

Huntingdon College
Adult Degree Completion Program

COURSE NUMBER: BIOL161
COURSE NAME: Environmental Science
Spring 2009, Session II, Brewton

INSTRUCTOR'S NAME: Dr. Lyndell Gill

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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

TEXT REQUIRED: Enger and Smith, Environmental Science: A Study of Interrelationships, McGraw-Hill. (see **Huntingdon College booklist for edition and ISBN**)

COURSE LEARNING OUTCOMES: At the end of the course, it is expected that you will:

1. be familiar with the main environmental problems of the day;
2. be familiar with the methods of science as they apply to environmental issues (including data collection, quantitative methods, publications and peer review);
3. understand basic concepts of ecology, physics, and chemistry as they apply to environmental issues;
4. be able to discuss and make informed decisions on topics such as: human population growth; energy sources and consumption; the current status of biodiversity; and air pollution and the potential for climate change.

COURSE ASSIGNMENTS & GRADING CRITERIA:

One **QUIZ** each class period for a total of **five** quizzes. Quiz scores will be averaged and will be equivalent to **65%** 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 **10%** 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 **25%** 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 11-point business-acceptable typeface (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. The Kyoto Protocol on Greenhouse Emissions: Current Status and Evaluation
4. Should We Drill For Oil in the Arctic National Wildlife Refuge?
5. A Comparative Assessment of Alternative (Non-Fossil Fuel) Energy Sources for the Future
6. Green Business: Do Pro-Environmental Businesses Fare Better?
7. Environmental Priorities for Developing Countries in the next 20 Years
8. Habitat Protection and Management in the Southeastern U.S.: A Job Well Done?
9. The Role of the Private Sector in Biodiversity Protection
10. Nuclear Power: Environmental Savior, or Threat?
11. Invasive and Exotic Species: A Summary of Their Threat to the Southeastern U.S.
12. A Comparison of the Environmental Policies of two Recent Presidents (your choice)
13. Climate Change: An Assessment of the Controversy and the Reality
14. 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.

Miscellaneous matters:

USE the Web resources available through your text (www.mhhe.com/enger10e) to intensify your learning experience. Although not required for your grade, it would be prudent of you to spend some time working with these online resources.

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 – Explain whether late assignments will be accepted and what penalty might be imposed if the assignment is late. Also specify what assignments can be turned in late. This will allow the student to make informed decisions.

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, 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) 833-4432 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.

Session Topics:

Session 1: Text chapters 1, 2, and 3 – Environmental Science in a Social Context

Session 2: Text chapters 4, 5, 7, and 8 – Ecological Principles and Their Application

Session 3: Text chapters 9, 10, and 11 – Energy

Session 4: Text chapters 12, 13, and 16 – Resource Management

Session 5: Text chapters 17, 18, 19, and 20 – Pollution and Policy

Class Session 1: *Environmental Science in a Social Context*

Objective: To introduce environmental issues as interdisciplinary problems, and to explore the ethical and economic aspects of environmental issues.

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

- READ Chapters 1, 2 and 3 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 10% 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:

- Understand the interdisciplinary nature of environmental science, and be able to predict and understand and predict the far-reaching implications of environmental issues.
- 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.

QUIZ: Short-answer test on chapters 1, 2, and 3 at end of class.

Outline of material to be covered during session one (Based on chapter outlines; instructor may use discretion in deleting or expanding some sections):

Chapter 1

- A. The Field of Environmental Science
- B. The Interrelatedness of Environmental Problems
- C. An Ecosystem Approach
- D. Regional Environmental Concerns
 - 1. The Wilderness North
 - 2. The Agricultural Middle
 - 3. The Dry West
 - 4. The Forested West
 - 5. The Great Lakes and Industrial Northeast
 - 6. The Diverse South

Chapter 2

- A. Views of Nature
- B. Environmental Ethics
- C. Environmental Attitudes
- D. Societal Environmental Ethics
- E. Corporate Environmental Ethics
- F. Environmental Justice
- G. Individual Environmental Ethics
- H. Do We Consume Too Much?
 - 1. Food
 - 2. Nature
 - 3. Oil
 - 4. Water
 - 5. The Unknown
- I. Global Environmental Ethics

