

◀ ENVIRONMENTAL ETHICS ▶



Examining Your Connection
to the Environment
and Your Community



Educator Guide

The Goldman
Environmental
Prize



ENVIRONMENTAL ETHICS

Examining Your Connection
to the Environment
and Your Community.

EDUCATOR GUIDE

© 2005 The Goldman Environmental Prize & The Video Project

Distributed by:



1-800-4-PLANET
www.videoproject.com



**For more information about
ENVIRONMENTAL ETHICS:
EXAMINING YOUR CONNECTION TO THE ENVIRONMENT AND YOUR COMMUNITY,
visit:
www.envethics.org**

Or contact:

**The Video Project
Phone: (415) 241-2514
Fax: (415) 241-2511**

www.videoproject.com

**The Goldman 
Environmental
Prize**

**For more information about the
Goldman Environmental Prize,
visit:
www.goldmanprize.org**

ACKNOWLEDGMENTS

The Goldman Environmental Prize thanks those who developed this curriculum:

Project Leaders:

Dr. Albert Jonsen, Professor Emeritus of Ethics in Medicine, University of Washington School of Medicine

Dr. Stephen Kellert, Tweedy Ordway Professor of Social Ecology, Yale University, School of Forestry and Environmental Studies

Curriculum Writers:

William Finnegan, Tamarack Media

Elizabeth Allison, Ph.D. Candidate, University of California, Berkeley

Nicole Ardoin, Ph.D. Candidate, Yale University, School of Forestry and Environmental Studies

Additional Curriculum Development:

Bay Breeze Educational Resources

EDUCATOR GUIDE: Table of Contents

Overview.....	5
Teacher Tips.....	9
Introduction to Environmental Ethics and the Eco-Ethical Mountain.....	11
Introduction Worksheets	13
Vocabulary Organizer	13
Debating the Environment.....	21
Wildlife.....	22
Wildlife Worksheets	31
Wilderness Journal Prompts	31
Wilderness Journal Template	32
The Great Elephant Debate Cards	33
Forests	34
Forest Worksheets	42
Excerpt from "Work, Worship and the Natural World"	42
Forest for Sale.....	43
Forest for Sale Decision-Making Organizer	44
Water	45
Water Worksheets	47
KWL Chart	47
Keep a Water Diary	54
Seafood Sleuthing	56
Air	57
Air Worksheets	59

Double Entry Journal	59
Individuals Count	67
Considering the Ethical Principle of "Duty"	69
Minerals.....	70
Minerals Worksheets	78
Enviro-Mines: The Wave of the Future?	78
Story Board Template.....	79
Extention Activities	80
Conclusion: Thinking Like a Mountain	82
Conclusion Worksheets	89
Wetland Wonderland Organizer	89
Internet Resources	90
Glossary.....	93
Education Standards.....	98

OVERVIEW

Environmental Ethics offers you an exciting opportunity. You will meet people from around the world who have shown initiative and courage for a cause: protecting the environment. This is a course about environmental ethics. This may be a new idea to you, but it relates to everybody and each decision we make. In short, environmental ethics relates to how people should act to use, protect, and improve the natural world in which we live.

In each of the environmental ethics lessons, you'll explore a different natural resource, including wildlife, forests, water, air, and minerals. You'll watch video profiles about people who felt an ethical responsibility to preserve their environments. The multimedia curriculum is built around a set of video profiles of the winners of the Goldman Environmental Prize (www.goldmanprize.org), which is awarded each year to significant and sustained grassroots efforts to preserve the natural environment. The curriculum consists of a series of lesson plans, videos, and activities that may be used in high school science, geography, English/language arts, social science, environmental science, media literacy, or current events courses to help students explore environmental ethics.

Key Components

Environmental Ethics consists of the following components:

- Educator Guide
- Student Workbook
- Video / DVD
- Environmental Ethics Network, an interactive online community for educators and students located at www.envethics.org

Educator Guide

The Educator Guide includes an introduction, five lesson plans, background information for teachers, teacher tips, templates, extension suggestions, appendices with a list of suggested resources, a glossary, and a conclusion.

Introduction

The introduction presents the fundamental concepts of ethics, environment, and environmental ethics. A way of approaching ethical problems is presented in the form of the Eco-Ethical Mountain. This mountain shows that any problem in environmental ethics requires the following components:

- 1) Appreciation: the values associated with the natural resource that is under discussion
- 2) Ecology: an understanding of the scientific issues involved
- 3) Responsibility: three ethical principles that help frame the ethical nature of the problem.

The ethical principles that have been chosen for this curriculum are utility, duty, and justice. These ethical principles are applicable to each one of the five issues discussed. They are, however, given particular prominence in certain issues where they seem particularly applicable to the issue under discussion.

Lesson Plans

Each of the five lessons explores a serious environmental issue. The lessons in this guide include the following:

- 1) Wildlife conservation
- 2) Forest preservation
- 3) Water use
- 4) Clean-air protection
- 5) Mineral extraction

The lesson plans involve one 50-minute class period each for classroom lecture, video viewing, and discussion, and it is recommended that additional class periods be used for the activities.

Each lesson plan explains the ecology of the problem and discusses the ethical principles, with an emphasis on the ethical principles that are most suited to the problem. Three Goldman Environmental Prize winners are featured in each lesson. These profiles of environmental heroes provide real-life examples of environmental ethics at work. The highlighted Goldman Prize winners—some of whom come from cultures and situations very different from our own—attempt to explain the way they value the environment and how they see their actions as ethical, or right and good.

Each lesson plan contains the following elements:

- Purpose
- Overview
- Key Concepts
- Vocabulary
- Time
- Video Segments
- Key Teaching Points
- Activities
- Education Standards

The lessons are designed as a sequence that develops the ideas in a systematic way. It is also possible, however, to use the lessons selectively. For example, rather than working through a systematic curriculum in environmental ethics, a teacher of biology or social studies may select one or two issues that might meet the needs of the class. It is recommended that the introduction be used, since it presents the fundamental notions of environmental science and environmental ethics. It may be helpful to review the key points presented in the introductory activity in advance of starting with one of the issue-based lessons.

Each lesson plan includes activity suggestions. While most of these activities can be pursued in class, each lesson also has an activity designated as "In Your Community," which aims to get students out of the classroom to investigate and contemplate environmental ethics in a real-world context.

The Educator Guide also contains a section entitled "Extension Suggestions" that provides teachers with ideas for extending the educational concepts in diverse ways. Teaching Tips are included to help teachers use the *Environmental Ethics* most effectively.

Conclusion

The Conclusion section of the curriculum provides a summary of environmental ethics. Aldo Leopold, one of the pioneers of environmental ethics came to view any ecosystem—like a mountain—less as a random collection of dead rocks and soil disconnected from the surrounding plants and animals, and more as living and non-living materials bound together in a mutually dependent flow of energy and resources. Leopold called this ecological and ethical understanding "thinking like a mountain." The image of the mountain also reminds us that, like any mountain, the mountain's peak is only as strong and secure as its base.

Student Workbook

The Student Workbook contains text that explains the major ideas and the video profiles. It also includes readings that can be assigned as homework or read aloud in class, depending on the class format and time constraints. The Student Workbook is designed as a companion to the curriculum. It provides an effective learning framework to help students develop their understanding of environmental ethics. Copies of all activities, worksheets, and templates are included in the Student Workbook.

Video / DVD

The Goldman video profiles focus on the inspiring, true stories of people who felt a responsibility to take action on behalf of the environment. The video profiles are designed to be used in conjunction with the readings, discussions, and activities, and provide students with a unique opportunity to explore and clarify their own ethical stance on challenging issues. Three video profiles accompany each lesson. (Introduction and Conclusion have one profile.) The profiles average three or four minutes.

The videos tell the stories of amazing people who often started out as ordinary citizens, but who became motivated to make an extraordinary difference. The people in these videos have won awards for actions that are perceived as being heroic. They may seem very different from you and your students—many of them are from far-off countries, and each of them has been caught up in dramatic conflicts. But it is important to remember that they are just normal people—people who learned about an environmental situation that they thought was wrong and took actions that they believed were right.

Our goal is for students to gain an understanding of environmental ethics, and to foster an awareness of the role an individual can play in changing the world. *Environmental Ethics* can provide students with thoughtful opportunities to learn more about themselves, the environment, and the importance of caring for the Earth.

You will be using the *Environmental Ethics* in varied ways in your classrooms. Teacher Tips have been included to provide you with sources, background information, strategies, and ideas that may be helpful to you as you implement the different lesson plans and activities.

Environmental Ethics Network – www.envethics.org

The Environmental Ethics Network was created specifically to support educators and students using this curriculum. Visit the Network to connect with other educators and students, showcase the work of your classes, get support in teaching *Environmental Ethics*, and access additional resources, including links to websites focused on how resource management industries view the issues discussed in this curriculum.

TEACHER TIPS

For Effective Implementation of *Environmental Ethics*

Maps

The Goldman Environmental Prize winners come from diverse places around the globe. It will help your students to use a map to locate the different countries they will be learning about as they watch the videos. Three excellent online resources for maps can be found at the following websites:

- CIA World Factbook
www.cia.gov/cia/publications/factbook
- American Memory
<http://memory.loc.gov/ammem/gmdhtml/gmdhome.html>
- United Nations Cartographic Section
<http://www.un.org/Depts/Cartographic/english/htmain.htm>

Vocabulary

Environmental Ethics contains a wide variety of new vocabulary that may be challenging for high school students. It is important to introduce the vocabulary and concept to the class prior to beginning the activities. The Student Workbook contains a glossary. You may also wish to visit the following websites that contain information about effective vocabulary instruction for students in grades 9-12:

- Vocabulary Strategies
<http://litsite.alaska.edu/uaa/workbooks/readingvocabulary.html>
- Vocabulary & Comprehension
http://www.readingonline.org/articles/art_index.asp?HREF=curtis/index.html
- Word Walls for Secondary Classrooms
<http://www.curriculum.org/tcf/teachers/projects/wordwalls.shtml>

Reading Comprehension Strategies

Environmental Ethics contains a Student Workbook with varied reading materials. These materials may be assigned before viewing the film, after viewing the film, or as homework. Since many of the ideas introduced are complex, it can be helpful to use strategies such as Graphic Organizers or K-W-L Charts to help students organize and process information and enhance comprehension.

A Graphic Organizer is a visual/spatial representation of information. The following websites contain examples of graphic organizers:

- <http://www.cast.org/ncac/index.cfm?i=3015#vocabulary>
- <http://www.ncrel.org/sdrs/areas/issues/students/learning/lr2grap.htm>

A K-W-L Chart helps students activate prior knowledge on a topic, focus on what they want to know more about, and synthesize what they have learned. An excellent website that describes K-W-L Charts may be found at

- <http://www.ncrel.org/sdrs/areas/issues/students/learning/lr2kwl.htm>

Journal Writing

An important part of *Environmental Ethics* involves encouraging students to make connections between their own lives and what they are learning. You may wish to have your students keep an ongoing journal to record current events and examples in their own lives and communities that relate to this quote from the video: "Why should we care? Maybe it's because, of all the species that share this world, we're the only ones with the power to protect the entire planet, the only one with the power to protect every species on Earth...including ourselves. Every species is here for a purpose and each of us has a part to play."



INTRODUCTION TO ENVIRONMENTAL ETHICS AND THE ECO-ETHICAL MOUNTAIN

Purpose: The purpose of this lesson is to introduce students to environmental ethics and the Eco-Ethical Mountain, and to apply this knowledge to community environmental issues.

Overview: Environmental ethics is "an examination of human attitudes and values that influence human behavior and social policies toward nature."¹ This study aims to educate students about how right and good decisions can be made when seeking to protect the environment and to promote human well-being. This course is built around video stories of persons who have been awarded the Goldman Environmental Prize for dedication and courage in taking on environmental causes. Each lesson explains the ethical principles that support their decisions. Each lesson focuses on one major topic of environmental ethics: Wildlife, Forests, Water, Air, Minerals.

Objectives: Students will be able to define environment, ethics, and environmental ethics. They will be able to describe the Eco-Ethical Mountain (Appreciation, Ecology, and Responsibility) and explain the ethical principles on which environmental decisions should be based (Utility, Duty, and Justice).

Key Concepts:

- The term environment refers to all living and non-living components of the natural world.
- Ethics refers to the study of right and wrong actions.
- Environmental ethics rests on three basic ideas: appreciation, ecology, and responsibility.
- Three ethical principles, which help in considering environmentally ethical decisions, are Utility, Duty, and Justice.

Vocabulary: appreciation, ecology, environment, environmental ethics, ethical conflict, ethics, responsibility

Time: One class session to watch and discuss videos. Additional class sessions to complete suggested activities.

Video Segments: Video #1: Why Should We Care?; Video #2: Kory Johnson, United States, 1998.

¹ J. Baird Callicott, "Environmental Ethics," in W.Reich (ed.), *The Encyclopedia of Bioethics* (New York: Simon Schuster Macmillan) vol. 2, p. 676.

Introduction

The lesson plan begins with Key Teaching Points. These points contain the most important features of the lesson. As your students view the videos and participate in class discussions and activities, it is important to emphasize these ideas.

Key Teaching Points:

- The Goldman Environmental Prize is awarded to grassroots environmental activists around the world.
- By watching video profiles of Goldman Prize winners, your students will learn about environmental ethics.

Topic 1: What Is the Environment?

Key Teaching Points:

- The words nature and environment are often used synonymously.
- The environment includes all living and non-living things on the planet.
- Human beings are part of nature, as we depend on the natural resources of the Earth, and our actions can impact the health of natural systems. Therefore, the environment is not something outside of or disconnected from people; rather the environment includes us in our surroundings.

The first step in this lesson is for students to complete the Vocabulary Organizer for Introduction to Environmental Ethics and the Eco-Ethical Mountain. The visual memory clue will help students to synthesize and interpret the new information by making it their own. Students will be using most of these vocabulary words repeatedly over the course of this guide, so it is important that they integrate these words into their memories. Students may read the Introduction to Environmental Ethics and the Eco-Ethical Mountain section in the Student Workbook to complete the vocabulary organizer. This may be assigned as homework.

VOCABULARY ORGANIZER

Introduction to Environmental Ethics and the Eco-Ethical Mountain

Word	Definition	Sentence Use the word in a sentence	Picture Visualize the word by drawing a picture
Appreciation			
Ecology			
Environment			
Environmental Ethics			

Ethical Conflict			
Ethics			
Responsibility			



Discussion Questions: Video #1: Why Do We Care?

Summary: This video montage provides a visual tour of the world's ecosystems, exploring the role of humans in nature. Use the following questions in your class discussion:

- In the video, you saw many images of the natural world. Did any of the images remind you of the environment in or around your community? How is your local environment similar to or different from the environments highlighted in the video? *(Responses will vary.)*
- The video explores some important relationships in the natural world, such as those between whales and plankton, and redwoods and insects. Do you think that people have special relationships with the natural world? If so, can you describe some ways that people depend on the environment? *(Plants provide oxygen for us to breathe, and plants and animals provide us with food to eat. Other ecosystem services include purification of water and air, pollination of crops, and provision of materials for clothes and construction. People also derive psychological and emotional benefits from experiencing nature.)*
- Do you think that people have a responsibility to protect the environment? Why or why not? *(Responses will vary.)*

Topic 2: What Is Ethics?

Key Teaching Points:

- Ethics refers to the study of right and wrong actions.
- Philosophers, such as Confucius and Aristotle, have long discussed the meaning of right and wrong, good and evil.
- Ethics is not detached from everyday life, as we all use ethical arguments to explain our beliefs and actions.



Discussion Questions: Ethics

Use the following questions to spark discussion about the definition of ethics and how our actions may be guided by ethical principles.

- What is ethics, and how does it apply to your life? *(Ethics is the study of what is right and wrong. Ethical arguments apply to every decision we make, every action we take, and every belief we hold.)*
- Have you made ethical or unethical decisions in your life? What causes you to categorize those decisions as such? *(Responses will vary.)*

- Who are some people you consider to be ethical role models—people who make ethical decisions and take ethical actions? (*Role models may include government or religious officials, environmental or social activists, parents, grandparents, or other personal mentors.*)

Topic 3: What Is Environmental Ethics?

