Huntingdon College
W. James Samford, Jr. School of Business and Professional Studies

COURSE NUMBER: BIOL161
COURSE NAME: Environmental Science
Fall 2015, Session III – Shelby
Tuesday, 11/ 10, 17, 12/ 1, 8, 15, 5:30 p.m. - 9:30 p.m.

INSTRUCTOR'S NAME: Ms. Stephanie Miller

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COURSE DESCRIPTION: Environmental Science is an interdisciplinary area of study that seeks to understand humanity’s impact on the world, both from a theoretical and applied perspective. This course deals with some of the most important issues confronting humanity. Human population growth, climate change, loss of biodiversity, and other environmental changes are predicted to affect our future profoundly. The goals of this course are to describe aspects of how the Earth works, and understand humanity’s impact on the planet. Specific fields to be covered will include ecology, population biology, resource use and extraction, biodiversity, and related topics. Environmental Science is an interdisciplinary endeavor; although our main approach will be to understand the subject from a scientific perspective, we’ll also consider other topics such as economics, politics, and ethics as they relate to environmental decision-making.

PREREQUISITE: None


COURSE LEARNING OUTCOMES: At the end of the course, it is expected that you will demonstrate:
1. knowledge of the history and interdisciplinary nature of environmental science, and of the social, political, economic and ethical issues relating to human activities on the Earth;
2. an understanding of scientific philosophy and methodology (including quantitative methods, publication, and peer review) as it applies to environmental issues;
3. an understanding of the principles of evolution, ecology, physics, and chemistry as they apply to environmental issues;
4. knowledge of the history and current status of issues including: human population growth; energy sources and consumption; biodiversity; habitat degradation; and air pollution and the potential for climate change;
5. knowledge of environmental policy and legislation.
COURSE ASSIGNMENTS & GRADING CRITERIA:

Online homework and quizzes will comprise 15% of the overall grade for the course.

One QUIZ starting at the beginning of the second class session for a total of four quizzes. Quiz scores will be averaged and will be equivalent to 40% of your overall grade for the course. All quizzes cover the subject matter of their respective class session and are not cumulative.

Five BRIEF ASSIGNMENTS, one due at the beginning of each session, will collectively comprise 15% of the course grade. The structure of the assignments is this: select one of the “Topics for Discussion” listed after the reading outline for the upcoming week (i.e., in advance of Session 2, you should select a question from the “Session 2 Topics for Discussion” after the outlines of chapters 4, 5, 7, and 8). Conduct some brief research (for this assignment, web-based research is adequate), and type up (double-spaced, please) a response to any one of the questions in the list. Your response is expected to be about a half page to a full page in length. The purpose of the brief assignments is to allow you to focus on topics of interest from the readings, to facilitate class discussion, and to allow the instructor to give you some writing feedback before the research paper is due. You are not expected to spend hours working on the brief assignments – to do so may be counterproductive – but you are expected to do at least some cursorial research as you write your response to the question.

RESEARCH PAPER: Your research paper will comprise 30% of your overall grade for the course. This will be a standard research paper comprising not less than 10 pages, nor more than 15 pages, of text in an 12-point business-acceptable typeface (Times-New Roman, Garamond, Tahoma). Submission will be in the form of a printed and bound document AND electronically according to the procedure “Method for Submission of Work” in this syllabus. PC/Windows versions only. Acceptable word processors are Microsoft Word (preferred) or Corel WordPerfect only.

It is expected that research papers be well-written, both in terms of grammar, format, and subject presentation. Of course, your paper will be thoroughly evaluated based on its content, the quality of your research and the presentation of your ideas. Also, evaluation of your paper will be consistent with college-level English composition benchmarks. This means that, regardless of your subject or thesis, your English composition quality is expected to be the same as you would expect in your college English composition classes. You should aim to be concise, convincing in the presentation and defense of your thesis, and respect established rules of grammar and style.

You may select from the following topics when deciding on your research project. These topics are designed to make you think and assimilate what you learn.

