AP environmental science

[11th-12th grade] (10 Credits)

- *Meets high school graduation requirement for (Life or Physical science)*
- *Meets the UC/CSU subject area "D" Lab Science requirements*

General Information

Description

The goal of the Advanced Placement Environmental Science course (AP Environmental Science, or APES) 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. Environmental Science is interdisciplinary; it embraces a wide variety of topics from different areas of study (e.g. biology, chemistry, earth science, geography), yet there are several major unifying themes that cut across the many topics included in the study of environmental science. These themes include sustainability, conservation, resource management, systems interactions, and human influence on environmental resources.

Topics include:

I. Interdependence of Earth's Systems: Fundamental Principles and Concepts (25%)
A. Flow of energy B.The cycling of matter C.The solid Earth D.The atmosphere
E. The Biosphere
II. Human Population Dynamics (10%)
A. History and Global Distribution B. Carrying Capacity-Local, Regional, Global C. Cultural and Economic Influences
III. Renewable and Nonrenewable Resources: Distribution, Ownership, Use, Degradation (15%)
A. Water B. Minerals C. Soils D. Biological E. Energy F. Land
IV. Environmental Quality (20-25%)
A. Air/Water/Soil B. Solid Waste C. Impact on Human Health
V. Global Changes and Their Consequences (15-20%)
A. First-order Effects (changes) B. Higher-order Interactions (consequences)
VI. Environment and Society: Trade-Offs and Decision Making (10%)

Expectations and Goals

AP Environmental Science has a significant laboratory and field investigation component. The goal of this component is to complement the classroom portion of the course by allowing students to learn about the environment through firsthand observations. Experiences both in the laboratory and in the field provide students with important opportunities to test concepts and principles that are introduced in the classroom, to explore specific problems with a depth not easily achieved otherwise, and to gain an awareness of the importance of variables that exist in the "real world." Examples of investigations include, collecting and analyzing water and soil samples, conducting long term studies regarding local ecosystems or environmental problems, analyzing data sets from experiments, and exploring local public facilities such as a water-treatment plants, local water districts, and energy production facilities. The laboratory and field component will challenge students' abilities to:

- Critically observe environmental systems
- Develop and conduct well-designed experiments
- Utilize appropriate techniques and instrumentation
- Analyze and interpret data, including appropriate statistical and graphical presentations
- Think analytically and apply concepts to the solution of environmental problems
- Make conclusions and evaluate their quality and validity
- Propose further questions for study

APES EXAM PREPARATION-This course will prepare students to take the Advanced Placement environmental science exam. The three hour long exam is divided equally in time between a multiple-choice section and a free-response section. The multiple-choice section consists of 100 questions and constitutes 60% of the final grade. The free response section (40%) emphasizes the application of principles in greater depth. In this section, students must organize answers to broad questions, thereby demonstrating reasoning and analytical skills, as well as the ability to synthesize material from several sources into cogent and coherent essays. There are four free response essays on every AP Environmental Science (APES) exam.

Sample AP Test Questions (taken from http://apcentral.collegeboard.com)

Sample Multiple Choice Questions

1. When X joules of nuclear energy is used to produce Y joules of electrical energy, which of the following is true?
a) In every case, X > Y **b)** In every case, X = Y **c)** In every case, X < Y
d) Either X < Y or X > Y, depending on the efficiency of the generator **e)** Either X < Y or X > Y, depending on the amount of heat produced
2. Of the following, which has the greatest permeability?
a) Clay **b)** Loam **c)** Sand **d)** Silt **e)** Humus
3. The dangers of disposing of toxic chemicals underground came to public attention in which of the following locations?
a) Bhopal, India **b)** Chernobyl, Ukraine **c)** Love Canal, New York **d)** Minamata, Japan **e)** Three Mile Island, Pennsylvania

Sample Free Response Question from the 2002 AP Exam

The Colorado River runs 1,450 miles from the headwaters of the Rocky Mountains to the Gulf of California. The river has many dams, aqueducts, and canals that divert water in order to supply water for electricity, irrigation, recreation, and domestic use.
a) Describe and discuss two environmental problems that are associated with water diversion.
b) If there is a shortage of water, choices will have to be made as to whether water should be diverted to urban areas, agricultural areas, or natural ecosystems. Make an argument for diverting water for urban consumption and an argument for permitting the flow of water to natural areas.
c) Identify another example (other than the Colorado River) of a large-scale water-diversion project, and discuss two environmental problems that have resulted, or might result, from this project.

· Workload, expectations, and grading

AP environmental science is a difficult course and requires approximately 90 minutes of work outside of class for every hour in class. This includes doing the assigned reading, chapter outlines, finishing labs, and working on assigned projects. AP environmental science requires good time management skills and consistent work habits to be successful. Grades in AP Environmental science will be determined as follows: Tests & Quizzes will account for65 % of the grade (this will be weighted). The remaining 35% of the grade will come from formal and informal lab reports, independent and group

projects, in class activities, projects and homework assignments (this will also be weighted). There will be Extra credit opportunities will comprise no more than 2.5% of the overall grade, which is a department-wide agreed upon limitation. Grading is on a straight scale 100-90%=A, 89%-80%=B, 79%-70%=C, 69%-60%=D, 59% or below is failing.

This Class Is Best For…

AP environmental science is best suited for junior and senior level students that have already passed biology and chemistry. This course is an interdisciplinary course that utilizes and applies knowledge of both life and physical science. This class is geared towards students that have in a natural interest in science, and in particular fields such as ecology, environmental design, natural resource management, alternative energy, bioremediation, urban/suburban development, environmental quality, and local applications to San Diego,

For a full description of the AP environmental Science visit the College Board website (downloadable in pdf format):
http://apcentral.collegeboard.com/apc/public/repository/05832apcoursdescenvsc_4317.pdf

From the College Board Website

"Are there any prerequisites for students who want to take AP Environmental Science?
This course is an excellent choice for students who have completed two years of high school laboratory science -- one year of life science and one year of a physical science (for example, a year of biology and a year of chemistry). Students should also have at least a year of algebra under their belts; and a course in earth science would be helpful. Because of these prerequisites, AP Environmental Science is usually taken in either the junior or senior year."

Course Materials

Required Materials

Textbook: Miller, G. Tyler, Jr. ***Living in the Environment: Principles, Connections, and Solutions,15th ed.***, Belmont, CA: Brooks/Cole, 2007.

Additional Information and Resources

The publisher's companion website offers many interactive tutorials and updated links for materials and supplemental resources related to environmental science. Here is link to the publisher website: http://www.cengage.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&product_isbn_issn=9780495015987&discipline_number=22

Environmental Science released exams from the College Board

http://apcentral.collegeboard.com/apc/public/exam/exam_information/2003.html

Teacher webpages

Mr Bodas TPHS http://teachers.sduhsd.net/bbodas/welcome_to_ap_environmental_scie.htm