Key Teaching Points:

- The realm of environmental ethics occurs at the intersection of ethics and the environment, when we evaluate our relationship with the natural world.
- Human beings have the potential to change and even destroy ecological systems. The destruction of these systems will, in turn, decrease our own quality of life.
- An ethical conflict occurs when people's disagreements are grounded in their basic beliefs of what is right and wrong.



Discussion Questions: Video #2: Kory Johnson, United States, 1998

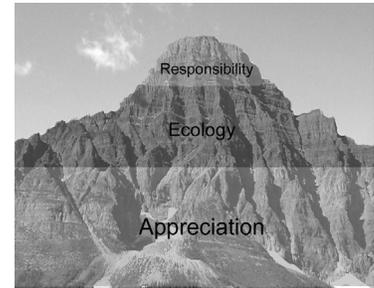
Summary: In 1987, when she was nine years old, Kory Johnson organized her fellow students into a nonprofit group called Children for a Safe Environment, and has been an environmental activist ever since. Use the questions below in your class discussion.

- What motivated Kory Johnson to become an environmental activist at such a young age? (*Kory Johnson was motivated by her sister's untimely death from heart problems, which Johnson believes was linked to environmental factors. She is motivated by a sense of duty to protect the health and well-being of others in her community and, by extension, to protect the environment.*)
- An ethical conflict arises when people disagree on what is right or wrong. What ethical conflict did Johnson face? (*A hazardous waste incinerator and dump was going to be located in a poor community in Arizona. While the company that planned the incinerator and the government officials that approved it felt that the facility must be placed somewhere, and this location made sense, Johnson believed the plans were unacceptable and ethically wrong.*)
- Johnson and her group were able to convince the governor of Arizona to stop the building of the incinerator. How did they change his mind? What role do you think young people have in environmental activism? Why do you think kids should or should not be involved? (*The governor said that, if he had allowed the construction of the incinerator, his own children wouldn't have let him come home. While there are adults in positions of power and responsibility to protect the environment, it is the younger generation that will inherit their mistakes and the environmental problems. By becoming active and involved in environmental issues at a young age, kids have the opportunity to help create the kind of world in which they'd like to live.*)

Topic 4: The Eco-Ethical Mountain

Key Teaching Points:

- The Eco-Ethical Mountain is a tool for understanding the ethical implications of environmental issues.
- The concept of appreciation forms the base of the mountain. Through appreciation, we recognize the values and importance of our environment.
- Ecology forms the second layer of the mountain and refers to the importance of developing a scientific understanding of the environment.
- Responsibility forms the top layer of the mountain and refers to the ethical principles that should govern our choices about acting to preserve the values of our environment. When thinking about our responsibility toward the environment, we often use arguments based on the ethical principles of utility, justice, and duty (discussed in detail in later units).
- Utility is the ethical argument that aims to produce the greatest amount of good for the greatest number of persons.
- Justice is the ethical argument that determines how benefits and burdens should be shared by the persons in a community for the good of the community.
- Duty is the ethical principle that requires that certain actions must be done, even if they are not advantageous for the person who performs them.



Discussion Questions: Eco-Ethical Mountain

Use the questions below to review the Eco-Ethical Mountain.

- The Eco-Ethical Mountain is a model that incorporates three important building blocks of environmental ethics. Can you think of similar models? How are they useful? *(Another mountain-shaped model is the Food Guide Pyramid, which was developed by the U.S. Department of Agriculture to illustrate the essential elements of a healthy diet. Other visual models can be found in many different subjects to help visualize abstract topics.)*
- Why do the levels of the Eco-Ethical Mountain become narrower when moving from appreciation to ecology to responsibility? What does this represent? *(People tend to value or appreciate the environment in very different ways, resulting in a broad base of appreciation. However, scientific facts must be supported by observation or experimentation and can't be based merely on opinion. Therefore, the range of acceptable scientific facts is narrower. Finally, the mountain's narrow top represents the understanding that there are a small number of ethical concepts that determine the responsibility people feel to act with regard to environmental issues.)*

Discussion Questions: Wrap-Up

The following short commentary, and the subsequent questions, can encourage discussion about environmental ethics. These questions will help students to summarize and synthesize what they have learned.

Commentary: In this unit we have defined the environment as our surroundings, and ethics as the study of right and wrong actions. The subject of environmental ethics concerns our relationship with the environment. Whether we live in a big city, a bustling suburb, or a rural farming community, we are dependent on the environment in many ways. Through the following lessons, we will explore a range of natural resources—examining and discussing their importance as well as threats to them. At the end of each unit, you'll have a chance to discuss and explore the relevance of these issues to your own community. Let's start by thinking a little more about the local environment.

- What is environmental ethics? What are some examples of dilemmas that arise in environmental ethics? *(Environmental ethics studies the way that people make decisions about what is ethical—or what is right and good—in relation to the natural world. Ethical dilemmas that arise in relation to the environment often address the use of renewable resources [such as wildlife, water, and forests] as well as non-renewable resources [such as minerals]. Other ethical dilemmas may include questions of environmental justice—or who benefits from and is harmed by the use of natural resources.)*
- Like Kory Johnson, the people in the videos you'll watch in this course are all winners of the Goldman Environmental Prize, awarded to extraordinary environmental or social activists. Do you know of any environmental or social activists in your community—people who have gone to great lengths to take ethical actions, or actions that they perceived to be right and good, on behalf of the local community? How have those people been treated? Have they received awards or been honored by the community? Or have they been shunned and prosecuted for voicing what may be unpopular opinions? *(Responses will vary.)*
- What are the different ways you appreciate the natural world? As a class, brainstorm about the ways you use natural resources or experiences you enjoy in nature. *(The list may include things such as these: food, water, clothing, shelter, air, hiking, and swimming.)*
- Can you think of ethical conflicts that you have faced? (These may or may not be related to the environment.) Have you ever been in a situation where certain actions may harm certain people (or groups of people) while, at the same time, help others? How did or would you decide what to do in such a situation? *(Responses will vary.)*

Activity Ideas

The following suggestions allow your students to explore environmental issues in your community, and will encourage them to learn about the different sides of ethical conflicts. (Note that a student worksheet is provided for activity #1.)

Activity #1: Debating the Environment

As with all ethical issues, there is not a single right answer to questions dealing with environmental ethics. Rather, there are a variety of different perspectives that are based on each individual's unique combination of personal experiences, beliefs, and values. When we form our own opinions, we draw on the different levels of the Eco-Ethical Mountain—personal appreciation and value, scientific understanding, and ethical principles.

Refer to the series of questions included in Topic 3 ("What Is Environmental Ethics?"), and have your students debate the issues in these questions. (See the "Debating the Issues" worksheet to help organize this exercise.)

Assign your students to the point and counterpoint positions for each of the questions, and ask them to prepare three-minute speeches in which they support their arguments with scientific facts, social impacts, and personal statements of appreciation. Although this may mean that students will have to take a side with which they personally disagree, the exercise will encourage them to see various sides of each issue and appreciate the complexity of environmental debates.

The point and counterpoint are stated very simply, even simplistically. Students should be able to recognize this and show how the statement needs to be qualified and refined in order to make a good argument.

Organize your class so that the students with the point statements present their arguments first, followed immediately by the counterpoint arguments. After both speeches on a topic, have your class discuss the merits of the arguments. Then, to add another dimension to the activity, have your students switch sides and debate the issues again from the opposing perspective. (Make sure that they come up with their own arguments, rather than repeating those made by their initial opponents.) After students have finished debating, ask students if their opinions on the subject changed during the course of the activity.

Activity #2: Environment in the News

Have your students look through recent newspapers for stories on environmental issues. Each student should photocopy or clip out one local and one national environmental story, and write a one-page report on each issue. The report should include a summary of the topic, a one-sentence description of any ethical conflicts related to the story, an overview of the different sides involved in the issue, and a recap of the major arguments. Have your students briefly describe the side of the issue with which they agree and explain why. Your students should also list any questions they have about the issue that the article did not address.

Activity #3: In Your Community: My Environment

Ask your students to write a short essay about the environment of their schoolyard or home. They should first define the borders of this environment. Then the students should catalogue the different living and non-living components, such as trees, flowers, and birds, as well as human-made things like a birdbath or swing set. What are the natural resources in this environment? How do the different living and non-living, natural and human-made elements interact with each other? What role do people play in this system? Have your students illustrate these relationships with drawings or photographs.

INTRODUCTION WORKSHEET

Debating the Environment

Environmental issues are complex and have many sides. People have different perspectives, and often make very persuasive arguments to support their opinions. Ethics helps us consider what is right and wrong in light of our own personal perspectives. Sometimes we will agree on certain fundamental and ethical beliefs—such as the belief that people shouldn't be able to kill other people. But often we are forced to weigh the pros and cons, the costs and benefits, and each person may come to a different conclusion.

You will be assigned to take a position on one of the issues below. Prepare a short (three-minute) speech to support either the point or the counterpoint, and conduct research to make as convincing of an argument as possible. To strengthen your argument, be sure to include at least one scientific fact, one social impact, and one personal statement of appreciation.

Should we change nature?

Point: Yes, we need to change nature to live our lives.

Counterpoint: No, if we change nature too much we will destroy it.

Should there be limits on what we choose to do with nature?

Point: Yes, if we don't set limits on what businesses or individuals can do, we will pollute the environment.

Counterpoint: No, environmental regulations put animals or trees before people, and people should be able to do whatever they have to do to survive.

Are we obligated to protect nature, even if that means that we must make some sacrifices?

Point: Yes, human beings have a duty to be stewards of nature.

Counterpoint: No, it is not necessary for human beings to make sacrifices for animals or the environment.

Should we think about future generations when we're exploiting natural resources?

Point: Yes, we need to live in a sustainable manner, so future generations will have the same resources we have.

Counterpoint: No, we shouldn't worry about future generations because they will develop new technologies and innovations.

Do trees and animals have rights of their own?

Point: Yes, as living things, plants and animals have rights.

Counterpoint: No, only humans have rights because we are smarter and more sophisticated than other animals.

Does the natural world have a value apart from its support of human life?

Point: Yes, the natural world has intrinsic value, and things should be protected even if they have no apparent economic value.

Counterpoint: No, things in nature are only valuable if they provide some sort of material or nonmaterial benefit to humans.



WILDLIFE

Purpose: The purpose of this lesson is for students to reflect on personal experiences with the wilderness and to evaluate their personal opinions and actions regarding wildlife protection.

Overview: This lesson examines ethical questions concerning the conservation of wild animals. It asks about human responsibility and duties toward animals, especially animals in the wild whose existence is threatened or endangered. Three Goldman Award Winners demonstrate their responsibility for saving and conserving rhinos, dolphins, and mountain gorillas.

Objectives: Students will be able to describe several different ways of valuing wildlife, and explain how those values can lead to the undertaking of actions that may help conserve wildlife and protect habitats.

Key Concepts:

- People value and appreciate wildlife in many different ways. Some people value wildlife for the material benefits the animals can provide (use value), while others appreciate the simple fact that wild animals and habitats exist in the world (existence value).
- The ethical principles of justice and duty depend on how people define the community in which they live. In environmental ethics, the idea of community is expanded to include beings other than humans.
- While we may live far from unfamiliar ecosystems, we must consider how our actions help or harm those spaces and species.

Vocabulary: biodiversity, CITES, community, duty, ecosystem services, endangered, existence value, extinct, genes, genetic diversity, intrinsic value, invertebrate, justice, keystone species, rain forest, species, utility

You may wish to provide students with definitions of these words, and discuss and clarify their meaning prior to viewing the video and completing the lesson plan and activities.

Time: One class session to watch and discuss videos. Additional class sessions to complete suggested activities.

Video Segments: Video #1: Michael Werikhe, Kenya, 1990; Video #2: Eugene Rutagarama, Rwanda 2001; Video #3: Samuel LaBudde, United States, 1991.

Background

The lesson plan begins with Key Teaching Points. These points contain the most important features of the lesson. As your students view the videos and participate in class discussions and activities, it is important to emphasize these ideas.

Key Teaching Points:

- The variety of life on Earth is called biodiversity.
- While only 1.7 million species have been named, scientists believe that there may be more than 10 million species living on Earth.
- The majority of these species live outside of daily contact with humans. However, people's daily actions have implications for wildlife and affect biodiversity.

The Student Workbook contains important information about the lesson concepts. Prior to viewing the videos, have your students read the Wildlife section of the Student Workbook. There are several different ways to do this. You may wish to assign this reading as homework or you may also read the information together as a class.

After the students have read the assigned section of the Student Workbook, have the class view the video.

Topic 1: Appreciation

Key Teaching Points:

- People appreciate and value wildlife in a range of ways.
- Many times, wildlife is appreciated for its use values, or the ways in which animals can be used to provide some benefit to humans; for example, through providing products (for example, leather from cowhide) or services (for example, pulling carts) to people.
- Wildlife may also be appreciated for its existence value, or the belief that plants and animals simply have a right to exist apart from any utility they may provide to humans.
-



Discussion Questions: Video #1: Michael Werikhe, Kenya, 1990

Summary: Michael Werikhe walks thousands of miles to educate people about and advocate for rhinos and other wildlife.

Use the following questions to get your students thinking about the relationship between people and wildlife, the responsibilities people have toward conserving wild spaces and species, and how our actions have an effect upon even faraway ecosystems.

- What motivated Werikhe to begin to "walk for wildlife"? (*He was motivated by the environmental destruction he saw in Kenya, and wanted to spread the word that the*

environment was under threat. He felt a strong ethical duty to educate people, in Kenya and throughout Africa, about the plight of wildlife.)

- Why did Werikhe choose the rhino as his symbol? What is he hoping to gain through his actions? *(Werikhe selected the rhino because it is a large animal that has the power to capture people's imagination. Using the rhino as a symbol for all wildlife, Werikhe raised awareness and knowledge among fellow Africans. By getting people emotionally and intellectually engaged, he hopes to spark their sense of responsibility to conserve this magnificent creature, its habitat, and, by extension, other animals who share the rhino's ecosystem.)*

Topic 2: Ecology

Key Teaching Points:

- Currently, many species are endangered or have become extinct, and many of those extinctions have been the result of human actions.
- When species become extinct, there may be large-scale repercussions. Ecological processes may be interrupted and the impacts may be greater than we know. As we lose diverse habitats, not only do we lose diversity in species, but our planet also loses genetic diversity.



Discussion Questions: Video #2: Eugene Rutagarama, Rwanda, 2001

Summary: Eugene Rutagarama dedicates his life to protecting a close relative of humans: the mountain gorilla, which is listed as an endangered species. Akin to the mountain gorilla is the lowland gorilla, which, although listed as a threatened species, is more numerous and is not considered endangered.

Use the following questions to engage students in a discussion on the ethics of conservation and taking actions on behalf of a particular species or the environment in general.

- What were some of the reasons that Rutagarama was so motivated to protect mountain gorillas? *(He understood that the species was in danger of extinction from habitat loss as well as the violence imposed by the ongoing war.)*
- How did understanding the species help motivate Rutagarama to take action? *(As a biologist, he understood the important role that mountain gorillas play in their forest habitats. He also may have been concerned about the loss of species and genetic biodiversity—realizing that once a species is gone, it cannot be brought back. Each species represents the unique outcome of millions of years of evolution and adaptation.)*
- Did Rutagarama have other motivations, besides ecological, for working to conserve gorillas? *(While Rutagarama believes that gorillas are an important species in their own right, he also sees the environment—and particularly charismatic species such as gorillas—as having the power to unite people for a common cause, such as the protection of the natural world.)*

- Can you think of an example in the United States where an ecological concern served to unite people around a common goal? (*Concern for the national symbol, the bald eagle, has rallied people to return that bird from the edge of extinction. Similarly, concern for large whales has supported significant conservation efforts.*) Can you think of an example where an ecological concern may have been divisive? (*In the late 1980s and early 1990s, the famous "spotted owl" issue in the Pacific Northwest quickly polarized people and was portrayed as a fight of "environment versus jobs."*)

Topic 3: Responsibility

Key Teaching Points:

- Some people have expanded their personal understanding of a community to include wildlife.
- By believing that wildlife is part of our community, we begin to feel a sense of duty for what happens to wildlife.
- Some people, such as those portrayed in these three videos, have a strong sense of personal responsibility to wildlife because they consider themselves to be members of the community of life, and are willing to go to great lengths and take risks in order to protect and conserve wildlife.



