

Earth & Space Curriculum Map

| Timeframe | Topic/Concepts/Standards | Eligible Content | Assessments | Suggested Resources |
|---------------------------------|--|---|--|---|
| <p>Marking Period 1 & 2</p> | <p>ESS Dynamics</p> <ul style="list-style-type: none"> • Geologic Processes • Plate Tectonics • Geologic History / Timescale <p><u>Standards:</u></p> <p>3.3.10.A1: Relate plate tectonics to both slow and rapid changes in the earth’s surface.</p> <p>Describe the rock cycle and the processes that are responsible for the formation of igneous, sedimentary, and metamorphic rocks.</p> <p>Relate geochemical cycles to the conservation of matter.</p> <p>Explain how the Earth is composed of a number of dynamic, interacting systems exchanging energy or matter.</p> <p>3.3.10.A3: Explain how the evolution of Earth has been driven by interactions between the lithosphere, hydrosphere, atmosphere, and biosphere.</p> <p>3.3.10.A4: Relate geochemical cycles to conservation of matter.</p> <p>Explain how the Earth’s systems and its various cycles are driven by energy.</p> <p>3.3.10.A7: <u>SCALE/MODELS</u></p> | <ul style="list-style-type: none"> • Earth consists of an interacting set of processes and structures. • Different forms of energy contribute to the transport mechanisms of Earth’s dynamic systems. • Energy is transferred through Earth’s systems via radiation, conduction, and convection. • Based on the measured scattering of seismic waves, the Earth’s interior is subdivided into layers based on physical properties. • Evidence suggests that the interior layers arose long ago from heat, cooling and gravity. • The Earth’s crust is made up of rocks, which undergo cyclic changes and can be classified by their origins and formation. • Minerals, which make up rocks, have internal structures determined by a regular arrangement of internal atoms or ions that determine their physical properties. | <ul style="list-style-type: none"> • Quizzes • Formative Assessments • Labs • Projects • Articles • Summative assessments • Videos • Online Labs | <ul style="list-style-type: none"> • <u>Academic:</u> Glencoe - Earth Science ©2013 • <u>Core:</u> Prentice Hall - Pearson Concepts and Challenges: Earth Science ©2009 • <u>Honors:</u> Prentice Hall - Earth Science 14e Tarbuck/Lutgens ©2015 • <u>Survey:</u> Holt McDougal – Earth Science ©2010 • Video library • Various web sites |

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| | <p>Interpret and create models of the Earth's physical features in various mapping representations.</p> <p><u>CONSTANCY AND CHANGE</u></p> <p>Relate constancy and change to the hydrologic and geochemical cycles.</p> <p><u>SCALE</u></p> <p>Apply an appropriate scale to illustrate major events throughout geologic time.</p> <p><u>CONSTANCY/CHANGE</u></p> <p>Describe factors that contribute to global climate change.</p> <p>3.3.10.A8:</p> <ul style="list-style-type: none"> • Compare and contrast scientific theories. • Know that both direct and indirect observations are used by scientists to study the natural world and universe. • Identify questions and concepts that guide scientific investigations. • Formulate and revise explanations and models using logic and evidence. • Recognize and analyze alternative explanations and models. • Explain the importance of accuracy and precision in making valid measurements. <p>3.3.12.A1:</p> <p>Explain how parts are related to other parts in weather systems, solar systems, and earth systems, including how the output from one part can become an input to another part.</p> <p>Analyze the processes that cause the movement of material in the Earth's systems.</p> | <ul style="list-style-type: none"> • The surface features of the earth change as a result of observable physical and chemical processes. • Movement of the Earth's crust by Plate tectonics contributes to changes in the surface of the earth. • Earth History: How the Earth formed and how it has changed to its present conditions. How life has changed and how it has changed the Earth. • Explain the difference between absolute age and relative age, and how they are used to order past events. • Describe and identify some of the major events that occur on the geologic time scale. | | |
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| <p>Classify Earth’s internal and external sources of energy such as radioactive decay, gravity, and solar energy</p> <p>3.3.12.A3: Describe the absolute and relative dating methods used to measure geologic time, such as index fossils, radioactive dating, law of superposition, and crosscutting relationships.</p> <p>3.3.12.A4: Classify Earth’s internal and external sources of energy such as radioactive decay, gravity, and solar energy.</p> <p>Relate the transfer of energy through radiation, conduction, and convection to global atmospheric processes.</p> <p>3.3.12.A7: <u>MODELS</u> Interpret and analyze a combination of ground-based observations, satellite data, and computer models to demonstrate Earth systems and their interconnections.</p> <p><u>CONSTANCY/CHANGE</u> Infer how human activities may impact the natural course of Earth’s cycles.</p> <p><u>PATTERNS</u> Summarize the use of data in understanding seismic events, meteorology, and geologic time.</p> <p>3.3.12.A8:</p> <ul style="list-style-type: none"> • Examine the status of existing theories. • Evaluate experimental information for relevance and adherence to science processes. | | | |
