

# 2013-2014 Rocklin High School

## AP Environmental Science (APES) Course Syllabus

### Course Instructors:

Period 1: Mr. Kimmel ([wkimmel@rocklin.k12.ca.us](mailto:wkimmel@rocklin.k12.ca.us)), Room G1

Period 7: Mr. Marjama ([gmarjama@rocklin.k12.ca.us](mailto:gmarjama@rocklin.k12.ca.us)), Room G2

### Course Description:

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 and/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. The following themes provide a foundation for the structure of the AP Environmental Science course.

1. Science is a process.
  - Science is a method of learning more about the world.
  - Science constantly changes the way we understand the world.
2. 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.
3. The Earth itself is one interconnected system.
  - Natural systems change over time and space.
  - Biogeochemical systems vary in ability to recover from disturbances.
4. Humans alter natural systems.
  - Humans 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.
5. Environmental problems have a cultural and social context.
  - Understanding the role of cultural, social and economic factors is vital to the development of solutions.
6. Human survival depends on developing practices that will achieve sustainable systems.
  - A suitable combination of conservation and development is required.
  - Management of common resources is essential.

This course is intended to be the equivalent of a one-semester college environmental science course, which is taught over an entire year in high school. It is expected that the APES student will have strong academic skills, focused on self-discipline, purposeful ambition, driving intellectual curiosity, willingness to learn independently and a creative mind. Students need to approach this AP course with the understanding that greater dedication and effort is required for success. Attendance, physical and mental, is a must. An extra grade point is assigned for AP courses and must be earned. Students should find this class compelling and exciting, but they should not underestimate its difficulty or the fact that it will make significant demands on their time.

### Course Prerequisites:

Students taking APES must have completed Biology and Chemistry with a minimum grade of a "B" in

each class.

**Course Textbook:**

The Princeton Review: AP Environmental Science Exam 2013 (or most recent edition available)  
Botkin, Keller, *Environmental Science*, Wiley, 6th edition (2007)

**Course Planner/Outline:**

Below is a list of the APES units we will be studying this year which includes a basic outline of unit topics as well as the percentage of questions from each unit on the APES exam. Multiple choice exams will be given at the conclusion of each unit of study. Students will also be required to complete a series of essential skill questions and free response questions for each unit where they must demonstrate thorough understanding of the material. There will also be 1<sup>st</sup> and 2<sup>nd</sup> semester comprehensive final exams. Details for each unit, including daily activities/assignments, homework, quizzes, and exams will be displayed on the course calendar located on the course website. This course is structured and designed with the intent of enabling students to be successful on the APES exam, which is usually administered during the first few weeks of May. Students are *not* required to take the College Board AP Environmental Science Exam. However, there are a number of number of compelling reasons to do so and will be addressed by your instructor at the beginning of the school year.

**SEMESTER 1**

**Unit 1: Introduction to Environmental Science/Earth's Systems and Resources (10-15%)**

- Major Environmental Science Themes and Concepts (Human population growth; sustainability; a global perspective; an urbanizing world; people and nature; science and values; ecosystems; biological and ecological diversity; greenhouse effect; ecological footprint)
- Earth Science Concepts (Geologic time scale; plate tectonics; earthquakes; volcanoes; seasons; solar intensity; latitude)
- The Atmosphere (Composition; structure; weather and climate; atmospheric circulation and the Coriolis Effect; atmosphere-ocean interactions; ENSO)
- Global Water Resources and Uses (Freshwater/saltwater; ocean circulation; agricultural, industrial, and domestic use; surface and groundwater issues; global problems; conservation)
- Soil and Soil Dynamics (Rock cycle; formation; composition; physical and chemical properties; main soil types; erosion and other soil problems; soil conservation)

**Units 2: The Living World (10-15%)**

- Ecosystem Structure (Biological populations and communities; ecological niches; interactions among species; keystone species; species diversity and edge effect; major terrestrial and aquatic biomes)
- Energy Flow (Photosynthesis and cellular respiration; food webs and trophic levels; ecological pyramids)
- Ecosystem Diversity (Biodiversity; natural selection; evolution; ecosystem services)
- Natural ecosystem Cycles (Climate shifts; species movement; ecological succession)
- Natural Biogeochemical Cycles (Carbon; nitrogen; phosphorous; sulfur; water; conservation of matter)

**Unit 3: Population (10-15%)**

- Population Biology Concepts (Population ecology; carrying capacity; reproduction strategies;

survivorship)

- Human Population Dynamics (Historical population sizes; distribution; fertility rates; growth rates and doubling times; demographic transition; age-structure diagrams)
- Population Size (Strategies for sustainability; case studies; national policies)
- Impacts of Population Growth (Hunger; disease; economic effects; resource use; habitat destruction)

#### **Unit 4: Land and Water Use (10-15%)**

- Agriculture (Feeding a growing population; human nutritional requirements; types of agriculture; Green Revolution; genetic engineering and crop production; deforestation; irrigation; sustainable agriculture)
- Controlling Pests (Types of pesticides; costs and benefits of pesticide use; integrated pest management; relevant laws)
- Forestry (Old growth forests; forest fires; forest management; national forests)
- Rangelands (Overgrazing; deforestation; desertification; rangeland management; federal rangelands)
- Urban Land Development (Planned development; suburban sprawl; urbanization)
- Transportation Infrastructure (Federal highway system; canals and channels; roadless areas; ecosystem impacts)
- Public and Federal Lands ( Management; wilderness areas; national parks; wildlife refuges; forests; wetlands)
- Mining (Mineral formation; extraction; global reserves; relevant laws and treaties)
- Fishing (Fishing techniques; overfishing; aquaculture; relevant laws and treaties)
- Global Economics (Globalization; World Bank; Tragedy of the Commons; relevant laws and treaties)

### **SEMESTER 2**

#### **Unit 5: Energy Resources and Consumption (10-15%)**

- Energy Concepts (Energy forms; power; units; conversions; Laws of Thermodynamics)
- Energy Consumption (History of energy consumption; present global energy use; future energy needs)
- Fossil Fuel Resources and Uses (Formation of coal, oil, and natural gas; extraction/purification methods; world reserves and global demand; synfuels; environmental advantages/disadvantages of sources)
- 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)
- Hydroelectric Power (Dams; flood control; salmon; silting; other impacts)
- Energy Conservation (Energy efficiency; CAFÉ standards; hybrid electric vehicles; mass transit)
- Renewable Energy (Solar energy; solar electricity; hydrogen fuel cells; biomass; wind energy; small-scale hydroelectric; ocean waves and tidal energy; geothermal; environmental advantages/disadvantages)

#### **Unit 6: Pollution (25-30%)**

- Air Pollution (Primary and secondary sources; major air pollutants; measurement units; smog; acid deposition - causes and effects; heat islands and temperature inversions; indoor air pollution; remediation and reduction strategies; Clean Air Act and other relevant laws)

- Noise Pollution (Sources; effects; control methods)
- Water Pollution (Types; sources; causes and effects; cultural eutrophication; groundwater pollution; maintaining water quality; water purification; sewage treatment/septic systems; Clean Water Act and other relevant laws)
- Solid Waste (Types; disposal; reduction)

**Unit 7: Global Change (10-15%)**

- Stratospheric Ozone (Formation of stratospheric ozone; ultraviolet radiation; causes and effects of ozone depletion; strategies for reducing ozone depletion; relevant laws and treaties)
- Global Warming (Greenhouse gases and the greenhouse effect; impacts and consequences of global warming; reducing climate change; relevant laws and treaties)
- Loss of Biodiversity (Habitat loss; overuse; pollution; introduced species; endangered and extinct species; maintenance through conservation; relevant laws and treaties)

**Attendance**

Consistent attendance is not only recommended, but required for student success. When a student returns to school from an excused absence, it is their responsibility to obtain missed work and complete it. The amount of time given to complete the missed work will be determined by the instructor. Generally, students will have the same number of days they were absent to make up the missed work.

**Student Evaluation/Grade:**

A student's grade will be determined by the completion and performance on the following course work categories which are weighted accordingly:

Multiple Choice Exams:	50%
Essential Skill Exams & Free Response Assessments:	25%
Homework/Class Work & Quizzes:	25%

Grades will be assigned according to the following percentages:

98% - 100%+ = A+	88% - 89% = B+	78% - 79% = C+	0% - 69% = NC*
93% - 97% = A	83% - 87% = B	73% - 77% = C	*NC = not completed/not passed
90% - 92% = A-	80% - 82% = B-	70% - 72% = C-	

\* The grading differential will be added to each semester grade report.

**Important APES Information:**

- Students are given three weeks after school begins to drop an AP course.
- The fee for each AP exam is \$87.00. Information regarding Fee Waivers can be picked up in the Counseling Center.
- AP exam fees must be paid for by December 1<sup>st</sup>. Checks should be made payable to **Rocklin High School** and students can turn in their fee to the Student Store. If the fee is not paid by December 1<sup>st</sup>, a \$20.00 late fee per exam will be assessed.

**PLEASE SIGN AND RETURN!**

By signing, I acknowledge that I have read and completely understand the information presented above in the 2013-2014 Rocklin High School AP Environmental Science (APES) Course Syllabus.

Student \_\_\_\_\_ (print please)

Student \_\_\_\_\_ (signature)

Date \_\_\_\_\_

Parent/Guardian \_\_\_\_\_ (print please)

Parent Guardian \_\_\_\_\_ (signature)

Date \_\_\_\_\_

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