

Trimester 3

HSCE Code	Expectation	Vocabulary	Amount of Time Spent	Current Instructional Materials and Activities
Statement E4.2	<p>Oceans and Climate Energy from the Sun and the rotation of the Earth control global atmospheric circulation. Oceans redistribute matter and energy around the Earth through currents, waves, and interaction with other Earth systems. Ocean currents are controlled by prevailing winds, changes in water density, ocean topography, and the shape and location of landmasses. Oceans and large lakes (e.g., Great Lakes) have a major effect on climate and weather because they are a source of moisture and a large reservoir of heat. Interactions between oceanic circulation and the atmosphere can affect regional climates throughout the world.</p>			
E4.2A	Describe the major causes for the ocean's surface and deep water currents, including the prevailing winds, the Coriolis effect, unequal heating of the earth, changes in water temperature and salinity in high latitudes, and basin shape.	Surface current Coriolis Effect Global Winds Gyre Density Salinity Gulf Stream Deep Current	1 Week All Oceans and Climate	Holt Chap 21 Sec. 1 Ocean Salinity lab pg. 515 Maps in action pg. 542 Mini Lab pg. 499
E4.2B	Explain how interactions between the oceans and the atmosphere influence global and regional climate. Include the major concepts of heat transfer by ocean currents, thermohaline circulation, boundary currents, evaporation, precipitation, climatic zones, and the ocean as a major CO ₂ reservoir.	Thermocline circulation Boundary currents Evaporation Precipitation		Holt pg. 498 Holt pg. 493 Dissolved gasses CO ₂
E4.2c	Explain the dynamics (including ocean-atmosphere interactions) of the El Niño-Southern Oscillation (ENSO)	El Nino	1 Day	Interwrite Notes El Nino http://my.hrw.com Video El Nino & Ocean

	and its effect on continental climates.			Density
E4.2d	Identify factors affecting seawater density and salinity and describe how density affects oceanic layering and currents.	Density		Ice Cube Demo (The Ocean conveyor Belt)
E4.2e	Explain the differences between maritime and continental climates with regard to oceanic currents.	Maritime and Continental Climates	1 Day	Map Skills Pg. 654 1-5 Holt pg. 519-24
E4.2f	Explain how the Coriolis effect controls oceanic circulation.			Holt pg. 5-19-24
E4.r2g	Explain how El Niño affects economies (e.g., in South America). (<i>recommended</i>)			Interwrite notes from above
Statement 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 non-renewable 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.	Same as E2.2B		Poster Jigsaw with renewable and nonrenewable resources Graphing Skills Holt Chap 7 Worksheet/Graph Fossil Fuel production
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.	Air pollution Deforestation Coral reef		Smoker Brainstorming activity.
E2.4c	Explain ozone depletion in the stratosphere and methods to slow human activities to reduce ozone depletion.	Ozone Ozone Layer CFC's Ultraviolet radiation		Holt pg. 549
E2.4d	Describe the life cycle of a product, including the resources, production, packaging, transportation, disposal, and pollution.			

