

Advanced Placement Environmental Science Course Syllabus

Textbook:

The textbook is *Environmental Science* by Holt McDougal (Houghton Mifflin Harcourt Publishing Company) By: Heitaus, Arms, 2013

Class Size: Held to 36 due to lab facilities. Class period is 90 minutes on a 4 x 4 Block schedule. One term is 18 weeks, there are two terms per year.

Methods:

Instruction will consist of lecture, notes, homework, quizzes, tests, essays, activities, demonstrations, labs & reports, Socratic Seminars, Philosophical chairs, field work/ fieldtrips, community service, presentations, Environmental Current Events and projects.

Prerequisites:

Open to all students with successful completion of Biology (required) and Chemistry (recommended). Students must be willing to work outside on field studies.

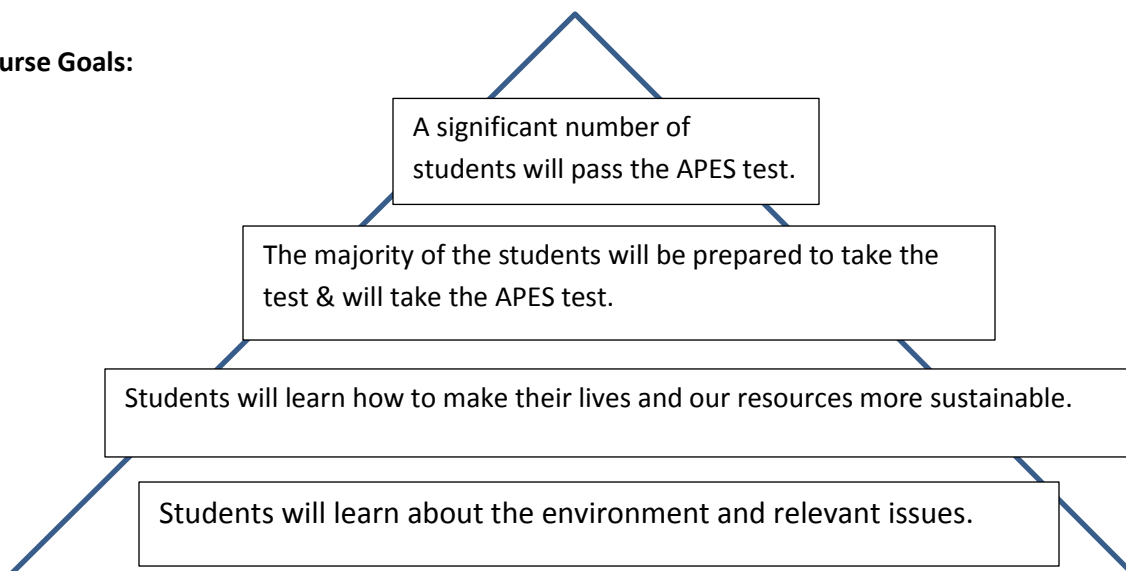
Course Description:

Students in the APES course will gain hands – on experience in lab and field investigations to learn about environmental systems. In addition, they students will develop well thought out, thorough experiments and use appropriate instruments accurately. The labs will include data interpretation and analysis with accurate data tables, graphs and conclusions with meaningful findings. Also, observations, hypotheses, and further questions to explore are important lab report aspects to develop in this class. Concepts learned in class activities will be applied to relevant labs and field work in an effort to provide solutions to our environmental problems. Math calculations are a must, including but not limited to dimensional analysis. The APES course themes and topics will be applied throughout the various methods of instruction to meet curriculum requirements.

Course Themes:

1. Science is a process.
2. Energy conversions underlie all ecological processes.
3. The Earth itself is one interconnected system.
4. Humans alter natural systems.
5. Environmental problems have a cultural and social context.
6. Human survival depends on developing practices that will achieve sustainable systems.

Course Goals:



Course Topics & Outline

Topic	Chapters	Lab/ Activities/ Field Studies	Scoring Component
Topic 1: Earth Systems & Resources A. Earth Science Concepts B. The Atmosphere C. Global Water Resources & Use D. Soil & Soil Dynamics	1: Science and the Environment 2: Tools of Environmental Science 3: The Dynamic Earth 15: Food & Agriculture	Salinization Lab – Introduce Pasco Equipment What makes soil healthy? Lab Earth’s Systems & Coriolis Effect Tragedy of the Commons Activity Beach Erosion Activity Risk Assessment Superfund Research Activity	13- Analyzing & interpreting experimental data 17 – Field investigation 1 – Instruction in Earth’s Systems
Topic 2: The Living World A. Ecosystem Structure B. Energy Flow C. Ecosystem Diversity D. Natural Ecosystem Change E. Natural Biogeochemical Cycles	4: The Organization of Life 5: How Ecosystems Work 6: Biomes 7: Aquatic Ecosystems 10: Biodiversity	Living World Hardy Weinberg Equilibrium Oh Deer Activity Ecosystem Project - Biomes The Nitrogen Game Eutrophication of Water Lab Investigating Succession – Field Study Using a spotting scope at CACHE Creek Nature Preserve CA Invasive Species Project Eco Column Lab	3- Instruction in the living world 14 – Analyzing & interpreting mathematical calculations 12- Analyzing & interpreting information 4- Instruction in Populations 11 – Principles are required to understand interrelationships of the natural world & draws upon various scientific disciplines. 11- Lab & field investigation component. A minimum of one class period per week engaged in lab &/ or field work.
Topic 3: Population A. Population Biology Concepts B. Human Population END OF SEMESTER 1	8: Understanding Populations 9: The Human Population	Calculating Growth Rate of Populations Age Structure graph Population Issues – Field study	14- Analyzing & interpreting mathematical calculations 4 – Instruction in populations.

<p>Topic 4: Land & Water Use</p> <ul style="list-style-type: none"> A. Agriculture B. Forestry C. Rangelands D. Other land Use E. Mining F. Fishing G. Global Economics 	<p>11: Water 12: Air 13: Atmosphere & Climate Change 14: Land 15: Food & Agriculture</p>	<p>Stream Table Lab Water Table Demonstration Pollution Solution Activity & Weekly Environmental Current Event Soil Composting Lab Bio-monitoring & Water Quality Lab Earth's Resources Research Activity Fieldtrip to Water Treatment Plant Porosity & Permeability Filtration Lab Containing an Oil Spill Activity Physical & Chemical Characteristics of Soil</p>	<p>9 – Instruction in Pollution 5 – Instruction in Land use 6 – Instruction in Water use 2 – Instruction in Earth Resources 13- Analyzing & interpreting experimental data</p>
<p>Topic 5: Energy Resources and Consumption</p> <ul style="list-style-type: none"> A. Energy Concepts B. Energy Consumption C. Fossil Fuel Resources and Use D. Nuclear Energy E. Hydroelectric Power F. Energy Conservation G. Renewable Energy 	<p>16: Mining & Mineral Resources 17: Nonrenewable Energy 18: Renewable Energy 19: Waste</p>	<p>Surface Mining Activity Socratic Seminar – Sustainability Energy Audit – PG& E Lab Renewable Energy Resource Project Presentation Solar Panel Field Study Mining for Ore – Chocolate Chips</p>	<p>15- Students identify & analyze environmental problems 8- Instruction in Energy Consumption 7 – Instruction in Energy Resources 6 – Instruction in Water use</p>
<p>Topic 6: Pollution</p> <ul style="list-style-type: none"> A. Air Pollution Types B. Impacts on the Environment and Human Health C. Economic Impacts 	<p>12: Air 20: the Environment & Human Health 21: Economics, Policy, & the Future</p>	<p>Environmental Ambassador/ Earth Day Community Service Project Reduce, Reuse, Recycle, Repurpose Demonstration</p>	<p>16 – Solutions to resolving environmental problems</p>
<p>Topic 7: Global Change</p> <ul style="list-style-type: none"> A. Stratospheric Ozone B. Global Warming C. Loss of Biodiversity <p>END OF SEMESTER 2</p>	<p>13: Atmospheric & Climate Change 10: Biodiversity</p>	<p>Socratic Seminar – Global Climate Change What is your Ecological Footprint & Carbon Footprint? Activity</p>	<p>10- Instruction in Global Change</p>

Field Work:

Garden (Sustainability), Nature Walk (Biodiversity), Water Quality Monitoring, Swainson Hawk Survey, Eutrophication, Bird watching/ identifying with Spotting Scope at Cache Creek Nature Preserve.

Fieldtrips:

Butte Community College, Water Treatment Plant, Recycling Center, SMUD, Fuel Cell Partnership, Cache Creek Nature Preserve, Waste Water Treatment Plant, Landfill, Dairy Farm – Biomass/ Biodigester CH₄.

Resources:

Online Textbook: Friedland, Andrew, Rick Relyea and David Courard-Hauri. *Environmental Science for AP**. W. H. Freeman and Company.

Videos: The Animal Planet's *The Brown Tree Snake on Guam*, *The Power of Water* (National Geographic), *Ozone: The Hole Story*, Pod Cast: Science on Saturday – Lawrence Livermore Lab.

Guest Speakers: Former students in Environmental Field (Lawrence Livermore Lab- Climate Change, Chevron – Non-renewable resources), PG &E – Natural gas, SMUD – Renewable Resources, Solar Array Expert, Interns from UC Davis and Sacramento State University.

Web Sites: Various and many, but will include apcentralcollegeboard.org and enviroliteracy.org, Khan Academy, California Education and the Environmental Initiative, CAEEI & available DVD.

Student Community Service Hours: Earth Day, Gardening, Recycling Program.