	Units	HSCEs	Vocabulary	Pacing
	Earth as a System Ch1 1. A New view of Earth 2. The Earth System's Four Spheres 3. Cycles and the Earth	**E2.2D** Identify the main sources of energy to the climate system. **E2.1A** Explain why the Earth is essentially a closed system in terms of matter. **E2.1B** Analyze the interactions between the major systems (geosphere, atmosphere, hydrosphere, biosphere) that make up the Earth. **E2.1C** Explain, using specific examples, how a change in one system affects other Earth systems. **E2.2A** Describe the Earth's principal sources of internal and external energy (e.g., radioactive decay, gravity, solar energy). **E2.2B** Identify differences in the origin and use of renewable (e.g., solar, wind, water, biomass) and nonrenewable (e.g., fossil fuels, nuclear [U-235]) sources of energy. **E2.2C** Describe natural processes in which heat transfer in the Earth occurs by conduction, convection, and radiation. **E2.3c** Explain how the nitrogen cycle is part of the Earth system. **E2.3d** Explain how carbon moves through the Earth system (including the geosphere) and how it may benefit (e.g., improve soils for agriculture) or harm (e.g., act as a pollutant) society. **E2.2e** Identify the main sources of energy to the climate system. **E2.2f** Explain how energy changes form through Earth systems.	Earth System Science Model System Closed System Open System Atmosphere Geosphere Hydrosphere Biosphere Cycle Water Cycle Evapotranspiration Carbon Cycle Energy Cycle Solar Energy Geothermal Energy Tidal Energy	9 days
		Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

	Units	HSCEs		Pacing
	Atoms To Minerals Ch5 1. Matter and Atoms 2. Composition and Structure of Minerals 3. Identifying Minerals 4. Mineral Groups	**E3.p2A** Identify common rockformingminerals (quartz, feldspar,biotite, calcite, hornblende).*(prerequisite)* **E2.3A** Explain how carbon exists in different forms such as limestone (rock), carbon dioxide (gas), carbonic acid (water), and animals (life) within Earth systems and how those forms can be beneficial or harmful to humans. **E2.3b** Explain why small amounts of some chemical forms may be beneficial for life but are poisonous in large quantities (e.g., dead zone in the Gulf of Mexico, Lake Nyos in Africa, fluoride in drinking water). **E2.3 Biogeochemical Cycles** The Earth is a system containing essentially a fixed amount of each stable chemical atom or element. Most elements can exist in several different states and chemical forms; they move within and between the geosphere, atmosphere, hydrosphere, and biosphere as part of the Earth system. The movements can be slow or rapid. Elements and compounds have significant impacts on the biosphere and have important impacts on human health.	Element Atomic Number Isotope Mass Number Compound Molecule Ion Metal Nonmetal Mineral Crystal Silicate Silica Tetrahedron Cleavage Mineralogy Rock-forming mineral Luster Streak Fracture Specific Gravity Carbonate Oxide Sulfide	10 days
		Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

Units	HSCEs	Vocabulary	Pacing
Rocks Ch6 1. How Rocks Form 2. Igneous Rocks 3. Sedimentary Rocks 4. Metamorphic Rocks	**E3.p2B** Identify common igneous(granite, basalt, andesite, obsidian,pumice), metamorphic (schist,gneiss, marble, slate, quartzite),and sedimentary (sandstone,limestone, shale, conglomerate) **E3.1 Advanced Rock Cycle** Igneous, metamorphic, and sedimentary rocks are indicators of geologic and environmental conditions and processes that existed in the past. These include cooling and crystallization, weathering and erosion, sedimentation and lithification, and metamorphism. In some way, all of these processes are influenced by plate tectonics, and some are influenced by climate. **E3.1A** Discriminate between igneous, metamorphic, and sedimentary rocks and describe the processes that change one kind of rock into another. **E3.1B** Explain the relationship between the rock cycle and plate tectonics theory in regard to the origins of igneous, sedimentary, and metamorphic rocks. **E3.1c** Explain how the size and shape of grains in a sedimentary rock indicate the environment of formation (including climate) and deposition. **E3.1e** Explain how the texture (foliated, nonfoliated) of metamorphic rock can indicate whether it has experienced regional or contact metamorphism.	Rock Igneous Magma Sedimentary Sediment Metamorphic Rock Cycle Felsic Mafic Pluton Batholith Cementation Stratification Fossil Parent Rock Metamorphism Deform	12 days
	Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