Statement E5.4	Climate Change Atmospheric gases trap solar energy that has been reradiated from the Earth's surface (the greenhouse effect). The Earth's climate has changed both gradually and catastrophically over geological and historical time frames due to complex interactions between many natural variables and events. The concentration of greenhouse gases (especially carbon dioxide) has increased due to human industrialization which has contributed to a rise in average global atmospheric temperatures 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.			
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).	Greenhouse effect Carbon dioxide Ozone Climate Specific Heat	6 days	-Green House Effect (Green House Gases and Albedo) -Graphing Climate and Green house Gasses -Pollen activity -A simplistic view of climate change (Mihigan's effects)
E5.4B	Describe natural mechanisms that could result in significant changes in climate (e.g., major volcanic eruptions, changes in sunlight received by the earth, meteorite impacts).			
E5.4C	Analyze the empirical relationship between the emissions of carbon dioxide, atmospheric carbon dioxide levels and the average global temperature over the past 150 years.			
E5.4D	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).	Estuarine Coral Bleaching	2 days	Global Warming Video
E5.4e	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 .			
E5.4f	Describe geologic evidence that implies climates were significantly colder at times in the geologic record (e.g., geomorphology, striations, and fossils).	Geomorphology Striations		
E5.4g	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.	Nitrous Oxide Flouorocarbons		
E5.r4h	Use oxygen isotope data to estimate paleotemperature. <i>(recommended)</i>	Isotope Paleotemperature		
E5.r4i	Explain the causes of short-term climate changes such as catastrophic volcanic eruptions and impact of solar system objects. <i>(recommended)</i>		Same as E5.4B	
E5.r4j	Predict the global temperature increase by 2100, given data on the annual trends of CO2 concentration increase. <i>(recommended)</i>		Same or done with E5.4C	
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.	Renewable Nonrenewable Solar energy Wind energy Hydroelectric Tidal energy Geothermal Biomass Fossil fuels Nuclear fusion	1 week	Holt pg. 159-68 Poster jig-saw presentations.
Standard E5	THE EARTH IN SPACE AND TIME			
Statement E5.p1	Sky Observations <i>(prerequisite)</i> Common sky observations (such as lunar phases) can be explained by the motion of solar system objects in regular and predictable patterns. Our galaxy, observable as the Milky Way, is composed of billions of stars, some of			

	<p>which have planetary systems. Seasons are a result of the tilt of the rotation axis of the Earth. The motions of the moon and Sun affect the phases of the moon and ocean tides. (prerequisite)</p>			
E5.p1A	<p>Describe the motions of various celestial bodies and some effects of those motions. (prerequisite)</p>	<ul style="list-style-type: none"> -Rotation -Coriolis Effect -Revolution -Aphelion -Perihelion -Geocentric -Heliocentric -Retrograde Motion -Eccentricity -Orbital Period -Inertia -Satellite -Moon -apogee -perigee -solar eclipse -lunar eclipse Phases of moon -Tidal Bulge -High tide -low tide -Asteroid -Comet -Near Earth Asteroid -Meteoroid -Meteor 	5 days	<p>*pg.667-671 Moon Observations. Explore Learning Moon quiz Holt Power point video Moon phases. Phases of moon worksheet from poster. Moon Video “The Universe” Alien Moon Video “The Universe”?</p> <p>Chapter 26 Section 2 Direct read and section quiz Moon video. Pg. 677 31-34 Holt (Interpreting graphics) Pg. 670 Venn Diagram Pg. 673 mini Lab Pg. 668 Quick Lab Pg. 667 role-Playing activity Pg. 668 Demonstration Coriolis Effect (Record Player) Pg. 673 Re-teaching.</p> <p>Internet (Solar system visualizer) Quick lab pg. 692 eclipses. Explore Learning Quiz Eclipses Note cards terms Pg. 728 Quick Lab DSM Activity 10 Pg. 691 role Play retrograde Motion Gravity video Keplers animation Internet Orbit Game.</p> <p>DSM Seasons, tides, eclipses, Rotation/day</p>

				<p>night, Revolution/years.</p> <p>Pg. 732 Read Tides DSM Activity 11</p> <p>Chapter 28 Section 4 Quiz Comets Video Near Earth Asteroids “The Universe”</p>
E5.p1B	Explain the primary cause of seasons. (<i>prerequisite</i>)	-Solstice -Equinox -Earth’s Axis	1 day	*pg.672-4 Pg. 773 Quick Lab
E5.p1C	Explain how a light year can be used as a distance unit. (<i>prerequisite</i>)	-Light Year -astronomical unit	2 days	*pg. 659-61 * Solar System Demo with Basketball, soft ball tennis ball.
E5.p1D	Describe the position and motion of our solar system in our galaxy. (<i>prerequisite</i>)	-Milky Way -Local Group -Solar System -Terrestrial - Planets -Inner Planets -Outer Planets -Kuiper Belt -Oort Cloud	2 days	*pg. 789-92 *pg.701 Demo of solar system with different size sports balls. *pg. 804 Map Skills * http://galaxymap.org/ * http://www.atlasoftheuniverse.com/
Statement 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.			
E5.1A	Describe the position and motion of our solar system in our galaxy and the overall scale, structure, and age of the universe.	-Milky Way -Solar System -Galaxy	E5.1b plus	* Time line of Big Bang *Chap. 30 Sec. 3 pg. 789-92 *pg. 804 Map Skills

