

## HIGH SCHOOL EARTH SCIENCE

## CAPE MAY COUNTY NEW JERSEY

(2010)

OBJECTIVE CODE			UNIT CONTENT & PACING	UNIT ESSENTIAL QUESTIONS	UNIT ENDURING UNDERSTANDING WHAT STUDENTS SHOULD KNOW AND BE ABLE TO DO	DIFFERENTIATED ACTIVITIES Tier 1, 2, 3	BENCHMARK ASSESSMENTS
Grade	Standard	Strand					
9	5.4	12.A.1	Earth Science	How did the invention of the telescope change the perception of the universe?	Explain how new evidence obtained using telescopes (e.g. the phases of Venus or the moons of Jupiter) allowed 17 <sup>th</sup> -centrury astronomers to displace the geocentric model of the universe		
9		12.A.2		How did the solar system form? Where did the planets come from?	Collect, analyze, and critique evidence that supports the theory that Earth and the rest of the solar system formed from a nebular cloud of dust and gas 4.6 billion years ago		
9		12.A.3		What is the life cycle of a star? Where does our sun fit on an H-R diagram?	Analyze an H-R diagram and explain the life cycle of stars of different masses using simple stellar models		
9		12.A.4		How do we count/calculate the number of stars? Is there a pattern to how stars are arranged in the sky?	Analyze simulated and/or real data to estimate the number of stars in our galaxy and the number of galaxies in our universe		
9		12.A.5		What is the Big Bang Theory?	Critique evidence for the theory that the universe evolved as it expanded from a single point 13.7 billion years ago		
9		12.A.6		How would you measure an expanding universe?	Argue, citing evidence (e.g., Hubble Diagram), the theory of an expanding universe		
9		12.B.1		How has the Earth's atmosphere changed over time? How are the atmosphere,	Trace the evolution of our atmosphere and relate the changes in rock types and life forms to the evolving atmosphere		

				biosphere and geosphere related?			
9		12.B.2		How do we know the Earth is approximately 4.6 billion years old?	Correlate stratigraphic columns from various locations by using index fossils and other dating techniques		
9		12.B.3		How does the fossil record support the theory of evolution?	Account for the evolution of species by citing specific absolute-dating evidence of fossil samples		
9		12.C.1		How do materials and energy move between living and nonliving systems?	Model the interrelationships among the spheres in the Earth systems by creating a flow chart		
9		12.C.2		What properties of the atmosphere allow it to support life?	Analyze the vertical structure of Earth's atmosphere, and account for the global, regional, and local variations of these characteristics and their impact on life		
9		12.D.1		How does plate movement cause earthquakes?	Explain the mechanisms for the plate motions using earthquake data, mathematics, and conceptual models		
9		12.D.2		How fast does the seafloor spread?	Calculate the average rate of seafloor spreading using archived geomagnetic-reversals data		
9		12.E.1		What is the major external energy source for the Earth?	Model and explain the physical science principles that account for the global energy budget		
9		12.E.2		How does energy move through Earth's biogeochemical cycles?	Predict what the impact on biogeochemical systems would be if there were an increase or decrease in internal and external energy		

9		12.F.1		How does Earth's tilt affect climate during different times of the year?	Explain that it is warmer in summer and colder in winter for people in New Jersey because the intensity of sunlight is greater and the days are longer in summer than in winter. Connect these seasonal changes in changes in sunlight to the tilt of Earth's axis with respect to the plane of its orbit around the Sun		
9		12.F.2		What factors determine the climate of a particular location on Earth?	Explain how the climate in regions throughout the world is affected by seasonal weather patterns, as well as other factors, such as the addition of greenhouse gases to the atmosphere and proximity to mountain ranges and to the ocean		
9		12.F.3		Why does it rain?	Explain variations in the global energy budget and hydrologic cycle at the local, regional and global scales		
9		12.G.1		What are the short and long-term impacts of industry on local watersheds?	Analyze and explain the sources and impact of a specific industry on a large body of water (e.g. Delaware or Chesapeake Bay)		
9		12.G.2		What are the unintended consequences of harvesting natural resources?	Explain the unintended consequences of harvesting natural resources from an ecosystem.		
9		12.G.3		What drives the major biogeochemical cycles?	Demonstrate, using models, how internal and external sources of energy drive the hydrologic, carbon, nitrogen, phosphorus, sulfur, and oxygen cycles		
9		12.G.4		How does human activity affect ecosystems?	Compare over time the impact of human activity on the cycling of matter and energy through ecosystems		
9		12.G.5		How has the town in which you live changed in the last century?	Assess (using maps, local planning documents, and historical records) how the natural environment has changed since humans have inhabited the region		
9		12.G.6		What are the benefits and drawbacks to the large scale adoption of emerging technologies?	Assess (using scientific, economic, and other data) the potential environmental impact of large-scale adoption of emerging technologies (e.g., wind		

					farming, harnessing geothermal energy)		
9		12.G.7		At what rate are materials cycled through an ecosystem?	Relate information to detailed models of the hydrologic, carbon, nitrogen, phosphorus, sulfur, and oxygen cycles, identifying major sources, sinks, fluxes, and residence times		