

# AP Environmental Science Course and Exam Description

## AP Environmental Science Course Overview

The 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 within 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.

### RECOMMENDED PREREQUISITES

Students should have completed two years of high school laboratory science—one year of life science and one year of physical science (e.g., a year of biology and a year of chemistry). Due to the quantitative analysis required in the course, students should also have taken at least one year of algebra. Also desirable (but not necessary) is a course in earth science.

### LABORATORY REQUIREMENT

Although there are no specific AP Environmental Science labs or field investigations required for the course, it is required that students have the opportunity to spend a minimum of 25% of instructional time engaged in hands-on, inquiry-based laboratory and/or fieldwork investigations.

### AP Environmental Science Course Content

- Unit 1: The Living World: Ecosystems
- Unit 2: The Living World: Biodiversity
- Unit 3: Populations
- Unit 4: Earth Systems and Resources
- Unit 5: Land and Water Use
- Unit 6: Energy Resources and Consumption
- Unit 7: Atmospheric Pollution
- Unit 8: Aquatic and Terrestrial Pollution
- Unit 9: Global Change

## Big Ideas

- **Energy Transfer:** 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.
- **Interactions between Earth Systems:** The Earth is one interconnected system. Natural systems change over time and space. Biogeochemical systems vary in ability to recover from disturbances.
- **Interactions between Different Species and the Environment:** Humans alter natural systems and 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.
- **Sustainability:** Human survival depends on developing practices that will achieve sustainable systems. A suitable combination of conservation and development is required. The management of resources is essential. Understanding the role of cultural, social, and economic factors is vital to the development of solutions.

## AP Environmental Science Practices

- **Concept Explanation:** Explain environmental concepts, processes, and models presented in written format.
- **Visual Representations:** Analyze visual representations of environmental concepts and processes.
- **Text Analysis:** Analyze sources of information about environmental issues.
- **Scientific Experiments:** Analyze research studies that test environmental principles.
- **Data Analysis:** Analyze and interpret quantitative data represented in tables, charts, and graphs.
- **Mathematical Routines:** Apply quantitative methods to address environmental concepts.
- **Environmental Solutions:** Propose and justify solutions to environmental problems.

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<b>UNIT 1 THE LIVING WORLD: ECOSYSTEMS</b>	
1.1	Introduction to Ecosystems
1.2	Terrestrial Biomes
1.3	Aquatic Biomes
1.4	The Carbon Cycle
1.5	The Nitrogen Cycle
1.6	The Phosphorus Cycle
1.7	The Hydrologic (Water) Cycle

1.8	Primary Productivity
1.9	Trophic Levels
1.10	Energy Flow and the 10% Rule
1.11	Food Chains and Food Webs
<b>UNIT 2 THE LIVING WORLD: BIODIVERSITY</b>	
2.1	Introduction to Biodiversity
2.2	Ecosystem Services
2.3	Island Biogeography
2.4	Ecological Tolerance
2.5	Natural Disruptions to Ecosystems
2.6	Adaptations
2.7	Ecological Succession
<b>UNIT 3 POPULATIONS</b>	
3.1	Generalist and Specialist Species
3.2	K-Selected r-Selected Species
3.3	Survivorship Curves
3.4	Carrying Capacity
3.5	Population Growth and Resource Availability
3.6	Age Structure Diagrams
3.7	Total Fertility Rate
3.8	Human Population Dynamics

