Earth Systems Curriculum Map: PCSD 2018-2019 Block Schedule

Unit 1 Organizer: Systems and Cycles	**Block Schedule – 2 weeks**	**Holt McDougal Earth Science (HMES)**
OVERVIEW: Intro to Earth Sciences included with systems and cycles.		
STANDARDS ADDRESSED IN THIS UNIT	**Enduring Understanding / topic**	**Text/Lab/Resources**
SES1. Obtain, evaluate, and communicate information to investigate the composition and formation of Earth systems, including the Earth's place in the solar system b. Ask questions to evaluate evidence for the development and composition of Earth's early systems, including the geosphere (crust, mantle and core), hydrosphere and atmosphere. (Clarification statement: The differentiation by density of Earth into crust, mantle and core should be included in this element.) **SES2. Obtain, evaluate, and communicate information to understand how plate tectonics creates certain geologic features, landforms, Earth materials, and geologic hazards.** d. Ask questions to compare and contrast the relationship between transformation processes of all rock types (sedimentary, igneous, and metamorphic) and specific plate tectonic settings. **SES6. Obtain, evaluate, and communicate information about how life on Earth responds to and shapes Earth's systems.** b. Construct an explanation that describes how biological processes have caused major changes in Earth's systems through geologic time (e.g., nutrient cycling, atmospheric composition, and soil formation).	Systems and spheres 1. Atmosphere (air, weather, climate) 2. Hydrosphere (water, oceans, rivers) 3. Geosphere (crust, mantle, core) Cycles 4. Rock cycle 5. Hydrologic cycle (water cycle) 6. Carbon cycle 7. Nitrogen cycle	Chapter 1: Introduction to Earth Science Chapter 2: Earth as a System Chapter 6: Rocks

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Systems and Cycles **Resources and Suggestions**
Pre-Post Short Assessments (formative/informative): *Super Summaries:* Thinkcentral.com—go to the site and enter the following codes: • Ch. 1—HQXIESS • Ch. 2—HSHSTR • Ch. 6—HQXRXSS

Unit 2 Organizer: Plate Tectonics	**Block Schedule – 4 weeks**	**Holt McDougal Earth Science (HMES)**
OVERVIEW: Formation of earth, plate tectonics, earthquakes and volcanoes		
STANDARDS ADDRESSED IN THIS UNIT	**Enduring Understanding / topic**	**Text/Lab/Resources**
SES1. Obtain, evaluate, and communicate information to investigate the composition and formation of Earth systems, including the Earth's place in the solar system a. Construct an explanation of the origins of the solar system from evidence including the composition, distribution and motion of solar system objects. (Clarification statement: The nebular hypothesis should be included in this element.) c. Develop a model of the physical composition of Earth's layers using multiple types of evidence (e.g., Earth's magnetic field, composition of meteorites and seismic waves). (Clarification statement: Earth's layers should include crust, mantle, inner core	Origin: 1. The sun, the earth, and the rest of the solar system formed from a nebular cloud of dust and gas 4.6 billion years ago. 2. The earth and other solar system objects are believed to have melted early in their history, allowing the layering of lighter over heavier material that accounts for today's crust, mantle and core . 3. Differentiation during the solar system's formation caused the inner planets have a rocky exterior and a metallic core, whereas the outer planets consist mostly of light elements in gaseous and liquid	Chapter 27: Planets of the Solar System Chapter 10: Plate Tectonics Chapter 11: Deformation of the Crust Chapter 12: Earthquakes Chapter 13: Volcanoes

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and outer core.) **SES2. Obtain, evaluate, and communicate information to understand how plate tectonics creates certain geologic features, landforms, Earth materials, and geologic hazards.** a. Construct an explanation that describes radioactive decay as the source of energy that drives plate tectonics through the process of convection. b. Develop and use models for different types of plate tectonic settings (convergent, divergent, and transform boundaries) c. Construct an explanation that communicates the relationship of geologic features, landforms, Earth materials, and geologic hazards to each plate tectonic setting. d. Ask questions to compare and contrast the relationship between transformation processes of all rock types (sedimentary, igneous, and metamorphic) and specific plate tectonic settings. (Clarification statement: The plate tectonic settings to be considered here are continental collision, subduction zone, mid-ocean ridge, transformation fault, hot spot, and passive zone.) e. Construct an argument using multiple forms of evidence that supports the theory of plate tectonics (e.g., fossils, paleomagnetism, seafloor age, etc.)	states. 4. Two primary sources of Earth's internal energy are the decay of radioactive isotopes and initially, the gravitational energy from the earth's formation. <u>Plate Tectonics</u>: 5. By studying earthquake waves that pass through the Earth, scientists know the structure of earth's layers in terms of composition and physical properties. 6. The lithosphere — including the crust and rigid uppermost mantle, beneath both the continents and the ocean basins —consists of separate plates that ride on the hot, gradually deformable rock of the underlying mantle. 7. The locations and occurrences of earthquakes and volcanoes are related to specific plate tectonic settings. 8. There are 3 main types of plate interactions (convergent, divergent, and transform) involving oceanic and / or continental crust that each have their own distinct geologic features and hazards associated with them. 9. Earthquakes and volcanoes cause devastation on human time scales, but regional changes in landscape	

