

Course Syllabus

AP Environmental Science

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Advanced Placement Environmental Science is a yearlong (2 semesters) high school course that addresses the topics covered during a semester long introductory college course in environmental science. Students who pass the AP exam at the end of the yearlong high school course are eligible to receive college credit. In this case, credit for the equivalent of an introductory college course in environmental science is usually granted to students who pass the AP Environmental Science Exam. This is a great benefit to a first year college student in terms of both time and money saved.

Grading

Assessments (tests, quizzes, essays, and projects) will make up 60% of the course average.

Classwork, homework, labs and notebook checks will make up the other 40% of the course average.

Make-up: It is the student's responsibility to find out what make-up work they have. The student needs to come in on their own-time usually during lunch or after school. Also, Mr. Butera's AP Environmental Science Website is a great resource for finding out what happened in class while they were absent. Not all work can be made-up so some alternate assignment may be given. Students have the number of days they were absent, plus one day to complete make-up work (DPS Policy). The student is responsible to obtain make-up work from the teacher on the day of return. If the absence is unexcused the work may be accepted but for 50% off the grade. If the student missed the class but was at school that day, all assignments due that day are still required to be turned in. If the assignments are turned in the next day, the work is considered late at 50% off.

Mr. Butera has no obligation to give out make-up work during passing periods or class instruction. If the student was present the day of an assignment and failed to complete and turn in the assignment by the due date, Mr. Butera has no obligation to provide another copy of the assignment. Mr. Butera will not accept work that is more than a week late. You may speak to Mr. Butera if you have encountered a hardship and wish to request more time to complete an assignment. Because of the high volume of assignments in this AP Environmental Science Class, it is very important to stay organized and do all of the assignments when they are assigned to avoid falling behind.

Extra credit opportunities will be given at the teacher's discretion. If extra credit is given, it will be planned ahead of time, made available to all students, and will be academic in nature.

Textbook

Living in the Environment, Miller, G. Tyler, 17th ed., Brooks/Cole Publishing Co. 2012.

Concepts and Coursework

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 or preventing them.

Environmental science is interdisciplinary; it embraces a wide variety of topics from different areas of study. Yet there are several major unifying constructs, or themes, that cut across the many topics included in the study of environmental science.

Students will connect to the themes addressed in this class in a variety of ways including: reading and writing, collaborating in peer groups, laboratory investigations, activities and simulations, completing math problem sets, on and off campus field investigations, and Internet and library research. Students are expected to study the AP Environmental Science textbook, as well as other resources. Finally, students will take rigorous tests that model the AP Exam upon completion of each chapter and/or unit of study.

This course covers the following topics (taken from the College Board Course Description):

- I. **Earth Systems and Resources (10%–15%)**
 - A. Earth Science Concepts (Geologic time scale; plate tectonics, earthquakes, volcanism; seasons; solar intensity and latitude)
 - B. The Atmosphere (Composition; structure; weather and climate; atmospheric circulation and the Coriolis effect; atmosphere-ocean interactions; ENSO)
 - C. Global Water Resources and Use (Freshwater/saltwater; ocean circulation; agricultural, industrial, and domestic use; surface and groundwater issues; global problems; conservation)
 - D. Soil and Soil Dynamics (Rock cycle; formation; composition; physical and chemical properties; main soil types; erosion and other soil problems; soil conservation)
- II. **The Living World (10%–15%)**
 - A. Ecosystem Structure (Biological populations and communities; ecological niches; interactions among species; keystone species; species diversity and edge effects; major terrestrial and aquatic biomes)
 - B. Energy Flow (Photosynthesis and cellular respiration; food webs and trophic levels; ecological pyramids)
 - C. Ecosystem Diversity (Biodiversity; natural selection; evolution; ecosystem services)
 - D. Natural Ecosystem Change (Climate shifts; species movement; ecological succession)
 - E. Natural Biogeochemical Cycles (Carbon, nitrogen, phosphorus, sulfur, water, conservation of matter)
- III. **Population (10%–15%)**
 - A. Population Biology Concepts (Population ecology; carrying capacity; reproductive strategies; survivorship)
 - B. Human Population
- IV. **Land and Water Use (10%–15%)**
 - A. Agriculture
 - 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
 - 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)
- V. **Energy Resources and Consumption (10%–15%)**
 - A. Energy Concepts (Energy forms; power; units; conversions; Laws of Thermodynamics)
 - B. Energy Consumption
 - 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)
 - 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)
 - E. Hydroelectric Power (Dams; flood control; salmon; silting; other impacts)
 - F. Energy Conservation (Energy efficiency; CAFE standards; hybrid electric vehicles; mass transit)
 - 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)
- VI. **Pollution (25%–30%)**
 - A. Pollution Types
 - B. Impacts on the Environment and Human Health
 - C. Economic Impacts (Cost-benefit analysis; externalities; marginal costs; sustainability)
- VII. **Global Change (10%–15%)**
 - 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