Discussion Questions: Video #3: Sam LaBudde, United States, 1991

Summary: This video portrays Sam LaBudde's courageous work to conserve dolphins by secretly filming a destructive tuna harvest. Use the following questions in your class discussion:

- How did LaBudde become involved in the effort to stop the killing of dolphins? (*LaBudde learned about the plight of dolphins while working at the Earth Island Institute. When he inquired about why nobody was doing anything to stop the killing of these intelligent, fascinating animals, he was told that there wasn't any visual documentation of the slaughter. With his last \$800, he flew to Mexico, secured a job as a cook on a Panamanian fishing vessel, and spent the next four months videotaping the tuna-fishing process, which ensnared numerous dolphins in addition to the targeted species.*)
- How did LaBudde get the American public to care about the slaughter of dolphins? What actions were individuals able to take to help conserve dolphins? (*LaBudde gave his videotapes to the Earth Island Institute, which shared them with Congress and the major television networks. As soon as the public saw pictures, there was a public outcry and a boycott against tuna companies. The pressure from the public, in conjunction with Congressional legislation, eventually convinced the tuna-fishing companies to change their techniques to minimize the capture of dolphins.*)
- Can you think of any wildlife species or habitats for which you feel a particular interest or affection? Do you feel an ethical responsibility to try to protect or conserve those places or species? Why or why not? (*Responses will vary.*)

- What, if any, steps might you take to help protect those species if they were threatened? *(Responses will vary.)*
- Can you think of examples of actions that people can take in their everyday lives, which might help protect species that live far away? *(Responses will vary.)*



Discussion Questions: Expanding Our Definition of Community

Expanding our definition of community to include wildlife requires consideration of challenging questions. Have your students discuss the following:

- The interrelationships of ecosystems and the processes of evolution connect us to other animals. Ecologists use the word *community* to refer to groups of living organisms (such as animals) and non-living organisms (such as rocks and soil) that interact with each other in an ecosystem. Similarly, ethicists use the principle of *community* to explain why people sometimes work together for the betterment of a particular group, such as a family or neighborhood.
- Do you think animals have a place in our community? Why or why not? *(Responses will vary.)*
- How can we make decisions based on the wellbeing of animals, in addition to the well-being of people? *(Many people believe it's important to have a scientific understanding of the needs of animals—for example, for habitat, food, and water—to be able to make educated decisions about conservation measures. However, there will never be a simple solution to balancing the needs of wildlife with the needs of people. It requires creativity, compassion, and understanding of a range of perspectives.)*
- Does a mosquito have the same rights as a musk ox? What about a microorganism? *(Responses will vary.)*
- How might a community between different species, particularly between humans and non-humans, be formed? Clearly, animals can't "talk" for themselves, so how can we include considerations of their needs and rights and balance those with the wants, needs, and rights of humans? *(Remind students that communities are formed between persons and pets: in what way might this be an image of communities between humans and wild animals? A first step toward considering animals as part of our inter-species community is to use scientific research to better understand the needs and responses of wildlife populations to different pressures, both natural and human-made. We should also make decisions about wildlife conservation based on a long-term model, recognizing the importance of conserving species and habitats not only for our own generation, but also for generations to come. By developing a longer-term perspective, we will consider human wants, needs, and rights alongside the needs and rights of animals over a large-scale horizon, both physically and temporally.)*

Discussion Questions: Wrap-Up

Use this short commentary and the subsequent questions to encourage discussion around endangered species closer to home. These questions will help students to summarize and synthesize what they have learned.

- These stories of distant animals and dedicated conservationists may seem detached from our everyday lives. However, these men were normal people, just like the rest of us. Michael Werikhe worked in an automobile factory as a security guard, and Sam LaBudde was a recent college graduate when he set sail on the tuna boat. Ordinary people can make a difference in conserving wildlife. Also, not all wild animals are "charismatic megafauna," which is what people call large, interesting, and widely recognized animals like the rhino, gorilla, and dolphin. There may be an endangered or threatened species in your community that needs protection.
- Do you know of any endangered or threatened species that live in your community, or in a local park or protected area? How could you find out if there are endangered species nearby? *(You could talk to a naturalist at a local nature center, contact a high school science teacher or biology professor at a local college, or search on the U.S. Fish and Wildlife Service or IUCN websites.)*
- If there are local species that are threatened, what could you do to help them? *(First, you would want to start by finding out why they are threatened. If the threat is because of an invasive species, you'd want to attack the issue from that angle. Alternatively, if the threat is habitat loss, you might want to explore your town or community's planning or zoning regulations. Second, you could find out if there are any local groups addressing the issue and, if so, whether they have volunteer opportunities available. Third, you could examine whether your own daily activities have an impact on that endangered species, and if so, change your behavior accordingly.)*
- Ethically, do you think that you have any responsibility to help protect this threatened or endangered plant or animal? Why or why not? *(Responses will vary.)*

Activity Ideas

The following ideas describe optional activities that your class may wish to undertake after watching the videos and completing the recommended discussions. (Note that student worksheets are provided for activities #1 and #2.)

Activity #1: Wilderness Journal

Using the Wildlife Worksheet: Wilderness Journal—have your students write about an experience they have had with wilderness or wild animals, and how that experience may have affected what they

think about wildlife and wilderness protection. Ask students to address the following topics in their entries:

People often talk about preserving wilderness—wild areas free of development or any other sign of human impact. Have you ever personally experienced what you would consider to be "wilderness"? If so, what was it like? What feelings did it evoke in you? (For example, did you feel scared? Free? Far from civilization? Adventurous?) If you have not experienced wilderness firsthand, what do you think it would be like, based on portrayals you may have read about in books, heard on the radio, or seen on television or in movies? Students who have not had an opportunity to experience wilderness firsthand may choose to look at photographs in magazines or conduct an Internet search for wildlife photographs. An easy way to find wildlife photographs is to go to <http://www.google.com>, type in the word "wildlife" in the query box and click on the "Image" button.

Was the experience you had with wilderness or wild animals a positive or negative one? Did a close encounter with a particular animal change your previous ideas about that animal? (For example, did you see a great blue heron in the wild, and find that it was much more beautiful than in photographs? Or did you see a bear, and find it to be smaller and less threatening than you had expected?) Have you ever experienced wildlife in a zoo setting? If so, what were you able to learn about the natural history, preferred habitat, and threatened or endangered status of that animal?

Based on your wilderness experiences, both firsthand and through the media, do you think there is a role for wilderness? What is the value of a place that has been kept wild, even if you could never experience it?

Activity #2: The Great Elephant Debate

Few wildlife debates have been more controversial than the one surrounding elephant ivory. In 1989, the Convention on the International Trade of Wild Species of Fauna and Flora (CITES, pronounced *SIGH-teez*) passed an international ban on the trade of elephant ivory. This decision was based on the steeply declining populations of elephants in Africa and Asia.

As a result of the ban, elephant populations have somewhat recovered. Worldwide, the ban helped to protect elephants, drastically reduce ivory prices, and facilitate enforcement of anti-poaching measures. However, in the countries in which the elephant populations have rebounded most dramatically—including South Africa, Zimbabwe, Botswana, Zambia, and Namibia—local people and government officials have expressed concern about being "overrun" by elephants. In these countries, elephants have been known to knock down fences, trample crops, and even kill people in areas where elephant and human communities live in close proximity.

Therefore, these countries petitioned CITES to consider reinstating the ivory trade for the countries in which elephant populations were determined to be healthy. The measure proposed by these countries stated that any funds received from ivory sales would be used to fund elephant and habitat conservation. Other countries strongly opposed this measure, arguing that any revival of the ivory trade would quickly lead to rising ivory prices, make law enforcement more complicated, and—ultimately—encourage poaching, which would again threaten populations of this keystone animal.

This has continued to be an extremely controversial issue and has been hotly debated at numerous CITES conventions.

Divide the class into two groups: One representing the countries that are in support of allowing limited, legal ivory sales, and the other representing the countries and nonprofit organizations that are vehemently opposed to any ivory trade. You may have the students conduct research to clarify the ideas and arguments posed by each side, and consider the ethical principles that underlie each of the positions. The following websites might be useful in collecting information for this activity:

David Sheldrick Wildlife Trust website: <http://www.sheldrickwildlifetrust.org/index.html>

BBC websites: http://newswww.bbc.net.uk/2/hi/south_asia/2583891.stm
<http://www.bbc.co.uk/nature/wildfacts/factfiles/178.shtml>

CITES website: www.cites.org

TRAFFIC website: www.traffic.org

World Wildlife Fund's CITES website: www.worldwildlife.org/cites

Alternatively, you may provide students with a brief overview by using the cards provided in the Wilderness Worksheet: The Great Elephant Debate found in the "Student Worksheets" section of this guide.

Once groups are prepared, conduct a mock CITES conference, in which each side has the opportunity to present its position. Three students should serve as the "judges" who will make a decision based on the persuasiveness of the arguments.

Perhaps the essential paradox of this debate centers on two points: first, do elephants enjoy any special moral status because of their place in culture, their size and regal bearing, their intelligence and their threatened status? Second, what right do persons who live outside of Africa and Asia—the elephant habitats—have to determine how people who live in those places should treat the animals?

Activity #3: In Your Community: Community BioBlitz

As a class, complete a BioBlitz, which is an ecological survey that assesses local species of wildlife, ecosystems, and natural resources, in your schoolyard or a nearby park. (For instructions and student pages, visit www.nrel.colostate.edu/projects/iboy/biomonth/backbioblitz.html or refer to the "BioBlitz" activity in Biodiversity Basics [See the Resources section].).

Some questions to address through the BioBlitz include: Are there any endangered or threatened species in your community? If so, are there plans (by the local or federal government) to conserve those species? Develop a brochure that describes those species and plans that have been made for their conservation. Use the brochure to educate others in your community about your locally unique

wildlife. (You may consider distributing this brochure through the local public library, at a local nature center, and to other nearby schools and community groups.)

If there are not any recognized endangered species in your community, search for habitats that show signs of being threatened. For example, are there areas where non-native and invasive species threaten to destroy native plant life? Contact a local nature center or conservation group to find out what species or habitats are of particular concern in your area. If you do discover habitats or species that may not be officially endangered, but that appear to be threatened, work in teams to develop potential conservation strategies (be creative!) to share with local conservation groups and government officials.

WILDLIFE WORKSHEET

Wilderness Journal Prompts

Use these prompts to write in the Wilderness Reflective Journal:

1. People often talk about preserving wilderness—wild areas free of development or any sign of human impact. Have you ever personally experienced what you would consider to be "wilderness"? If so, what was it like? What feelings did it evoke in you? (For example, did you feel scared? Free? Far from civilization? Adventurous?) If you have not experienced wilderness firsthand, what do you think it would be like, based on portrayals you may have read about in books, heard on the radio, or seen on television or in movies?
2. Was the experience you had with wilderness or wild animals a positive or negative one? Did a close encounter with a particular animal change your previous ideas about that animal? (For example, did you see a great blue heron in the wild, and find that it was much more beautiful than in photographs? Or did you see a bear, and find it to be smaller and less intimidating than you had expected?) Have you ever experienced wildlife in a zoo setting? If so, what were you able to learn about the natural history, preferred habitat, and threatened or endangered status of that animal?
3. Based on your wilderness experiences, both firsthand and through the media, do you think there is a role for wilderness? What is the value of a place that has remained completely wild, even if you could never experience it for yourself?

WILDERNESS JOURNAL TEMPLATE

What happened?

Use this space to describe your wilderness experience. Refer to the Wilderness Journal Prompts.

How do/did I feel?

Use this space to describe how you felt about your experience. Refer to the Wilderness Journal Prompts.

What did I learn?

Use this space to write about the role of wilderness in our world. Refer to the Wilderness Journal Prompts.

WILDLIFE ACTIVITY

The Great Elephant Debate Cards

For Allowing Ivory Trade to Resume

In 1989, steeply declining elephant populations in Africa and Asia motivated the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES, pronounced *sigh-TEEZ*) to ban the trade of elephant ivory. In recent years, elephant populations in South Africa, Zimbabwe, Botswana, Zambia, and Namibia have rebounded dramatically. Local people and government officials have expressed concern about being overrun by elephants. In these areas, elephants have been known to knock down fences, trample crops, and even kill people in places where elephants and human communities live in close proximity. These countries have petitioned CITES to consider allowing the ivory trade for countries in which the elephant populations have been determined to be healthy. The measure proposed by these countries states that any funds received from ivory sales would be used to fund elephant and habitat conservation, and thus free other government funding for schools and poverty-reduction programs.

You are a representative of the countries that are in support of allowing limited, legal ivory sales. Clarify your ideas and arguments, and consider the ethical principles that underlie your position. Your job is to convince the CITES judges of your position.

Against Allowing Ivory Trade to Resume

In 1989, steeply declining elephant populations in Africa and Asia motivated the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES, pronounced *sigh-TEEZ*) to ban the trade of elephant ivory. In recent years, elephant populations have rebounded dramatically in some countries. Worldwide, the ban helped to protect elephants, severely reduce ivory prices, and facilitate enforcement of anti-poaching measures. The African countries with relatively large elephant populations, including South Africa, Zimbabwe, Botswana, Zambia, and Namibia, have petitioned CITES to reinstate the ivory trade in the countries where elephant populations are healthy. Other countries, such as Kenya, strongly oppose this measure, arguing that any revival of the ivory trade would quickly lead to rising ivory prices, make anti-poaching enforcement more complicated, and—ultimately—encourage poaching, which would again threaten populations of this keystone species.

You represent the countries and nonprofit organizations that are vehemently opposed to any ivory trade. Clarify your ideas and arguments, and consider the ethical principles that underlie your position. Your job is to convince the CITES judges of your position.



FORESTS

Purpose: The purpose of this lesson is to develop an understanding of the role forests play in people's lives and in the local community.

Overview: Forests are essential to human life, regardless of where one lives. Videos of three activists who worked to protect forests reveal our ethical responsibilities to forests and how we can balance those responsibilities with the need to use forest resources, such as lumber, paper, and non-timber products.

Objectives: Students will be able to describe the products (timber and non-timber) that are derived from forests. They will be able to explain what ecosystem services are and how forests provide those services. Finally, students will be able to discuss the tradeoffs inherent in using forest resources while preserving the health of forests.

Key Concepts:

- Forests are valuable because they provide people with lumber, paper, and non-timber forest products. They also provide many ecological services, such as water and air purification, soil stabilization, and nutrient cycling.
- The utility of forest resources—and people's need for the materials provided by forests—sometimes causes people to exploit forests and threaten the species that live in them.
- People must carefully weigh the benefits and drawbacks of using forest resources. We must consider how forests can provide the greatest good for the greatest number of people.

Vocabulary: alpine forest, boreal forest, campesino, community, canopy, duty, ecological services, erosion, rain forest, temperate forest, topsoil, understory, utility

You may wish to provide students with definitions of these words, and discuss and clarify their meaning prior to viewing the video and completing the lesson plan and activities.

Time: One class session for watching videos and completing discussion. Additional sessions are required to complete the suggested activities.

Video Segments: Video #1: Colleen McCrory, Canada, 1992; Video #2: Loir Dingit, Indonesia, 1997; Video #3: Rodolfo Montiel Flores, Mexico, 2000.

Background

The lesson plan begins with Key Teaching Points. These points contain the most important features of the lesson. As your students view the videos and participate in class discussions and activities, it is important to emphasize these ideas.

Key Teaching Points:

- Forests are complex ecosystems that provide numerous ecosystem services and serve a range of functions.
- Poor management and exploitation can threaten forests around the world.

The Student Workbook contains important information about the lesson concepts. Prior to viewing the videos, have your students read the Forests section of the Student Workbook. There are several different ways to do this. You may wish to assign this reading as homework or you may also read the information together as a class.

After the students have read the assigned section of the Student Workbook, have the class watch the video.

Topic 1: Appreciation

Key Teaching Points:

- Healthy, natural forests represent a range of values: material, ecological, and spiritual.
- One of the most common ways of valuing forests relates to the material benefits provided by logging, as well as harvesting non-timber forest products.
- Forests provide ecological services, such as water purification, air filtration, and soil stabilization.
- Many people appreciate forests for spiritual reasons, finding them beautiful and inspiring places.