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| | <ul style="list-style-type: none"> • Judge that conclusions are consistent and logical with experimental conditions. • Interpret results of experimental research to predict new information, propose additional investigable questions, or advance a solution. • Communicate and defend a scientific argument. <p>Atmosphere- Ocean- Land Interaction</p> <ul style="list-style-type: none"> • Radiation / Energy Budget • Temperature/ Heat Transfer • Water Cycle / Distribution of Moisture • Atmosphere/ Ocean Circulation • Climate Variability • Interpreting Weather Maps <p><u>Standards:</u></p> <p>3.3.10.A1: Relate plate tectonics to both slow and rapid changes in the earth's surface.</p> <p>Describe the rock cycle and the processes that are responsible for the formation of igneous, sedimentary, and metamorphic rocks.</p> <p>Relate geochemical cycles to the conservation of matter.</p> <p>Explain how the Earth is composed of a number of dynamic, interacting systems exchanging energy or matter.</p> <p>3.3.10.A3: Explain how the evolution of Earth has been driven by interactions between the lithosphere, hydrosphere, atmosphere, and biosphere.</p> | <p>The atmosphere is a uniform mixture of gases that decrease in temperature and pressure with increasing altitude.</p> <p>Based on systematic, measurable changes in physical properties, the atmosphere is subdivided into different layers.</p> <p>Unequal heating of the surface of the earth contributes to global circulation patterns, climate, and weather.</p> <p>Changes in atmospheric composition can lead to changes in the intensity and composition of sunlight reaching the Earth's surface that can be observed and measured.</p> <p>Climate measurably changes over time due to natural and human processes.</p> <p>Weather is the result of complex interactions between atmospheric pressure, land conditions, and ocean temperatures that can be measured.</p> | | |
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| | <p>3.3.10.A5: Explain how there is only one ocean.</p> <p>Explain the processes of the hydrologic cycle. Explain the dynamics of oceanic currents and their relationship to global circulation within the marine environment.</p> <p>3.3.10.A6: Interpret meteorological data to describe and/or predict weather.</p> <p>Explain the phenomena that cause global atmospheric processes such as storms, currents, and wind patterns.</p> <p>3.3.10.A8:</p> <ul style="list-style-type: none">• Compare and contrast scientific theories.• Know that both direct and indirect observations are used by scientists to study the natural world and universe.• Identify questions and concepts that guide scientific investigations.• Formulate and revise explanations and models using logic and evidence.• Recognize and analyze alternative explanations and models.• Explain the importance of accuracy and precision in making valid measurements. <p>3.3.12.A1: Explain how parts are related to other parts in weather systems, solar systems, and earth systems, including how the output from one part can become an input to another part.</p> <p>Analyze the processes that cause the movement of material in the Earth's systems.</p> | | | |
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| | <p>Classify Earth’s internal and external sources of energy such as radioactive decay, gravity, and solar energy</p> <p>3.3.12.A4: Classify Earth’s internal and external sources of energy such as radioactive decay, gravity, and solar energy.</p> <p>Relate the transfer of energy through radiation, conduction, and convection to global atmospheric processes.</p> <p>3.3.12.A5: Explain how the ocean dominates the Earth’s carbon cycle.</p> <p>3.3.12.A6: Explain how the unequal heating of the Earth’s surface leads to atmospheric global circulation changes, climate, local short term changes, and weather.</p> <p>Relate the transfer of energy through radiation, conduction, and convection to global atmospheric processes.</p> <p>3.3.12.A7: <u>MODELS</u> Interpret and analyze a combination of ground-based observations, satellite data, and computer models to demonstrate Earth systems and their interconnections.</p> <p><u>CONSTANCY/CHANGE</u> Infer how human activities may impact the natural course of Earth’s cycles.</p> <p><u>PATTERNS</u> Summarize the use of data in understanding seismic events, meteorology, and geologic time.</p> | | |
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| | <p>3.3.12.A8:</p> <ul style="list-style-type: none">• Examine the status of existing theories.• Evaluate experimental information for relevance and adherence to science processes.• Judge that conclusions are consistent and logical with experimental conditions.• Interpret results of experimental research to predict new information, propose additional investigable questions, or advance a solution.• Communicate and defend a scientific argument. | | | |