Chapter 3

- A. Risk and Economics
- B. Characterizing Risk
 - 1. Risk Assessment
 - 2. Risk Management
 - 3. True and Perceived Risks
- C. Economics in an Environmental Context
 - 1. Resources
 - 2. Supply and Demand
 - 3. Assigning Value to Natural Resources
 - 4. Kinds of Environmental Costs
 - 5. Cost-Benefit Analysis
 - 6. Concerns about Cost-Benefit Analysis
 - 7. Comparing Economic and Ecological Systems
 - 8. Common Property Resource Problems – The Tragedy of the Commons
- D. Using Economic Tools to Address Environmental Issues
 - 1. Subsidies
 - 2. Market-based instruments
 - 3. Life Cycle Analysis and Extended Product Responsibility
- E. Economics and Sustainable Development

F. Economics, Environment, and Developing Nations

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.
- What are ecosystems, and what is meant by an ecosystem approach to environmental problem-solving?
- 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?
- What is a Tragedy of the Commons? Give a thorough description of a modern example of a tragedy of the commons.
- List some economic tools that have been used to address environmental problems in the U.S.
- List some economic problems relevant to finding environmental solutions in developing nations.

In advance of Session 2:

- READ Chapters 4, 5, 7, and 8 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.

Class Session 2: *Ecological Principles and Their Application*

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

Assignments for Session 2 (complete *prior* to class session 2):

- READ Chapters 4, 5, 7, and 8. 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:

- 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 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 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.

QUIZ: Short-answer test on Chapters 4, 5, 7 and 8 at end of class.

Outline of material to be covered during session two (Based on chapter outlines; instructor may use discretion in deleting or expanding some sections):

Chapter 4

- A. Scientific Thinking
 1. The Scientific Method
 2. Observation
 3. Questioning and Exploring
 4. Constructing Hypotheses
 5. Testing Hypotheses
 6. The Development of Theories and Laws
- B. Limitations of Science
- C. The Structure of Matter, deleted from reading
- D. Energy Principles
 1. Kinds of Energy
 2. States of Matter
 3. First and Second Laws of Thermodynamics
- E. Environmental Implications of Energy Flow

Chapter 5

- A. Ecological Concepts
 1. Environment
 2. Limiting Factors
 3. Habitat and Niche
- B. The Role of Natural Selection and Evolution
 1. Genes, Populations, and Species
 2. Natural Selection
 3. Evolutionary Patterns
- C. Kinds of Organism Interactions, deleted from reading
- D. Community and Ecosystem Interactions
 1. Major Roles of Organisms in Ecosystems
 2. Keystone Species
 3. Energy Flow Through Ecosystems
 4. Food Chains and Food Webs
 5. Nutrient Cycles in Ecosystems – Biogeochemical Cycles
 6. Human Impact on Nutrient Cycles

Chapter 6

This chapter may be assigned at the discretion of the instructor

Chapter 7

- A. Population Characteristics
 - 1. Natality and Mortality
 - 2. Sex Ratio and Age Distribution
 - 3. Population Density and Spatial Distribution
 - 4. Summary of Factors That Influence Population Growth Rates
- B. A Population Growth Curve
- C. Carrying Capacity
- D. Reproductive Strategies and Population Fluctuations, deleted from reading
- E. Human Population Growth
 - 1. Available Raw Materials
 - 2. Available Energy
 - 3. Waste Disposal
 - 4. Interaction with Other Organisms
 - 5. Social Factors Influence Human Population
 - 6. Ultimate Size Limitation

Chapter 8

- A. World Population Characteristics and Implications
- B. Factors That Influence Population Growth
 - 1. Biological Factors
 - 2. Social Factors
 - 3. Political Factors
- C. Population Growth and Standard of Living
- D. Population and Poverty – A Vicious Cycle?
- E. Hunger, Food Production, and Environmental Degradation
- F. The Demographic Transition Concept
- G. The U.S. Population Picture
- H. Likely Consequences of Continued Population Growth

Session 2 Topics For Discussion:

- “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?
- 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?

In advance of Session 3:

- READ Chapters 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.

Class Session 3: *Energy*

Objective: This session will introduce the sources of energy and explore the costs and benefits of each different source.

Assignments for Session 3 (complete *prior* to class session 3):

- READ Chapters 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.**

Topic Outcomes

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

- Explain the general history, economy, and politics of energy production and use.
- 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.

QUIZ: Short-answer test on Chapters 9, 10, and 11 at end of class.

