Course Details

Course Resources

The goal of the AP Environmental Science course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving and/or preventing them.

**Course Themes**

Although Environmental Science is interdisciplinary, there are several major unifying constructs, or themes, that are covered in the course. The following themes provide a foundation for the structure of the AP Environmental Science course.

1. Science is a process.
   * Science is a method of learning more about the world.
   * Science constantly changes the way we understand the world.
2. Energy conversions underlie all ecological processes.
   * Energy cannot be created; it must come from somewhere.
   * As energy flows through systems, at each step more of it becomes unusable.
3. The Earth itself is one interconnected system.
   * Natural systems change over time and space.
   * Biogeochemical systems vary in ability to recover from disturbances.
4. Humans alter natural systems.
   * Humans have had an impact on the environment for millions of years.
   * Technology and population growth have enabled humans to increase both the rate and scale of their impact on the environment.
5. Environmental problems have a cultural and social context.
   * Understanding the role of cultural, social and economic factors is vital to the development of solutions.
6. Human survival depends on developing practices that will achieve sustainable systems.
   * A suitable combination of conservation and development is required.
   * Management of common resources is essential.

**Course Topics**

This course covers the following topics:

1. **Earth Systems and Resources (10%–15%)**
   1. Earth Science Concepts (Geologic time scale; plate tectonics, earthquakes, volcanism; seasons; solar intensity and latitude)
   2. The Atmosphere (Composition; structure; weather and climate; atmospheric circulation and the Coriolis effect; atmosphere-ocean interactions; ENSO)
   3. Global Water Resources and Use (Freshwater/saltwater; ocean circulation; agricultural, industrial, and domestic use; surface and groundwater issues; global problems; conservation)
   4. Soil and Soil Dynamics (Rock cycle; formation; composition; physical and chemical properties; main soil types; erosion and other soil problems; soil conservation)
2. **The Living World (10%–15%)**
   1. Ecosystem Structure (Biological populations and communities; ecological niches; interactions among species; keystone species; species diversity and edge effects; major terrestrial and aquatic biomes)
   2. Energy Flow (Photosynthesis and cellular respiration; food webs and trophic levels; ecological pyramids)
   3. Ecosystem Diversity (Biodiversity; natural selection; evolution; ecosystem services)
   4. Natural Ecosystem Change (Climate shifts; species movement; ecological succession)
   5. Natural Biogeochemical Cycles (Carbon, nitrogen, phosphorus, sulfur, water, conservation of matter)
3. **Population (10%–15%)**
   1. Population Biology Concepts (Population ecology; carrying capacity; reproductive strategies; survivorship)
   2. Human Population
4. **Land and Water Use (10%–15%)**
   1. Agriculture
   2. Forestry (Tree plantations; old growth forests; forest fires; forest management; national forests)
   3. Rangelands(Overgrazing; deforestation; desertification; rangeland management; federal rangelands)
   4. Other Land Use
   5. Mining (Mineral formation; extraction; global reserves; relevant laws and treaties)
   6. Fishing (Fishing techniques; overfishing; aquaculture; relevant laws and treaties)
   7. Global Economics (Globalization; World Bank; Tragedy of the Commons; relevant laws and treaties)
5. **Energy Resources and Consumption (10%–15%)**
   1. Energy Concepts (Energy forms; power; units; conversions; Laws of Thermodynamics)
   2. Energy Consumption
   3. Fossil Fuel Resources and Use (Formation of coal, oil, and natural gas; extraction/purification methods; world reserves and global demand; synfuels; environmental advantages/disadvantages of sources)
   4. Nuclear Energy (Nuclear fission process; nuclear fuel; electricity production; nuclear reactor types; environmental advantages/disadvantages; safety issues; radiation and human health; radioactive wastes; nuclear fusion)
   5. Hydroelectric Power (Dams; flood control; salmon; silting; other impacts)
   6. Energy Conservation (Energy efficiency; CAFE standards; hybrid electric vehicles; mass transit)
   7. Renewable Energy (Solar energy; solar electricity; hydrogen fuel cells; biomass; wind energy; small-scale hydroelectric; ocean waves and tidal energy; geothermal; environmental advantages/disadvantages)
6. **Pollution (25%–30%)**
   1. Pollution Types
   2. Impacts on the Environment and Human Health
   3. Economic Impacts (Cost-benefit analysis; externalities; marginal costs; sustainability)
7. **Global Change (10%–15%)**
   1. Stratospheric Ozone (Formation of stratospheric ozone; ultraviolet radiation; causes of ozone depletion; effects of ozone depletion; strategies for reducing ozone depletion; relevant laws and treaties)
   2. Global Warming (Greenhouse gases and the greenhouse effect; impacts and consequences of global warming; reducing climate change; relevant laws and treaties)
   3. Loss of Biodiversity

For more detail on the course topics covered in Environmental Science, see the [Course Description](https://secure-media.collegeboard.org/apc/ap-environmental-science-course-description.pdf).

**Lab Investigations and Lab Notebooks**

Lab and field investigations are important components to the AP Environmental Science course. Go to the [Lab and Field Investigation](https://apstudent.collegeboard.org/apcourse/ap-environmental-science/laboratory-and-field-investigation) page for more information about laboratory requirements for this course.

Colleges may require students to present their laboratory materials from AP science courses before granting college credit for laboratory, so students are encouraged to retain their laboratory notebooks, reports, and other materials.