1. The Endangered Species Act: A History and Assessment of Success
2. Wetlands as Ecosystem Services along the Gulf Coast
3. Should We Drill For Oil in the Arctic National Wildlife Refuge?
5. Green Business: Do Pro-Environmental Businesses Fare Better?
6. Environmental Priorities for Developing Countries in the next 20 Years
7. Habitat Protection and Management in the Southeastern U.S.: A Job Well Done?
8. The Role of the Private Sector in Biodiversity Protection
9. Nuclear Power: Environmental Savior, or Threat?
10. Invasive and Exotic Species: A Summary of Their Threat to the Southeastern U.S.
11. A Comparison of the Environmental Policies of two Recent Presidents (your choice)
12. Climate Change: An Assessment of the Controversy and the Reality
13. The Gulf Of Mexico Fishery: An Environmental Assessment

Method for Submission of Work:
All work is to be submitted electronically, directly to the facilitator within 24 hours of its due date as found in this syllabus. You should send work as an attachment to an email to the instructor’s email account and be certain to send it with a read receipt request. In so doing, you will receive a confirmation that your mail and attachment were received by the facilitator, which is your proof of submission. All work submitted will be evaluated and scored using pen-based technology (which allows the facilitator to score and comment upon your work in ink in the same fashion as a hard copy would be marked) and returned to you as an email attachment. Printed (not handwritten) copies of your work may be submitted according to the timetable in this syllabus; however, the electronic version will be the one used by the facilitator for grading purposes. The printed copy will serve as a backup only.

GRADE POINT EQUIVALENTS - Describe the point range for each letter grade.
A = 90-100
B = 80-89
C = 70-79
D = 60-69
F = 59-below

ATTENDANCE POLICY:

Absences and Tardiness – All students are required to attend the first session. Those who do not attend the first session will be automatically dropped from the course. Students with more than one absence will receive an "F" for the course. Since this class meets only five times, missing a single class meeting is equivalent to missing three weeks of a regular term. If you cannot attend a class you must let the instructor know via email as soon as possible. In case of absences you are responsible for obtaining all handouts and assignments. Tardiness may result in a deduction in your class participation grade. Excessive tardiness may count as an absence.

Participation – This course is not a lecture course. Each student, by their active involvement, will ensure a learning environment in which the instructor will serve as facilitator. Each of us, including the instructor, will learn from each other, expounding upon our experiences while building upon the foundation provided by the text. Everyone is a vital contributor to the process. Be prepared to be vocal while simultaneously being an attentive listener and conversationalist.

Late Assignments – No shows fail the assignment. It is expected that the students fulfill their assignments on the date they are scheduled to do so. Students with illness or other problems that prevent them from attending class on the day a presentation or written assignment is due must contact their instructors PRIOR to the deadline via Huntingdon College email with supporting documentation to request an extension or a make-up. In most cases, missed assignments are logistically difficult to make-up while maintaining the integrity of the module. In rare cases, approval to make-up an assignment may be granted at the discretion of the faculty member based on the seriousness of the circumstance and on the supporting evidence.
provided by the student. Contacting a fellow class member does not substitute for contacting the instructor.

**Accommodation of Special Needs** - Huntingdon College makes every reasonable accommodation for disabilities that have been processed and approved through our Disability Services Committee in accord with the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. In order to request disability-related services at Huntingdon College, students must self-identify to the Disabilities Intake Coordinator, Camilla Irvin, and provide appropriate and up-to-date documentation to verify their disability or special needs. After the accommodations have been approved by the Disability Services Committee, the 504 Coordinator, Dr. Lisa Olenik Dorman, will notify your professor(s) of the committee’s decision. If you have any questions regarding reasonable accommodation or need to request disability-related services, please contact Disability Services at (334) 833-4577 or e-mail at disabilityservices@huntingdon.edu.

**Academic Honesty** – Plagiarism is literary theft. Failure to cite the author of any language or of any ideas *which are not your own creation* is plagiarism. This includes any text you might paraphrase, as well. Anyone is capable of searching the Internet or any printed media; your research paper is intended to broaden your knowledge, stimulate your creativity, and make you think, analyze, and learn. It is not consistent with the College Honor Code, nor with scholarly expectations to submit work which is not the product of your own thinking and research. Severe penalties will result upon the submission of any work found to be plagiarized, including potential failure of the entire course. It is easy and simple to properly cite all sources used in your paper. Take no risks – cite your sources.

**Huntingdon College Library:** As an EB student you have access to the full-range of electronic resources provided by the Library of Huntingdon College. Your first step upon enrollment at Huntingdon should be to register for a library account. You can do this by going to the Library’s web site at http://library.huntingdon.edu/ and under “EB Services” complete the “Library Card Application” form and submit it. You will receive shortly your personal library account information, which will then allow you to access a variety of resources including databases. Should you ever have a problem accessing the Library’s electronic resources, please contact the Library (specifically, Systems Librarian Brenda Kerwin at bkerwin@huntingdon.edu <mailto:bkerwin@huntingdon.edu>).

* Among the Library’s electronic resources, you will find a number of databases specific to the area of business administration and its allied fields of study (e.g. databases within /EbscoHost/, /Gale/, and /ProQuest/, as well as /Oxford Journals/). You will also find databases that support your core courses in such fields as English, history, communications, the arts, and the sciences. You may be familiar with the AVL (the /Alabama Virtual Library/) and have your own AVL card. As a student at Huntingdon College, you no longer need to maintain your own AVL card, if you access the AVL through our web site. Simply click on “Campus &Library” rather than “Home Access” within the AVL. A few other mentions: /Countess/ is the name of the Library’s online catalogue and among its holdings you will find electronic books. If you want to know what full-text electronic journals are available to you through the Library’s databases, you can use the /Serials Solutions/ link on our web site. You can limit your search by discipline (such as “Business & Economic”). If you use Google for any of your research, we greatly encourage you to use /Google Scholar/ and /Google Books/. These features of Google will direct you to resources appropriate for academic research.*
Session Topics:

Session 1: Foundations of Environmental Science
What is Environmental Science? Chapter 1
Earth's Physical Systems/Geology/Atmosphere basics Chapter 2, 17
Evolution, Biodiversity & Population Ecology Chapter 3
Species Interactions and Community Ecology Chapter 4

Session 2: Big Picture Questions in Environmental Science
Environmental Systems and Ecosystem Ecology Chapter 5
Environmental Ethics and Economics Chapter 6
Environmental Policy Chapter 7

Session 3: Human Population and Food
Human Population (In class census activity and report) Chapter 8
Modern Agriculture (Where does our food come from?) Chapter 9
Is our modern food system sustainable? Chapter 10
Biodiversity and Conservation Biology Chapter 11

Session 4: Environments and Resources
Forests, Forest Management, and Protected Areas Chapter 12
Urban Environment and Sustainable Living Chapter 13
Freshwater Systems and Resources Chapter 15
Marine and Coastal Systems Chapter 16

Session 5: Human Impacts and Energy
Global Climate Change Chapter 18
Fossil Fuels and Energy Conservation Chapter 19
Energy Alternatives Chapter 20-21
Session 1: Foundations of Environmental Science

What is Environmental Science?  Chapter 1
Earth’s Physical Systems/Geology/Atmosphere basics  Chapter 2, 17
Evolution, Biodiversity & Population Ecology  Chapter 3
Species Interactions and Community Ecology  Chapter 4

Objective: To introduce environmental issues as interdisciplinary problems, and to explore the scientific basis for considering environmental science in general.

Assignments for Session 1 (complete prior to class session 1):

- READ Chapters 1, 2, 3, 4 and 17 in the text.
- SELECT a research paper topic from those listed at the end of this syllabus. WRITE a brief statement of your idea and SUBMIT it to the instructor at this session. REMEMBER: THIS PAPER IS A MAJOR COMPONENT OF YOUR GRADE! STRIVE FOR EXCELLENCE STARTING NOW.
- BRIEF ASSIGNMENT: Following the chapter outlines for the first three chapters is a list of questions titled “Session 1 Topics for Discussion.” After you’ve read the chapters, please select ANY ONE of these questions and provide a brief typed answer (no more than one page), and present it to the instructor at the beginning of class. Each week you will be asked to submit an assignment based on the reading; these assignments collectively count for 15% of your grade. For more information on these assignments, read the description under “Grading” near the end of this syllabus.

Topic Outcomes

Upon completion of Session 1, the student will be able to:

- Explain what science is, and explain how the process of science is used to understand environmental issues. Also, be able to list the benefits and limitations of the scientific method in environmental problem-solving.
- Understand the interdisciplinary nature of environmental science, and be able to predict and understand and predict the far-reaching implications of environmental issues.
- Understand how energy moves through ecosystems, and how the energy pyramid predicts the biomass at different trophic levels.
- Understand how materials (nutrients) move through ecosystems, and explain how humanity is affecting biogeochemical cycles.
- Understand the fundamentals of population growth, including the variables natality, mortality, and carrying capacity.
- Explain what exponential growth is, and list the kinds of factors that tend to limit growth in natural populations.
- Understand the causes and consequences of ozone depletion.

