

APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Earth Science

GRADE: HS

Strand/Concept	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Student Expectation			

TIMELINE: Quarter 1

<p>Earth's Place in the Universe HS-ESS1-1 Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation. I C M</p>	<p>I can develop an evidence-based model of the Law of Conservation of Energy as it applies to the transfer of radiation/energy released from fusion reactions in the Sun's core as it travels to Earth.</p> <p>I can demonstrate, through modeling, the life cycle of all stars.</p>	<p>Application Synthesis</p> <p>Application</p>	<p>Nuclear fusion Radiation Solar flares</p>
---	---	---	--

<p>Earth's Place in the Universe HS-ESS1-2 Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. I C M</p>	<p>I can explain how the Conservation Laws of Mass and Energy apply to the Big Bang Theory.</p> <p>I can construct an explanation of the Big Bang Theory, specifically supported by light spectra, galactic motion, and the composition of matter in the universe.</p>	<p>Comprehension Application Synthesis Application Synthesis</p>	<p>Big Bang Theory Light spectra Red shift Remnant radiation</p>
---	--	--	--

<p>Earth's Place in the Universe HS-ESS1-3 Communicate scientific ideas about the way stars, over their life cycle, produce elements. I C M</p>	<p>I can explain how stars produce elements through nucleosynthesis.</p>	<p>Comprehension Application</p>	<p>Nucleosynthesis</p>
--	--	--------------------------------------	------------------------

<p>Earth's Place in the Universe HS-ESS1-4 Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. I C M</p>	<p>I can use charts, graphs, or equations to represent Kepler's and Newton's Laws and predict the motion of orbiting bodies in the solar system.</p>	<p>Application Synthesis</p>	<p>Kepler's Laws Newton's Laws Orbital motion</p>
--	--	----------------------------------	---

APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Earth Science

GRADE: HS

Strand/Concept	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Student Expectation			
Earth's Place in the Universe HS-ESS1-5 Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. I C M	I can apply the Theory of Plate Tectonics to evaluate evidence for the creation of mountains and ridges. I can determine the age of earth's crust based on its current location and rate of flow in relation to mid-ocean ridges and the central core.	Application Analysis Application Synthesis	Crustal rocks Mid-ocean ridge Oceanic crust Plate interactions Plate tectonics

APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Earth Science

GRADE: HS

Strand/Concept	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Student Expectation			

RESOURCES AND NOTES FOR QUARTER 1:

APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Earth Science

GRADE: HS

Strand/Concept	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Student Expectation			

TIMELINE: Quarter 2

<p>Earth's Place in the Universe</p> <p>HS-ESS1-6 Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. I C M</p>	<p>I will describe how the absolute age of objects is determined.</p> <p>I will explain why craters are found on some objects and not on others in our Solar System through the process of erosion.</p> <p>I can apply the scientific method to form a hypothesis about Earth's formation and early history and test my hypothesis with existing evidence from ancient Earth materials, meteorites, and the surfaces of other planets.</p>	<p>Comprehension</p> <p>Comprehension</p> <p>Application Analysis Synthesis</p>	<p>Absolute age Meteorites Scientific Method</p>
--	--	---	--

<p>Earth's Systems</p> <p>HS-ESS2-1 Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean floor features. I C M</p>	<p>I can differentiate between a destructive and constructive mechanism.</p> <p>I can construct a model that shows how the internal and surface processes on Earth operate at different time and size scales to form geologic features.</p>	<p>Comprehension</p> <p>Application Synthesis</p>	<p>Constructive mechanisms Continental features Destructive mechanisms Internal processes Oceanic features Spatial scales Surface processes Temporal scales</p>
---	---	---	---

<p>Earth's Systems</p> <p>HS-ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth's systems. I C M</p>	<p>I can classify various cyclic processes (water cycle, carbon cycle, etc.)</p> <p>I can apply empirical evidence to show cause and effect relationships between various cyclic processes.</p>	<p>Analysis</p> <p>Application Synthesis</p>	<p>Coastal erosion Greenhouse Groundwater Sediment transport Soil erosion Water runoff Wetland</p>
--	---	--	--

APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Earth Science

GRADE: HS

Strand/Concept	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Student Expectation			
<p>Earth's Systems</p> <p>HS-ESS2-3 Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. I C M</p>	<p>I can demonstrate how matter is cycled through Earth's internal processes.</p> <p>I can develop a model to explain how mantle convection results in plate tectonics by using quantitative and qualitative evidence. (Seismic wave maps, Earth's magnetic field as it applies to convection of the outer core, composition of Earth's layers)</p>	<p>Comprehension Application</p> <p>Application Synthesis</p>	<p>Inner core Mantle convection Outer core Radial layers Thermal convection</p>
<p>Earth's Systems</p> <p>HS-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. I C M</p>	<p>I apply the scientific method to form an hypothesis about how water affects the rock cycle and test my hypothesis with existing evidence from destructive (chemical and mechanical erosion) and constructive (deposition and recrystallization) mechanisms.</p>	<p>Application Analysis Synthesis</p>	<p>Chemical weathering Deposition Erosion Frost wedging Recrystallization Solubility</p>
<p>Earth's Systems</p> <p>HS-ESS2-6 Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. I C M</p>	<p>I can create a model showing how carbon is cycled through biogeochemical process -ocean, atmosphere, soil and biosphere (including humans).</p>	<p>Synthesis</p>	<p>Atmosphere Biogeochemical cycles Biosphere Geosphere Hydrosphere</p>

APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Earth Science

GRADE: HS

Strand/Concept	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Student Expectation			
<p>Earth's Systems</p> <p>HS-ESS2-7 Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. I C M</p>	<p>I can construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. Examples of include how photosynthetic life altered the atmosphere through the production of oxygen, which in turn increase weathering rates, creation of soil, plant life and animal life.</p>	<p>Application Synthesis</p>	<p>Simultaneous coevolution Soil formation Weathering rates</p>

APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Earth Science

GRADE: HS

Strand/Concept	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Student Expectation			

RESOURCES AND NOTES FOR QUARTER 2 :

APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Earth Science

GRADE: HS

Strand/Concept	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Student Expectation			
TIMELINE: Quarter 3			
<p>Earth's Systems</p> <p>HS-ESS2-4 Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. I C M</p> <p>Engineering Design Connection: HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. I C M</p>	<p>I can use a model to describe how variations in energy flow affect climate over different time spans.</p>	<p>Application Synthesis</p>	<p>Ocean circulation Solar output</p>
<p>Earth and Human Activity</p> <p>HS-ESS3-5 Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. I C M</p> <p>Engineering Design Connection: HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. I C M</p>	<p>I can evaluate qualitative and quantitative geoscience data in order to make a prediction about the rate of global and regional climate change.</p> <p>I can determine how climate changes (examples-precipitation and temperature) can impact the environment (examples-sea levels, atmosphere and ocean composition)</p>	<p>Application Synthesis Evaluation</p> <p>Application Synthesis</p>	

APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Earth Science

GRADE: HS

Strand/Concept	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Student Expectation			
<p>Earth and Human Activity</p> <p>HS-ESS3-1 Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. I C M</p> <p>Engineering Design Connection: HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. I C M</p>	<p>I can interpret and explain how availability of resources, natural hazards, and climate change impact and affect populations and activity of humans.</p>	<p>Comprehension Application</p>	<p>Interior Earth Incidents Natural hazards</p>

APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Earth Science

GRADE: HS

Strand/Concept	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Student Expectation			

RESOURCES AND NOTES FOR QUARTER 3 :

APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Earth Science

GRADE: HS

Strand/Concept	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Student Expectation			
TIMELINE: Quarter 4			
<p>Earth and Human Activity</p> <p>HS-ESS3-2 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios. I C M</p> <p>Engineering Design Connection: HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. I C M</p>	<p>I can identify several methods of conservation, recycling and reuse of resources.</p> <p>I can evaluate several methods of conservation based on cost benefit ratios. (examples must be from various industries of farming, mining and fossil fuels)</p>	<p>Knowledge</p> <p>Application Analysis Evaluation</p>	<p>Conservation Cost-benefit Metal resources Mineral resources</p>
<p>Earth and Human Activity</p> <p>HS-ESS3-3 Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. I C M</p> <p>Engineering Design Connection: HS-EST1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. I C M</p>	<p>I can identify factors that affect the management of natural resources. Factors include costs, per-capita consumption and new technologies.</p> <p>I can identify factors that affect human sustainability such as agricultural efficiency, levels of conservation and urban planning.</p> <p>I can relate how the management of natural resources can affect human sustainability.</p>	<p>Knowledge</p> <p>Knowledge</p> <p>Application</p>	<p>Agricultural efficiency Biodiversity Computational simulation Conservation Multiparameter Natural resource management Relationships Resource extraction Sustainability Technologies Urban planning Waste management</p>

APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Earth Science

GRADE: HS

Strand/Concept	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Student Expectation			
<p>Earth and Human Activity</p> <p>HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. I C M</p> <p>Engineering Design Connection: HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. I C M</p>	<p>I can evaluate a technological solution that reduces the impact of human activities on natural systems.</p>	<p>Analysis Evaluation</p>	<p>Biomass Geo-engineering Species diversity</p>
<p>Earth and Human Activity</p> <p>HS-ESS3-6 Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. I C M</p> <p>Engineering Design Connection: HS-EST1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. I C M</p>	<p>I can use charts, graphs, and equations to show the relationships between human activity and the Earth systems of the natural world.</p>	<p>Application Synthesis</p>	<p>Biosphere Cryosphere Hydrosphere</p>

APPROVED FACILITY SCHOOLS CURRICULUM GUIDE

SUBJECT: Earth Science

GRADE: HS

Strand/Concept	Student Friendly Learning Objective	Level of Thinking	Academic Vocabulary
Student Expectation			

RESOURCES AND NOTES FOR QUARTER 4: