1i Seasonal changes can be explained using concepts of density and heat energy. These changes include the shifting of global temperature zones, the shifting of planetary wind and ocean current patterns, the occurrence of monsoons, hurricanes, flooding, and severe weather.
4.2.2a Insolation (solar radiation) heats Earth's surface and atmosphere unequally due to variations in: the intensity caused by differences in atmospheric transparency and angle of incidence which vary with time of day, latitude, and season characteristics of the materials absorbing the energy such as color, texture, transparency, state of matter, and specific heat Duration, which varies with seasons and latitude.
4.2.2b The transfer of heat energy within the atmosphere, the hydrosphere, and Earth's surface occurs as the result of radiation, convection, and conduction. Heating of Earth's surface and atmosphere by the Sun drives convection within the atmosphere and oceans, producing winds and ocean currents.
4.2.2c A location's climate is influenced by latitude, proximity to large bodies of water, ocean currents, prevailing winds, vegetative cover, elevation, and mountain ranges.
4.2.2d Temperature and precipitation patterns are altered by: natural events such as El Nino and volcanic, Eruptions, Human influences including deforestation, urbanization, and the production of greenhouse gases such as carbon dioxide and methane.

Differentiation-Scaffolding/ Adaptation for ELLs/SWDs:
-Explicit (verbal & written) instructions
-Visuals (photos, animations, videos) with subtitles
-Modeled activity
-Modified class work & assessment
-Graphic organizers

	-Coloring & underlining -Copy of PowerPoint -Calculators -Additional time -Peer assisted learning; grouping consisted of students with varying English language and academic abilities in order to facilitate peer-to-peer interaction. -Provide ELLs with appropriate resources to support this such as a science dictionary. Translations & dictionaries will be provided if needed. Note: Modifications, scaffolding, and adaptations will be provided as needed by student and as recommended on IEP.
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Homework: Per Teacher

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Content/Discipline Earth Science

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Marking Period / Unit 8

Topic and Essential Question:

How do human activities affect the Earth's water and climate? How does water cycle between different spheres of Earth? Why does water infiltrate or run-off? How does latitude affect climate? How do large bodies of water affect climate? How do mountains affect climate?

Unit/Topics	Unit 8: Climate Topics: Climate Change Green House Global warming Gases Ozone layer
SWBAT/Objectives	Debate on climate topics Describe the Green House Effect Explain natural and human impacts on climate
Vocabulary/Key Terms	Atmosphere, climate, global warming, climate, climate change
Assessments:	**Formative Assessments:** Diagram processing, Notebook processing, Graphic organizers, Quick Writes, Lab analysis questions, Regent question explanations, discussions, quizzes, classwork, homeworks, misconception checks, exit tickets, & entrance slips **Summative Assessment:** Unit test, Projects, & presentations Throughout the year students produce work which allows the instructor to interpret their achievement. Daily homework assignments combined with class work demonstrate the grasp that students have on theories, concepts, and problem solving skills. Laboratory reports demonstrate interpretations of theories through observations, deductions, critical analysis, and reasoning skills. Exams, quizzes, in-class assignments, and projects provide the basis for assessment. Student's grades are calculated based on the following: 60% Exams/quizzes 20% Laboratory reports 15% Homework assignments 5% Class participation This course culminates in a Regents exam which is a standardized assessment given to all students in New York State. Failure of this exam results in students not being able to obtain an Advanced Regents Diploma.
Common Core Standards:	**Common Core Standards:** **Reading** R.ST.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or