Session 1 Topics for Discussion:

- Why is it so hard to find solutions to environmental problems? Give an example, using an issue relevant to Alabama or the south.
- List some of the most common airborne pollutants, hazardous wastes, and solid wastes. For each that you listed, what is the difficulty with reducing this particular kind of waste? Is the problem political, economical, or other? What changes would be needed to reduce the pollutants?
- What causes ozone depletion, and what are the consequences of lower ozone levels?
- “Science should provide unbiased information, but individual scientists cannot advocate solutions to environmental problems.” Do you agree? Why or why not?
• “The energy pyramid explains why big fierce animals (e.g., tigers, bears, eagles) are rare.” How is this true?
• How is humanity influencing the carbon cycle, and what is the relevance of that influence?
• Natural populations rarely grow exponentially for long, but the human population is growing that way. What has caused/allowed this growth? Can this growth keep going on forever?
• What are ecosystems, and what is meant by an ecosystem approach to environmental problem-solving?

In advance of Session 2:
• READ Chapters 5, 6, and 7 in the text (some chapters may be read selectively; see outline in session 2 description).
• BRIEF ASSIGNMENT: Please type up a response (no more than one page) to one of the topics for discussion listed after the Session 2 reading outline.

Major Objectives and Topics
Class I
Chapter 1
• The meaning of the term environment
• The field and interdisciplinary nature of environmental science
• The importance of natural resources and ecosystem services
• The scientific method and the process of science
• Some pressures on the global environment
• Concepts of sustainability and sustainable development

Chapter 2
• The fundamentals of matter and chemistry
• Energy and energy flow
• Photosynthesis, respiration, and chemosynthesis
• Plate tectonics and the rock cycle
• Geologic hazards and ways to mitigate them

Chapter 17
• The Earth’s atmosphere
• Weather, climate, and atmospheric conditions
• Outdoor pollution and solutions
• Stratospheric ozone depletion
• Acidic deposition and consequences
• Indoor air pollution and solutions

Chapter 3
• Natural selection
• How evolution influences biodiversity
• Reasons for species extinction
• Ecological organization
• Population characteristics
• Population ecology
• Conserving biodiversity
Chapter 4
- Species interactions
- Feeding relationships, energy flow, trophic levels, and food webs
- Keystone species
- The process of succession
- Potential impacts of invasive species
- Restoration ecology
- Terrestrial biomes

Session 2: Big Picture Questions in Environmental Science
Environmental Systems and Ecosystem Ecology Chapter 5
Environmental Ethics and Economics Chapter 6
Environmental Policy Chapter 7

QUIZ: Chapters 1, 2, 3, 4, and 17 at the beginning of class.

Objective: To understand what science is and how science approaches environmental issues, and to understand the basic principles of economics and ethics and how they relate to environmental issues.

Assignments for Session 2 (complete prior to class session 2):
- READ Chapters 5, 6, and 7. In order to focus your learning and our class time, certain topics will be stressed and others de-emphasized; the reading outline below lists a few short sections of the required chapters that are de-emphasized.
- Spend quality time doing the necessary research for your paper topic so that you can begin to select and incorporate those resources you intend to use in writing the paper.
  DO NOT WAIT UNTIL THE LAST MINUTE TO WORK ON YOUR PAPER! ASK FOR HELP NOW IF YOU NEED IT.

Topic Outcomes
Upon completion of Session 2, the student will be able to:
- Understand the nature of ethics and its relationship to environmental issues.
- Understand the principles of risk and cost, as they relate to environmental issues, and understand the concept of sustainable development.
- Explain how all environmental issues are economic issues.
- Understand the status of the human population, including the raw numbers and rates of increase, as well as economic and political factors relevant in different regions of the world.
- Demonstrate familiarity with the branches of the U.S. government that deal with environmental issues, and understand the complex process by which new laws are made.

Session 2 Topics For Discussion:
- How does the field of ethics relate to the environment?
- What is the unique perspective of corporations on environmental issues, including: what are the major motivating forces of corporate management? How do decision-makers view the actions of corporations, and is that different than the way they view the actions of individuals?
- What are the roles of risk assessment and risk management in environmental issues?
Major Objectives and Topics

Class II

Chapter 5
- Environmental systems
- Ecosystems and their services
- How living and nonliving entities interact
- Landscape ecology, GIS and ecological modeling
- The water, carbon, nitrogen, and phosphorus cycles
- Human impacts on these cycles

Chapter 6
- Culture, worldviews, and choices
- Environmental ethics
- Economics and the environment
- Classical and neoclassical economics
- Economic growth, well-being, and sustainability
- Environmental and ecological economics

Chapter 7
- Environmental policies
- Major U.S. environmental laws
- Approaches to environmental policy
- The environmental policy process
- Science and policy
- International environmental policy

In advance of Session 3:
- READ Chapters 8, 9, 10 and 11 in the text.
- BRIEF ASSIGNMENT: Please type up a response (no more than one page) to one of the topics for discussion listed after the Session 3 reading outline.