		-Goblular Clusters -Spiral Galaxy -Elliptical Galaxy -Irregular Galaxy		* http://galaxymap.org/ * http://www.atlasoftheuniverse.com/
E5.1b	Describe how the Big Bang theory accounts for the formation of the universe.	-Big Bang -Cosmic Background Radiation -Doppler Effect -Red Shift -Blue Shift -Uniform Distribution of matter	4-5 Days	*Video Big Bang Theory *Holt Text Book pg. 793-96 *Direct Reading Worksheets Chap 30 Section 4. *Question 1-7 pg.796 text. *Power Point of big Bang *Time line of Big Bang *Balloon Demonstration. Uniform distribution of mass. *Holt Power Point video expanding universe. *Water demo. *Balloon expanding universe. Pg. 795 textbook *2 col. Notes Planets form. *Section Quiz Holt Runaway Universe Video Holt.
E5.1c	Explain how observations of the cosmic microwave background have helped determine the age of the universe.	E5.1b	E5.1b	E5.1b
E5.1d	Differentiate between the cosmological and Doppler red shift.	E5.1b	E5.1b	E5.1b
Statement 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, and solar wind).	-Sunspot -prominence	3 days	*pg 761-65 * Video "The Universe" The Sun

		-Solar Flare -Coronal Mass Ejection		Chapter 29 Section 2 Direct reading. Pg. 772 Map Skills. Pg. 762 Using the figure Pg. 767 Interpreting Graphics 37-39
E5.2B	Relate events on the Sun to phenomena such as auroras, disruption of radio and satellite communications, and power grid disturbances.	-Aurora	3 days	*Pg. 761-65 Comic strip.
E5.2C	Describe how nuclear fusion produces energy in the Sun.	-Nuclear Fusion -proton -positron -Hydrogen -Helium	2 days	*755-757 Pg. 757 Quick Lab How stuff works nuclear fusion video 5 min.
E5.2D	Describe how nuclear fusion and other processes in stars have led to the formation of all the other chemical elements.	E5.2f	1 day	E5.2f
Statement 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.			
E5.2e	Explain how the Hertzsprung-Russell (H-R) diagram can be used to deduce other parameters (distance).	-Parallax -Light Year -Actual motion of stars -Apparent motion of stars -apparent magnitude -absolute magnitude	3 days	*pg. 779 *Quick Lab pg. 779 *pg. 780
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	-HR Diagram -luminosity	3 days	*Chapter 30 section 2 pg. 781-88 *Virtual Lab

	explain the life cycles of stars.	Main sequence -Nebula -White Dwarf -Nova -Neutron star -Pulsar -Black Hole -Super Giants -Black Dwarf		Classroom HR chart Video life and Death of a star Teaching Transparency Holt Life cycle of stars. Compare and Contrast life of a star to life of humans
E5.2g	Explain how the balance between fusion and gravity controls the evolution of a star (equilibrium).	E5.2f	½ days	E5.2f http://www.astro.ubc.ca/~scharein/a311/Sim/hr/HRdiagram.html
E5.2h	Compare the evolution paths of low-moderate-, and high-mass stars using the H-R diagram.	E5.2f	½ days	E5.2f http://aspire.cosmic-ray.org/labs/star_life/hr_interactive.html