Discussion Questions: Video #1: Colleen McCrory, Canada, 1992

Summary: Colleen McCrory realized that the forests that had surrounded her since childhood were an essential part of her community, and she felt a responsibility to protect them. She led an impassioned fight to preserve forested land in her native British Columbia. Have your students discuss the following questions:

- What motivated McCrory to fight to conserve forests around her? Although she doesn't describe it explicitly, can you imagine what ethical arguments McCrory might make about the importance of the forests' existence? *(McCrory was motivated to action when she realized that large-scale mining and logging were threatening the mountain ecosystem where she lived. McCrory was not motivated by utilitarian principles; rather, she was interested in conserving the forests for the forests' sake, or what may be described as recognizing their*

intrinsic value. She was also motivated to protect forests throughout Canada, even those that were not close to her home, as she believed in the existence value of forests—the importance of having healthy forest ecosystems exist in the world and remain without human pressure.)

- What were the ethics of the people against the protection of the forests? What did they value more than the ecosystem services and spiritual benefits provided by forests? *(The companies, individuals, and government representatives who opposed McCrory's efforts to preserve the forests emphasized the utilitarian value of forests, focusing on the timber resources those forests can provide. Based on their reasoning, harvesting trees provides many benefits, including the direct material benefits of producing timber, as well as the related benefits of creating jobs and increasing wealth.)*
- Are McCrory's values about the forest better than those who oppose her? Why or why not? What difficult tradeoffs must be made when considering whether or not to protect an area and restrict logging? What ethical principles can help guide these challenging decisions? *(Whether someone considers one way of valuing the forest "better" than another depends upon that person's perspective. Certainly, providing jobs in an economically impoverished area is important. In addition, we all use wood and wood products, so cutting and processing trees is critical to our way of life. However, if that means destroying a forest ecosystem, which provides many benefits beyond just timber resources, an ethical dilemma arises. It is important to recognize that one position is not inherently "good," and the other is not inherently "bad." Rather, we must weigh the alternatives and then use ethically-based principles to make decisions regarding resource and land use.)*

Topic 2: Ecology

Key Teaching Points:

- Forests are complex, diverse ecosystems that provide habitat for an overwhelming number of species.
- Forests are often considered to be renewable resources because trees eventually regenerate over time. Selective cutting and continuous replanting may allow a forest to renew itself on the human time-scale.
- A forest is an entire community, not just a stand of trees. A natural forest represents a complex interaction of organic elements that sustain a wide variety of life forms.
- Intensive harvesting and clear-cutting may damage forest ecosystems, compromise their ability to regenerate, and harm the human, plant, and animal communities that depend on forests.



Discussion Questions: Video #2: Loir Dingit, Indonesia, 1997

Summary: Loir Dingit spearheaded an effort to develop sustainable forest management practices among rattan farmers in East Kalimantan, Indonesia. Use the following questions in your class discussion.

- Why are forests such important ecosystems? *(Forests are important for a variety of reasons. Through logging, they provide timber resources for use in an array of products, from paper to lumber to rayon fabric. As healthy ecosystems, forests provide ecological services, such as air and water purification, soil stabilization, and habitat for plants and animals.)*
- How does a group of trees differ from a forest? When trees are replanted after forests have been logged, do you think that the replanted trees provide the same benefits and services as the natural forest? *(A healthy, functioning forest ecosystem represents a diverse, complex community of living organisms. Different species of trees, as well as trees of various ages, provide habitat for different species of animals and plants. Decomposing plants and animals recycle nutrients within the system, while deep, strong roots help stabilize the soil and filter groundwater. By contrast, tree plantations often include only a single species of tree, the majority of which are the same age and height. Many times, the groundcover has been removed or damaged during the harvesting process, so the ecological interactions that occur in plantations or reforested areas are much less complex and provide fewer ecological benefits. However, plantations provide trees for harvesting and, therefore, are considered by some to be an economically feasible alternative to the continued cutting of additional natural forests.)*
- In the video, Loir Dingit and his colleagues do not completely oppose the harvesting and use of forest resources; rather, they are disturbed by the harvesting practices of the large-scale, industrial companies. How do the local rattan farmers, including Dingit, think that the forest products should be harvested? Do local inhabitants have any special rights over their locale? If so, why? *(While Loir Dingit and his neighbors believe that the forest should be used and that rattan should be harvested, they support small-scale—rather than corporate or industrial—efforts. They believe that harvesting by local residents more appropriately serves to benefit the nearby communities. Industrial harvesting, they believe, is more to the benefit of outsiders.)*
- Do the small-scale, local farmers treat the forest in a different way than the international companies? What does it mean when the small-scale farmers are described as practicing sustainable forestry? *(The small-scale, local farmers take a longer-term perspective on how best to use the resources from the forest ecosystem because they are concerned for the well-being of their children and grandchildren. The term "sustainable forestry" refers to a set of practices—such as those employed by these locals and by some logging companies—that allows forests to regenerate and continue to produce, ensuring that the forest resources continue to be available for harvesting and use in the future.)*

Topic 3: Responsibility

Key Teaching Points:

- When making resource-use decisions, the principle of utility considers what actions ensure that the greatest possible benefits accrue to the greatest number of people.
- With forest resources, arguments based solely on utility often ignore the ethical responsibilities we have to forest-dependent communities, including people and wildlife.

- Difficult decisions and tradeoffs must be made when deciding whether or not and how to harvest forest resources in a way that honors utility, justice, and duty. Taking responsibility for these decisions and making appropriate and well-reasoned arguments in support of a perspective are important elements of activism and conservation.



Discussion Questions: Video #3: Rodolfo Montiel Flores, Mexico, 2000

Summary: Rodolfo Montiel Flores is a subsistence farmer who organized forest communities to protest logging in the state of Guerrero, Mexico, where lumber companies and local people disagreed over the values of a forest—an ethical clash that resulted in violence. Have your students discuss the following questions:

- How did Flores's ethical commitment to the forest differ from the logging company against which he and his fellow campesinos (small-scale farmers) were protesting? *(While Flores and his colleagues did have a utilitarian reason for protecting the forests [their supply of clean water was threatened], they also were motivated by other reasons, including ethical duty. However, the companies that were exploiting the forests were doing so solely for economic gain, without concern for the forest ecosystem and future benefits of the forest.)*
- As a result of standing up for forest protection in his homeland, Flores was sentenced to prison for two-and-a-half years, away from family and friends. Before he was arrested, did Flores seem to realize how controversial and dangerous his actions were? *(Flores and the other local farmers formed a group to oppose the large-scale logging that was taking place. They attended meetings with officials to voice their protests and registered official complaints. As a result of these actions, Flores and a friend were arrested under "undisclosed" circumstances. While Flores and his colleagues seemed to perceive that there could be consequences to their actions, they felt strongly enough about their cause that they continued to fight, despite the potential danger. Since this video was made, Flores has been released from prison and continues his work.)*
- Why do you think the Mexican government perceived Flores's actions to be controversial and threatening enough to warrant his arrest? *(Flores and his colleagues organized into collective groups and put pressure on the government to take certain actions, including placing stricter regulations on the logging companies. The government may have perceived those actions and subsequent restrictions as threatening the ability to reap economic benefits from harvesting the forest.)*
- Are there any issues that would inspire you to organize with your colleagues or fellow students, petition the government, and undertake other actions like Flores's? *(Responses will vary.)*
- Was Rodolfo Flores motivated by the principle of utility, or some other ethical principle? *(Flores was initially motivated by utility—the large-scale logging was ruining the quality of water for drinking and farming. However, Flores was also motivated by other reasons: He*

describes feeling a duty to protect the forest because the forest has provided him with so much.)

- Flores says, "If the forests care for us and give me life, then why shouldn't I give mine for them?" Do you agree with this statement? Why or why not? *(This quotation is an expression of duty and justice: the duty of gratitude for benefits received is a form of justice or fair exchange. Instead of applying this to his parents, as we usually do, Flores applies it to nature.)*

Discussion Questions: Wrap-Up

The following blurb and questions will help lead your students in a discussion of the principle of utilitarianism, grappling with some of the tough issues that arise when considering what actions lead to the "greatest good for the greatest number of people." These questions will help students to summarize and synthesize what they have learned.

- Utilitarianism states that an action should be considered ethically right if it produces a greater amount of satisfaction for a greater number of people than another action. But this is not an easy thing to quantify. For example, it is very difficult to define and measure satisfaction.
- Do you find the utilitarian, community, or duty arguments to be convincing reasons to protect a forest? Why or why not? *(Responses will vary.)*
- What is satisfaction? *(Satisfaction is a word that describes the fulfillment of needs, such as the need for lumber or non-timber forest products.)*
- How can we measure and compare the satisfaction experienced by different people? Can you think of some techniques that would help quantify "satisfaction"? *(The satisfaction produced by exploiting or conserving forests can be measured in different ways: the number of species in a particular area can be recorded; increases in CO₂ in the atmosphere due to burning forests can be measured; and forest-dependent livelihoods can be described in economic terms. Although it may not be possible to lump all of these effects together in a single number, one begins to see an overall picture of the ways in which forest protection and destruction affect human satisfaction.)*
- If you are trying to create the greatest satisfaction for the greatest number of people, what do you think happens to the smaller number of people whose satisfaction needs are not met? *(Responses will vary.)*
- Imagine that you are someone who makes a living from logging. Would the utilitarian, community, or duty arguments be compelling to you? What values might you hold about the forest? *(Like all of us, loggers hold complex views of forests and value them in a range of ways. Clearly, because they make their living from harvesting trees, the utilitarian argument is an important one: trees can provide material benefits, jobs, and economic benefits. However, people who work as loggers spend more time in the forest than almost any other profession, so many of them also develop a strong connection to and appreciation of the wildlife*

communities that live in forests. Some develop a sense of duty related to harvesting trees in an ecologically and socially sustainable manner. [Refer to the Perschel article for insight into the range of perspectives held by a forester.]

- Each of the videos addresses conflicts that have occurred between companies (or governments) that believe in harvesting forest resources and individuals who are concerned with the long-term sustainability of those forests. How do you think conflicts like these should be resolved in a fair way? *(People have a range of perspectives on the best ways to deal with forest-related conflicts. Some believe that the government, as well as international treaties, should more closely regulate logging practices and force consideration of economic versus social benefits. Others have worked to create certification standards to help ensure that wood is grown and harvested in a sustainable manner. [To learn more about these efforts, visit www.fscus.org.]*

Activity Ideas

The following ideas describe optional activities that your class may wish to undertake after watching the videos and completing the recommended discussions. (Note that a student worksheet is provided for Activity #1.)

Activity #1: Forest for Sale

Ask students to imagine that there is a piece of forested land for sale in a nearby area. Explain to students that they will role-play a town meeting (debate) to determine how this land will be used. Characters will include the following:

- environmentalists who want to protect the forest area and the rare species within it
- loggers who want jobs to maintain their way of life
- corporate executives who would like to log the forest to create profits, which they argue will be reinvested in the town
- people who live in the community
- government officials who will moderate the meeting (debate) and make the final decision

As background, have students conduct research on the positions that each of these groups may hold. For example, the group that is portraying environmentalists should conduct research on previous controversies about forested lands to develop convincing arguments based on the ethical principles invoked by this group. You may want to visit the websites of the Sierra Club (www.sierraclub.org), the Wilderness Society (www.wilderness.org), and the National Forest Protection Alliance (www.forestadvocate.org) to learn about arguments used by these groups. Similarly, the groups that are representing loggers and corporate executives should make convincing economic and lifestyle arguments based on previously contested forested landscapes. These perspectives can be garnered from websites such as the American Forest Resource Council (<http://www.afrc.ws/>) and the Forest Resources Association (www.apulpa.org). The group that is portraying people who live in the community should visit the Mountain Voices website to read firsthand accounts by the people who live in India and Poland, as they talk about the state of local forests. <http://www.mountainvoices.org> Click on India and Poland and go to the "forestry" link.

Government officials, who will listen to the arguments of all groups and then make a decision, should report on which arguments were most persuasive and why. Were they influenced by their personal convictions? Did they have preconceived notions of what the "right" thing to do with the forest would be? Were the environmentalists, loggers, local community members and corporate representatives able to convince them to change their original opinion?

Have students complete the Forests Worksheet: Forest For Sale Decision-Making Organizer to help them prepare for the town meeting.

Activity #2: A Forester's Perspective

Ask students to read the excerpt from an essay by forester Robert Perschel (provided in the Student Workbook). After reading the excerpt, have students write a short journal entry on their reaction to his excerpt. Explain to students that the journal entry should address the following questions:

- Does Robert Perschel's description of his feelings as a forester fit with how you imagined foresters to feel about trees?
- Is it possible to have a utilitarian view of a forest while also having a spiritual view of it?
- How would you reconcile the differences between the two competing ethics? Is it possible to connect those differing ethical perspectives?

Activity #3: In Your Community: A Community Forest

Tell students that they are going to create a brochure to educate the local community about a nearby forest. The objective of the brochure should be to raise community awareness of the existence of this forest and of the environmental issues that are most pressing in your area.

Start by gathering more information than can be included in the brochure—this will help in developing a broader understanding of the history and use of the forest. To gather the necessary background information, conduct research to address the following questions:

- Where is the forest located?
- What kind of forest is it? What kinds of plant and animal species live there? Are there any endangered species in the forest? Are there any non-native or invasive species in your forest?
- Who owns the forest? What laws govern it? (For example, is it a county, state, or national park? Does a nonprofit nature group privately own the forest?)
- What groups play a role in the forest's protection and management? Has the forest ever been threatened by development?
- Is the forest open to recreation? If so, what recreational opportunities are available, and how do those activities impact the forest?

If possible, visit the forest to create maps and take photographs to include in the brochure. You may want to find places to display the brochure, such as the school library, the public library, a community center, etc.

FORESTS WORKSHEET

Excerpt from

*Work, Worship, and the Natural World: A Challenge for the Land Use Professions**

by Robert Perschel

For almost fifteen years, I worked as a forester in the woods of New England. I spent long days marking timber sales. Alone. In the woods. I was there when the first snarls of snow fell out of the northern sky and softly filled up the woods. I was there when the first green shoots forced their way out of the wet mud and unfurled in a blanket of green. I was there when the first orange color etched itself on the edges of the maple leaves, and I watched the first leaves let loose their hold on life and flutter to the ground.

As a forester, you spend all day weaving your way back and forth through the hardwood forest, examining each tree in turn and deciding whether it should live or die. You repeat this each day, considering 30,000 or 40,000 trees and selecting about 300 of them to mark with a blue paint spot. Each decision involves factors such as age, size, health, soil, aspect, economic value, competition, potential growth, wildlife value, and so on. You calculate all these in your forestry-oriented brain. You raise your paint gun to deliver the death sentence, and then something unnamable crawls up from your belly and asks, "Is this the right thing to do?"; "How well does this action fit into the natural flow of the forest?"; "What harm is this causing?"; "What does this have to do with me?"; "What does this have to do with that moment on the salt marsh?"; "What is your relationship with this entity you call a tree?"; "Is this a loving act, or a purely selfish one motivated by your need and the landowner's desire to earn money?"

You squeeze the trigger, or don't squeeze the trigger, and move on to repeat the process again and again, thousands of times each day, day after day, season after season, year after year. This is work that can change you—if you open yourself to the hard questions that are about your Self: What are you as a human being, and what is your purpose, your responsibility, your role in relationship with the natural world?

If you are willing to do that, I guarantee you that each step through the forest will change you. Each difficult and complicated decision to mark a tree and alter the forest will alter you as well, but only if you are willing to bring your spirit—the essence of who you are—with you into the forest when you mark timber. Or you can choose to live your professional life, and perhaps your personal life, in accordance with the satirical prescription once voiced by comic strip author Gary Trudeau: "I am trying to cultivate a lifestyle that does not require my presence."

*Printed in *The Good in Nature and Humanity: Connecting Science, Religion, and Spirituality with the Natural World*, edited by Stephen R. Kellert and Timothy J. Farnham (2002). Island Press: Washington, DC.

FORESTS WORKSHEET

Forest for Sale

In this activity, you will imagine that a piece of forested land is for sale in a nearby area. You will role-play a town meeting to determine how this land will be used. Characters will include the following:

- environmentalists who want to protect the forest area and the rare species within it
- loggers who want jobs to maintain their way of life
- corporate executives who would like to log the forest to create profits, which they argue will be reinvested in the town
- government officials who will moderate the meeting and make the final decision
- people who live in the community

To prepare for the town meeting, you will conduct research on the positions that each of the groups involved may hold. Government officials, who will listen to the arguments of all groups and then make a decision, will report on which arguments were most persuasive and why.

The Web sites listed below contain information for this activity. Use the Forests Worksheet: Forest for Sale Organizer to record information.

Sierra Club Web site
www.sierraclub.org

Wilderness Society Web site
www.wilderness.org

National Forest Protection Alliance Web site
www.forestadvocate.org

American Forest Resource Council Web site
<http://www.afrc.ws/>

Forest Resources Association Web site
www.apulpa.org

Mountain Voices Web site
<http://www.mountainvoices.org>

FORESTS WORKSHEET

Forest for Sale Decision-Making Organizer

Problem
How will the piece of forested land be used?

<u>Characters</u>	Proposed use for the land	<u>Pros and Cons</u>
Environmentalists		Pros
		Cons
Loggers		Pros
		Cons
Corporate Executives		Pros
		Cons
Community People		Pros
		Cons
Government Official's Final Decision		Reasons For Official's Decision



WATER

Purpose: The purpose of this lesson is to help students gain an understanding of the importance of water conservation.

Overview: While water is practically everywhere on Earth, freshwater resources are scarce and fragile, requiring us to be conscientious about conserving this life-giving resource. This lesson highlights the importance of conserving fragile freshwater resources.

Objectives: Students will be able to name many of the benefits we derive from water. Students will be able to explain some of the most serious threats to water resources, including groundwater overdrafting, over-fishing, and pollution, and will be able to describe some ways that ethically motivated conservationists are working to address those threats.

Key Concepts:

- Water plays a critical role in supporting all life on Earth.
- Pollution and overuse threaten water resources, making fresh water a depleting resource in many places.
- People are taking actions to conserve water and make decisions regarding its use in an ethical manner.
- The concept of community is an important basis for ethical responsibility.

Vocabulary: aquaculture, aquatic, biosphere, community, groundwater, groundwater overdrafting, hydrologic cycle, mangroves, over-fishing, plankton, pollution, transpiration, use values, utility, watershed

You may wish to provide students with definitions of these words, and discuss and clarify their meaning prior to viewing the video and completing the lesson plan and activities.

Time: One class session to watch and discuss videos. Additional class sessions to complete suggested activities.

Video Segments: Video #1: Michal Kravcik, Slovakia, 1999; Video # 2: Jorge Varela, Honduras, 1999; Video #3: Hirofumi Yamashita, Japan, 1998.

Background

The lesson plan begins with Key Teaching Points. These points contain the most important features of the lesson. As your students view the videos and participate in class discussions and activities, it is important to emphasize these ideas.

The Student Workbook contains important information about the lesson concepts. Prior to viewing the videos, have your students read the Water section of the Student Workbook. There are several different ways to do this. You may wish to assign this reading as homework or you may also read the information together as a class.

After the students have read the assigned section of the Student Workbook, have the class watch the video.

Key Teaching Points:

- Water covers two-thirds of the Earth's surface.
- The human body is 70 percent water, and a person would die in less than a week without water.
- Humans depend on water, not just for drinking, but also for industry, agriculture, and recreation.

Topic 1: Appreciation

The first step in this lesson plan is the construction of a K-W-L Chart. The purpose of this chart is to help the students understand the varied lesson concepts. Each student will have a copy of a K-W-L Chart in his or her Student Workbook.

Explain to students that a K-W-L Chart is a tool that will help them reflect on what they know about a topic, what they want to know, and what they have learned. The "K" stands for what one already knows about a topic.

In this lesson, ask your students to brainstorm what they already know about the topic of water, and list this information under the "K" portion of the K-W-L Chart.

When the students are finished, ask them to complete the "W" portion of the K-W-L Chart, which focuses on what they would like to learn more about regarding the topic of water. The purpose of completing these portions of the chart is two-fold. First, it helps students activate their background knowledge of the topic, and second, it helps them begin to make connections between what they already know and what they are interested in learning more about.

The "L" portion of the K-W-L Chart is to be completed after the students have viewed the videos and participated in the lesson activities. The purpose of completing the final section of the chart is to help students reflect on, synthesize, and summarize what they have learned throughout the lesson activities.

WATER WORKSHEET

K-W-L Chart

K WHAT I KNOW	W WHAT I WANT TO KNOW	L WHAT I LEARNED

The Student Workbook contains important information about the lesson concepts. Prior to viewing the videos, have your students read the Water section of the Student Workbook. There are several different ways you can choose to do this. You may wish to assign this reading as homework or you may also read the information together as a class.

After the students have read the assigned section of the Student Workbook, have the class watch the video.

After watching the video, engage your students in discussion.

Key Teaching Points:

- The material benefits and uses of water include drinking, cooking, cleaning, sanitation, and a source of food.
- Water is also a very important symbol in religion, literature, and art, and is appreciated for recreational uses.
- Dams are very controversial. They harness the power of water for electricity, prevent flooding, and gather water in reservoirs to supply drinking water. However, they can also have a negative impact on the environment, and displace communities.



Discussion Questions: Video #1: Michal Kravcik, Slovakia, 1999

Summary: When the Slovakian government proposed a plan to construct a large dam on the Upper Torysa River, hydrologist Michal Kravcik knew there must be a less environmentally and socially destructive way to meet the area's growing need for water.

Use the following questions to lead a discussion around Michal Kravcik's search for alternatives to the large-scale dam proposed for the Upper Torysa River.

- When Michal Kravcik originally started his work against the large-scale dam planned for the Upper Torysa River in his hometown, what was his motivation? Was it related to his commitment to the environment or to people? *(Kravcik says his initial concern was that the quality of life would have been destroyed for all those living along the river, and that five historical towns would have been flooded as a result of the dam. However, he also recognized that the ecological damage to the marine life would have been devastating. Eventually, his reasoning against the dam intertwined social and environmental concerns, and recognized humans as an essential part of the local ecological community.)*
- How did Kravcik ensure that he wasn't alone in his efforts to protect the Upper Torysa River? How did he get others involved in his work, and why is that ethically important? *(Kravcik did not make decisions and advocate for actions on behalf of local residents without their support. He initiated educational and community-empowerment projects to help residents learn more about the impacts of the dam, search for economic alternatives to environmentally destructive practices, and become more adept at having their voices heard.)*

Topic 2: Ecology

Key Teaching Points:

- The continuous movement of water through the biosphere, in its different states of liquid, gas (water vapor), and solid (ice), is known as the hydrologic cycle, and is responsible for rain-fall and flowing rivers.
- Freshwater, ocean, and estuarine ecosystems support a vast number of wild species.
- Water resources also connect people: watersheds can be used to define communities.



Discussion Questions: Video #2: Jorge Varela, Honduras, 1999

Summary: When industrial fishing interests began clear-cutting coastal mangrove forests to create artificial aquaculture sites, Jorge Varela knew he had to take action.

Use the following questions to guide a discussion with your students regarding the ethical principles surrounding Jorge Varela's actions.

- What ethical principles were shared among the industrial fishing companies, the aquaculture farmers, and the small-scale fishers? Why did the actions of these three groups differ so markedly? *(All three groups were interested in the utility of the mangroves for producing material benefits [namely, seafood to sell]. However, the local fishers were interested in catching only enough fish to make a living and had a vested interest in protecting the mangrove environment for future generations. The other groups were seeking greater profit margins, which led them to use quick—yet not sustainable—methods to grow more seafood in a shorter time in a more confined area.)*
- What motivated Jorge Varela to take action to address this issue? Were his efforts recognized and appreciated? Why or why not? *(Upon witnessing the rapid destruction of the mangroves, Varela felt compelled to take action to protect this local resource—which provided economic, aesthetic, and even spiritual benefits to the community. While local fishers joined with Varela in his fight, Varela and his colleagues were threatened by violence and, in one case, with murder. However, Varela was so uplifted by the number and strength of people supporting his efforts, he persevered despite the threats.)*

Topic 3: Responsibility

Key Teaching Points:

- Water resources are threatened by pollution and exploitation, while wildlife species living in ocean and freshwater ecosystems are mostly threatened by over-fishing.
- According to the ethical principle of utility, we want to maximize good things, like the benefits of water. However, with limited resources, we face the decision of maximizing

benefits in the short term, or making sure clean and plentiful water is still available for future generations.

- Sometimes the production of a benefit for the majority in a society will cause a minority to be deprived or to suffer. This is a standard problem with utilitarian thinking: it justifies deprivation of the fewer if the larger group will benefit. Does this seem right?
- It is important to think of ecological issues in terms of communities bound together in common interests and values. This is the basis for responsibility.



Discussion Questions: Video #3: Hirofumi Yamashita, Japan, 1998

Summary: In Japan, Hirofumi Yamashita was concerned that the plans to build a wall across Isahaya Bay failed to take into consideration the human and ecological communities of the coast.

Use the following questions to explore the responsibility that Yamashita felt toward protecting Isahaya Bay.

- The Japanese government originally claimed that the seawall would create farmland and help with flood control. But then, secret scientific documents stated that the wall wouldn't help at all with those two goals. Why do you think the Japanese government was so adamant about building the seawall? *(Responses will vary.)*
- After 28 years of "ceaseless campaigning," what is driving Hirofumi Yamashita? *(He cites his commitment to the animals that live in the bay. He also says, "For me, this . . . is like saving my own life." He clearly has a strong ethical conviction that protecting the marine habitat, and all the animals it supports, is the most important thing in his life.)*
- What strategies does Yamashita use to garner support for removal of the seawall and conservation of this environmentally sensitive area? *(He uses a range of strategies, including supporting and encouraging scientific research, educating local residents, educating lawmakers, and lobbying the government. Therefore, he uses a combination of strategies: science, management, policy, and education.)*

Discussion Questions: Wrap-Up

Use this short commentary, and the subsequent questions, to encourage discussion around water resources closer to home. These questions will help students to summarize and synthesize what they have learned.

In this unit you learned about debates over dams, industrial aquaculture, and seawalls in faraway countries including Slovakia, Honduras, and Japan. But water is a resource that affects everybody, no matter where you are on this planet. We all need and use water, and depend on the ecosystem services provided by aquatic resources. Have you ever thought about how much water you use in your life or where your water comes from? "Now is your chance."

- Do you live in a community that gets a lot of rain (and other precipitation), or do you live in an arid climate? How does the level of rainfall affect your community? Are there farms near you, and if so, what kind of crops are they able to grow? Does the amount of rain determine what people do for fun or how much time they spend outside? *(Responses will vary.)*
- Are there any major bodies of water near or in your community? If so, how have they played a role in local history? Is your local watershed clean enough to swim in, or to eat fish that are caught from it? If yes, has it always been this clean? If no, has it always been this polluted? *(Responses will vary.)*
- Where does your drinking water come from, either at home or at school? What kind of treatment processes does the water undergo before it reaches the tap? Where does your wastewater go, and how is it treated? Do you think water is used efficiently in your community? *(Responses will vary. Check with your town or city-service provider for information on water provision, purification, and use.)*
- What is the "community" created by water in the place where you live? *(Communities created around watersheds are stronger in some places than others. Find your local watershed group and attend at least one meeting to develop a broad-based understanding of the processes of water negotiations, ethical conflicts in policy decisions, and other interesting current topics.)*

Activity Ideas

The following ideas describe optional activities that your class may wish to undertake after watching the videos and completing the recommended discussions. (Note that student worksheets are provided for Activities #1 and #2.)

Activity #1: Keep a Water Diary

For one day, have your students keep track of all of the ways they use water. They should start first-thing in the morning by taking note of the water used to take a shower, brush their teeth, prepare breakfast, wash the dishes, and so on. Some water uses might be less visible, such as the water in the radiator of the car they drive or in a can of soda. Encourage the students to be thoughtful and creative in recording their water usage. Ask your students to share their Water Diaries with their classmates. They may be surprised!

Divide your class into small research groups and ask them to visit the Peace Corp Water in Africa website at <http://www.peacecorps.gov/wws/water/africa/resources/index.html>. Ask each group to click on a country found under the "stories" section of the website.

Click on the "daily usage" button and read how the people of the country use the water in their daily lives. Have students discuss the connections between their personal water diaries, the information they learned on the website and issues of water conservation. Ask each group to select and print an

image from their selected country that conveys what they think is important. Ask each group to share what it has learned with the entire class.

Calculations have found that the average American uses about 28 gallons of water per day. If that is the case, can your students figure out how much water they and their families use each day and each year? How much does your entire class or school use? You may wish to share the results of your class research with the entire school by creating a poster to hang outside your classroom door.

As a class, discuss why it is important to know about how much water we use and what implications this usage may have for the broader environment. Why might it be important to conserve water?

Have each student develop a succinct description of why it's important to conserve water, accompanied by several concrete suggestions of how other students and teachers in their school can help conserve water. They should use this information to write an essay or opinion piece to be published in their community or school newspaper. You could also have them design water-conservation stickers to post in the school's restrooms, teachers' lounges, and cafeteria, and share with other classes in your school.

Activity #2: Seafood Sleuthing

As a class, have your students create a seafood guide to inform other students, parents, and teachers about how their food choices might affect populations of seafood species and their habitats. The guide should provide information on how consumers can make better seafood choices that support environmentally friendly fishing practices. They could also distribute the guide at local aquariums or in front of supermarkets.

Start by having each person research a different type of seafood. Each student should investigate the biology of the animal, its place of origin, the role it plays in its ecosystem, and the potential environmental impacts of its harvesting. You may also choose to have the students research social issues. Use the following questions as a guide: Is it expensive or affordable? Does its harvesting create many jobs? Do people depend upon the resource as an important source of food in their community?

Certain seafood species are threatened by over-fishing or harmful fishing practices. This has led to a movement for certifying fisheries that catch and process fish in an environmentally responsible way. Ask your students to research the Marine Stewardship Council's program (www.msc.org). Do they think this kind of effort could work to help protect certain seafood species? Why or why not? What might be some potential problems with this approach? Are any of the species that your class researched "certified"?

To create the consumer-information section of your class's seafood guide, refer to the Audubon Seafood Lover's Guide (www.Audubon.org/campaign/lo/seafood/index.html) and the Monterey Bay Aquarium Seafood Watch guide (www.mbayaq.org/cr/seafoodwatch.asp).

Activity #3: In Your Community: Create a Watershed Management Plan

Have your students undertake a research project focused on the major watershed in which you live. You may wish to use the following Environmental Protection Agency resource at <http://cfpub.epa.gov/surf/locate/index.cfm>. How large is the watershed? What cities and towns are included in it? What are the major water-related environmental problems occurring in their watershed? They should use this information to develop a map that shows watershed boundaries and locates the major sources of water-quality and usage threats.

Then, have them work in teams to contact local resource managers and find out whether one or more watershed management plans exist. If so, each team should read the plan to see if it addresses the threats they found to be serious during their research. Do they think the management plans provide realistic and appropriate suggestions for addressing those issues?

If management plans do not exist, seize the opportunity! As a class, conduct research on other area's watershed management plans to gather ideas on what kind of information is included and what kind of suggestions your students might be able to make. You may want to have them contact representatives from local conservation groups to get their input on the plan. You may also want to have them contact other watershed representatives who helped to develop that area's management plan. Based on the class's research, the students should develop some guiding principles for a future watershed management plan, and share those with local policy makers and nonprofits through a written memo.

Was the total amount on your chart more or less water than you expected to use in one day? Why or why not?

Do you think you could use less water, or find ways to use water more efficiently? If yes, in what ways? If not, why not?

WATER WORKSHEET

Seafood Sleuthing

Gather the following information about your selected seafood species.

What's it called?

Seafood name:

Scientific name:

Where's it from?

Natural geographic distribution:

Source of this seafood in your community:

Tell me about it.

