

Newport-Mesa Unified School District
Course Description

AP Environmental Science
(Elective Course)

Content covered in this course is described in the Course of Study. Based upon student needs, teachers select appropriate materials from the Instructional Materials List. Classroom presentations of course content are determined by the instructor and described under Teacher Activities. A more detailed outline of this course can be obtained from the instructor.

Overview:

This course is a yearlong elective course offered through the Science Department. The prerequisites for this course are Biology and Chemistry. The goal of this course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world. Students will also learn to identify and analyze environmental problems, both natural and artificial, to evaluate the possible risks associated with these problems, and to examine solutions for resolving or preventing them. This course is interdisciplinary, including topics from physics, geology, chemistry, political science, ecology and health.

Course of Study Objectives:

- 1.0 Students will determine the flow of energy through the Earth's systems, the form and quality of energy, energy units and measurements, sources, sinks, and conversions.**
- 1.1 SUGGESTED STUDENT ACTIVITIES:
- Class exercises demonstrating energy pyramids and food webs.
 - Field trip to the Newport Back Bay to discover local communities of flora and fauna.
 - Develop energy pyramids and calculate energy transfer based on local ecosystem.
- 1.2 INSTRUCTIONAL MATERIALS USED:
- School adopted textbook
 - Lab manual
 - Videos
 - Environmental Nature Center
- 1.3 SUGGESTED TEACHER ACTIVITIES:
- Lecture
 - Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.
 - Development of field trip and supervision of the student
- 2.0 Students will examine the cycling of elements and the difference between cycling of major and trace elements.**
- 2.1 SUGGESTED STUDENT ACTIVITIES:
- Class discussions and/or related laboratory activities
 - Laboratory investigation of phase changes
 - Laboratory investigation of microbial nitrogen cycling
 - Laboratory investigation of soil characteristics and plant growth
- 2.2 INSTRUCTIONAL MATERIALS USED:
- School adopted textbook
 - Laboratory equipment
 - Laboratory Manual
 - Videos
- 2.3 SUGGESTED TEACHER ACTIVITIES:
- Lecture

- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.

3.0 The student will explain earth history and geologic time and earth's dynamics processes.

3.1 SUGGESTED STUDENT ACTIVITIES:

- Laboratory investigating plate boundaries and earthquake activity
- CDROM simulation of plate tectonics
- Accessing current earthquake information via the Internet

3.2 INSTRUCTIONAL MATERIALS USED:

- School adopted textbook
- Software
- Videos

3.3 SUGGESTED TEACHER ACTIVITIES:

- Lecture
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.

4.0 The student will demonstrate basic knowledge of atmospheric history (origin, development, composition, structure) and dynamics (weather, climate).

4.1 SUGGESTED STUDENT ACTIVITIES:

- Laboratory investigating global warming and the greenhouse effect
- Access NASA weather services via the Internet

4.2 INSTRUCTIONAL MATERIALS USED:

- School adopted textbook
- Laboratory materials
- Videos

4.3 SUGGESTED TEACHER ACTIVITIES:

- Lecture
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.

5.0 The student will examine the organisms and their adaptations, populations and communities, ecosystems, and natural selection in our Biosphere.

5.1 SUGGESTED STUDENT ACTIVITIES:

- Laboratory simulating the natural selection of peppered moths
- Laboratory investigation of interspecific and intraspecific competition

5.1 INSTRUCTIONAL MATERIALS USED:

- Adopted school textbook
- Laboratory Materials
- Videos

5.2 SUGGESTED TEACHER ACTIVITIES:

- Lecture
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.

6.0 The student will compare human population history and global distribution, demographics, patterns of resource utilization, carrying capacity, and influence.

6.1 SUGGESTED STUDENT ACTIVITIES:

- Laboratory activity where the student investigates the growth of a natural population and the affect on its environment
- Compare and contrast growth rates of various nations and predict future outcomes and complications and population demographics

6.2 INSTRUCTIONAL MATERIALS USED:

- Laboratory materials
- School Adopted Textbook
- Internet
- Videos

6.3 SUGGESTED TEACHER ACTIVITIES:

- Lecture
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.

7.0 The student will describe how water, minerals, soil, and energy (abiotic resources) are renewable, nonrenewable, distributed, owned, and used globally.

7.1 SUGGESTED STUDENT ACTIVITIES:

- Participation in a computer program that simulates “real world” actions and consequences regarding abiotic factors
- Laboratory investigation of abiotic influences on organisms

7.2 INSTRUCTIONAL MATERIALS USED:

- Computer Program
- Laboratory Materials
- Videos
- School Adopted Textbook

7.3 SUGGESTED TEACHER ACTIVITIES:

- Lecture
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.

8.0 The student will examine how biological resources-natural areas, genetic diversity, agriculture-are renewable, nonrenewable, distributed, owned, and used globally.

8.1 SUGGESTED STUDENT ACTIVITIES:

- Participation in a computer program that simulates “real world” actions and consequences regarding abiotic factors
- Students will monitor the air and water quality of a water source in Orange County of their choice during the entire year
- They will attempt to determine the source of the pollution and plot the area on a computer map using GIS and Arcview
- Depending on their results, they will present their data to the community in hopes of establishing a recovery plan
- This site will be used year after year to develop a long-term research project

8.2 INSTRUCTIONAL MATERIALS USED:

- Water Testing Kit
- Air Testing Kit
- Arcview Software
- Adopted School Textbook
- Laboratory Manual

8.3 SUGGESTED TEACHER ACTIVITIES:

- Lecture
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.