Methods of Instruction and Student Learning

Laboratory Investigations

Students will conduct a variety of laboratory investigations. The goal of the lab component of this class is to complement the classroom portion of the course by allowing students to learn about the environment through firsthand observation. Ozone testing and copper ore heap leach extraction are a few examples of hands on laboratory procedures that are conducted by science and industry that we will conduct in class. Experiences in the laboratory provide students with important opportunities to test concepts and principles that are introduced in the classroom, explore specific environmental problems, and gain awareness of complex environmental issues.

Activities

Students will participate in periodic cooperative group activities. Simulations of ecological systems, as well as, biogeochemical cycles will be facilitated. Other activities will teach students how to identify and analyze environmental problems. Students will collaborate in groups, evaluating the ecological and human health risks associated with environmental problems, and critically examine various solutions for numerous environmental issues.

Internet Research & Google Classroom

Students will also use class time, as well as their own time, to complete a variety of Internet research activities. Many of these activities will be conducted through the Google Classroom online interface.

Direct Instruction

Each chapter will include at least one class period of direct instruction that provides an overview of the topics to be learned. This direct instruction will be in the form of a lecture using a PowerPoint slideshow presentation. Power Point and/or PDF slide shows will be available on the class website for students to download and print. It is advised that they print and bring them to class for the appropriate lessons. Chapter outlines will also be available on the class website for student use.

Quantitative Problem Sets & Data Analysis

Environmental science involves the quantification, analysis, and application of a multitude of data that is drawn from an interdisciplinary body of scientific sources of information. Students will be introduced to, practice, and demonstrate proficiency in the mathematical analysis and application of quantitative environmental science data.

Homework

Students will answer a rigorous series of chapter review questions for each chapter. Students will also be assigned article summaries, case studies, Internet research, and a variety of other assignments for homework throughout the school year.

Notebook

Your instructor will provide a 70 ct. spiral notebook at the beginning of each semester. Students that lose or fill up their notebooks midway through each semester are expected to purchase a new notebook to use until the end of the semester. Students are required to bring notebooks to class everyday. Notebooks will be checked twice per six-week grading period. Notebooks grades compose a significant amount of points in this class. The notebooks have a very straightforward format and are a great resource for students. Additionally, notebooks are one of the easiest ways to build your grade in this class.

Rocky Mountain National Park Field Trip

Students will take a field trip to Rocky Mountain National Park for one day during first week of October as a part of a forest ecology unit of study. The purpose of this trip is to give students hands-on experience doing ecological forest monitoring. This is a citizen science project in which the data will be submitted to park ecologists and land managers, potentially for their use in management decisions. To this end, students will write scientific papers as a formative assessment for this project. To cover food cost and offset transportation costs students are required to remit a \$15.00 fee, due by October 1st.

Assessment

Tests

Unit tests will be given after each chapter or unit of study and will be announced at least three days in advance, usually a week or two in advance. Tests will model the AP Exam format including both multiple choice and free response questions. The multiple-choice section of the AP Environmental Science Exam has 100 questions and is 90 minutes in duration. Therefore, students have 54 seconds to complete each question. Similarly, the free response section of the AP Environmental Science Exam has 4 questions and is also 90 minutes in duration. Therefore, it is recommended by the College Board that students use about 22 minutes to complete each free response question.

In an effort to prepare students to be successful on the AP Environmental Science Exam these timing parameters will be modeled during our 50-minute class periods and testing sessions. A typical test in this class will have 25 multiple-choice questions and 1 free response question. No extra time will be permitted on exams (However, IEP accommodations, such as extra time, are required by law).

Quizzes

Quizzes will be given after each chapter during multi-chapter units and as need arises.

Class Website: To visit the AP Environmental Science class website go to the following URL:

<http://buteraapes.wikispaces.com/>

The AP Environmental Science class website is updated daily and includes pages such as the Daily Agenda (Home), Calendar, Links, Course Expectations, and more. Many students and parents have found this website to be a very useful tool in keeping up date on what's happening in class.

Review Sessions, Tutorials, and Practice Exams

To prepare students for class exams and the AP exam, in-class review sessions, lunch tutorials, practice exams, and a mock-exam will be offered throughout the school year.

Post Exam Activities

Environmental Issues: "Think Globally, Act Locally" Project (Students collaborate in groups creating blogs and videos).