Outline of material to be covered during session three (Based on chapter outlines; instructor may use discretion in deleting or expanding some sections):

Chapter 9

- A. History of Energy Consumption
 1. Biological Energy
 2. Increased Use of Wood
 3. Fossil Fuels and the Industrial Revolution
 4. The Role of the Automobile
 5. Growth in the Use of Natural Gas
- B. How Energy is Used
 1. Residential and Commercial Energy Use
 2. Industrial Energy Use
 3. Transportation Energy Use
- C. Electrical Energy
- D. The Economics and Politics of Energy Use
 1. Fuel Economy and Government Policy
 2. The Importance of OPEC
- E. Energy Consumption Trends
 1. Growth in Energy Use
 2. Available Energy Sources
 3. Political and Economic Factors

Chapter 10

- A. Energy Sources
- B. Resources and Reserves
- C. Fossil-Fuel Formation
 1. Coal
 2. Oil and Natural Gas
- D. Issues Related to the Use of Fossil Fuels

1. Coal Use
 2. Oil Use
 3. The Arctic National Wildlife Refuge and Oil
 4. Natural Gas Use
- E. Renewable Sources of Energy
1. Hydroelectric Power
 2. Tidal Power
 3. Geothermal Power
 4. Wind Power
 5. Solar Energy
 6. Biomass Conversion
 7. Fuelwood
 8. Solid Waste
- F. Energy Conservation
1. The Hydrogen Economy

Chapter 11

- A. The Nature of Nuclear Energy
- B. The History of Nuclear Energy Development
- C. Nuclear Fission Reactors
1. Plans for New Reactors Worldwide
 2. Plant Life Extension
- D. Investigating Nuclear Alternatives
1. Breeder Reactors
 2. Nuclear Fusion
- E. The Nuclear Life Cycle
- F. Nuclear Material and Weapons Production
- G. Nuclear Power Concerns
1. Reactor Safety
 2. Exposure to Radiation
 3. Thermal Pollution
 4. Decommissioning Costs
 5. Radioactive Waste Disposal
- H. The Politics of Nuclear Power
1. Developments in Asia

Session 3 Topics for Discussion:

- “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?

In advance of Session 4:

- READ Chapters 12, 13, 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.

Class Session 4: Resource Management

Objective: To understand the issues surrounding biodiversity, and the management of land and water resources.

Assignments for Session Four (complete *prior* to class session 4):

- READ Chapters 12, 13, 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 what biodiversity is, and discuss the material and esthetic benefits of biodiversity.
- Understand the ecological and policy surrounding biodiversity management.
- Understand the challenges (and possible solutions) of proper management of land.
- Understand the challenges (and possible solutions) of proper management of water.

QUIZ: Short-answer test on Chapters 12, 13 and 16 at end of class.

Outline of material to be covered during session four (Based on chapter outlines; instructor may use discretion in deleting or expanding some sections):

Chapter 12

- A. Biodiversity Loss and Extinction
 1. Causes of Extinction
 2. Extinction as a Result of Human Activity
- B. Describing Biodiversity
 1. Genetic Diversity
 2. Species Diversity
 3. Ecosystem Diversity
- C. The Value of Biodiversity
 1. Biological and Ecosystem Services Values
 2. Direct Economic Values
 3. Ethical Values
- D. Threats to Biodiversity
 1. Habitat Loss
 2. Overexploitation
 3. Introduction of Exotic Species
 4. Control of Pest Organisms
- E. What is Being Done to Protect Biodiversity?
 1. Legal Protection
 2. Sustainable Management of Wildlife Populations
 3. Sustainable Management of Fish Populations

Chapter 13

- A. The Need for Planning
- B. Historical Forces That Shaped Land Use in North America
 - 1. The Importance of Waterways
 - 2. The Rural-to-Urban Shift
- C. Migration from the Central City to the Suburbs
- D. Factors That Contribute to Sprawl
 - 1. Lifestyle Factors
 - 2. Economic Factors
 - 3. Planning and Policy Factors
- E. Problems Associated with Unplanned Urban Growth
 - 1. Transportation
 - 2. Air Pollution
 - 3. Low Energy Efficiency
 - 4. Loss of Sense of Community
 - 5. Death of the Central City
 - 6. Higher Infrastructure Costs
 - 7. Loss of Open Space
 - 8. Loss of Farmland
 - 9. Water Pollution Problems
 - 10. Floodplain Problems
 - 11. Wetlands Misuse
 - 12. Other Land-Use Considerations
- F. Land-Use Planning Principles
- G. Mechanisms for Implementing Land-Use Plans
 - 1. Establishing State or Regional Planning Agencies
 - 2. Purchasing Land or Use Rights
 - 3. Regulating Use
- H. Special Urban Planning Issues
 - 1. Urban Transportation Planning
 - 2. Urban Recreation Planning
 - 3. Redevelopment of Inner-City Areas
 - 4. Smart Growth
- I. Federal Government Land-Use Issues

