

Questions to consider: What are the components of ecosystems and how do these components interact with one another? What are the major threats to a healthy environment? What are the identified solutions to those threats? How do politics, science and culture interact in the study of the environment?

Text: Living in the Environment. Miller, G.T., 2007. 15th ed. Brooks Cole Publishing. Selections from *Silent Spring* (Carson 1962), *A Sand County Almanac* (Leopold 1949), *Survival of the Sickest* (Moalem 2007), *Elephantoms* (Watson 2002), *Tales of A Shaman's Apprentice* (Plotkin 1993), and various articles in current popular literature

Overview: This course is designed to provide students with an introduction to the study of ecology, a subject on which increased emphasis is currently being placed in many colleges. As our students prepare for life beyond the walls of academia, they must be prepared to make wise decisions that weigh both the environmental and the economic/social costs and benefits of the many options that will face them in the global society in which we live. This course seeks to identify those areas in which critical decisions must be made by our species in our effort to continue to compete and to survive on this planet, in addition to guiding students to a better understanding of the ramifications of those decisions.

In Fall Term, students gain a basic understanding of the physical, chemical and biological principles that determine which kinds of plants and animals live in the various ecosystems of the world. Students learn how natural ecosystems have developed and how people have altered or affected these systems, creating the greenhouse effect and air and water pollution. The emphasis of the term is to gain a greater understanding of the dynamics of ecosystems, particularly the deciduous/coniferous ecotone typifying our location in Ashburnham, MA and to understand how these systems are likely to change over time.

In Winter Term, the emphasis is on energy and how its use and extraction (mining) have affected various ecosystems. Students examine how our patterns of energy use have changed historically and what the prospects for future energy usage are. A major emphasis is placed on looking at possible energy alternatives, such as nuclear, solar, wind, hydropower, hydrogen, and geothermal sources, and their potential value in solving energy supply problems.

In Spring Term, the focus is on an overview of major environmental problems. Students examine issues surrounding population growth, loss of biological diversity and pollution. A key element of this discussion is gaining an understanding about the cultural differences and social influences on these problems, as well as our ethical responsibility toward all species.

Methods: In addition to the traditional method of lecture, students will also create PowerPoint presentations in individual and group efforts, conduct research, construct research papers, write journal entries, and participate in laboratory exercises, both in the lab and outside. Video clips will also be used from sources including www.ted.com and *Terra: The Nature of Our World* podcast, as well as educational videos including *Who Killed the Electric Car*, *The Trials of Life* series, PBS's *Race to Save the Planet* series, and *An Inconvenient Truth*. Speakers, field trips, and readings from sources other than the text will supplement the classroom material with examples of how these concepts are applied. Throughout the course, students will be asked to reflect on their personal relationship with the world around them in journal entries and in response to the readings. In the Winter Term students will be asked to construct an interdisciplinary portfolio focusing on an environmental issue and examining several different aspects of that issue, including the scientific background and research being conducted, the

historical background, art related to the topic, literature related to the topic, a cultural perspective on the topic, and the economic impact of the topic.

In doing so, the students will be learning to:

1. Evaluate choices that they face as consumers of goods, services, and information.
2. Gain confidence in their communication skills, both visual and verbal.
3. Utilize sound researching techniques with an emphasis on database skills.
4. Understand their role and responsibility in securing a healthy future for not just our own species, but for the planet as a whole.

Topics Covered:

1. FALL TERM: Ecosystem Components and Dynamics
 - a. Abiotic versus biotic components of ecosystems
 - b. Nutrient cycling
 - c. Major world biomes and the adaptations to those biomes
 - d. Species interactions: competition, predation, and symbiosis
 - e. Population dynamics
 - f. Biological succession in New England
 - g. Developed versus developing nations
2. WINTER TERM: Energy Issues
 - a. Energy and matter
 - b. Traditional energy forms (coal, oil, natural gas)
 - c. Alternative energy forms (wind, solar, hydropower, hydrogen, geothermal, nuclear)
 - d. Energy efficiency in building construction, in transportation, in products
3. SPRING TERM: Current Issues
 - a. Food issues (food production, soil conserving agricultural techniques, organic farming, industrial farming, pesticide use)
 - b. Sustaining biodiversity
 - c. Water issues (pollution and shortages)
 - d. Sustainable Cities (green city policies and strategies for construction)
 - e. Solid Waste (types and management)
 - f. Environmental Health Hazards (how is disease transmitted and why do we see so many new diseases)
 - g. Human population growth
 - h. Air pollution (indoor and outdoor)