Population in the wild:

Lifespan:

Interesting biological facts:

Role in ecosystem (What eats it? What does it eat? Is it involved in any symbiotic relationships?):

Catching it

Amount of annual catch (in terms of money and numbers of fish):

Sustainable yield or fishing limits (if determined):

Number of fishers employed catching it:

Number of subsistence fishers (people who catch only to eat, not sell):

How it is caught (What kind of boats and nets? How do they find it?):

Environmental impacts of harvesting:

Buying and eating it

Price per pound (How does this compare to other types of seafood? Is it affordable?):

How far it travels to get to your plate:

Nutritional value or health impacts:

Attach a map of geographic distribution and a picture of your seafood species to this worksheet.



AIR

Purpose: The purpose of this lesson is to help students gain an understanding of how degraded air quality compromises human health and destroys the environment.

Overview: It is easy to take air for granted because air is all around us and provides the backdrop for everything we do. In this lesson students will learn about the impact of air quality and responsible environmental activism.

Objectives: Students will be able to describe how air supports life, and how human actions are degrading air quality. Students will be able to provide examples of people who are working to improve air quality in their communities and describe the ethical principles that guide them in their activities. They will learn how the principle of duty is relevant to determining ethical responsibility to protect air quality.

Key Concepts:

- Air is a life-giving medium that surrounds and supports all life on Earth.
- Human actions are threatening the atmosphere, and issues such as toxic air pollution, climate change, the ozone hole, and acid rain are affecting the quality of human and nonhuman life.
- People are taking actions to improve air quality by pressing the government to limit industrial waste and working with community groups to regulate the quality of their local environment.
- When exploring issues of environmental ethics, the ethical principles of utility and duty are often in conflict.

Vocabulary: acid rain, air, atmosphere, climate change, duty, greenhouse effect, greenhouse gases, ozone hole, smog, utility

You may wish to provide students with definitions of these words, and discuss and clarify their meaning prior to viewing the video/DVD and completing the lesson plan and activities.

Time: One class session to watch and discuss videos. Additional class sessions to complete suggested activities.

Video Segments: Video #1: M.C. Mehta, India, 1996; Video #2: Margie Eugene-Richard, United States, 2004; Video #3: Terri Swearingen, United States, 1997.

Background

Key Teaching Points:

- Air is the mixture of gases that make up the atmosphere.
- Life on Earth would not be possible without the atmosphere, which provides the air we breathe, regulates climate, and protects us from harmful effects of the sun's radiation.
- Pollution caused by humans is changing the composition of the atmosphere.

The lesson plan begins with Key Teaching Points. These points contain the most important features of the lesson. As your students view the videos and participate in class discussions and activities, it is important to emphasize these ideas.

Topic 1: Appreciation

The Student Workbook contains important information about the lesson concepts. Prior to viewing the videos, have your students read the Air section of the Student Workbook and complete the Double Entry Journal. There are several different ways you can choose to do this. You may wish to assign this reading as homework or you may also read the information together as a class. After viewing the video, engage your students in discussion.

Key Teaching Points:

- The atmosphere is a sink for the byproducts of industry.
- Without air, there would be no wind, no sound, and nothing for people to breathe.
- The mysterious and powerful nature of air has inspired art, literature, and religion.
- Wind power propelled the sailing ships for trade and exploration and currently generates large amounts of clean electricity.

The first step in this lesson is the construction of a Double Entry Journal. The Double Entry Journal is a note-taking tool that provides opportunities for students to ask questions, make comments, clarify, challenge, and engage with the material that they are reading. The Double Entry Journal format is a piece of paper divided into two columns. The first column is where students will take notes on what they are reading or viewing. The second column of the Double Entry Journal is where students add their own thoughts and responses. In this lesson, students will read their Student Workbooks to learn about air. They might take notes that describe pollution effects on one side of the Double Entry Journal, and the second column might contain a comment such as "I really don't understand this," a comment such as "I see this happening at the factory near the river in our town," or a question such as, "What can I do about this problem?"

The following is an example of a Double Entry Journal:

AIR WORKSHEET

The Double Entry Journal

Facts and Information

My Thoughts, Reactions, Comments



Discussion Questions: Video #1: M.C. Mehta, India, 1996

Summary: After Indian lawyer M.C. Mehta realized that air pollution was destroying the Taj Mahal and threatening the communities around it, he worked to clean up India's air and water. Have your students discuss the following questions:

- Mehta says, "People have a right to live in a clean world. Nobody has the right to poison current generations and future generations." No one would disagree that living in a clean world should be available to everyone. But does this represent a basic human right more important than other human rights such as freedom, having a job, being secure? Why or why not? How far would you be willing to go to fight for this right for your own family? How about for other people's families? *(Responses will vary.)*
- What mechanisms does Mehta use to address the issue of toxic air pollution? Do you believe that the government has an ethical duty to regulate companies to reduce (or stop) their release of toxic waste? Why or why not? *(As a lawyer, Mehta petitions the government and sues companies to stop the release of toxic chemicals into the air and water. [Responses regarding the government's duty will vary.]*
- Consider the companies that are releasing toxic wastes into the air, which are eventually harming the Taj Mahal and—most likely—the health of surrounding communities. What do you think is the motivation behind those companies' actions? Considering that the people who work at those factories probably live near the factories, do you think that they approve of those factories releasing toxic chemicals if stopping this pollution resulted in fewer jobs and less job security? Why might those workers decide to rally against the toxic wastes? On the other hand, why might they not? *(The companies are motivated by profits as it is less expensive to expel the toxic waste into the air [through smokestacks] or into nearby water sources, than to dispose of it in other ways. Factory workers who live nearby may be concerned about their families' health but also be equally concerned about protecting their jobs and being able to continue supporting their families. This dilemma—between wanting to fight for a cleaner environment while also being able to make a living—faces many workers around the world.)*

Topic 2: Ecology

Key Teaching Points:

- The atmosphere is 78 percent nitrogen and 21 percent oxygen. The remaining one percent is comprised of a number of gases, some of which are fairly steady, while others vary in concentration over time.
- Major air pollution concerns focus on toxic chemical contaminants released into the air that may harm human health. Much of this contamination derives from consumption of energy resources such as gas, oil, and coal, and from the production of manufactured commodities such as plastic, rubber, and metals.

- Ozone is an important gas that is found high in the atmosphere, where it prevents cancer-causing radiation from reaching the Earth's surface. Certain human-made chemicals, such as CFCs, destroy ozone, which has created an "ozone hole" over the polar regions.
- Greenhouse gases, such as carbon dioxide, trap heat from the sun, making life on Earth possible. However, the concentration of greenhouse gases in the atmosphere is on the rise, and scientists believe that this will change the Earth's climate.
- Other environmental problems include acid rain, where pollution contaminates rainwater by making water acidic, and smog, which is caused when the mixture of chemicals in urban areas reacts under sunlight to create unhealthy compounds.



Discussion Questions: Video #2: Margie Eugene-Richard, United States, 2004

Summary: After growing up breathing the polluted air of Louisiana's "Cancer Alley," Margie Eugene-Richard decided to fight the polluting companies to stop them from contaminating the air of her hometown. Use the following questions in your class discussion.

- Eugene-Richard grew up in a place called "Cancer Alley." Why do you think she didn't just move away when she found out that the air she was breathing might be dangerous? Do you think people should have to move to avoid pollution? *(Many of the families of the Old Diamond neighborhood of Norco could not afford to leave, while others might have felt a responsibility to a job or to family or friends. Still others likely felt an attachment to the land and did not want to abandon their homes.)*
- Eugene-Richard and her group engaged environmental scientists to gather data about deadly pollution. Why is scientific data necessary? *(Scientific research uses a consistent, formulated method to consider various aspects of an issue. By using the scientific method to gather data on the causes and effects of the pollution, residents, such as Eugene-Richard, were able to better understand the phenomena that was occurring and that may have caused air-quality-related health issues. Moreover, their arguments for fighting against the companies that were creating the pollution are stronger when backed by scientific studies.)*
- In the end, Shell agreed to lower emissions and pay to relocate the people living closest to the chemical plant. Do you think Shell should have agreed to pay the residents this money? Based on the issue, do you think that Shell owed the residents more or less? Do you think sufficient information and evidence was available to determine without question that the emissions caused large-scale illness among the nearby residents? Should all companies or individuals be held accountable for the negative impact they have on others? *(In economics, a negative impact on someone who is not part of a transaction is called an externality. This situation occurs when one party obtains a benefit or profit by exploiting a resource and passing the costs of that resource use onto another party. A good example is when people use water or air and derive a profit from that use and then export the resulting pollution to another area that did not cause the problem. Ideally, externalities are incorporated into the transaction by the industry, compensating the individuals who are harmed and raising the company's sale price so as not to lose profits.)*

- In this video profile, you heard the term “environment justice.” When people speak of an environmental justice issue (or an environmental injustice) they are referring to a situation in which one group of people bears a disproportionate amount of the negative impact of an environmental problem. Often times, this happens when particularly vulnerable people, such as the young or the poor, are afflicted by polluted air or water, while other better-situated people enjoy clean air or water. Can you think of any examples of this in your community? What are some possible solutions? (Responses will vary.)

Topic 3: Responsibility

Key Teaching Points:

- Duty is a very different ethical principle than utility. Under utility, costs and benefits are measured, and a decision is made that supports the action that brings the greatest good to the greatest number of people. If we are driven by duty, we believe that there is one, single right action, and no room for compromise or cost-benefit analysis.
- Duty requires some sort of master rule by which one can judge right and wrong. A commonly used Golden Rule, found in both religion and philosophy, is: “Do unto others as you would have them do unto you.”
- Environmental philosopher Aldo Leopold expanded his sense of duty to include the environment, referring to this as the Land Ethic: “A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.”
- The principle of community—and its associated principle of justice—is important. Communities cannot live without a healthy atmosphere. The burden of polluted air, caused by industrial activities, should not fall on the powerless while the benefits accrue to the powerful. Similarly, industry must bear the burden of assuring a safe, clean atmosphere.



Discussion Questions: Video #3: Terri Swearingen, United States, 1997

Summary: Terri Swearingen fights the installation of a toxic-waste-incineration facility in her hometown of East Liverpool, Ohio. Have your students discuss the following questions:

- As a registered nurse, Swearingen had never been involved in environmental activism, nor did she have training in or knowledge of the effects of toxic air pollution on human or environmental health. What ethical principles motivated Swearingen to fight against the building of this toxic-waste-incineration facility? *(Swearingen was motivated by her commitment to future generations [particularly her own daughter] and her belief that future generations have the right to live in a healthy, clean place. Later, Swearingen became motivated by the ethical principle of justice, as she recognized that this toxic-waste facility [along with many others] was to be situated in an area where many low-income families lived.)*
- The company that was planning to build the waste-incineration facility stated that it would “provide badly-needed jobs to an economically depressed area.” Many environmental

controversies, such as this one, are often portrayed as "jobs versus the environment." How do you think that the benefits and drawbacks of providing jobs versus having a toxic-waste facility in a community should be weighed? Should there be legal rules that govern where polluting plants can be located? What role should the local community play in making these decisions? Do you think there are any people in East Liverpool, where Swearingen lived, who would have chosen the "jobs" provided by the factory over the "environment"? Why or why not? (Responses will vary.)

Discussion Questions: Wrap-Up

Use this short commentary, and the subsequent questions, to encourage discussion about quality and ethical responsibility closer to home. These questions will help students to summarize and synthesize what they have learned.

- The air around us supports our lives and all other living things on the planet, but we often don't even think about it. Air is invisible. It has no flavor, no smell—unless, of course, the air has been polluted. Next time you are outside, think critically about the air quality in your community. Walking around your neighborhood, do you notice any places where the air quality is poorer than others? Try to figure out what may be polluting the air; it may be a factory, farm, power plant, or busy road. Who lives with this air pollution? Discuss the ethical and environmental justice implications of air quality in your community. *(Responses will vary.)*
- Consider Terri Swearingen, Margie Eugene-Richard and M.C. Mehta. Before becoming involved in their respective environmental issues, were these people experts on air pollution? If not, what motivated them to want to make a difference and take action? *(None of these people were experts on air pollution before beginning their environmental fights. They were motivated by concern for future generations and decided to address issues that their political leaders and the company executives did not wish to address. Public pressure plus good scientific evidence brought these others into the discussion.)*
- What is the difference between the ethical principles of duty and utility? Were the people in these videos acting on the basis of utility or duty? To them, what was it that made them cross the line from utility to duty? *(The ethical principle of duty indicates a much stronger responsibility than utility does. Mehta, Eugene-Richard, and Swearingen all acted out of a sense of duty, which they described as arising from a concern for justice and future generations.)*

Activity Ideas

Although we may not realize it, every time we ride in a car instead of walk, or turn up the heat instead of putting on a sweater, we are making environmental and ethical decisions. The following activity suggestions help explore personal impacts on the atmosphere and investigate duties and responsibilities to do something about protecting and sustaining the environment. (Worksheets are provided for Activities #1 and #3.)

Activity #1: Individuals Count

While it is true that industries greatly affect air quality, individuals also have an impact. This activity will help you become more aware of your impact on air quality, and will help you consider ways to lessen that impact.

For one week measure your impact on the air. Although many different activities affect air quality, consider two of the most important: transportation choices and home energy use.

1. **Transportation:** Keep track of the number of miles you travel by car. To calculate how much fuel those car trips required, go to the website www.fueleconomy.gov. The site estimates average miles per gallon for the car used. (You will need to know the year, make, and model of the car.) You can multiply the combined MPG by the number of miles traveled to get the total amount of gas used. Then you can divide by number of people riding in the car to get your personal gas use. Also notice, on the "greenhouse gas emissions" gauge, how well the car in which you are riding scores. If you've taken public transportation, such as a bus or train, calculate the amount of fuel used for each of these activities. This calculation may be more difficult as you must divide the amount of fuel used by the number of people serviced. Therefore, even though a bus requires more gas overall, the burden of that fuel usage is spread out across more people. Conduct some research on fuel efficiency to try to estimate miles per gallon, or try asking the bus driver or train conductor. Divide the class into small groups and ask them to share and discuss their results.
2. **Home Energy Usage:** While it is difficult to actually measure your individual energy usage, you can estimate the amount of energy used in one week in your home by asking an adult to show you last month's electricity bill for your apartment or house. The bill should indicate the amount of electricity used in your home, which will probably fall between 500 and 1,000 kilowatt-hours. The bill will also include the time period for which that usage was calculated. Divide the amount used by the number of days included in the billing cycle, and then multiply by seven to get one week's usage. If you'd like to figure out how much of that may be attributed to you and your actions, divide the daily amount by the number of people who live in your house. This will give you an estimate of the amount of energy each person used to turn on lights, heat or cool the house, wash clothes and dishes, watch television, and undertake other activities that run using electricity. You may wish to visit the following websites to learn how you can make changes that will reduce your energy consumption. Some examples include the following:

- The U.S. Department of Energy
http://www.eere.energy.gov/consumerinfo/energy_savers/intro.html
 - The State of New Hampshire's Governor's Office of Energy and Community Services
 - <http://nh.gov/oep/programs/energy/ReducingHomeEnergyCosts.htm>
 - Colorado State University Extension
<http://www.ext.colostate.edu/pubs/columncc/cc011113.html>
3. Bring your calculations to class. Combine the figures to determine how much energy was used both in the home and for transportation. Then answer the following questions: In your area, how is energy created (e.g., coal, wind, nuclear, or hydropower)? How is energy usage, both within a house and for transportation, tied to air quality? How do car, bus, and train travel contribute to compromised air quality? What kinds of new technologies are being used to reduce this impact?
 4. To summarize what your class has learned, ask your students to create a class mural depicting different areas of a home and what can be done in each room to save energy based on what they have learned. Invite other students in the school to view the mural.

Activity #2: Considering the Ethical Principle of “Duty”

Read the provided excerpt from Aldo Leopold's famous essay, "The Land Ethic," from the *Sand County Almanac*. Selections from this essay are available at <http://www.worldpolicy.org/globalrights/environment/leopold.html>.

Use this essay as a basis for a journal entry and consider the following questions:

- Do you agree with Aldo Leopold's description of the land ethic? Why or why not?
- Do you feel a duty to the ecological community? Why or why not?
- Describe any actions that you feel a duty to do in your life. (These actions should not be motivated by personal satisfaction or the utilitarian satisfaction of the greatest good.)
- Do you feel any duty with respect to the natural environment? Why or why not?