Units	HSCEs	Vocabulary	Pacing
Resources And The Environment Ch7 1. Mineral Resources 2. Energy Resources 3. Environmental issues	**E2.4 Resources and Human Impacts on Earth Systems** The Earth provides resources (including minerals) that are used to sustain human affairs. The supply of nonrenewable natural resources is limited and their extraction and use can release elements and compounds into Earth systems. They affect air and water quality, ecosystems, landscapes, and may have effects on long-term climate. Plans for land use and long-term development must include an understanding of the interactions between Earth systems and human activities. **E2.4A** Describe renewable and nonrenewable sources of energy for human consumption (electricity, fuels), compare their effects on the environment, and include overall costs and benefits. **E2.4B** Explain how the impact of human activities on the environment (e.g., deforestation, air pollution, coral reef destruction) can be understood through the analysis of interactions between the four Earth systems. **E2.4c** Explain ozone depletion in the stratosphere and methods to slow human activities to reduce ozone depletion. **E2.4d** Describe the life cycle of a product, including the resources, production, packaging, transportation, disposal, and pollution.	Environment Renewable Resource Nonrenewable Resource Ore mineral Reserve Fossil Fuel Conservation Recycle	9 days
	Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

	Units	HSCEs	Vocabulary	Pacing
	Plate Tectonics Ch8 1. What is Plate Tectonics 2. Types of Plate Boundaries 3. Causes of Plate Movement 4. Plate Movements and Continental Growth	**Prerequisite:** E3.p3, E3.p3A, E3.3pB, E3.p3C **E3.2A** Describe the interior of the Earth (in terms of crust, mantle, and inner and outer cores) and where the magnetic field of the Earth is generated. **E3.2C** Describe the differences between oceanic and continental crust (including density, age, composition). **E3.3A** Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, subduction zones, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface. **E3.3B** Explain why tectonic plates move using the concept of heat flowing through mantle convection, coupled with the cooling and sinking of aging ocean plates that result from their increased density. **E3.3C** Describe the motion history of geologic features (e.g., plates, Hawaii) using equations relating rate, time, and distance. **E3.3d** Distinguish plate boundaries by the pattern of depth and magnitude of earthquakes. **E3.r3e** Predict the temperature distribution in the lithosphere as a function of distance from the mid-ocean ridge and how it relates to ocean depth. *(recommended)* **E3.r3f** Describe how the direction and rate of movement for the North American plate has affected the local climate over the last 600 million years. *(recommended)* **E3.4A** Use the distribution of earthquakes and volcanoes to locate and determine the types of plate boundaries.	Plate Tectonics Continental Drift Mid-Ocean Ridge Divergent Boundary Rift Valley Rift Convergent Boundary Subduction Boundary Deep-Sea Trench Collision Boundary Transform Boundary Mantle Convection Ridge Push Slab Pull Pangaea Craton Terrane	10 days
		Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

	Units	HSCEs	Vocabulary	Pacing
	Volcanoes Ch9 1. How and Where Volcanoes Form 2. Magma and erupted Materials 3. Bolcanic Landforms 4. Extraterrestrial Vulcanism	**E3.4d** Explain how the chemical composition of magmas relates to plate tectonics and affects the geometry, structure, and explosivity of volcanoes. **E3.4e** Explain how volcanoes change the atmosphere, hydrosphere, and other Earth systems. **E3.4f** Explain why fences are offset after an earthquake, using the elastic rebound theory.	Volcano Hot Spot Viscosity Lava Pahoehoe Aa Pillow Lava Pyroclastic Material Pyroclastic Flow Shield Volcano Cinder Cone Composite Volcano Lahar Caldera Lava Plateau	10 days
		Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

