

Content: SCIENCE

Grade or Course: APES

Date Developed: 1/8/19

Overview:

AP Environmental Science course is designed to be the equivalent of a one-semester, introductory college course in environmental science, through which students engage with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world. The course requires that students identify and analyze natural and human-made environmental problems, evaluate the relative risks associated with these problems, and examine alternative solutions for resolving or preventing them. Environmental Science is interdisciplinary, embracing topics from geology, biology, environmental studies, environmental science, chemistry, and geography

Essential Concepts:

Environmental science is interdisciplinary; it embraces a wide variety of topics from different areas of study. There are several unifying themes that cut across topics. The following are course themes: • Science is a process. • Energy conversions underlie all ecological processes. • The Earth itself is one interconnected system. • Humans alter natural systems. • Environmental problems have a cultural and social context. • Human survival depends on developing practices that will achieve sustainable systems.

Standards:

- Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.
- Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.
- 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.
- Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.
- Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.
- Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
- Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
- Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.
- Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
- Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
- Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
- Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.
- Use a computational representation or model to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

Students will understand and demonstrate through practice the following Scientific Practices:

- Asking Questions and Defining Problems
- Developing and Using Models
- Planning and Carrying Out Investigations
- Analyzing and Interpreting Data
- Using Math and Computational Thinking
- Constructing Explanations and Designing Solutions
- Engaging in Argument over Evidence
- Obtaining, Evaluating, and Communicating Information

Engineering

- Defining engineering problems
- Developing possible solutions
- Optimizing the design solution

Units:

I. Earth Systems and Resources

-What is Environmental Science? & Science Concepts Review

-Weather & Climate

-Geology & Mineral Resources

II. The Living World

-Biodiversity & Evolution

-Population & Community Ecology

III. Population

-Human Population

IV. Land and Water Use

-Water Usage

-Soils

-Land Usage

V. Energy Resources and Consumption

-Renewable & Nonrenewable Energy

-Sustainable Technologies

VI. Pollution

-Water Pollution

-Soil Pollution

-Air Pollution

-Toxicology

VII. Global Change

-Climate Change

-Environmental Change

Assessments:

- End of Unit Exams
- Module Concept Checks
- Water Quality Lab
- Soil Report Lab
- Various Unit Labs (Toxicology, Measuring Biodiversity, Etc.)
- Presentations
- Midterm Exam
- AP Exam