	descriptions.
Differentiated Instruction:	R.ST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9– 10 texts and topics*. R.ST.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
ELLs:	R.ST.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
SWDs:	R.ST.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
High-Achievers:	R.ST.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and Proficiently. **Writing** W.HST.1 Write arguments focused on *discipline specific content*. W.HST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. W.HST.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. W.HST.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. W.HST.9 Draw evidence from informational texts to support analysis, reflection, and research. **New York State Standards:** 4.1.2g Earth has continuously been recycling water since the out gassing of water early in its history. This constant recirculation of water at and near Earth's surface is described by the hydrologic (water) cycle. Water is returned from the atmosphere to Earth's surface by precipitation. Water returns to the atmosphere by evaporation or transpiration from plants. A portion of the precipitation becomes runoff over the land or infiltrates into the ground to become stored in the soil or groundwater below the water table. Soil capillarity influences these processes. The amount of precipitation that seeps into the ground or runs off is influenced by climate, slope of the land, soil, rock type, vegetation, land use, and degree of saturation. Porosity, permeability, and water retention affect runoff and infiltration. 4. 2.1f Air temperature, dewpoint, cloud formation, and precipitation are affected by the expansion and contraction of air due to vertical atmospheric movement. 4. 2.1i Seasonal changes can be explained using concepts of density and heat energy. These changes include the shifting of global temperature zones, the shifting of planetary wind and ocean current patterns, the occurrence of monsoons, hurricanes, flooding, and severe weather. 4. 2.2a Insolation (solar radiation) heats Earth's surface and atmosphere unequally due to variations iṇ:the intensity caused by differences in atmospheric transparency and angle of incidence which vary with time of day, latitude, and season. Characteristics of the materials absorbing the energy such as color, texture, transparency, state of matter, and specific heat duration, which varies with seasons and latitude. 4.2.2c A location's climate is influenced by latitude, proximity to large bodies of water, ocean currents, prevailing winds, vegetative cover, elevation, and mountain ranges. 4.2.2d Temperature and precipitation patterns are altered by natural events such as El Nino and volcanic eruptions. Human influences including deforestation, urbanization, and the production of greenhouse gases such as carbon dioxide and methane.

	Differentiation-Scaffolding/ Adaptation for ELLs/SWDs: -Explicit (verbal & written) instructions -Visuals (photos, animations, videos) with subtitles -Modeled activity -Modified class work & assessment -Graphic organizers -Coloring & underlining -Copy of PowerPoint -Calculators -Additional time -Peer assisted learning; grouping consisted of students with varying English language and academic abilities in order to facilitate peer-to-peer interaction. -Provide ELLs with appropriate resources to support this such as a science dictionary. Translations & dictionaries will be provided if needed. Note: Modifications, scaffolding, and adaptations will be provided as needed by student and as recommended on IEP.
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Marking Period / Unit 9

Topic and Essential Question

What is the relationship between mass, distance, and the force of gravity for objects in the universe? How do the planets move around the sun? What types of objects orbit the Earth? How has the latitude and longitude coordinate system developed? Why does it appear that the Sun, moon, and stars move around the Earth once each day? How do we explain local time and time zones? Where can we find evidence for Earth's rotation? What causes the Earth's seasons? How do constellations provide evidence of Earth's revolution? How does the sun's apparent path through the sky vary with latitude and seasons? What causes the daily cycle of high and low tides? What evidence supports the big bang theory? How do stars form? How do stars differ from each other? What is our place in the universe? When and how did our solar system form? What are some important characteristics of planets of the solar system? How do the terrestrial and Jovian planets differ? What are comets, asteroids, and meteors? What are some major consequences of impact events?

Unit/Topics	Unit 9: Astronomy Topics: A) Solar System B) Celestial Bodies C) Phases of the Moon D) Eclipses E) Tides F) Eccentricity G) HR Diagram H) Life in other planets
SWBAT/Objectives	Sketch the life of a star and describe each phase Construct model of moon phases and the solar system Calculate eccentricity Construct eccentricity model Graph HR data
Vocabulary/Key Terms	Asteroid; Big Bang theory; celestial object; comet; Doppler effect; eccentricity; ellipse; galaxy; gravitation; impact crater; inertia; Jovian planet; meteor; moon; nuclear fusion; red shift; revolution; rotation; solar system; star; terrestrial planet; universe.
Assessments:	**Formative Assessments:** Diagram processing, Notebook processing, Graphic organizers, Quick Writes, Lab analysis questions, Regent question explanations, discussions, quizzes, classwork, homeworks, misconception checks, exit tickets, & entrance slips **Summative Assessment:** Unit test, Projects, & presentations Throughout the year students produce work which allows the instructor to interpret their achievement. Daily homework assignments combined with class work demonstrate the grasp that students have on theories, concepts, and problem solving skills. Laboratory reports demonstrate interpretations of theories through observations, deductions, critical analysis, and reasoning skills. Exams, quizzes, in-class assignments, and projects provide the basis for assessment. Student's grades are calculated based on the following:

	60% Exams/quizzes 20% Laboratory reports 15% Homework assignments 5% Class participation This course culminates in a Regents exam which is a standardized assessment given to all students in New York State. Failure of this exam results in students not being able to obtain an Advanced Regents Diploma.
Common Core Standards: **Differentiated Instruction:** **ELLs:** **SWDs:** **High-Achievers:**	**Reading** R.ST.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. R.ST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9– 10 texts and topics*. R.ST.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., *force, friction, reaction force, energy*). R.ST.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. **Writing** W.HST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. W.HST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. W.HST.9 Draw evidence from informational texts to support analysis, reflection, and research. **New York State Standards:** *Key Idea 2:* Deductive and inductive reasoning are used to reach mathematical conclusions. For example: determine the relationships among: velocity, slope, sediment size, channel shape, and volume of a stream, understand the relationships among: the planets' distance from the Sun, gravitational force, period of revolution, and speed of revolution *Key Idea 3:* The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems. For example: develop a scale model to represent planet size and/or distance, develop a scale model of units of geologic time use topographical maps to determine distances and elevations *Key Idea 4:* Equilibrium is a state of stability due either to a lack of change (static equilibrium) or a balance between opposing forces (dynamic equilibrium).For example: analyze the interrelationship between gravity and inertia and its effects on the orbit of planets or satellites 4.1.1a Most objects in the solar system are in regular and predictable motion. These motions explain such phenomena asdynamically. Draw evidence from informational texts to support analysis, reflection, and research. The day, the year, seasons, phases of the moon, eclipses, and tides. Gravity influences the motions of celestial objects. The force of gravity between two objects in the universe depends on their masses and the distance between them. 4.1.1b Nine planets move around the Sun in nearly circular orbits. The orbit of each planet is an ellipse with the Sun located at one of the foci. Earth is orbited by one moon and many artificial satellites. 4.1.2a The universe is vast and estimated to be over ten billion years old. The current theory is that the universe was created from an

	explosion called the Big Bang. Evidence for this theory includes: cosmic background radiation red-shift (the Doppler effect) in the light from very distant galaxies. 4.1.2b Stars form when gravity causes clouds of molecules to contract until nuclear fusion of light elements into heavier ones occurs. Fusion releases great amounts of energy over millions of years. The stars differ from each other in size, temperature, and age. Our Sun is a medium-sized star within a spiral galaxy of stars known as the Milky Way. Our galaxy contains billions of stars, and the universe contains billions of such galaxies. 4.1.2c Our solar system formed about five billion years ago from a giant cloud of gas and debris. Gravity caused Earth and the other planets to become layered according to density differences in their materials. The characteristics of the planets of the solar system are affected by each planet's location in relationship to the Sun. The terrestrial planets are small, rocky, and dense. The Jovian planets are large, gaseous, and of low density. 4.1.2d Asteroids, comets, and meteors are components of our solar system. Impact events have been correlated with mass extinction and global climatic change. Impact craters can be identified in Earth's crust. **Differentiation-Scaffolding/ Adaptation for ELLs/SWDs:** -Explicit (verbal & written) instructions -Visuals (photos, animations, videos) with subtitles -Modeled activity -Modified class work & assessment -Graphic organizers -Coloring & underlining -Copy of PowerPoint -Calculators -Additional time -Peer assisted learning; grouping consisted of students with varying English language and academic abilities in order to facilitate peer-to-peer interaction. -Provide ELLs with appropriate resources to support this such as a science dictionary. Translations & dictionaries will be provided if needed. Note: Modifications, scaffolding, and adaptations will be provided as needed by student and as recommended on IEP.
Resources/Books	Earth Science: Geology, the Environment, and the Universe New York Edition by Glencoe McGraw Hill Ciencias de la Tierra: Ciencias & technologia By Holt The Illustrated/Interactive Reference: http://www.regentsearth.com/Illustrated%20ESRT/Illustrated%20ESRT%20index.htm Learn Earth Science: http://learnearthscience.com/pages/Unit_Links/unitlinks.html Regents Prep Centers: http://www.nysedregents.org/earthscience/ http://regentsprep.org/regents/earthsci/earthsci.cfm http://reviewearthscience.com/pages/regents-review.php http://www.regentsearth.com/Interactive%20Regents/Interactive%20Regents.htm

http://regentsearth.com/Tests/index.htm
http://www.regentsearth.com/Regents%20Archive/Archive_Index.htm
Note: Students will be provided with more resources during the school year

Homework: Per Teacher

Manhattan Center for Science and Math High School

Science Department Curriculum

Content/Discipline Earth Science

http://mcsmportal.net

Marking Period / Unit 10

Topic and Essential Question

What are test taking strategies that could be useful during the regents? How is eccentricity calculated? How do we identify rocks and minerals? How do we construct eccentricity model? How do we locate earthquakes' epicenter? How could we use the Earth Science Reference Table during the regent?