	Units	HSCEs	Vocabulary	Pacing
	Earth Quakes Ch10 1. How and where Earthquakes Occur 2. Locating and Measuring Earthquakes 3. Earthquake Hazards 4. Studying Earth's Interior	**E3.2d** Explain the uncertainties associated with models of the interior of the Earth and how these models are validated. **E3.4 Earthquakes and Volcanoes** Plate motions result in potentially catastrophic events (earthquakes, volcanoes, tsunamis, mass wasting) that affect humanity. The intensity of volcanic eruptions is controlled by the chemistry and properties of the magma. Earthquakes are the result of abrupt movements of the Earth. They generate energy in the form of body and surface waves. **E3.4A** Use the distribution of earthquakes and volcanoes to locate and determine the types of plate boundaries. **E3.4B** Describe how the sizes of earthquakes and volcanoes are measured or characterized. **E3.4C** Describe the effects of earthquakes and volcanic eruptions on humans.	Earthquake Fault Focus Epicenter Body Waves P Waves S Waves Surface Waves Seismograph Seismogram Magnitude Liquefaction Aftershock Tsunami Seismic Gap	10 days
		Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

Units	HSCEs	Vocabulary	Pacing
Surface Water Ch13 1. Streams and Rivers 2. Stream Erosion and Deposition 3. River Valleys 4. Floodplains and Floods	**E4.p1D** Explain the types, process, and beneficial functions of wetlands. *(prerequisite)* **E4.p1C** Describe the river and stream types, features, and process including cycles of flooding, erosion, and deposition as they occur naturally and as they are impacted by land use decisions. *(prerequisite)* **E3.p1C** Describe how coastalfeatures are formed by wave erosion and deposition.*(prerequisite)* **E4.1 Hydrogeology** Fresh water moves over time between the atmosphere, hydrosphere (surface water, wetlands, rivers, and glaciers), and geosphere (groundwater). Water resources are both critical to and greatly impacted by humans. Changes in water systems will impact quality, quantity, and movement of water. Natural surface water processes shape the landscape everywhere and are affected by human land use decisions. **E4.1A** Compare and contrast surface water systems (lakes, rivers, streams, wetlands) and groundwater in regard to their relative sizes as Earth's freshwater reservoirs and the dynamics of water movement (inputs and outputs, residence times, sustainability).	Tributary River System Drainage Basin Watershed Divide Gradient Discharge Deposition Pothole Load Suspension Bed Load Competence Capacity Delta Headward Erosion Base Level Stream Piracy Flood Floodplain Meanders Oxbow Lake Natural Levees Flash Flood	10 days
	Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

Units	HSCEs	Vocabulary	Pacing
Groundwater Ch14 1. Water in the Ground 2. Conserving groundwater 3. Groundwater and Geology	**E4.p1A** Describe that the water cycle includes evaporation, transpiration, condensation, precipitation, infiltration, surface runoff, groundwater, and absorption. *(prerequisite)* **E4.p1B** Analyze the flow of water between the elements of a watershed, including surface features (lakes, streams, rivers, wetlands) and groundwater. *(prerequisite)* **E4.1B** Explain the features and processes of groundwater systems and how the sustainability of North American aquifers has changed in recent history (e.g., the past 100 years) qualitatively using the concepts of recharge, residence time, inputs, and outputs. **E4.1C** Explain how water quality in both groundwater and surface systems is impacted by land use decisions. **E4.1 Hydrogeology** Fresh water moves over time between the atmosphere, hydrosphere (surface water, wetlands, rivers, and glaciers), and geosphere (groundwater). Water resources are both critical to and greatly impacted by humans. Changes in water systems will impact quality, quantity, and movement of water. Natural surface water processes shape the landscape everywhere and are affected by human land use decisions. **E4.1A** Compare and contrast surface water systems (lakes, rivers, streams, wetlands) and groundwater in regard to their relative sizes as Earth's freshwater reservoirs and the dynamics of water movement (inputs and outputs, residence times, sustainability).	Groundwater Porosity Permeability Water Table Capillary Action Ordinary Well Spring Aquifer Artesian Formation Geyser Water budget Recharge Surplus Usage Deficit Mineral Deposit Cavern Karst Topography	9 days
	Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

