

# Environmental Science

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Introduces fundamental ecological concepts, explores the interactions within ecosystems, and focuses upon the inter-relatedness of life on Earth. Students learn about the biosphere, major biomes, ecosystems, chemical cycles, and the role of living things in ecosystems. In addition to learning about environmental problems such as land, water, and air pollution, overpopulation, and habitat destruction, students explore practical alternatives for protecting the environment and moving toward a sustainable future. The following books are required for this course:

- The Oak Meadow Environmental Science Syllabus
- Holt *Environmental Science* by Karen Arms, Holt, Rinehart and Winston, 2005

## Outline of the Environmental Science Syllabus:

### **Unit 1: Introduction to Environmental Science**

- Lesson 1:** Science and the Environment
  - Lesson 2:** Tools of Environmental Science, Section 1
  - Lesson 3:** Tools of Environmental Science, Sections 2-3
  - Lesson 4:** The Dynamic Earth, Sections 1-2
  - Lesson 5:** The Dynamic Earth, Section 3
  - Lesson 6:** Lab Activity
- ### **Unit 2: Ecology**
- Lesson 7:** The Organization of Life
  - Lesson 8:** How Ecosystems Work
  - Lesson 9:** Biomes, Sections 1-2
  - Lesson 10:** Biomes, Section 3
  - Lesson 11:** Aquatic Ecosystems
  - Lesson 12:** Lab Activity
- ### **Unit 3: Populations**
- Lesson 13:** Understanding Populations
  - Lesson 14:** The Human Population, Section 1
  - Lesson 15:** The Human Population, Section 2
  - Lesson 16:** Biodiversity, Sections 1-2
  - Lesson 17:** Biodiversity, Section 3
  - Lesson 18:** Midterm Exam / Lab Activity

### **Unit 4: Water, Air, and Land**

- Lesson 19:** Water
- Lesson 20:** Air
- Lesson 21:** Atmosphere and Climate Change
- Lesson 22:** Land
- Lesson 23:** Food and Agriculture
- Lesson 24:** Lab Activity

### **Unit 5: Mineral and Energy Resources**

- Lesson 25:** Mining and Mineral Resources
- Lesson 26:** Nonrenewable Energy
- Lesson 27:** Renewable Energy
- Lesson 28:** Waste, Sections 1-2
- Lesson 29:** Waste, Section 3
- Lesson 30:** Lab Activity

### **Unit 6: Our Health and Our Future**

- Lesson 31:** The Environment and Human Health, Section 1
- Lesson 32:** The Environment and Human Health, Section 2
- Lesson 33:** Economics, Policy, and the Future, Section 1
- Lesson 34:** Economics, Policy, and the Future, Section 2
- Lesson 35:** Economics, Policy, and the Future, Section 3
- Lesson 36:** Final Exam / Lab Activity

## Lesson 11: Chapter 7, Sections 1-2

### Chapter 7: Aquatic Ecosystems

Now let's get out on the water! You've spent some time learning about terrestrial systems, and in this lesson you will begin to look at aquatic ecosystems. Chapter 7 discusses freshwater and marine ecosystems. These systems are just as vital to life here on Earth, and yet they are equally endangered. Freshwater ecosystems are made up of lakes, rivers, and wetlands. Marine ecosystems include estuaries, coral reefs, and oceans. Aquatic ecosystems perform many environmental functions and support many plant and animal species. You will note that the types of organisms that can survive in an aquatic system are determined by the salinity, or level of salt, present in the water. Unfortunately, pollution, development, and overuse threaten many of these ecosystems.

**Section 1** discusses the characteristics of freshwater ecosystems. You'll also learn about how wetlands are an important kind of freshwater ecosystem.

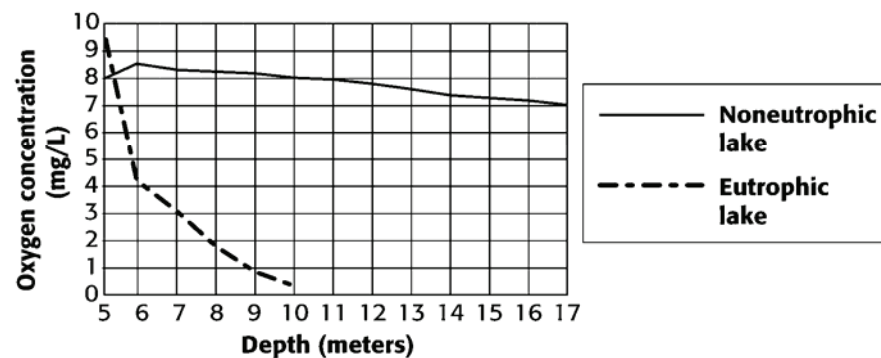
**Section 2** describes marine ecosystems, such as estuaries, coral reefs, and open oceans. These systems are home to a wide variety of plants and animals, all specially adapted to changes in water level, sunlight and temperature. You'll also learn about the myriad threats to these ecosystems.

**Read Chapter 7, Sections 1-2, pages 172-186**

**Answer the following questions:**

1. Compare and contrast the littoral zone and the benthic zone of a lake.
2. Refer to the graph below. Based on oxygen content, which lake would probably have a greater number of species? Explain.

#### Comparison of Oxygen Concentration in Two Lakes



3. Write an essay that suggests actions that can be taken to reverse eutrophication in a lake.

4. Identify the factors that determine where organisms live in aquatic ecosystems. Give examples of how each factor affects a specific organism.

**Choose *one* of the following projects to complete:**

- a) Develop a poster that shows the characteristics of plankton, nekton, and benthos. The poster should include examples of each type of organism and information about where in the ocean each organism is found. Use the Internet to find photographs of each aquatic organism to include on your poster.
- b) Nearly 90 years ago, an enthusiastic scientist with the United States Department of Forestry received a small packet of seeds in the mail from a colleague in Australia. The seeds were of the melaleuca tree. The scientist scattered the seeds across the Florida Everglades, hoping the water-loving trees would dry up the “mucky wasteland” to make way for agricultural and residential development. Since then, the melaleuca has spread across thousands of acres of South Florida wetlands. The tree has no natural consumers in South Florida and has driven out many native plants and animals. Scientists are currently trying to eradicate the tree by experimenting with another import from Australia — a melaleuca-eating insect. Find out more about the problems with melaleuca trees and the eradication program. Prepare a brief report on your findings.
- c) Perform the **QuickLab** on page 180.
- d) Select an estuary in the United States. Use the Internet to find the tide charts for a location on the estuary and a nearby spot on the coast. Tide charts may be found at the web sites of newspapers for cities near the estuary. Write a brief description of how the tide in the estuary differs for the tide at a nearby point on the coast. Compare the tide levels on the coast and in the estuary. How do the tides affect the water in the estuary?
- e) Read the two quotations given below:

“Roll on, thou deep and dark blue ocean — roll!  
Ten thousand fleets sweep over thee in vain;  
Man marks the earth with Ruin — his control  
Stops the shore.”

“The sea is tired. It’s throwing back at  
us what we’re throwing in there.”

— Senator Frank Lautenberg

— “George Gordon,” Lord Byron

In a short essay, discuss the contrary opinions provided by these two quotations. How might the attitude expressed by Lord Byron have led to the conditions described by Senator Lautenberg?

- f) Conduct the **Field Activity** on page 184. Photograph or videotape your ecosystem to show your teacher along with your report and observations.