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|---------------------------------|---|--|--|---|
| <p>Marking Period 3 & 4</p> | <p>Astronomy</p> <ul style="list-style-type: none"> • Composition of universe • Formation and history of universe • Sun – Planet Relationships • Earth – Sun Relationships • Earth-Moon-Sun Relationships • Composition and Processes on Sun <p><u>Standards:</u></p> <p>3.3.10.A8:</p> <ul style="list-style-type: none"> • Compare and contrast scientific theories. • Know that both direct and indirect observations are used by scientists to study the natural world and universe. • Identify questions and concepts that guide scientific investigations. • Formulate and revise explanations and models using logic and evidence. • Recognize and analyze alternative explanations and models. • Explain the importance of accuracy and precision in making valid measurements. <p>3.3.12.A1: Explain how parts are related to other parts in weather systems, solar systems, and earth systems, including how the output from one part can become an input to another part.</p> <p>Analyze the processes that cause the movement of material in the Earth’s systems.</p> | <ul style="list-style-type: none"> • The Earth exists in a solar system including the sun, the planets, their moons, and other smaller objects. • Objects in the solar system are illuminated by sunlight. Object brightness depends on a number of factors. • Orbits are the result of a perfect balance between the forward motion of a body in space, such as a planet or moon, and the pull of gravity on it from another body in space, such as a large planet or star resulting in near circular or elliptical shapes. • The orbits and rotations of the Earth-moon-sun system account for lunar and solar eclipses, phases of the moon, and tides. • The abundance of liquid water makes the Earth unique among the planets of this solar system. • Direct and indirect measurements provide evidence that the sun, Earth and most of the planets formed at the same time | <ul style="list-style-type: none"> • Quizzes • Formative Assessments • Labs • Projects • Articles • Summative assessments • Videos • Online Labs | <ul style="list-style-type: none"> • <u>Academic:</u> Glencoe - Earth Science ©2013 • <u>Core:</u> Prentice Hall - Pearson Concepts and Challenges: Earth Science ©2009 • <u>Honors:</u> Prentice Hall - Earth Science 14e Tarbuck/Lutgens ©2015 • <u>Survey:</u> Holt McDougal – Earth Science ©2010 • Video library • Various web sites |

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| | <p>Classify Earth's internal and external sources of energy such as radioactive decay, gravity, and solar energy</p> <p>3.3.12.A8:</p> <ul style="list-style-type: none"> • Examine the status of existing theories. • Evaluate experimental information for relevance and adherence to science processes. • Judge that conclusions are consistent and logical with experimental conditions. • Interpret results of experimental research to predict new information, propose additional investigable questions, or advance a solution. • Communicate and defend a scientific argument. <p>3.3.10.B1: Explain how gravity is responsible for planetary orbits.</p> <p>Explain what caused the sun, Earth, and most of the other planets to form between 4 and 5 billion years ago.</p> <p>Provide evidence to suggest the Big Bang Theory.</p> <p>Describe the basic nuclear processes involved in energy production in a star.</p> <p>3.3.10.B2: <u>SCALE AND MEASUREMENT</u> Explain how scientists obtain information about the universe by using technology to detect electromagnetic radiation that is</p> | <ul style="list-style-type: none"> • Groups of stars that move in unison in the night sky form constellations. • Direct and remote sensing provides evidence that billions of star cluster into galaxies. • Direct and remote sensing provides evidence that the universe contains billions of galaxies. • The current theory as to the formation of the universe is known as the big bang theory. | | |
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| | <p>emitted, reflected, or absorbed by stars and other objects.</p> <p><u>CONSTANCY AND CHANGE</u> Describe changes in the universe over billions of years.</p> <p><u>SCALE AND MEASUREMENT</u> Explain the scale used to measure the sizes of stars and galaxies and the distances between them</p> <p>3.3.10.B3:</p> <ul style="list-style-type: none">• Compare and contrast scientific theories.• Know that both direct and indirect observations are used by scientists to study the natural world and universe.• Identify questions and concepts that guide scientific investigations.• Formulate and revise explanations and models using logic and evidence.• Recognize and analyze alternative explanations and models.• Explain the importance of accuracy and precision in making valid measurements. <p>3.3.12.B1: Describe the life cycle of stars based on their mass.</p> <p>Analyze the influence of gravity on the formation and life cycles of galaxies, including our own Milky Way galaxy; stars; planetary systems; and residual material left from the creation of the solar system. Relate the nuclear processes involved in energy production in stars and supernovas to their life cycles.</p> | | | |