9.0 The student will explain land development in terms of residential, commercial, agricultural, and recreational usage.

9.1 SUGGESTED STUDENT ACTIVITIES:

- Participation in a computer program that simulates “real world” actions and consequences regarding abiotic factors

- 9.2 • Class discussion on topics relating to current events using data via the Internet
INSTRUCTIONAL MATERIALS USED:
• Software
• Videos
• School Adopted Textbook
- 9.3 SUGGESTED TEACHER ACTIVITIES:
• Lecture
• Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.
- 10.0 The student will describe types, sources, disposal methods, and alternatives to solid waste.**
- 10.1 SUGGESTED STUDENT ACTIVITIES:
• Students will simulate a landfill and determine the decomposition rates for various waste materials
• Students will visit a local waste disposal site to see first hand how waste is treated and compare one city's method to another
- 10.2 INSTRUCTIONAL MATERIALS USED:
• Adopted School Textbook
• Laboratory Equipment
- 10.3 SUGGESTED TEACHER ACTIVITIES:
• Lecture
• Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.
• Development of field trip and supervision of students
- 11.0 The student will examine the impact of the reduction in environmental quality on human health.**
- 11.1 SUGGESTED STUDENT ACTIVITIES:
• The student will participate in various community service projects (beach clean up, removing exotic plants from local communities)
• The student will monitor the air and water quality of a water source in Orange County of their choice during the entire year
• The student will attempt to determine the source of the pollution and plot the area on a computer map using GIS and Arcview
• Depending on the results, the student will present the data to the community in hopes of establishing a recovery plan
• This site will be used year after year to develop a long-term research project
- 11.2 INSTRUCTIONAL MATERIALS USED:
• Water Testing Kit
• Air Testing Kit
• Arcview Computer Program
• Adopted School Textbook
• Laboratory Manual
- 11.3 SUGGESTED TEACHER ACTIVITIES:
• Lecture
• Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.
• Development of field trip and supervision of students
- 12.0 The student will describe the first-order effects of global changes in the atmosphere, oceans, and terra firma.**
- 12.1 SUGGESTED STUDENT ACTIVITIES:
• Laboratory activity investigating global warming

- Laboratory activity testing how pollution affects terrestrial and aquatic life
- 12.2 INSTRUCTIONAL MATERIALS USED:
 - Laboratory Materials
 - Videos
 - School adopted textbook
- 12.3 SUGGESTED TEACHER ACTIVITIES:
 - Lecture
 - Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.

13.0 The student will examine the higher-order interactions of carbon dioxide, ocean currents, and ultraviolet light and their global consequences.

- 13.1 SUGGESTED STUDENT ACTIVITIES:
 - Laboratory activity examining the connections between terrestrial and aquatic ecosystems
 - Class discussions using data via the Internet
- 13.2 INSTRUCTIONAL MATERIALS USED:
 - Laboratory manual
 - School adopted textbook
 - Videos
- 13.3 SUGGESTED TEACHER ACTIVITIES:
 - Lecture
 - Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.

14.0 The student will compare and contrast the economic forces and how they impact the environment and society.

- 14.1 SUGGESTED STUDENT ACTIVITIES:
 - The student will participate in a field trip to examine the impact of the Eastside Reservoir and their mitigation projects
 - Investigation of risk assessment
- 14.2 INSTRUCTIONAL MATERIALS USED:
 - Adopted School Textbook
 - Internet
 - Brochures/pamphlets from the field trip location
- 14.3 SUGGESTED TEACHER ACTIVITIES:
 - Lecture
 - Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.
 - Development of field trip and supervision of students

15.0 The student will describe how international, national and regional environmental laws affect decision-making and ethics.

- 15.1 SUGGESTED STUDENT ACTIVITIES:
 - The student will participate in a field trip to examine the Salton Sea, develop a monitoring protocol, and see the current impact in Mexico of one of the most highly polluted man-made lakes in California.
 - The student will examine local water politics and how decisions affect our community
- 15.2 INSTRUCTIONAL MATERIALS USED:
 - Water Politics Simulation Activity
 - Adopted School Textbook
 - Laboratory Manual
- 15.3 SUGGESTED TEACHER ACTIVITIES:

- Lecture
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.
- Development of field trip and supervision of students

16.0 By combining all that they have learned, the student will examine humanity's options for the future regarding conservation, preservation, restoration, remediation, and

16.1 SUGGESTED STUDENT ACTIVITIES:

- The student will participate in a field trip to examine alternative forms of energy
- The student will investigate uses of alternative forms of energy around the world via the Internet
- The student will research how foreign governments are attempting to establish sustainable development

16.2 INSTRUCTIONAL MATERIALS USED:

- Adopted School Textbook
- Internet
- Newspaper/Magazine articles

16.3 SUGGESTED TEACHER ACTIVITIES:

- Lecture
- Classroom management, which may include class preparation of labs, supervising individual student and group activities, class discussion, and class demonstrations.

May 9,2000