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	such as mountain ranges and ocean basins take millions of years to form.	

Origin and Interior

Resources and Suggestions:

- Teacher's One Stop: Earth Science, Holt McDougal;
- All Uncovering Chapters – Vols 1-4\2017-2018 Curriculum Review*Uncovering Student Ideas in Science Vols. 1-4 (Probes)*


SolarEclipseV4-ch25.pdf


Emmy'sMoonAndSarsV2-ch24.pdf


WhereDoStarsGoV3-ch25.pdf


ObjectInTheSkyV2-ch25.pdf

Pre-Post Short Assessments (formative/informative):

Concept Reviews/Previews: Ch. 26, pp. 51-52; Ch. 27, pp. 53-54; Ch. 28, pp. 55-56; Ch. 29 (optional) Ch. 30 (optional)

Super Summaries: Thinkcentral.com—go to the site and enter the following codes:

- Ch. 26—HQXSSPS
- Ch. 27—HXPSSS
- Ch. 28—HSHSTR

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Plate Tectonics

Resources and Suggestions

- Teacher's One Stop: Earth Science, Holt McDougal
- All Uncovering Chapters – Vols 1-4\2017-2018 Curriculum Review*Uncovering Student Ideas in Science Vols. 1-4 (Probes)*


SolarEclipseV4-ch25.pdf


Emmy'sMoonAndSarsV2-ch24.pdf


WhereDoStarsGoV3-ch25.pdf


ObjectInTheSkyV2-ch25.pdf


Astronomy-Earth-Moon-SunProjectMen


IsItAModelV4-ch10.pdf


IsItARock(version1)V2-ch20.pdf


IsItARock(Version2)V2-ch21.pdf


WhereDidTheWaterComeFromV3-ch21.pdf


MountainAgeV1-ch23.pdf


MountaintopFossilV2-ch22.pdf

Pre-Post Short Assessments (formative/informative):

Concept reviews/previews:

Ch. 27, pp. 53-54 ,Ch. 10, pp. 19-20; Ch. 11, pp21-22; Ch. 12, pp23-24; Ch. 13, pp. 25-26

Super Summaries: Thinkcentral.com—go to the site and enter the following codes:

- Ch. 27—HXPSSS
-
- Ch. 10--HQXTECS
- Ch. 11--HQXDEFS
- Ch. 12—HQXEQKS
- Ch. 13--HQXVOLS

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Unit 3 Organizer: Historical Geology	**Block Schedule - 3 Weeks**	**Holt McDougal Earth Science (HMES)**
OVERVIEW: Geologic dating, history of Earth		
STANDARDS ADDRESSED IN THIS UNIT	**Enduring Understanding / topic**	**Text/Lab/Resources**
SES4. Obtain, evaluate, and communicate information to understand how rock relationships and fossils are used to reconstruct the Earth's past. a. Use mathematics and computational thinking to calculate the absolute age of rocks using a variety of methods (e.g., radiometric dating, rates of erosion, rates of deposition, and varve count.) b. Construct an argument applying principles of relative age (superposition, original horizontality, cross-cutting relations, and original lateral continuity) to interpret a geologic cross-section and describe how unconformities form. c. Analyze and interpret data from rock and fossil succession in a rock sequence to interpret major events in Earth's history such as mass extinction, major climatic change, and tectonic events. d. Construct an explanation applying the principle of uniformitarianism to show the relationship between sedimentary rocks and their fossils to the environments in which they were formed. e. Construct an argument using spatial representations of Earth data that interprets major transitions in Earth's history from the fossil and rock record of geologically defined areas. (Clarification statement: Students should use maps and cross-sections with a focus on Georgia.)	1. The age of rocks can be determined by relative and radioactive dating. 2. Geologic maps and cross sections are tools geologists use to establish spatial relationships (original horizontality, superposition, cross-cutting relationships) between rock sequences. 3. The sequence of rock layers at a given location provide a record of changing environmental conditions through incomplete intervals of geologic time. 4. Fossils are used to correlate the sequences of rocks at various locations, in order to build up a more complete picture of the past. 5. Geologic maps and cross sections are tools geologists use to establish spatial relationships between rock sequences.	Chapter 8: The Rock Record Chapter 9: A View of Earth's Past