3.9 Demographic Transition

#### **UNIT 4 EARTH SYSTEMS AND RESOURCES**

4.1 Plate Tectonics

4.2 Soil Formation and Erosion

4.3 Soil Composition and Properties

4.4 Earth's Atmosphere

4.5 Global Wind Patterns

4.6 Watersheds

4.7 Solar Radiation and Earth's Seasons

4.8 Earth's Geography and Climate

4.9 El Niño and La Niña

#### **UNIT 5 LAND AND WATER USE**

5.1 The Tragedy of the Commons

5.2 Clearcutting

5.3 The Green Revolution

5.4 Impacts of Agricultural Practices

5.5 Irrigation Methods

5.6 Pest Control Methods

5.7 Meat Production Methods

5.8 Impacts of Overfishing

5.9 Impacts of Mining

5.10	Impacts of Urbanization
5.11	Ecological Footprints
5.12	Introduction to Sustainability
5.13	Methods to Reduce Urban Runoff
5.14	Integrated Pest Management
5.15	Sustainable Agriculture
5.16	Aquaculture
5.17	Sustainable Forestry
<b>UNIT 6 ENERGY RESOURCES AND CONSUMPTION</b>	
6.1	Renewable and Nonrenewable Resources
6.2	Global Energy Consumption
6.3	Fuel Types and Uses
6.4	Distribution of Natural Energy Resources
6.5	Fossil Fuels
6.6	Nuclear Power
6.7	Energy from Biomass
6.8	Solar Energy
6.9	Hydroelectric Power
6.10	Geothermal Energy
6.11	Hydrogen Fuel Cell
6.12	Wind energy
6.13	Energy Conservation

## **UNIT 7 ATMOSPHERIC POLLUTION**

7.1 Introduction to Air Pollution

7.2 Photochemical Smog

7.3 Thermal Inversion

7.4 Atmospheric CO<sub>2</sub> and Particulates

7.5 Indoor Air Pollutants

7.6 Reduction of Air Pollutants

7.7 Acid Rain

7.8 Noise Pollution

## **UNIT 8 AQUATIC AND TERRESTRIAL POLLUTION**

8.1 Sources of Pollution

8.2 Human Impacts on Ecosystems

8.3 Endocrine Disruptors

8.4 Human Impacts on Wetlands and Mangroves

8.5 Eutrophication

8.6 Thermal Pollution

8.7 Persistent Organic Pollutants (POPs)

8.8 Bioaccumulation and Biomagnification

8.9 Solid Waste Disposal

8.10 Waste Reduction Methods

8.11 Sewage Treatment

8.12	Lethal Dose 50% (LD <sub>50</sub> )
8.13	Dose Response Curve
8.14	Pollution and Human Health
8.15	Pathogens and Infectious Diseases
<b>UNIT 9 GLOBAL CHANGE</b>	
9.1	Stratospheric Ozone Depletion
9.2	Reducing Ozone Depletion
9.3	The Greenhouse Effect
9.4	Increases in the Greenhouse Gases
9.5	Global Climate Change
9.6	Ocean Warming
9.7	Ocean Acidification
9.8	Invasive Species
9.9	Endangered Species
9.10	Human Impacts on Biodiversity

## **AP Environmental Science EXAM: 2 Hours 40 min**

The AP Environmental Science Exam assesses student understanding of the science practices and learning objectives outlined in the course framework. The exam is 2 hours and 40 minutes long and includes 80 multiple-choice questions and 3 free-response questions. A four-function, scientific, or graphing calculator is allowed on both sections of the exam.

### **Další informace:**

#### **AP Environmental Science Course Overview – 2 stránky**

<https://apcentral.collegeboard.org/pdf/ap-environmental-science-course-overview.pdf?course=ap-environmental-science>

#### **AP Environmental Science Course at a glance – 4 strany**

<https://apcentral.collegeboard.org/pdf/ap-environmental-science-course-at-a-glance.pdf?course=ap-environmental-science>

#### **AP Chemistry Course and Exam Description – 252 stran**

<https://apcentral.collegeboard.org/pdf/ap-environmental-science-course-and-exam-description.pdf?course=ap-environmental-science>

#### **Příklady zkouškových otázek**

<https://apcentral.collegeboard.org/courses/ap-environmental-science/exam/past-exam-questions>

<https://apcentral.collegeboard.org/pdf/ap21-frq-environmental-science-set-1.pdf>