Unit/Topics	Unit 10: Regents Review Topics: Lab practicum: Rocks & minerals identification, eccentricity, & locating epicenter Earth Science Reference Table Regents Preparation Test taking strategies
SWBAT/Objectives	Construct eccentricity model Calculate eccentricity Identify rocks and minerals Utilize the Earth Science Reference Table to answer regent questions Annotate essential details about graphs/diagrams from the Earth Science Reference Table
Vocabulary/Key Terms	Eccentricity, rocks, minerals, epicenter, earthquakes, foci, major axis, luster, hardness, cleavage, fracture, seismogram
Assessments:	**Formative Assessments:** Diagram processing, Notebook processing, Graphic organizers, Quick Writes, Lab analysis questions, Regent question explanations, discussions, quizzes, classwork, homeworks, misconception checks, exit tickets, & entrance slips **Summative Assessment:** Unit test, Projects, & presentations Throughout the year students produce work which allows the instructor to interpret their achievement. Daily homework assignments combined with class work demonstrate the grasp that students have on theories, concepts, and problem solving skills. Laboratory reports demonstrate interpretations of theories through observations, deductions, critical analysis, and reasoning skills. Exams, quizzes, in-class assignments, and projects provide the basis for assessment. Student's grades are calculated based on the following: 60% Exams/quizzes 20% Laboratory reports 15% Homework assignments 5% Class participation This course culminates in a Regents exam which is a standardized assessment given to all students in New York State. Failure of this exam results in students not being able to obtain an Advanced Regents Diploma.
Common Core Standards:	**Common Core Standards:** **Reading**

	R.ST.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
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ELLs:	R.ST.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate in formation expressed visually or mathematically (e.g., in an equation) into words.
SWDs:	**Writing**
	W.HST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
High-Achievers:	W.HST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
	W.HST.9 Draw evidence from informational texts to support analysis, reflection, and research.
	New York State Standards:
	1.1b Nine planets move around the Sun in nearly circular orbits. The orbit of each planet is an ellipse with the Sun located at one of the foci. Earth is orbited by one moon and many artificial satellites.
	2.1j Properties of Earth's internal structure (crust, mantle, inner core, and outer core) can be inferred from the analysis of the behavior of seismic waves (including velocity and refraction). Analysis of seismic waves allows the determination of the location of earthquake epicenters, and the measurement of earthquake magnitude; this analysis leads to the inference that Earth's interior is composed of layers that differ in composition and states of matter.
	2.1w Sediments of inorganic and organic origin often accumulate in depositional environments. Sedimentary rocks form when sediments are compacted and/or cemented after burial or as the result of chemical precipitation from seawater.
	3.1a Minerals have physical properties determined by their chemical composition and crystal structure. Minerals can be identified by well-defined physical and chemical properties, such as cleavage, fracture, color, density, hardness, streak, luster, crystal shape, and reaction with acid. Chemical composition and physical properties determine how minerals are used by humans.
	3.1b Minerals are formed inorganically by the process of crystallization as a result of specific environmental conditions. These include: cooling and solidification of magma precipitation from water caused by such processes as evaporation, chemical reactions, and temperature changes rearrangement of atoms in existing minerals subjected to conditions of high temperature and pressure.
	3.1c Rocks are usually composed of one or more minerals. Rocks are classified by their origin, mineral content, and texture. Conditions that existed when a rock formed can be inferred from the rock's mineral content and texture. The properties of rocks determine how they are used and also influence land usage by humans.
	Differentiation-Scaffolding/ Adaptation for ELLs/SWDs:
	-Explicit (verbal & written) instructions
	-Visuals (photos, animations, videos) with subtitles
	-Modeled activity

	-Modified class work & assessment -Graphic organizers -Coloring & underlining -Copy of PowerPoint -Calculators -Additional time -Peer assisted learning; grouping consisted of students with varying English language and academic abilities in order to facilitate peer-to-peer interaction. -Provide ELLs with appropriate resources to support this such as a science dictionary. Translations & dictionaries will be provided if needed. Note: Modifications, scaffolding, and adaptations will be provided as needed by student and as recommended on IEP.
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Homework: Per Teacher