

Grant H.S. AP Environmental Science

AP Environmental Science will be grouped into 7 units focused on questions and topics that matter to Oregonians like you. A typical unit will open with a broad question, that will guide students' individual and group research and work. Labs, homework, lecture and class activities will add to students' knowledge. Units will end with closing projects that might be debates, role plays, or reflection papers.

The College Board's topic outline for AP Environmental Science breaks the content into seven areas (I-VII), each of which have many sub-topics identified by letter. These are listed under each unit to give you a sense of the depth of each unit. As you can see we are not grouping topics in the order that the college board has, or that our textbook has, but instead have fit the content around recent topics in news and politics.

Information about class routines, expectations and grading follows after the unit outline.

Unit 1: Ecological Systems (chapters 3-7, 10 & 11)

Should we reintroduce wolves, and if so how should Oregonians manage the reintroduction?

- II. A. Ecosystem Structure (Biological populations and communities; ecological niches; interactions among species; keystone species; species diversity and edge effects; major terrestrial and aquatic biomes)
- II. B. Energy Flow (Photosynthesis and cellular respiration; food webs and trophic levels; ecological pyramids)
- II. C. Ecosystem Diversity (Biodiversity; natural selection; evolution; ecosystem services)
- II. D. Natural Ecosystem Change (Climate shifts; species movement; ecological succession)
- II. E. Natural Biogeochemical Cycles (Carbon, nitrogen, phosphorus, sulfur, water, conservation of matter)
- IV. B. Forestry (Tree plantations; old growth forests; forest fires; forest management; national forests)
- VII. C. Loss of Biodiversity 1. Habitat loss; overuse; pollution; introduced species; endangered and extinct species 2. Maintenance through conservation 3. Relevant laws and treaties

Unit 2: Using Land and Water Resources Part 1 (chapters 12-15)

How do we balance conflicting desires for the Klamath River watershed?

- I. C. Global Water Resources and Use (Freshwater/saltwater; ocean circulation; agricultural, industrial, and domestic use; surface and groundwater issues; global problems; conservation)
- I. D. Soil and Soil Dynamics (Rock cycle; formation; composition; physical and chemical properties; main soil types; erosion and other soil problems; soil conservation)
- IV. A. Agriculture 1. Feeding a growing population (Human nutritional requirements; types of agriculture; Green Revolution; genetic engineering and crop production; deforestation; irrigation; sustainable agriculture) 2. Controlling pests (Types of pesticides; costs and benefits of pesticide use; integrated pest management; relevant laws)
- IV. C. Rangelands (Overgrazing; deforestation; desertification; rangeland management; federal rangelands)
- IV. F. Fishing (Fishing techniques; overfishing; aquaculture; relevant laws and treaties)

Unit 3: Using Land and Water Resources Part 2 (chapters 15, 23 & parts of 16 & 18)
Fracking and Oil Car Transport: What are best policies and approaches?

- I. A. Earth Science Concepts (Geologic time scale; plate tectonics, earthquakes, volcanism; seasons; solar intensity and latitude)
- IV. D. Other Land Use 1. Urban land development (Planned development; suburban sprawl; urbanization) 2. Transportation infrastructure (Federal highway system; canals and channels; roadless areas; ecosystem impacts) 3. Public and federal lands (Management; wilderness areas; national parks; wildlife refuges; forests; wetlands) 4. Land conservation options (Preservation; remediation; mitigation; restoration) 5. Sustainable land-use strategies
- IV. E. Mining (Mineral formation; extraction; global reserves; relevant laws and treaties)
- VI. C. Economic Impacts (Cost-benefit analysis; externalities; marginal costs; sustainability)

Unit 4: Population Dynamics (chapters 8 & 9)

What is the ideal population distribution and size for the US, and what policies would support this?

- II. A. Population Biology Concepts (Population ecology; carrying capacity; reproductive strategies; survivorship)
- II. B. Human Population 1. Human population dynamics (Historical population sizes; distribution; fertility rates; growth rates and doubling times; demographic transition; age-structure diagrams) 2. Population size (Strategies for sustainability; case studies; national policies) 3. Impacts of population growth (Hunger; disease; economic effects; resource use; habitat destruction)

Unit 5: Energy and Global Warming (chapters 16, 17, 20, 24, 25 & parts of 2 & 19)

How do we think about Global Warming and appropriate energy use, generation and policy?

- I. B. The Atmosphere (Composition; structure; weather and climate; atmospheric circulation and the Coriolis Effect; atmosphere–ocean interactions)
- IV. G. Global Economics (Globalization; World Bank; Tragedy of the Commons; relevant laws and treaties)
- V. A. Energy Concepts (Energy forms; power; units; conversions; Laws of Thermodynamics)
- V. B. Energy Consumption 1. History (Industrial Revolution; exponential growth; energy crisis) 2. Present global energy use 3. Future energy needs
- V. 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)
- V. 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)
- V. E. Hydroelectric Power (Dams; flood control; salmon; silting; other impacts)
- V. F. Energy Conservation (Energy efficiency; CAFE standards; hybrid electric vehicles; mass transit)
- V. 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)

- VII. B. Global Warming (Greenhouse gases and the greenhouse effect; impacts and consequences of global warming; reducing climate change; relevant laws and treaties)

Unit 6: Pollution Part 1 – Atmospheric (chapters 19 & 20)

Focus Question TBD

- VI. A. Pollution Types 1. Air pollution (Sources — primary and secondary; 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) 2. Noise pollution (Sources; effects; control measures)
- VII. 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)

Unit 7: Pollution Part 2 – Water Pollution and Solid Waste (chapters 18, 21 & 22)

How should we respond to Lead in our Environment?

- VI. A. Pollution Types 3. 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) 4. Solid waste (Types; disposal; reduction)
- VI. B. Impacts on the Environment and Human Health 1. Hazards to human health (Environmental risk analysis; acute and chronic effects; dose-response relationships; air pollutants; smoking and other risks) 2. Hazardous chemicals in the environment (Types of hazardous waste; treatment/disposal of hazardous waste; cleanup of contaminated sites; biomagnification; relevant laws)

Grading

Points will be assigned such that the final grade will be based approximately on

Tests – 50%

Vocab quizzes – 10%

Unit Projects – 20%

Daily Work (Labs, notebooks, participation) – 20%

Tests will occur at the end of each unit. They will resemble the actual AP test with many multiple choice and short items and a few extended free response questions. It is our intention to allow a retake opportunity, in which students could recover half of the points they missed.

Vocabulary quizzes will happen two or three times per unit. Retakes will be available.

Unit Projects could be presentations, debates, roleplays, powerpoints, essays or more depending on the unit. If it is a group project there will usually be an individual written reflection.

Daily work will be checked for completion when due. At the end of the unit teachers will collect the work and grade it for accuracy. Each teacher will have a different organizational system for students. Some assignments will be strictly graded on participation. Students are expected to be on time and daily warm ups at the beginning of class will be part of this grade.

An overall grade will be assigned based on the standard scale:

100-90 A, 89-80 B, 79-70 C, 69-60 D, <60 F.

Class Expectations

While the details depend on the individual teacher, AP classes expect mature and motivated students who are interested in working at a college level. Students are expected to engage in class discussions, come prepared to class, complete assigned readings and homework, and ask for help when needed. The scope of the class content is enormous and students are responsible for learning some of it independently.

Students are expected to abide by all Grant School rules notably rules regarding plagiarism, attendance, electronics and the dress/hat policy.

Materials:

Students will be issued the textbook: Living in the Environment. It is not essential to bring it to class on most days. Students will need to bring pencil/pen and their notebook everyday.

The AP test occurs on Monday May 1. Students are encouraged to take the test and should expect to perform well on the test if they have been successful in the class.