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SES6. Obtain, evaluate, and communicate information about how life on Earth responds to and shapes Earth's systems. a. Construct an argument from evidence that describes how life has responded to major events in Earth's history (e.g., major climate change, tectonic events) through extinction, migration, and/or adaptation.	6. The known decay rates of radioactive isotopes present in rocks are used to measure the time since the rock was formed. 7. Fossils are used to correlate the sequences of rocks at various locations, in order to build up a more complete picture of the past.	

Geologic History

Resources and Suggestions

- Teacher's One Stop: Earth Science, Holt McDougal
- All Uncovering Chapters – Vols 1-4\2017-2018 Curriculum Review*Uncovering Student Ideas in Science Vols. 1-4 (Probes)*


WhereDidTheWaterComeFromV3-ch21.pdf


MountaintopFossilV2-ch22.pdf


MountainAgeV1-ch23.pdf

Pre-Post Short Assessments (formative/informative):
Concept reviews/previews:
Ch. 2, pp.3-4; Ch. 3, pp. 5-6; Ch. 6, pp. 11-12; Ch. 8, pp. 15-16; Ch. 9, pp. 17-18; Ch. 10, pp. 19-20; Ch. 11, pp21-22; Ch. 12, pp23-24; Ch. 13, pp. 25-26

Super Summaries: Thinkcentral.com—go to the site and enter the following codes:

- Ch. 2—HSHSTR
- Ch. 9—HQXVEPS
- Ch. 3—HSHSTR
- Ch. 10--HQXTECS
- Ch. 6—HQXRXSS
- Ch. 11--HQXDEFS
- Ch. 8—HQXRECS

Earth Systems Curriculum Map: PCSD 2018-2019 Block Schedule

- Ch. 12—HQXEQKS
- Ch. 13--HQXVOLS

Unit 4 Organizer: Landforms and Landscapes	**Block Schedule – 4 weeks**	**Holt McDougal Earth Science (HMES)**
OVERVIEW: Surface geology, weathering and erosion		
STANDARDS ADDRESSED IN THIS UNIT	**Enduring Understanding / topic**	**Text/Lab/Resources**
SES3. Obtain, evaluate, and communicate information to explore the actions of water, wind, ice, and gravity as they relate to landscape change. a. Plan and carry out an investigation that demonstrates how surface water and groundwater act as the major agents of physical and chemical weathering. b. Develop a model of the processes and geologic hazards that result from both sudden and gradual mass wasting c. Construct an explanation that relates the past and present actions of ice, wind, and water to landform distribution and landscape change. d. Construct an argument based on evidence that relates the characteristics of the sedimentary materials to the energy by which they were transported and deposited. **SES6. Obtain, evaluate, and communicate information about how life on Earth responds to and shapes Earth's systems.** b. Construct an explanation that describes	**Students will understand that:** 1. Water, ice, air, and biological activity at the Earth's surface cause rock to weather, partially dissolving it and breaking it down into smaller particles. 2. Decomposers add the remains of organisms to the rock particles, making the soil necessary for plants to grow. 3. Weathered earth materials move down slope gradually or catastrophically under the influence of gravity. 4. Wind, water, and ice erode weathered material and deposit it as sediment. Sediment is usually picked up, transported down-current, and deposited many times before it is finally buried in a sedimentary basin. 5. After sediment is buried, the weight of overlying material and the circulation of fluids cause the sediment to be compacted and cemented into rock. 6. The landforms that make up a landscape can be shaped by both erosion and deposition, and depend on	Chapter 14: Weathering and Erosion Chapter 15: River Systems Chapter 16: Groundwater Chapter 17: Glaciers Chapter 18: Erosion by Wind and Waves

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how biological processes have caused major changes in Earth's systems through geologic time (e.g., nutrient cycling, atmospheric composition, and soil formation).	uplift or subsidence, rock type, temperature variations, and the relative importance of different agents of weathering, erosion, and deposition.	

