

**Murrieta Valley Unified School District
HIGH SCHOOL COURSE OUTLINE**

REVISED: March 2016

Course Title: Advanced Placement Environmental Science

Department: Science

Course #: 3101

Grade Level/s: 11-12

Prerequisite: Grade B or better in CP Biology and Chemistry

Length of Course: Year

UC/CSU (A-G) Req: (D) Laboratory Science

Brief Course Description: Advanced Placement (AP) Environmental Science is an interdisciplinary, lab-based class using critical thinking and data analysis to comprehend the cause, effect and possible solutions facing humans in our environment. Students focus on scientific concepts and learn field work techniques for data collection of local biomes to understand our interaction with the natural world in our community and encourage human population sustainability.

Students attempting to receive college credit for Advanced Placement courses are required to pass a College Board exam which validates coursework. This exam is not a requirement for Murrieta Valley Unified School District credit, grade increase or extra credit.

Student fees are allowable for Advanced Placement, so long as: (1) taking the exam is not a course requirement; (2) the exam results have no impact on a pupil's grade or credit in a course; and (3) eligible economically disadvantaged high school pupils who receive school district funding towards the exam fee shall pay the required AP or IB reduced fee.

I. GOALS

The student will:

- A. Understand human interaction within our planet
- B. Identify environmental problems and possible solutions
- C. Learn a variety of data collection techniques
- D. Interpret charts, graphs and raw data

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- E. Be aware of career choices in the environmental science profession
- F. Be prepared to take the AP Environmental Science exam

II. OUTLINE OF CONTENT FOR MAJOR AREAS OF STUDY

Semester 1

- A. The Living World
 - 1. Ecology concepts
 - a. Communities
 - b. Biomes: terrestrial and aquatic
 - 2. Ecosystem diversity
 - a. Natural selection, evolution
 - 3. Natural ecosystem change
 - a. Climate shifts
 - b. Species movement
 - c. Ecological succession
 - 4. Biochemical Cycles
 - a. Carbon, nitrogen, phosphorus, sulfur, water
- B. Population
 - 1. Population biology concepts
 - a. Population ecology
 - b. Carrying capacity
 - c. Reproductive strategies
 - 2. Human population dynamics
 - a. Growth rates
 - b. Population size
 - c. Sustainability
 - d. Impact of growth
- C. Earth System Resources
 - 1. Land
 - a. Soil types, composition, physical and chemical properties
 - b. Soil problems: conservation and erosion
 - 2. Atmosphere
 - a. Composition, structure, atmospheric circulation, Coriolis Effect
 - 3. Water
 - a. Freshwater: surface and groundwater
 - b. Saltwater currents, ocean circulation, tides
- D. Human Land and Water Use
 - 1. Agriculture
 - a. Types, Green Revolution, genetic engineering, sustainable use
 - 2. Forestry management
 - a. Tree plantations vs. old growth forests, urban forests/lumber

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3. Rangeland management
 - a. Overgrazing, desertification, federal rangelands
4. Urban development
 - a. Planned development vs. suburban sprawl, infrastructure, housing construction
5. Land conservation
 - a. Wilderness areas, national parks, wildlife refuges, forests, wetlands
6. Land conservation practices
 - a. Preservation, remediation, mitigation, restoration
7. Mining
 - a. Mineral formation, extraction, global reserves, relevant laws
8. Coastal and inland waters
 - a. Coastal preserves, fishing techniques; overfishing, aquaculture, laws and treaties, agricultural, industrial and domestic use issues

Semester 2

A. Energy Resources and Consumption

1. Energy flow natural world
 - a. Photosynthesis & cellular respiration, food chains, trophic levels, ecological pyramids
2. Energy concepts
 - a. Energy forms, power, units, Laws of Thermodynamics, conservation of matter
3. Energy consumption
 - a. Past: Industrial Revolution; exponential growth; energy crisis
 - b. Present: global energy use
 - c. Future: energy needs
4. Energy resources non-renewable
 - a. Fossil fuel energy
 - b. Nuclear energy
5. Energy resources renewable
 - a. Solar energy intensity vs. latitude, solar thermal, solar electric
 - b. Hydrogen fuel cells
 - c. Biomass
 - d. Wind energy
 - e. Geothermal
 - f. Hydro, ocean, tidal
6. Energy conservation
 - a. Energy efficiency products, hybrid electric vehicles, mass transit

B. Pollution

1. Air pollution
 - a. Major air pollutants, smog, acid rain, Clean Air Act
2. Water pollution
 - a. Groundwater pollution, surface waterways, maintaining water quality, water purification, sewage, gray water, rain gardens, Clean Water Act and other relevant laws

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3. Solid waste
 - a. Types, disposal, reduction
 4. Impacts on the environment and human health
 - a. Hazardous chemicals, treatment/disposal, cleanup of contamination
- C. Global Change
1. Stratospheric ozone
 - a. Ultraviolet radiation, cause and effects of ozone depletion
 2. Global warming
 - a. Greenhouse effect, impacts and consequences, reducing climate change
 3. Loss of biodiversity
 - a. Habitat loss, introduced species, endangered and extinct species
 - b. Maintenance through conservation: preservation of species vs. ecosystems
 - c. Endangered Species Act and other relevant laws

III. ACCOUNTABILITY DETERMINANTS

- A. Assessment Methods
1. Short quizzes
 2. Discussions/Socratic seminars
 3. Formal and informal lab reports
 4. Midterm and final each semester
 5. Observation and field journals
 6. Essays

IV. INSTRUCTIONAL MATERIALS AND METHODOLOGIES

- A. Required Textbook(s):
1. *Environmental Science for AP* by Andrew Friedland and Rick Relyea 2nd ed.
- B. Methodologies
1. Direct instruction: structured overview, vocabulary activities
 2. Closed reading
 3. Guided inquiry
 4. Cooperative learning
 5. Discourse
 2. Independent study: self-assessments/blogging, research
 3. Experiential learning: guest speakers, projects, presentations
 4. Interactive instruction: debates, discussions, peer-partner learning, online current events discussions