Units	HSCEs	Vocabulary	Pacing
Weathering Soil and Erosion Ch12 1. Weathering 2. Soil 3. Mass Movement and Erosion	**E3.p1 Landforms and Soils *(prerequisite)*** Landforms are the result of a combination of constructiveand destructive forces. Constructive forces include crustal deformation, volcanic eruptions, and deposition of sediments transported in rivers, streams, and lakes through watersheds. Destructive forces include weathering and erosion. The weathering of rocks and decomposed organic matter result in the formation of soils. *(prerequisite)* **E3.p1A**Explain the origin of Michigan landforms. Describe and identify surface features using maps and satellite images. *(prerequisite)* **E3.p1B**Explain how physical and chemical weathering leads to erosion and the formation of soils and sediments. *(prerequisite)* **Assessments:** Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work	Weathering Mechanical Weathering Chemical Weathering Frost Wedging Abrasion Exfoliation Hydrolysis Acid Rain Oxidation Soil Parent Material Residual Soil Transported Soil Soil Profile Soil Horizon Topsoil Subsoil Mass Movement Erosion Talus Landslide Creep Slump Earthflow Mudflow Volcanic Neck Soil Fertility Soil Depletion Salinization	10 days

Units	HSCEs	Vocabulary	Pacing
Glaciers Ch15 1. What is a Glacier 2. Glacial Movement and Erosion 3. Glacial Deposit	**E4.p3**Glaciers *(prerequisite)* Glaciers are large bodies of ice that move under the influence of gravity. They form part of both the rock and water cycles. Glaciers and ice sheets have shaped the landscape of the Great Lakes region. Areas that have been occupied by ice sheets are depressed. When the ice sheet is removed, the region rebounds (see also climate change). *(prerequisite)* **E4.p3A**Describe how glaciers have affected the Michigan landscape and how the resulting landforms impact our state economy. *(prerequisite)* **E4.p3B**Explain what happens to the lithosphere when an ice sheet is removed. *(prerequisite)* **E4.p3C**Explain the formation of the Great Lakes. *(prerequisite)*	Glacier Snow Line Firn Valley Glacier Continental Glacier Ice Cap Crevasse Ice Front Calving Till Moraine Striations Glacial Valley Cirque Outwash Erratic Drumlin Outwash Plain Esker Kame Kettle	12 Days
	Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

	Units	HSCEs		Pacing
	Atmosphere Ch17 1. Atmosphere in Balance 2. Heat and The Atmosphere 3. Local Temperature Variations 4. Human Impact on the Atmosphere	**E4.p2** Weather and the Atmosphere *(prerequisite)* **E4.p2A**The atmosphere is divided into layers defined by temperature. Clouds are indicators of weather. *(prerequisite)* **E4.p2B**Describe the composition and layers of the atmosphere. *(prerequisite)* Describe the difference between weather and climate. *(prerequisite)* **E5.4A** Explain the natural mechanism of the greenhouse effect including comparisons of the major greenhouse gases (water vapor, carbon dioxide, methane, nitrous oxide, and ozone).	Radiation Convection Conduction Temperature Heat Troposphere Stratosphere Ozone Mesosphere Thermosphere Ionosphere Insolation Isotherm Air Pollutant Temperature Inversion	10 days
		Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

Units	HSCEs	Vocabulary	Pacing
The Atmosphere in Motion Ch19 1. Air Pressure and Wind 2. Factors Affecting Wind 3. Global Wind Patterns 4. Continental and Local Winds	**E4.p2C**Explain the differences between fog and dew formation and cloud formation. *(prerequisite)* **E4.p2E**Describe relative humidity in terms of the moisture content of the air and the moisture capacity of the air and how these depend on the temperature. *(prerequisite)* **E4.p2I**Identify major global wind belts (trade winds, prevailing westerlies, and polar easterlies) and that their vertical components control the global distribution of rainforests and deserts. *(prerequisite)*	Air OPressure Isobar High-pressure area Low-pressure area Pressure Gradient Coriolis effect Jet Stream Polar Front Middle Latitudes ITCZ Trade Winds Prevailing Winds Monsoon	10 days
	Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