Landforms and Landscapes

Resources and Suggestions:

- Teacher's One Stop: Earth Science, Holt McDougal
- All Uncovering Chapters – Vols 1-4\2017-2018 Curriculum Review*Uncovering Student Ideas in Science Vols. 1-4 (Probes)*

Probes:

IsltaSystemV4-ch11.pdf

Activities:

How does water move through Earth's layers?
http://www.nationalgeographic.org/activity/groundwater-movement/

How is Freshwater used on Earth?
http://www.nationalgeographic.org/activity/using-fresh-water/

How is Freshwater available?
http://www.nationalgeographic.org/activity/availability-fresh-water***/***

Pre-Post Short Assessments (formative/informative):
Content Review/Previews:
Ch. 14, pp27-28; Ch. 15, pp29-30; Ch. 16, pp31-32; Ch. 17, pp33-34; Ch. 18, pp35-36

Super Summaries: Thinkcentral.com—go to the site and enter the following codes:

- Ch. 14—HQXWAES
- Ch. 15—HQXRVSS
- Ch. 16—HQXGWES

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Unit 5 Organizer: Weather and Climate	**Block Schedule – 4 Weeks**	**Holt McDougal Earth Science (HMES)**
OVERVIEW: causes and effects of weather and climate		
STANDARDS ADDRESSED IN THIS UNIT	**Enduring Understanding / topic**	**Text/Lab/Resources**
SES5. Obtain, evaluate, and communicate information to investigate the interaction of solar energy and Earth's systems to produce weather and climate. a. Develop and use models to explain how latitudinal variations in solar heating create differences in air pressure, global wind patterns, and ocean currents that redistribute heat globally. b. Analyze and interpret data (e.g., maps, meteograms, and weather apps) that demonstrate how the interaction and movement of air masses creates weather. c. Construct an argument that predicts weather patterns based on interactions among ocean currents, air masses, and topography. d. Analyze and interpret data to show how temperature and precipitation produce the pattern of climate regions (zones) on Earth. e. Construct an explanation that describes the conditions that generate extreme weather events (e.g., hurricanes, tornadoes, and thunderstorms) and the hazards associated with these events. f. Construct an argument relating changes in global climate to variation to Earth/sun relationships and atmospheric composition.	**Students will understand that:** 1. Solar radiation heats the landmasses, oceans, and air. 2. The curvature of the Earth causes solar radiation to strike locations on the Earth at different angles. At high latitudes, the radiation passes through more of the atmosphere, causing less solar heating than at latitudes nearer the equator. 3. Heating of earth's surface and atmosphere by the sun drives convection within the atmosphere and oceans, producing winds and ocean currents. 4. Weather is the short term condition involving the transfer of energy in and out of the atmosphere. 5. Climate is the long term condition involving the transfer of energy in and out of the atmosphere. 6. Global climate is determined by energy transfer from the sun at and near the earth's surface. This energy transfer is influenced by dynamic processes such as cloud cover and the earth's rotation, and static conditions such as the position of mountain ranges and oceans.	Chapter 19: The Atmosphere Chapter 20: Water in the Atmosphere Chapter 21: Weather Chapter 22 Climate

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SES6. Obtain, evaluate, and communicate information about how life on Earth responds to and shapes Earth's systems. b. Construct an explanation that describes how biological processes have caused major changes in Earth's systems through geologic time (e.g., nutrient cycling, atmospheric composition, and soil formation). d. Analyze and interpret data that relates changes in global climate to natural and anthropogenic modification of Earth's atmosphere and oceans.	7. The climate of the earth has varied over time because of variations in the tilt of the earth, radiation output of the sun, composition of the atmosphere, arrangement of continents, and reflectivity of the earth's surface. 8. Global climate change natural and anthropogenic modification.	

Weather and Climate

Resources and Suggestions:

- Teacher's One Stop: Earth Science, Holt McDougal
- All Uncovering Chapters – Vols 1-4\2017-2018 Curriculum Review*Uncovering Student Ideas in Science Vols. 1-4 (Probes)*


WhatAreCloudsMadeOfV3-ch20.pdf


RainfallV3-ch22.pdf

Pre-Post Short Assessments (formative/informative):

Content Review/Preview:
Ch. 19, pp37-38; Ch. 20 pp39-40; Ch. 21, pp41-42; Ch. 22, pp43-44

Super Summaries: Thinkcentral.com—go to website and enter the following codes:
Ch. 19—HSHSTR
Ch. 20—HSHSTR
Ch. 21—HQXWTHS
Ch. 22—HQXCLIS

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