Session 3: Human Population and Food

Human Population (In class census activity and report) Chapter 8
Modern Agriculture (Where does our food come from?) Chapter 9
Is our modern food system sustainable? Chapter 10
Biodiversity and Conservation Biology Chapter 11

QUIZ: Chapters 5, 6, and 7 at the beginning of class.

Assignments for Session 3 (complete prior to class session 3):
- READ Chapters 8, 9, 10 and 11, in the text.
- Spend some quality time developing your research topic and get your progress down on paper in rough-draft format. DON'T PROCRASTINATE! ASK FOR HELP NOW IF YOU NEED IT.
BIOL161-Environmental Science

Topic Outcomes
Upon completion of Session 3, the student will be able to:

- Understand what biodiversity is, and discuss the material and esthetic benefits of biodiversity.
- Understand the ecological and policy surrounding biodiversity management.
- Understand the principles of human population growth and the demographic transition model
- Understand the principles and practices of agriculture, and their changes over time
- Understand how sustainable agriculture will be distinct from current methods

Session 3 Topics for Discussion:

- What is biodiversity, and what are the different ways that biodiversity can be said to have "value"? Which biodiversity value is most important to you?
- List some federally protected species in the United States; what are the biological, political, social, and/or economic issues relating to the recovery of those species?
- Some countries have a high rate of population growth, and others have a low rate. What are the social and economic factors that are correlated with high growth?
- What is the demographic transition model? When is it likely to describe population trends? When is it not likely to describe population trends?
- In what ways are agricultural methods not sustainable? Why is this a problem?
- What changes could/should be made to convert to sustainable agriculture? What are the drawbacks in making these changes? What are the advantages?

Major Objectives and Topics
Class III
Chapter 8
- Human population growth
- Different viewpoints on this growth
- Population, affluence, and technology's effects
- Demography
- Demographic transition
- Factors affecting population growth
- The HIV/AIDS epidemic
- Population and sustainable development

Chapter 9
- The relationship between soils and agriculture
- Major agricultural developments
- The fundamentals of soil science
- Causes and consequences of soil erosion and degradation
- Soil conservation: principles, solutions, and policies

Chapter 10
- Challenges of feeding a growing human population
- The Green Revolution
- Preserving crop diversity
- Strategies of pest management
- Pollination
- Genetically modified food
BIOL161-Environmental Science

11

- Feedlot agriculture
- Aquaculture
- Sustainable agriculture

Chapter 11
- The scope of Earth’s biodiversity
- Background extinction rates and mass extinctions
- Causes of biodiversity loss
- The benefits of biodiversity
- Conservation biology
- Conservation of species
- Conservation above the species level

In advance of Session 4:
- READ Chapters 12, 13, 15, and 16 in the text.
- BRIEF ASSIGNMENT: Please type up a response (no more than one page) to one of the topics for discussion listed after the Session 4 reading outline.

Session 4: Environments and Resources
Forrests, Forest Management, and Protected Areas Chapter 12
Urban Environment and Sustainable Living Chapter 13
Freshwater Systems and Resources Chapter 15
Marine and Coastal Systems Chapter 16

QUIZ: Chapters 8, 9, and 10 at the beginning of class.

Assignments for Session Four (complete prior to class session 4):
- READ Chapters 12, 13, 15, and 16 in the text.
- Add final touches to your research paper. TIME IS RUNNING OUT! PAPERS MUST BE TURNED IN AT THE NEXT SESSION!

Topic Outcomes
Upon completion of Session 4, the student will be able to:
- Understand the challenges (and possible solutions) of proper management of forests.
- Understand the challenges (and possible solutions) of proper management of cities.
- Understand the challenges (and possible solutions) of proper management of freshwater.
- Understand the challenges (and possible solutions) of proper management of salt water.
- Be able to list specific pollution threats in different categories: air pollution, hazardous waste, and solid waste.