Activity #3: In Your Community: Air Quality at Home

Learn more about the air quality in your community through the EPA's "Air Now" website (www.epa.gov/airnow). Compare air quality of your community to other communities in your state. Are there certain areas of your region or state that seem to have better or worse air quality than others? Can you think of some factors that may explain the difference?

Contact your local city, county, or state Department of Environmental Quality or Protection to find out if there is ongoing monitoring of air quality in your area. If so, what are the trends that the monitoring has highlighted? Have certain programs been put into effect to specifically address air quality?

Use the information you have gathered to write a short article for the school newspaper. You may work in teams to gather the information, and then you should select two or three authors to collaborate on the actual writing of the article. Other teams of students should collect or take photographs, while still others can use Excel or another software package to create graphical representations of the data to accompany the article.

Students may also work in small groups to create a skit that can be used to teach other students about air quality based on what they have learned throughout the lesson. Invite other classes to view the skit, and if possible, videotape the performance to use as a shared resource in the community.

After students have finished the lesson activities, you may wish to have them return to their Double Entry Journals for additional reflection.

AIR WORKSHEET

Individuals Count

Use the tables below to track the amount of energy you use in one week for transportation and electricity. You'll then calculate how much your personal energy use may affect the atmosphere.

Transportation

To figure out how much gasoline you use to get around, you'll need to keep track of the miles you travel on a car, bus, train, or plane. If you use a car, note the year, make, and model of the car so you can calculate the average miles per gallon by using the website www.fueleconomy.gov. If you use public transportation, you'll need to be creative in your accounting, using maps (or the website www.mapquest.com) to figure out the length of your trip, as well as do some research to find out the miles per gallon. Also, don't forget to keep track of how many people shared the car or bus with you.

<i>Where did you go?</i>	<i>Initial mileage</i>	<i>End mileage</i>	<i>Total miles</i>	<i>Type of vehicle</i>	<i>MPG for vehicle</i>	<i>Total gas (divide miles by MPG)</i>	<i>Number of people in vehicle</i>	<i>Individual gas (divide gas by # of people)</i>
<i>Total gas you used in one week:</i>								

To find out how much CO₂ results from your transportation choices, complete the following calculation:

_____ (gallons of gasoline) x 19 (pounds of CO₂ per gallon gas) = _____ pounds of CO₂

Electricity

You will need a copy of your latest electricity bill to compute your personal home energy use. Look on the bill for the number of kilowatt-hours consumed. You will also need to find out how your local utility produces power. To do this, check on the Internet or call the company to see if your local power plant uses coal, oil, natural gas, nuclear, hydro, wind, or solar power. Consult the chart below to find out how much CO₂ results from each kilowatt-hour of power.

<i>Pounds of CO₂ per kilowatt-hour</i>	<i>Coal</i>	<i>Oil</i>	<i>Natural gas</i>	<i>Nuclear</i>	<i>Hydropower</i>	<i>Wind</i>	<i>Solar</i>
	2	1.7	1	0	0	0	0

Fill out the following calculations to compute CO₂ created by your electricity use every month:

_____ (kilowatt-hours) / _____ of days in billing period x 7 days/week = _____ kilowatt-hours per week

_____ (kilowatt-hours per week) / _____ of people in family = _____ individual kilowatt-hours per week

_____ (kilowatt-hours per week) x _____ pounds CO₂ per kilowatt-hour = _____ pounds of CO₂

Total CO₂ emissions in a week: _____ (transportation) + _____ (electricity) = _____ pounds of CO₂

AIR WORKSHEET

Considering the Ethical Principle of “Duty”

Excerpt from: “The Land Ethic”* by Aldo Leopold

All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts. His instincts prompt him to compete for his place in that community, but his ethics prompt him also to co-operate (perhaps in order that there may be a place to compete for).

The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land.

This sounds simple: do we not already sing our love for and obligation to the land of the free and the home of the brave? Yes, but just what and who do we love? Certainly not the soil, which we are sending helter-skelter downriver. Certainly not the waters, which we assume have no function except to turn turbines, float barges, and carry off sewage. Certainly not the plants, of which we exterminate whole communities without batting an eye. Certainly not the animals, of which we have already extirpated many of the largest and most beautiful species. A land ethic, of course, cannot prevent the alteration, management, and use of these “resources,” but it does affirm their right to continued existence, and, at least in spots, their continued existence in a natural state.

In short, a land ethic changes the role of Homo sapiens from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow-members, and also respect for the community as such.

In human history, we have learned (I hope) that the conqueror role is eventually self-defeating. Why? Because it is implicit in such a role that the conqueror knows, ex cathedra, just what makes the community clock tick, and just what and who is valuable, and what and who is worth-less, in community life. It always turns out that he knows neither, and this is why his conquests eventually defeat themselves.

*Published in *The Sand County Almanac* by Aldo Leopold, 1948.

Write a short essay reacting to the above excerpt using the following questions to guide your writing:

- Do you agree with Aldo Leopold’s description of the land ethic? Why or why not?
- Do you feel a duty to the ecological community? Why or why not?
- Describe any actions that you feel a duty to do in your life. (These actions should not be motivated by personal satisfaction or the utilitarian satisfaction of the greatest good.)
Do you feel any duty with respect to the natural environment? Why or why not?



MINERALS

Purpose: The purpose of this lesson is to introduce students to the issues surrounding the environmental and social impacts of mineral use.

Overview: Mineral resources make modern life possible. Minerals are non-renewable, however, so our use of them must be responsible and sustainable. This lesson highlights the ethical principle of justice in deciding who benefits from mineral use and who bears the brunt of the environmental and social impacts associated with mining and processing.

Objectives: Students will be able to describe the ways in which mineral resources contribute to our modern lifestyles. Students will be able to explain some of the environmental and social complexities inherent in the mining and processing of mineral resources, and discuss the benefits and drawbacks of using non-renewable resources.

Key Concepts:

- Mineral resources, which are non-renewable, are critical to supporting our modern lifestyle.
- It is important to use non-renewable resources in a sustainable way to ensure that the benefit of using those resources now is balanced with the importance of saving resources for future generations.
- The ethical principle of justice requires weighing the benefits that accrue from the use of mineral resources against the negative impacts that may disproportionately affect local communities and cultures, particularly the poor and disadvantaged.

Vocabulary: justice, intergenerational justice, mineral resources, mining, non-renewable resource, tailings

You may wish to provide students with definitions of these words, and discuss and clarify their meaning prior to viewing the video and completing the lesson plan and activities.

Time: One class session for watching videos and completing discussion. Additional sessions are required to complete the suggested activities.

Video Segments: Video #1: Jonathon Solomon, Sarah James, and Norma Kassi, 2002; Video #2: Atherton Martin, Dominica, 1998; Video #3: Jacqui Katona and Yvonne Margarula, Australia, 1999.

Background

The lesson plan begins with Key Teaching Points. These points contain the most important features of the lesson. As your students view the videos and participate in class discussions and activities, it is important to emphasize these ideas.

Key Teaching Points:

- Today's modern lifestyle relies heavily on resources extracted from the Earth.
- Mineral resources are non-renewable, which means that they are not naturally replenished. Therefore, we must use them responsibly to ensure that we conserve mineral resources for the future.

The Student Workbook contains important information about the lesson concepts. Prior to viewing the videos, have your students read the Minerals section of the Student Workbook. There are several different ways you can choose to do this. You may wish to assign this reading as homework or you may also read the information together as a class.

After the students have read the assigned section of the Student Workbook, have the class watch the video.

After watching the video, engage your students in discussion.



Discussion Questions: Video #1: Jonathon Solomon, Sarah James, and Norma Kassi, United States and Canada, 2002

Summary: The Arctic National Wildlife Refuge provides one of the best-known backdrops for controversies related to the use and conservation of mineral resources. The debate over drilling for oil in northeast Alaska has raged for decades, and the activists profiled in this video are working to ensure that their native homeland is protected for generations to come.

The Arctic National Wildlife Refuge (ANWAR) represents one of the most difficult and controversial environmental and ethical dilemmas related to resource use. Use these questions to lead a discussion on the benefits and tradeoffs of resource use, as well as the concerns related to protecting cultures and societies.

- What ethical principles form the basis of the ANWAR debate? What individuals or groups invoke each of these principles? Is one more convincing than the other? Why or why not? *(The groups and individuals who are in favor of drilling for oil in ANWAR base their arguments on the principle of utility—the petroleum resources available in ANWAR could provide material benefits to Americans in the form of fuel as well as income for Alaska residents. Those who are opposed—including the Gwich'in tribe, profiled in the video—invoke the principle of justice, recognizing that the local people and wildlife will pay the price of the resource extraction without gaining the benefits of its use. The Gwich'in also believe that it is their duty to protect this landscape, which has nurtured and been home to their people for many generations.)*

- If the local people—particularly the Native American tribes—were to be offered generous monetary compensation in exchange for their approval of the drilling project, do you think they would agree to it? Why or why not? *(Most likely, monetary compensation would make no difference as the ethical stance of the Gwich'in—and other local people—is not based in material values. The value of a functioning ecosystem cannot be measured in monetary terms, and if drilling were to begin, the area would likely be seriously damaged.)*

Topic 1: Appreciation

Key Teaching Points:

- Minerals have been valuable throughout human history for both utilitarian and aesthetic reasons.
- Today's use of minerals affects almost every aspect of our daily lives. Certain products that are common and often taken for granted—including batteries, computers, television screens, telephones, and cars, to name a few—rely heavily on mineral resources.
- To understand the impacts of our use of minerals, we must take into account other impacts, such as the social and environmental costs associated with the mining and processing of mineral resources.



Discussion Questions: Video #2: Atherton Martin, Dominica, 1998

Summary: Atherton Martin protested the building of a copper mine on the Caribbean island of Dominica. Through convincing arguments about the visible and invisible social and environmental costs, he was able to persuade the mining company, as well as the local community, to consider the benefits and drawbacks of the proposed project.

Atherton Martin's story demonstrates a fight that is perceived to represent economics versus the environment. Have your students discuss this tradeoff and explore whether there can be solutions that have both environmental and economic benefits.

- What benefits did the proposed mining project tout to the local community? Why were these arguments persuasive or not persuasive, in light of Dominica's situation? *(The mining company promised economic and job benefits to Dominica. Dominica is a small, relatively poor country whose economy is based mainly on farming and tourism. Therefore, the promise of substantial economic benefits may have been tempting to locals in search of jobs but, at the same time, may have caused concern over the impacts the project might have on tourism.)*
- If the mining project were to go through, would there be economic impacts, in addition to environmental (and potentially social) impacts? *(Because Dominica's economy is based on tourism and farming—both of which require healthy environments—it is possible that the environmental damages from the proposed mine would have had drastic effects on both of these economies. By polluting waterways and air resources, the mine might have diminished tourism and greatly affected farming.)*

- Can you think of other examples of linkages between the environment and economics that may not be immediately visible? Are there any controversies in your own community that demonstrate these tradeoffs? Are there activists and groups working to make visible the tradeoffs that often occur with new economic development activities? *(Responses will vary.)*

Topic 2: Ecology

Key Teaching Points:

- Mineral deposits are distributed around the globe as a result of worldwide geologic processes that determine the formation and distribution of minerals.
- Minerals are compounds and elements that constantly cycle through the Earth's crust and mantle.
- Mining mineral resources is a difficult, expensive process that can be very disruptive to both the environment and to human communities. The mining, transporting, processing, and disposing of minerals occur at great environmental and social costs.



Discussion Questions: Video #3: Jacqui Katona and Yvonne Margarula, Australia, 1999

Summary: When a uranium mine threatened Kakadu National Park—one of only 20 World Heritage Sites with cultural and natural significance—Katona and Margarula leapt into action. These Aboriginal women mounted a massive opposition campaign to prevent the mine, which would have severely impacted upon their traditional lands and destroyed the fragile ecosystem.

Use the following questions in your class discussion:

- Because minerals are unevenly distributed around the world, many resource-extraction companies argue that it's necessary to mine minerals wherever they occur. They also argue that the practice is fair and ethical because the benefits of the minerals' use accrues to many people from many countries. Based on the knowledge that minerals are located only in certain parts of the world, how would you respond to this argument? *(Responses will vary.)*
- Why is the Jabiluka Mine such a controversial project? Who are the major opposing sides, and what does each side represent and believe? Are there differences in the sides' ethical relationship with the land and natural resources? *(The mining company, Energy Resources of Australia, wants to develop an underground uranium mine within the boundaries of Kakadu National Park. Based on a utilitarian value, the company believes that the uranium resources it could mine would provide great material benefits to consumers as well as economic benefits to the company. However, the Aboriginal people who live in Kakadu, and for whom the land holds spiritual and ancestral significance, believe that mining in this sacred, fragile area would destroy it forever. Aborigines such as Katona and Margarula believe that they have an ethical duty to conserve this World Heritage Site for future generations of Aborigines and visitors alike.)*

- Energy Resource of Australia claims that the mine would provide enough nuclear fuel to power a plant for the next three decades. The anti-mining groups argue that it will also create 20 million tons of radioactive mine-tailings, dust, and radon gas. If you were a government official who had to decide whether or not to let this mine move forward, how would you make your decision? Is there more information you would need to know? Where would you go to find this information? How could scientific research and data help you make an informed decision? How could you judge whether the information and scientific data were from a biased source? *(Responses will vary.)*

Topic 3: Responsibility

Key Teaching Points:

- According to the principle of utility, minerals provide greater benefits to a larger number of people when they are mined and used rather than left undisturbed underground.
- According to the principle of justice, it is important to consider how mineral resources, which are so integral to modern life, can be managed so that their benefits flow not only to people who are well-off, but also to people who are less advantaged.
- Another concern regarding mineral resources, which are non-renewable, is what to do once the current stocks are depleted. We must consider the potential impacts of our overuse of mineral resources on future generations. This is the principle of intergenerational justice.
- People can take specific actions to conserve the current stocks of mineral resources and limit the social and environmental impacts of mining, ensuring a healthy environment and a wealth of mineral resources for future generations.

Discussion Questions: Wrap-Up

Have your students consider the following questions to instigate a discussion of the ethical challenges inherent in considering who gets to use how many resources, who should monitor resource use, and who has the authority to decide what must be saved for future generations.

- Think about your own use of resources such as petroleum, other energy sources (for example, electricity), water, food, and minerals. Do you believe that you use those resources responsibly? Why or why not? *(Responses will vary.)*
- Do you reduce, reuse, and recycle? Why or why not? How are the "three R's" important in helping to conserve resources for the future? Given the stories presented in the videos, what do reducing, reusing, and recycling have to do with justice? *(The idea behind the "reduce, reuse, recycle" mantra is that, if we can shrink the demand for minerals, we can lessen the extent and intensity of mining activities. By minimizing ongoing mining, in turn, the environmental and social impacts that accompany those activities are lessened. Finally, by conserving these important and non-renewable resources, we can ensure that future generations benefit from them as well.)*

- If you choose to reduce, reuse, and recycle, but others don't, how does that make you feel? Does it seem unfair that some people get to use more resources than others, yet there aren't any penalties that go along with using more than your fair share of resources? What mechanisms might help ensure a more equitable use of resources? *(Some people think that industries and countries can be self-regulating, and make appropriate political, economic, social, and environmental choices for their own citizens with regard to resource use. Others insist that more regulation—by national governments as well as through international treaties—is necessary to oversee the equitable distribution and use of Earth's precious mineral resources. While the debate continues on the best ways to ensure equality, it's important to remember that equity in resource use is a complex and multifaceted issue: Often the first and easiest answer is not the most socially just or environmentally appropriate.)*

Activity Ideas

The following activities are optional after watching the videos and participating in the recommended discussions. (Note that a student worksheet is provided for Activity #2.)

Activity #1: Mineral Trace-Back

Choose one modern item that you use on a regular basis, such as a computer or a cell phone, and find out what mineral materials go into its production. Conduct research to find the nation of origin of those materials, how they are mined and processed, and the environmental and social concerns that may be related to the production of those minerals. Also, look into options for "reducing, reusing, and recycling" the final products. What are the most responsible ways to dispose of used or obsolete computers or cell phones, for example?

