Environmental Science Curriculum Pacing Guide

Cross-cutting Concepts: Systems and System models, Stability and Change, Structure and function

Ecology

Anchoring Phenomenon	Standard	Instructional Segment	Disciplinary Core Ideas	Science and Engineering Practices	Instructional Notes
Incomprehensible: The Scale of The Universe	**SEV1.** a, b, c, d **SEV2.** c, d	Planet Earth: Ecology	Frameworks of K-12 Science Education: ***By the end of grade 12:*** **HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems. **HS-LS2-1** Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems. **HS-LS2-2** Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems. **HS-LS2-4** Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. **HS- LS2-5** Develop and use a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon. **HS-LS2-6**	• Developing and using models • Using mathematical and computational thinking • Engaging in argument from evidence • Planning and carrying out investigations	Background This unit covers the first half of the environmental science course that includes population ecology, natural resources, biomes, and biodiversity. For courses that are on the block, this unit should be condensed into 9 weeks. Particular care should be given to emphasize the necessity of energy as it flows through ecosystems (the first and second law of thermodynamics). By the end of this unit, students are using the following language in their speaking and writing: • Organism • Population • Community • Ecosystem • Biosphere • Energy

			Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. **HS-LS2-8** Evaluate evidence for the role of group behavior on individual and species. **HS-LS4-5** Evaluate the evidence supporting claims that changes in environmental conditions may result in (1) increases in the number of some species, (2) the emergence of new species, and (3) the extinction of other species. **HS-ESS2-5** Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. **HS-ESS2-6** Develop a quantitative model to describe the cycling of carbon. **HS-ESS3-3** Illustrate the relationships among the management of natural resources, the sustainability of human populations, and biodiversity.		• Energy transfer • Food chain • Food web • Trophic level • Entropy • Biogeochemical cycle • Hydrologic cycle • Nitrogen cycle • Phosphorus cycle • Oxygen cycle • Carbon cycle • Biomes • Topography • Aquatic • Estuary • Biomass • Biodiversity • Complexity • Ecological succession • Ecosystem resilience • Keystone species • Invasive species • Native species • Endemic species • Indicator species • Endangered species • Renewable energy • Nonrenewable energy • Fossil fuels • Sustainable

This instructional segment will connect to the Rhythms of Planet Earth instructional segment.