Earth Science Unit Guide

Carbon in the Spheres

History of the Earth, Carbon Cycle, Nitrogen Cycle, Fossil Fuels, & Alternative Energy

NGSS Performance Expectation:	**CLASSLRs:**
HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. [Clarification Statement: The carbon cycle is a property of the Earth system that arises from interactions among the hydrosphere, atmosphere, geosphere, and biosphere. Emphasis is on modeling biogeochemical cycles that include the cycling of carbon through the ocean, atmosphere, soil, and biosphere (including humans), providing the foundation for living organisms.]	▲Character by: Treating others with respect and compassion.
HS-ESS2-7. Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. [Clarification Statement: Emphasis is on the dynamic causes, effects, and feedbacks between the biosphere and Earth's other systems, whereby geoscience factors control the evolution of life, which in turn continuously alters Earth's surface. Examples include: how photosynthetic life altered the atmosphere through the production of oxygen, which in turn increased weathering rates and allowed for the evolution of animal life; how microbial life on land increased the formation of soil, which in turn allowed for the evolution of land plants; or how the evolution of corals created reefs that altered patterns of erosion and deposition along coastlines and provided habitats for the evolution of new life forms.]	▲Leadership by: Modeling positive behavior ▲Attitude: Accepting rigorous challenges. ▲Scholarship by: Pursuing a high level of achievement
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. [Clarification Statement: Emphasis is on how the appearance of land features (such as mountains, valleys, and plateaus) and sea-floor features (such as trenches, ridges, and seamounts) are a result of both constructive forces (such as volcanism, tectonic uplift, and orogeny) and destructive mechanisms (such as weathering, mass wasting, and coastal erosion).]	▲Service by: Contributing to the well-being of your community.

<u>On test day you should be able to answer all of the following questions:</u>

1. Explain how, why, and where, the nitrogen cycle works. (Your answer should be able to tell me what you know about the nitrogen cycle and you need to include why the nitrogen cycle is relevant (affect us, meaningful to us).
2. Our planet is currently warming due to human activity. Explain how this works. (Explain how the Carbon Cycle works and in what amounts, carbon moving to and from the hydrosphere (water), Biosphere (living things), atmosphere, and lithosphere (rock and Earth), how the greenhouse effect works and the impacts of the movement of carbon)
3. What solutions can you offer our society about the problem of our planet warming? (Think of the reason for our warming. How can we stop putting carbon dioxide into the atmosphere? Explain how your solutions work.)
4. Explain the issues involved with converting our planet's power needs into renewable energy from fossil fuel energy. (Think about your energy table in your notebook, think about the problems with all forms of renewables, and why fossil fuels became the dominant source of energy over the past 150 years)
5. Explain in as much detail as you can the evolution of the Earth (how it has changed). What were the significant events that have taken place, how has the atmosphere, climate, landmasses and life changed.

Vocabulary/Concepts		
Fossil Fuel/Hydrocarbon	Photosynthesis	Half-Life
Reservoir	Radiometric Dating	Greenhouse Effect
Nitrogen Cycle	Carbon Cycle	Climate Change
Combustion	Eon/Era/Period/Epoch	Non-renewable Resource
Geothermal Energy	Weathering	Renewable Resource
Hydroelectric Power		