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| <p>3.3.12.B2: <u>MODELS AND SCALE</u> Apply mathematical models and computer simulations to study evidence collected relating to the extent and composition of the universe.</p> <p><u>PATTERNS AND CONSTANCY AND CHANGE</u> Analyze the evidence supporting theories of the origin of the universe to predict its future.</p> <p>3.3.12.B3:</p> <ul style="list-style-type: none"> • Examine the status of existing theories. • Evaluate experimental information for relevance and adherence to science processes. • Judge that conclusions are consistent and logical with experimental conditions. • Interpret results of experimental research to predict new information, propose additional investigable questions, or advance a solution. • Communicate and defend a scientific argument. <p>ESS Dynamics and Ecology</p> <ul style="list-style-type: none"> • Natural Resources • Alternative Energy • Hydrogeology & Water Quality • Watersheds & Wetlands <p><u>Standards:</u></p> <p>3.3.10.A1: Relate plate tectonics to both slow and rapid changes in the earth’s surface.</p> | <ul style="list-style-type: none"> • Air, soil, water, and indoor pollution affect human health in a variety of ways. • Wetlands play an important part in pollution control, water quality and human health issues. | | |
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| | <p>Describe the rock cycle and the processes that are responsible for the formation of igneous, sedimentary, and metamorphic rocks.</p> <p>Relate geochemical cycles to the conservation of matter.</p> <p>Explain how the Earth is composed of a number of dynamic, interacting systems exchanging energy or matter.</p> <p>3.3.10.A2: Analyze the effects on the environment and the carbon cycle of using both renewable and nonrenewable sources of energy.</p> <p>3.3.10.A7: <u>SCALE/MODELS</u></p> <p>Interpret and create models of the Earth's physical features in various mapping representations.</p> <p><u>CONSTANCY AND CHANGE</u></p> <p>Relate constancy and change to the hydrologic and geochemical cycles. <u>SCALE</u></p> <p>Apply an appropriate scale to illustrate major events throughout geologic time. <u>CONSTANCY/CHANGE</u></p> <p>Describe factors that contribute to global climate change.</p> <p>3.3.10.A8:</p> <ul style="list-style-type: none"> • Compare and contrast scientific theories. • Know that both direct and indirect observations are used by scientists to study the natural world and universe. | <ul style="list-style-type: none"> • The misuse of natural resources can negatively affect the sustainability of society. • There are costs and benefits associated with cleaning up contaminants. • Because natural resources like coal, water, oil and timber have economic influences, their availability can determine the local community's prosperity. • A steady or increased demand for a particular natural resource can affect the environment. • New technologies used in industries can increase the efficiency and prolong the supply of some natural resources. | | |
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| | <ul style="list-style-type: none"> • Identify questions and concepts that guide scientific investigations. • Formulate and revise explanations and models using logic and evidence. • Recognize and analyze alternative explanations and models. • Explain the importance of accuracy and precision in making valid measurements. <p>3.3.12.A1: Explain how parts are related to other parts in weather systems, solar systems, and earth systems, including how the output from one part can become an input to another part.</p> <p>Analyze the processes that cause the movement of material in the Earth's systems.</p> <p>Classify Earth's internal and external sources of energy such as radioactive decay, gravity, and solar energy</p> <p>3.3.12.A2: Analyze the availability, location, and extraction of Earth's resources.</p> <p>Evaluate the impact of using renewable and nonrenewable energy resources on the Earth's system.</p> <p>3.3.12.A7: <u>MODELS</u> Interpret and analyze a combination of ground-based observations, satellite data, and computer models to demonstrate Earth systems and their interconnections.</p> <p><u>CONSTANCY/CHANGE</u> Infer how human activities may impact the natural course of Earth's cycles.</p> | | | |
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| | <p><u>PATTERNS</u> Summarize the use of data in understanding seismic events, meteorology, and geologic time.</p> <p>3.3.12.A8:</p> <ul style="list-style-type: none">• Examine the status of existing theories.• Evaluate experimental information for relevance and adherence to science processes.• Judge that conclusions are consistent and logical with experimental conditions.• Interpret results of experimental research to predict new information, propose additional investigable questions, or advance a solution.• Communicate and defend a scientific argument. | | | |
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