Units	HSCEs	Vocabulary	Pacing
Weather Ch20 1. Air Masses and Weather 2. Fronts and Lows 3. Thunderstorms and Tornadoes 4. Hurricanes and Winter Storms 5. Forecasting Weather	**E4.p2E**Describe conditions associated with frontal boundaries (cold, warm, stationary, and occluded). *(prerequisite)* **E4.p2F**Describe the characteristics and movement across North America of the major air masses and the jet stream. *(prerequisite)* **E4.p2G**Interpret a weather map and describe present weather conditions and predict changes in weather over 24 hours. *(prerequisite)* **E4.p2I**Explain the primary causes of seasons. *(prerequisite)* E4.2c Explain the dynamics (including ocean-atmosphere interactions) of the El Niño-Southern Oscillation (ENSO) and its effect on continental climates. **E4.r2g**Explain how El Niño affects economies (e.g., in South America). *(recommended)* **E4.2e**Explain the differences between maritime and continental climates with regard to oceanic currents. **E4.3A**Describe the various conditions of formation associated with severe weather (thunderstorms, tornadoes, hurricanes, floods, waves, and drought). **E4.3B**Describe the damage resulting from and the social impact of thunderstorms, tornadoes, hurricanes, and floods. **E4.3C**Describe severe weather and flood safety and mitigation. **E4.3D**Describe the seasonal variations in severe weather. **E4.3E**Describe conditions associated with frontal boundaries that result in severe weather (thunderstorms, tornadoes, and hurricanes). **E4.3F**Describe how mountains, frontal wedging (including dry lines), convection, and convergence form clouds and precipitation. **E4.3g**Explain the process of adiabatic cooling and adiabatic temperature changes to the formation of clouds. **E5.p1B**Explain the primary cause of seasons. *(prerequisite)*	Meterology Air Mass Front Cold Front Warm Front Occluded Front Stationary Front Thunderstorm Squall Line Supercell Lightning Tornado Hurricane Storm Surge Saffir-Simpson Scale Blizzard Station model	12 days
	Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

Units	HSCEs	Vocabulary	Pacing
The Sun and The Solar System Ch26 1. The Sun's Size, Heat, and Structure 2. Observing the solar System	**E5.2 The Sun** Stars, including the Sun, transform matter into energy in nuclear reactions. When hydrogen nuclei fuse to form helium, a small amount of matter is converted to energy. Solar energy is responsible for life processes and weather as well as phenomena on Earth. These and other processes in stars have led to the formation of all the other chemical elements. **E5.2A**Identify patterns in solar activities (sunspot cycle, solar flares, solar wind). **E5.2B**Relate events on the Sun to phenomena such as auroras, disruption of radio and satellitecommunications, and power grid disturbances. **E5.2C** Describe how nuclear fusion produces energy in the Sun. **E5.2D**Describe how nuclear fusion and other processes in stars have led to the formation of all the other chemical elements.	Fusion Plasma Photosphere Chromosphere Corona Sunspot Solar Wind Aurora Geocentric Heliocentric Gravitation	8 days
	Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

Units	HSCEs	Vocabulary	Pacing
Stars and Galaxies Ch28 1. A Closer Look at Light 2. Stars and Their Characteristics 3. Life Cycles of Stars 4. Galaxies and the Universe	E5.1 The Earth in Space Scientific evidence indicates the universe is orderly in structure, finite, and contains all matter and energy. Information from the entire light spectrum tells us about the composition and motion of objects in the universe. Early in the history of the universe, matter clumped together by gravitational attraction to form stars and galaxies. According to the Big Bang theory, the universe has been continually expanding at an increasing rate since its formation about 13.7 billion years ago. E5.2x Stellar Evolution Stars, including the Sun, transform matter into energy in nuclear reactions. When hydrogen nuclei fuse to form helium, a small amount of matter is converted to energy. These and other processes in stars have led to the formation of all the other chemical elements. There is a wide range of stellar objects of different sizes and temperatures. Stars have varying life histories based on these parameters. **E5.1A** Describe the position and motion of our solar system in our galaxy and the overall scale, structure, and age of the universe. **E5.1b**Describe how the Big Bang theory accounts for the formation of the universe. **E5.1c**Explain how observations of the cosmic microwave background have helped determine the age of the universe. **E5.1d**Differentiate between the cosmological and Doppler red shift. **E5.2e**Explain how the Hertzsprung-Russell (H-R) diagram can be used to deduce other parameters (distance). **E5.2f**Explain how you can infer the temperature, life span, and mass of a star from its color. Use the H-R diagram to explain the life cycles of stars. **E5.2g**Explain how the balance between fusion and gravity controls the evolution of a star (equilibrium). **E5.2h**Compare the evolution paths of low-moderate-, and high-mass stars using the H-R diagram. **E5.3A**Explain how the solar system formed from a nebula of dust and gas in a spiral arm of the Milky Way Galaxy about 4.6 Ga (billion years ago). **Assessments:** Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work	Electromagnetic Radiation Electromagnetic Spectrum Continuous Spectrum Emission Spectrum Absorption Spectrum Constellation Apparent Magnitude Astronomical Unit Light-year Parsec Luminosity Absolute Magnitude Cepheid Variable Main Sequence Giant Star Supergiants White Dwarfs Nebula Planetary Nebula Supernova Neutron Star Pulsar Black Hole Galaxies Quasar Big Bang Model	12 Days

