AP Environmental Science Course Outline

AP Environmental Science course aim is to nurture students with scientific principles, concepts, and methodologies that are required to understand the interrelationships of the natural world, to analyse and evaluate environmental problems i.e.natural and human-made, to evaluate the risks associated with these problems and to find the various alternative solutions for resolving them and for the preservation.

Environmental science is interdisciplinary; it focuses on different variety of topics from different areas of study, Still there are several major unifying constructs and themes, that includes many topics being included in the study of environmental science. Following themes that are given below, will provide a basic foundation for the structure of the AP Environmental Science course.

- Science is a process.
- Science is a process of learning more about the world.
- Science frequently changes the way we understand the world, hence it is dynamic and not static.
- Energy conversions underlie all ecological processes.
- The Energy cannot be created or formed; it must come from somewhere.
- As energy flows through systems, at each step more of it becomes unusable.
- The Earth is one interconnected system.
- Natural systems change over time and space.
- Biogeochemical systems differ in ability to recover from disturbances.
- Humans alter the natural systems.
- Humans have had an impact on the environment for millions of years.
- Technology and population growth have enabled humans to increase their rate and scale on the environment.
- Environmental problems have both cultural and social context.
- Understanding the role of cultural, social and economic factors is vital to the development of solutions.
- Human survival depends on developing practices that will achieve sustainable systems.

- A rational combination of conservation and development is required.
- Common resources and their management is essential.

The following course will focus on the topics quoted below:

Earth Systems and Resources (10%-15%)

- Earth Science Concepts (Geologic time scale; plate tectonics, earthquakes, volcanism; seasons; solar intensity and latitude)
- The Atmosphere (Composition; structure; weather and climate; atmospheric circulation and the Coriolis effect; atmosphere-ocean interactions; ENSO)
- Global Water Resources and Use (Freshwater/saltwater; ocean circulation; agricultural, industrial, and domestic use; surface and groundwater issues; global problems; conservation)
- Soil and Soil Dynamics (Rock cycle; formation; composition; physical and chemical properties; main soil types; erosion and other soil problems; soil conservation)

The Living World (10%-15%)

- Ecosystem Structure (Biological populations and communities; ecological niches; interactions among species; keystone species; species diversity and edge effects; major terrestrial and aquatic biomes)
- Energy Flow (Photosynthesis and cellular respiration; food webs and trophic levels; ecological pyramids)
- Ecosystem Diversity (Biodiversity; natural selection; evolution; ecosystem services)
- Natural Ecosystem Change (Climate shifts; species movement; ecological succession)
- Natural Biogeochemical Cycles (Carbon, nitrogen, phosphorus, sulfur, water, conservation of matter)

Population (10%-15%)

- Population Biology Concepts (Population ecology; carrying capacity; reproductive strategies; survivorship)
- Human Population

Land and Water Use (10%-15%)

- Agriculture
- Forestry (Tree plantations; old growth forests; forest fires; forest management; national forests)

- Rangelands (Overgrazing; deforestation; desertification; rangeland management; federal rangelands)
- Other Land Use
- Mining (Mineral formation; extraction; global reserves; relevant laws and treaties)
- Fishing (Fishing techniques; overfishing; aquaculture; relevant laws and treaties)
- Global Economics (Globalization; World Bank; Tragedy of the Commons; relevant laws and treaties)

Energy Resources and Consumption (10%-15%)

- Energy Concepts (Energy forms; power; units; conversions; Laws of Thermodynamics)
- Energy Consumption
- 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)
- 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
- Hydroelectric Power (Dams; flood control; salmon; silting; other impacts)
- Energy Conservation (Energy efficiency; CAFE standards; hybrid electric vehicles; mass transit)
- Renewable Energy (Solar energy; solar electricity; hydrogen fuel cells; biomass; wind energy; small-scale hydroelectric; ocean waves and tidal energy; geothermal; environmental advantages/disadvantages)

Pollution (25%-30%)

- Pollution Types
- Impacts on Environment and Human Health
- Economic Impacts (Cost-benefit analysis; externalities; marginal costs; sustainability)

Global Change (10%-15%)

- 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)

- Global Warming (Greenhouse gases and the greenhouse effect; impacts and consequences of global warming; reducing climate change; relevant laws and treaties)
- Loss of Biodiversity