Advanced Placement Environmental Science Syllabus/Pacing Guide

Course Description
The AP Environmental Science course is designed to be the equivalent of a one-semester, introductory college course in environmental science. Unlike most other introductory-level college science courses, environmental science is offered from a wide variety of departments, including geology, biology, environmental studies, environmental science, chemistry, and geography. Depending on the department offering the course, different emphases are placed on various topics. Some courses are rigorous science courses that stress scientific principles and analysis and that often include a laboratory component; other courses emphasize the study of environmental issues from a sociological or political perspective rather than a scientific one. The AP Environmental Science course has been developed to be most like the former; as such, it is intended to enable students to undertake, as first-year college students, a more advanced study of topics in environmental science or, alternatively, to fulfill a basic requirement for a laboratory science and thus free time for taking other courses.

Required References
Online Book and Assignments: Mastering Environmental Science


<table>
<thead>
<tr>
<th>Time</th>
<th>Main Topic/Unit</th>
<th>Objective Topics</th>
<th>Corresponding Chapters</th>
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<tr>
<td>One Week</td>
<td>Introduction to Environmental</td>
<td>• Introduction to AP Science Practices</td>
<td>• Chapter 1 Science and Sustainability: An Introduction to Environmental Science</td>
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<td>Science</td>
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<td>Three</td>
<td>Unit I: Earth Systems and</td>
<td>A. Earth Science Concepts (Geologic timescale; plate tectonics, earthquakes,</td>
<td>• Chapter 2 Earth’s Physical Systems: Matter, Energy, and Geology</td>
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<td>Weeks</td>
<td>Resources</td>
<td>volcanism; seasons; solar intensity and latitude)</td>
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<td>B. The Atmosphere (Composition; structure; weather and climate; atmospheric</td>
<td>• Chapter 9 Soil and Agriculture</td>
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<td>circulation and the Coriolis Effect; atmosphere–ocean interactions; ENSO)</td>
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<td>C. Global Water Resources and Use (Freshwater/saltwater; ocean circulation;</td>
<td>• Chapter 15 Freshwater Systems and Resources</td>
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<td>agricultural, industrial, and domestic use; surface and groundwater issues;</td>
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<td>global problems; conservation)</td>
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<td>Soil and Soil Dynamics (Rock cycle; formation; composition; physical and</td>
<td>• Chapter 16 Marine and Coastal Systems and Resources</td>
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<td>chemical properties; main soil types; erosion and other soil problems; soil</td>
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<td>Unit II: The Living World and Populations</td>
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<td>A. Ecosystem Structure (Biological populations and communities; ecological niches; interactions among species; keystone species; species diversity and edge effects; major terrestrial and aquatic biomes)</td>
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<td>B. Energy Flow (Photosynthesis and cellular respiration; food webs and trophic levels; ecological pyramids)</td>
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<td>C. Ecosystem Diversity (Biodiversity; natural selection; evolution; ecosystem services)</td>
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<td>D. Natural Ecosystem Change (Climate shifts; species movement; ecological succession)</td>
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<td>E. Natural Biogeochemical Cycles (Carbon, nitrogen, phosphorus, sulfur, water, conservation of matter)</td>
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<td>Population Biology Concepts</td>
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<td>A. Population Biology Concepts (Population ecology; carrying capacity; reproductive strategies; survivorship)</td>
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<td>B. Human Population</td>
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<td>1. Human population dynamics</td>
<td>1. Human population dynamics (Historical population sizes; distribution; fertility rates; growth rates and doubling times; demographic transition; age-structure diagrams)</td>
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<td>2. Population size (Strategies for</td>
<td>2. Population size (Strategies for sustainability; case studies; national policies)</td>
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<td>sustainability; case studies; national</td>
<td>3. Impacts of population growth (Hunger; disease; economic effects; resource use; habitat destruction)</td>
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<td>Chapter 3 Evolution, Biodiversity, and Population Ecology</td>
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<td>Chapter 8 Human Populations</td>
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- Chapter 3 Evolution, Biodiversity, and Population Ecology
- Chapter 4 Species Interactions and Community Ecology
- Chapter 5 Environmental Systems and Ecosystem Ecology
- Chapter 8 Human Populations
| Unit III: Land and Water Use | A. Agriculture 1. Feeding a growing population (Human nutritional requirements; types of agriculture; Green Revolution; genetic engineering and crop production; deforestation; irrigation; sustainable agriculture) 2. Controlling pests (Types of pesticides; costs and benefits of pesticide use; integrated pest management; relevant laws)  
B. Forestry (Tree plantations; old growth forests; forest fires; forest management; national forests)  
C. Rangelands (Overgrazing; deforestation; desertification; rangeland management; federal rangelands)  
D. Other Land Use 1. Urban land development (Planned development; suburban sprawl; urbanization)  
2. Transportation infrastructure (Federal highway system; canals and channels; roadless areas; ecosystem impacts)  
3. Public and federal lands (Management; wilderness areas; national parks; wildlife refuges; forests; wetlands)  
4. Land conservation options (Preservation; remediation; mitigation; restoration)  
5. Sustainable land-use strategies  
E. Mining (Mineral formation; extraction; global reserves; relevant laws and treaties)  
F. Fishing (Fishing techniques; overfishing; aquaculture; relevant laws and treaties)  
G. Global Economics (Globalization; World Bank; Tragedy of the Commons; relevant laws and treaties) |  
|  | • Chapter 10 Agriculture, Biotechnology, and the Future of Food  
• Chapter 12 Forests, Forest Management, and Protected Areas  
• Chapter 13 The Urban Environment: Creating Livable and Sustainable Cities  
• Chapter 23 Minerals and Mining |
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<tr>
<th>Three Weeks</th>
<th>Unit IV: Energy Resources and Consumption</th>
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<tr>
<td>A. Energy Concepts (Energy forms; power; units; conversions; Laws of Thermodynamics)</td>
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<td>B. Energy Consumption</td>
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<td>1. History (Industrial Revolution; exponential growth; energy crisis)</td>
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<td>2. Present global energy use</td>
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<td>3. Future energy needs</td>
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<td>C. 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)</td>
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<td>D. 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)</td>
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<td>E. Hydroelectric Power (Dams; flood control; salmon; silting; other impacts)</td>
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<td>F. Energy Conservation (Energy efficiency; CAFE standards; hybrid electric vehicles; mass transit)</td>
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<td>G. Renewable Energy (Solar energy; solar electricity; hydrogen fuel cells; biomass; wind energy; small-scale hydroelectric; ocean waves and tidal energy; geothermal; environmental advantages/disadvantages)</td>
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<td>- Chapter 19 Fossil Fuels, Their Impacts, and Energy Conservation</td>
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<td>- Chapter 20 Conventional Energy Alternatives</td>
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<td>- Chapter 21 New Renewable Energy Alternatives</td>
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<td>Three Weeks</td>
<td>Unit V: Pollution</td>
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| Three Weeks | Unit VI: Global Change | A. 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) B. Global Warming (Greenhouse gases and the greenhouse effect; impacts and consequences of global warming; reducing climate change; relevant laws and treaties) C. Loss of Biodiversity 1. Habitat loss; overuse; pollution; introduced species; endangered and extinct species 2. Maintenance through conservation 3. Relevant laws and treaties | • Chapter 7 Environmental Policy: Decision Making and Problem Solving • Chapter 11 Biodiversity and Conservation Biology • Chapter 18 Global Climate Change • Chapter 24 Sustainable Solutions |
# AP Environmental Science Calendar Spring 2017

**All dates subject to change**

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