Chapter 16

- A. The Water Issue
- B. The Hydrologic Cycle
- C. Human Influences on the Hydrologic Cycle
- D. Kinds of Water Use
 - 1. Domestic Use of Water
 - 2. Agricultural Use of Water
 - 3. Industrial Use of Water
 - 4. In-Stream Use of Water
- E. Kinds and Sources of Water Pollution
 - 1. Municipal Water Pollution
 - 2. Agricultural Water Pollution
 - 3. Industrial Water Pollution
 - 4. Thermal Pollution
 - 5. marine Oil Pollution
 - 6. Groundwater Pollution

F. Water-Use Planning Issues

1. Water Diversion
2. Wastewater Treatment
3. Salinization
4. Groundwater Mining
5. Preserving Scenic Water Areas and Wildlife Habitats

Session 4 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?
- 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 (Land-Use 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.
- 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?

In advance of Session 5:

- READ Chapters 17, 18, 19, and 20 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.

Class Session 5: Pollution and Policy

Objective: To explore the threats of pollution, to understand the nature of climate change, and to understand the political underpinnings of environmental issues.

Assignments for Session 5 (complete *prior* to class session five):

- READ Chapters 17, 18, 19, and 20 in the text.
- **PAPERS MUST BE TURNED IN AT THIS SESSION!**

Topic Outcomes

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

- Be able to list specific pollution threats in different categories: air pollution, hazardous waste, and solid waste.
- Understand the causes and consequences of ozone depletion.
- Understand the causes, consequences, and politics of climate change.
- Understand the interaction of geopolitics with environmental issues.
- 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.

QUIZ: Short-answer test on Chapters 17, 18, 19, and 20 at end of class.

Outline of material to be covered during session five (Based on chapter outlines; instructor may use discretion in deleting or expanding some sections):

Chapter 17

- A. The Atmosphere
- B. Pollution of the Atmosphere
- C. Categories of Air Pollutants
 - 1. Carbon Monoxide
 - 2. Particulate Matter
 - 3. Sulfur Dioxide
 - 4. Nitrogen Dioxide
 - 5. Lead
 - 6. Volatile Organic Compounds
 - 7. Ground-Level Ozone and Photochemical Smog
 - 8. Hazardous Air Pollutants
- D. Control of Air Pollution
 - 1. Motor Vehicle Emissions
 - 2. Particulate Matter Emissions
 - 3. Power Plant Emissions
 - 4. The Clean Air Act
- E. Acid Deposition
- F. Ozone Depletion
- G. Global Warming and Climate Change
 - 1. Causes of Global Warming and Climate Change
 - 2. Potential Consequences of Global Warming and Climate Change
- H. Addressing Climate Change
 - 1. Energy Efficiency
 - 2. The Role of Biomass
 - 3. Political and Economic Forces
- I. Indoor Air Pollution

Chapter 18

- A. Kinds of Solid Waste
- B. Municipal Solid Waste
- C. Methods of Waste Disposal
 - 1. Landfills
 - 2. Incineration
 - 3. Producing Mulch and Compost
 - 4. Source Reduction
 - 5. Recycling

Chapter 19

- A. Hazardous and Toxic Materials in Our Environment
- B. Hazardous and Toxic Substances – Some Definitions
- C. Defining Hazardous Waste
- D. Issues Involved in Setting Regulations
 - 1. Identification of Hazardous and Toxic Materials
 - 2. Setting Exposure Limits
 - 3. Acute and Chronic Toxicity
 - 4. Synergism

5. Persistent and Nonpersistent Pollutants
- E. Environmental Problems Caused by Hazardous Wastes
- F. Health Risks Associated with Hazardous Wastes
- G. Hazardous-Waste Dumps – A Legacy of Abuse
 1. Toxic Chemical Releases
- H. Hazardous-Waste Management Choices
 1. Reducing the Amount of Waste at the Source
 2. Recycling Wastes
 3. Treating Wastes
 4. Disposal Methods
- I. International Trade in Hazardous Wastes
- J. Hazardous-Waste Management Program Evolution

Chapter 20

- A. New Challenges for a New Century
 1. Governance and Government
 2. Learning from the Past
 3. Thinking About the Future
 4. Defining the Future
- B. The Development of Environmental Policy in the United States
 1. The Changing Nature of Environmental Policy
- C. Environmental Policy and Regulation
- D. The Greening of Geopolitics
- E. Terrorism and the Environment
- F. International Environmental Policy
 1. Earth Summit on Environment and Development
 2. Environmental Policy and the European Union
 3. New International Instruments
- G. It All Comes Back to *You*

Session 5 Topics for Discussion:

- 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?
- 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?
- What branches of the federal government deal with environmental issues?
- 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?