Session 4 Topics for Discussion:
- List some examples of good land use (efficient, safe, promoting good quality of life) that you are familiar with, in your travels; list some examples of poor land use (inefficient, risk-prone, not promoting a good quality of life) that you are familiar with.
- How would some ideas from Chapter 13 (Urban Planning) be applied to the rebuilding of New Orleans in the wake of Hurricane Katrina?
- List one potential threat to the freshwater resources of the southeast; list one potential threat to the marine resources of the southeast.
Major Objectives and Topics
Class IV
Chapter 12
- Ecological and economic contributions of forests
- History and scale of deforestation
- Forest management and harvest methods
- Major federal land management agencies
- Types and design of protected areas

Chapter 13
- The scale of urbanization
- Urban and suburban sprawl
- Planning and land use strategies
- Transportation options
- The role of urban parks
- Impacts and advantages of urban centers
- Urban ecology, green building, sustainable cities

Chapter 15
- Water’s importance to people and ecosystems
- Water’s distribution
- Use and alteration of freshwater systems
- Problems of water supply and solutions
- Problems of water quality and solutions
- How wastewater is treated

Chapter 16
- The marine environment
- Ocean-climate relationships
- Marine ecosystems
- Marine pollution
- The state of ocean fisheries
- Marine protected areas and reserves

In advance of Session 5:
- READ Chapters 18, 19, 20, and 21 in the text.
- PAPERS MUST BE TURNED IN NEXT WEEK!
- BRIEF ASSIGNMENT: Please type up a response (no more than one page) to one of the topics for discussion listed after the Session 5 reading outline.

Session 5: Human Impacts and Energy
Global Climate Change Chapter 18
Fossil Fuels and Energy Conservation Chapter 19
Energy Alternatives Chapter 20-21

QUIZ: Chapters 12, 13, 15, and 16 at the beginning of class.

Objective: To explore the threat of climate change, and to understand the uses and problems of energy

Assignments for Session 5 (complete prior to class session five):
- READ Chapters 18, 19, 20, and 21 in the text.
- PAPERS MUST BE TURNED IN AT THIS SESSION!
Topic Outcomes

Upon completion of Session 5, the student will be able to:

- Understand the causes, consequences, and politics of climate change.
- Understand the interaction of geopolitics with environmental issues.
- Compare the costs and benefits of the three kinds of fossil fuels.
- Compare the benefits and limitations of the many kinds of renewable energy sources.
- Understand the nature of nuclear energy, and the political and environmental costs and benefits associated with its use.

Session 5 Topics for Discussion:

- How certain are scientists that climate change is happening? Many people in the U.S. believe that climate change is not happening and that scientists are just alarmists; do you agree?
- Some scientists list climate change as among the most (if not the most) dire environmental problems. Do you agree? If not, what problem do you think is more critical?
- Globally, what do you think are humanity’s biggest environmental challenges in the next century? Closer to home, what do you think are the United States’ biggest environmental challenges in the next century?
- Do you think the United States should get more energy from dams (hydropower), or should we be actively reducing the number of dams in the country? Why?
- “The ubiquitous nature of the automobile has not only dictated our energy dependency, but has also dictated our city design.” In what ways is this statement right, and in what ways is it oversimplistic?
- Everyone is talking about the need to wean ourselves from our dependence on foreign oil, but finding a replacement isn’t easy. What, in your opinion, are the best replacements we should be using? Which energy source(s) do you think are most likely to be used in the future?
- Should we drill for oil in the Arctic National Wildlife Refuge?
- Some environmentalists love nuclear energy; other environmentalists hate it. Explain why. Do you think nuclear energy is a good idea, or not, and on what do you base your opinion?

Major Objectives and Topics

Class V

Chapter 18
- The Earth’s climate system
- Human influences on the atmosphere and climate
- Methods of climate research
- Impacts of global climate change
- Ways we can respond to climate change

Chapter 19
- Our energy sources
- Coal
- Natural gas
- Crude oil
• Alternative fossil fuels
• Environmental impacts of fossil fuels
• Political, social, and economic aspects
• Conserving energy and enhancing efficiency

Chapter 20
• Reasons for seeking alternative fuels
• Contributions to world energy by alternative fuels
• Nuclear energy
• The social debate over nuclear power
• Bioenergy
• Hydroelectric power

Chapter 21
• The major sources of renewable energy
• Solar energy
• Wind energy
• Geothermal energy
• Ocean energy
• Hydrogen fuel cells