	Units	HSCEs	Vocabulary	Pacing
	Studying the Past Ch29 1. Fossils 2. Relative Time 3. Absolute Time	**E5.3x Geologic Dating** Early methods of determining geologic time, such as the use of index fossils and stratigraphic principles, allowed for the relative dating of geological events. However, absolute dating was impossible until the discovery that certain radioactive isotopes in rocks have known decay rates, making it possible to determine how many years ago a given mineral or rock formed. Different kinds of radiometric dating techniques exist. Technique selection depends on the composition of the material to be dated, the age of the material, and the type of geologic event that affected the material. **E5.3 Earth History and Geologic Time** The solar system formed from a nebular cloud of dust and gas 4.6 Ga (billion years ago). The Earth has changed through timeand has been affected by both catastrophic (e.g., earthquakes,meteorite impacts, volcanoes) and gradual geologic events (e.g., plate movements, mountain building) as well as the effects of biologicalevolution (formation of an oxygen atmosphere). Geologic time can be determined through both relative and absolute dating. **E5.3B**Describe the process of radioactive decay and explain how radioactive elements are used to date the rocks that contain them. **E5.3C**Relate major events in the history of the Earth to the geologic time scale, including formation of the Earth, formation of an oxygen atmosphere, rise of life, Cretaceous-Tertiary (K-T) and Permian extinctions, and Pleistocene ice age. **E5.3D**Describe how index fossils can be used to determine time sequence. **E5.3e**Determine the approximate age of a sample, when given the half-life of a radioactive substance (in graph or tabular form) along with the ratio of daughter to parent substances present in the sample. **E5.3f**Explain why C-14 can be used to date a 40,000 year old tree but U-Pb cannot. **E5.3g**Identify a sequence of geologic events using relative age dating principles.	Palentology Mold Cast Trace Fossil Relative Dating Strata Unconformity Correlation Index fossil Key Bed Absolute Time Varve Radioactive Decay Parent Isotope Daughter Isotope Half-Life Radiometric Dating	9 Days
		Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

Units	HSCEs	Vocabulary	Pacing
Climate and Climate Change Ch21 1. What is Climate 2. Climate Zones 3. Climate Change	**E5.4 Climate Change** Atmospheric gases trap solar energy that has beenreradiated from the Earth's surface (the greenhouseeffect). The Earth's climate has changed both gradually andcatastrophically over geological and historical time frames dueto complex interactions between many natural variables and events. The concentration of greenhouse gases (especially carbon dioxide) has increased due to human industrializationwhich has contributed to a rise in average global atmospherictemperatures and changes in the biosphere, atmosphere, and hydrosphere. Climates of the past are researched, usually using indirect indicators, to better understand and predict climate change. Analyze the empirical relationship between the emissions of carbon dioxide, atmospheric carbon dioxide levels and the average global temperature over the past 150 years. Based on evidence of observable changes in recent history and climate change models, explain the consequences of warmer oceans (including the results of increased evaporation, shoreline and estuarine impacts, oceanic algae growth, and coral bleaching) and changing climatic zones (including the adaptive capacity of the biosphere). Based on evidence from historical climate research (e.g., fossils, varves, ice core data) and climate change models, explain how the current melting of polar ice caps can impact the climatic system . Describe geologic evidence that implies climates were significantly colder at times in the geologic record (e.g., geomorphology, striations, and fossils). Compare and contrast the heat-trapping mechanisms of the major greenhouse gases resulting from emissions (carbon dioxide, methane, nitrous oxide, fluorocarbons) as well as their abundance and heat trapping capacity.	Climate Climate Controls	9 Days
	Assessments: Work Sheets, Vocabulary, Quizzes, Projects/Labs, Chapter Tests and Home Work		

	Units	**HSCEs**	**Vocabulary**	**Pacing**

	Units	HSCEs	Vocabulary	Pacing