Based on your findings, create a trace-back diagram that includes a world map showing where all of the materials were mined and processed. Then use a flow chart to show the path taken by those minerals as they made their way into your computer, cell phone, television, or DVD player. Include bullet points by each location that describe the environmental and social costs and concerns. Finally, provide recommendations for responsible use and disposal of the items.

Include all of this information on a colorful and well-designed poster that can be shared with your classmates. Hold a class "poster session" where you have the opportunity to walk around and talk with other students about the products they researched, view their trace-back diagrams, and hear what they learned about how to responsibly use and dispose of mineral-intensive products. Invite other classes and community members to participate in the poster session. You may wish to videotape the session.

Activity #2: Enviro-Mines: The Wave of the Future?

Many people are concerned with the social and environmental impacts of mining, and many groups are working to make mining a cleaner, safer, and healthier practice for people and wildlife alike. Undertake a research project to find out about the companies, governments, and nonprofit

organizations working on developing practices and procedures to clean up the act of some of the dirtiest mines. Focus particularly on the social concerns voiced by the organizations working to find alternative processes and products, and explore how the principle of environmental justice is driving many of these efforts.

Ask your students to conduct a research project to find out about the companies, governments, and nonprofit organizations working on developing practices and procedures to clean up the act of some of the dirtiest mines. Have them focus particularly on the social concerns voiced by the organizations working to find alternative processes and products, and explore how the principle of environmental justice is driving many of these efforts.

Divide the class into small research groups. Have the students begin by visiting the Mining Certification Evaluation Project's website: www.minerals.csiro.au/sd/SD_MCEP.htm. Provide the class with the following questions:

- What is the goal of this project?
- How is this project concerned with environmental ethics and social justice?

Tell the class to visit the recommended links from this page, and search the websites of the sponsor organizations to gain insight into the types of groups working on these efforts and their successes, as well as failures, to date.

Using the information the students have gathered, work as a class to create a colorful and informative brochure that discusses the history and background of mining, the environmental and social concerns related to it, and the efforts being made to pursue socially and environmentally friendly mining. Tell the students to include tips on ways for consumers to make more responsible choices with regard to consumption, recycling, and reusing of mineral-intensive products, such as mobile phones, televisions, and batteries. To create a professional-looking and eye-catching brochure, divide up jobs among classmates to capitalize on everyone's strengths, including writing, editing, drawing or photography, design and layout, and production. Use the Mineral Worksheet: Story Board Template to help students plan their brochures.

Distribute the brochure to students, parents, and administrators at your school. You may also wish to consider partnering with a local electronics store or recycling center to distribute the brochure to customers.

Activity #3: In Your Community: Minerals All Around

Find out about the mineral resources in your state. Conduct a research project to address the following questions:

- Are there any mines or processing facilities nearby?
- What kind of minerals do those facilities mine or process?
- How are those minerals used? What products are they used to produce?
- How long has the mine or processing facility been in operation? Are the resources being depleted? How much is left? Does the company in charge of the mining or processing have a

plan for the future exploitation of the resource, particularly if it is being depleted relatively quickly?

- Are there individuals or groups in your area that are concerned with the environmental or social impacts of the mining or processing facility? What are their concerns?
- Are there others who refute the environmental and social concerns? What are their counter-arguments?

Once you've become well educated on the background of the mine or the facility, arrange a tour, if possible. In addition, tour the community around the mine or plant, and interview local people. How do they feel about the facility? Are they pleased that it exists because of the economic benefits it provides to the community? Do any of them express concerns about the environmental or social impacts? Investigate who benefits from the facility and who bears the costs.

Based on what your class learns, write an article for the community or school newspaper that discusses the history of the mine or the facility, benefits and drawbacks to its location in your state, and recommendations for future economic, social, and environmental sustainability of the facility. Students may also create a multimedia slide presentation based on what they have learned from their research in this activity.

MINERAL ACTIVITY

Enviro-Mines: The Wave of the Future?

Many people are concerned with the social and environmental impacts of mining, and many groups are working to make mining a cleaner, safer, and healthier practice for people and wildlife alike. Undertake a research project to find out about the companies, governments, and nonprofit organizations working on developing practices and procedures to clean up the act of some of the dirtiest mines.

Conduct research to find out about the companies, governments, and nonprofit organizations working on developing practices and procedures to clean up the act of some of the dirtiest mines. Focus particularly on the social concerns voiced by the organizations working to find alternative processes and products, and explore how the principle of environmental justice is driving many of these efforts.

Visit the Mining Certification Evaluation Project's website at: www.minerals.csiro.au/sd/SD_MCEP.htm. Consider the following questions:

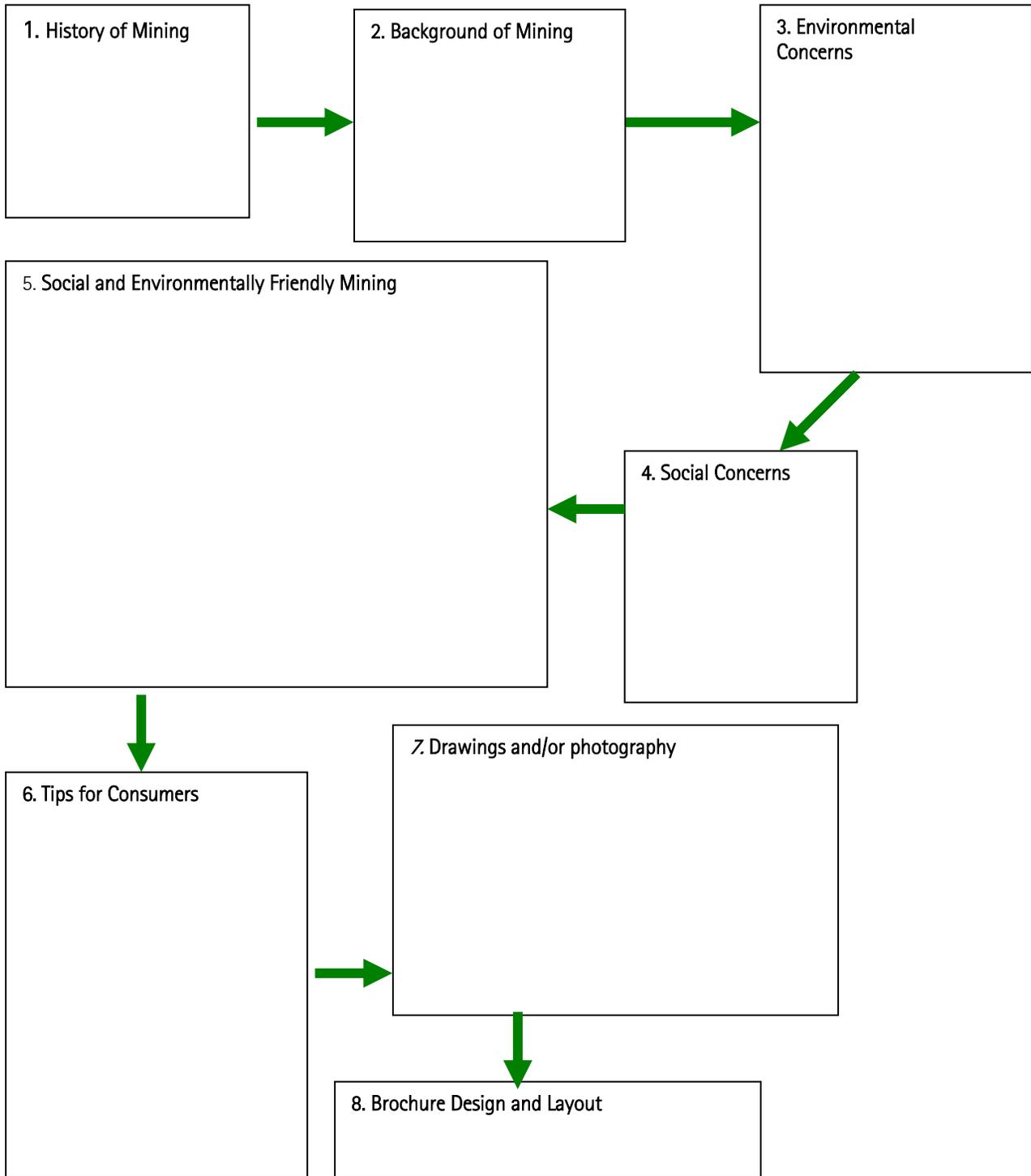
- What is the goal of this project?
- How is this project concerned with environmental ethics and social justice?

Visit the recommended links from this page, and search the websites of the sponsor organizations to gain insight into the types of groups working on these efforts and their successes, as well as failures, to date.

Use the Mineral Worksheet: Storyboard Template to organize your information. You are going to create a colorful and informative brochure that discusses the history and background of mining, the environmental and social concerns related to it, and the efforts being made to pursue socially and environmentally friendly mining. Include tips on ways for consumers to make more responsible choices with regard to consumption, recycling, and reusing of mineral-intensive products, such as mobile phones, televisions, and batteries.

MINERAL WORKSHEET

Story-Board Template



Extension Activities

Environmental Ethics provides an array of resources and activities for high school classroom teachers. The following section contains a list of extension suggestions that may be used to further enhance students' learning.

Class Book

Ask your students to select a Goldman Environmental Prize winner who addressed an issue that they felt was compelling. Have the students conduct additional research and create a page highlighting what they have learned. Allow students to work individually, in pairs, or in small groups. Compile students' work into a class book and use the book as a shared resource in the class, school, and community.

Design a Website

Ask your students to reflect on what they have learned about environmental ethics from the curriculum activities. Have them create a class website highlighting environmental ethics. Some good sources for creating websites can be found at the following web pages:

- <http://www.smpplanet.com/webpage/webpage.html>
- <http://www.actden.com/fp/>

Mock Television Show

Divide the class into small groups and ask them to create a mock talk-show broadcast based on different issues from *Environmental Ethics*. Ask each group to select a recipient of the Goldman Environmental Prize and create questions and answers pertaining to that individual's environmental work. Select a host/moderator. Stage the show, and invite other classmates and community members to the performance.

Public Service Announcement

Explain to students that public service announcements (PSAs) are short, non-commercial announcements aired on television and radio that are designed to educate people about issues that are difficult to deal with and to give people information about these issues so they can contemplate them and take positive action. Have the students work in small groups to create PSAs based on a topic that is of high interest to them from *Environmental Ethics*. Prior to creating their own PSA, send students to Listen Up's Youth Media website to view examples of public service announcements created by young people at <http://www.pbs.org/merrow/listenup/psacampaign/index.html>.

Multimedia Slide Show

Ask your students to work in small groups to create a multimedia slide show on environmental ethics and conservation. Encourage the class to use words, images, music, and photographs to convey their ideas.

Design a T-Shirt

Ask your students to create original t-shirt designs that reflect their ideas on conservation. If possible, try to get the t-shirts printed and sell them to raise funds for local environmental efforts.

Word Wall

Ask your students to create a class word wall composed of quotations about the environment. Some excellent resources include the following websites:

<http://www.curriculum.org/tcf/teachers/projects/wordwalls.shtml>

Calendar

Ask your students to create a calendar that incorporates what they have learned about the environment and current day and local conservation issues using local sites and resources. If possible, have the calendars printed and sell them to raise funds for local environmental efforts.

Environmental Art/Poetry/Music

Ask your students to express their relationship to the environment by creating original poetry, art or music. Have your students share their creations with their classmates.

Museum Exhibit

Ask your students to work in small groups to create a museum exhibit that highlights an area of conservation that is of interest to them. Invite other classes and community members to view the museum exhibit.

Power to Protect Video

Have your students create a "Power to Protect" video that discusses how people have the power to protect every species on Earth. Tell students that they may include information from the Goldman Video, class discussions, and personal experiences, as well as text, newspaper, Internet, and media resources. After creating the video, brainstorm ideas for places to show the video. These places might include other local schools, local community groups, or a local cable television station.



CONCLUSION: THINKING LIKE A MOUNTAIN

Overview: Review the basic principles of environmental ethics, exploring how the three levels of appreciation, ecology, and responsibility can guide people to take right and good actions that support environmental conservation.

Objectives: Students will be able to articulate the way ethical environmental actions are undertaken based on the importance of having an appreciation of the natural world, an understanding of its ecology, and a sense of responsibility to conserve it. They will be able to discuss and provide examples of the ethical principles of utility, duty, and justice.

Key Concepts:

- The three levels of the Eco-Ethical Mountain—appreciation, ecology, and responsibility—underpin ethical actions with respect to the natural world.
- Ethical responsibility is based on principles of utility, duty, and justice.
- People are an integral part of nature; we are members of the ecological community.
- "Thinking like a mountain" includes developing not only an ecological understanding, but also a deep ethical respect for the natural world.
- If we recognize that we are part of nature, and start "thinking like a mountain," we can fully appreciate the responsibility we have to protect the environment.

Vocabulary: appreciation, duty, justice, responsibility, utility

Time: One class session to watch and discuss the video profile. Additional class sessions to complete suggested activities.

Video: Yosepha Alomang, Indonesia, 2001.

Background

The lesson plan begins with Key Teaching Points. These points contain the most important features of the lesson. As your students watch the video profiles and participate in class discussions and activities, it is important to emphasize these ideas.

Key Teaching Points:

- The video profiles in this course were about Goldman Environmental Prize winners who acted, often at great risk to themselves, to protect the environment because they felt it was the right thing to do.

The Student Workbook contains important information about the lesson concepts. Prior to viewing the video profiles, have your students read the Conclusion section of the Student Workbook. There are several different ways you can choose to do this. You may wish to assign this reading as homework or you may also read the information together as a class.

After the students have read the assigned section of the Student Workbook, have the class watch the video.

Topic 1: Review of Basic Ideas

Key Teaching Points:

- As discussed throughout each of the six lessons, the Eco-Ethical Mountain is built on three levels: appreciation of how we value the environment, ecological understanding of environmental issues, and an ethical responsibility to act.
- Drawing from earlier lessons, we're reminded that the ethical principles that drive responsibility—and that are used to justify actions—include utility (weighing the costs and benefits so that the greatest good accrues to the greatest number of people); justice (making sure that benefits are shared equally and that a minority is not exploited or harmed to benefit the majority); and duty (an obligation to do certain things according to some overriding rule or belief of what is good and right).



Discussion Questions: Review

Use the following questions to review the basic ideas of this course. Guide the discussion so that it encourages students to connect these concepts with the stories of the Goldman Prize winners profiled in the videos as well as with their own local environment.

- How do the people portrayed in the video profiles in earlier units demonstrate the principles of appreciation, ecology, and responsibility? *(Each of the prize-winners was grounded in a deep appreciation of the natural world, which led them to become involved in protecting the environment. They then based their actions on ecological principles and understanding: those who had no ecological background, conducted intensive research and consulted with experts*

on the most appropriate actions to undertake. Finally, all of the prize-winners profiled in the videos were motivated by an overwhelming sense of responsibility, or duty, to the natural world. None of these three “pillars” can exist without the other two, and it is the combination of these that led the Goldman Prize winners to take extraordinary actions to protect their ecological community.)

- Can you think of a local landscape or ecosystem for which you have a deep appreciation, possess some knowledge of the ecology, and feel a responsibility to protect? How did you come to know this area? What actions would you be willing to undertake to ensure that it is conserved? Are there other people or organizations that feel this way, too? What actions are they undertaking? *(Responses will vary.)*

Topic 2: An Ecological Community

Key Teaching Points:

- Human beings are not separate from nature; rather they are an integral and intimate part of it.
- Ecologist and environmental philosopher Aldo Leopold based his environmental ethic on expanding the definition of community to include all the living and non-living things in our environment.
- “Thinking like a mountain” is the phrase that embodies Leopold’s philosophy. It requires a combination of ecological knowledge and deep ethical respect. Leopold’s mountain is similar to the Eco-Ethical Mountain and recognizes that we must build an ethical understanding of an issue on a robust foundation of appreciation, ecology, and responsibility.
- In the community of life, human beings, as the most intelligent and developed living things on the planet, are at the apex of the mountain. But, like mountains, we depend on everything below us—the environment that supports our lives.



Discussion Questions: Aldo Leopold and “Thinking Like a Mountain”

Use the following questions to explore Aldo Leopold’s environmental philosophy.

- Do you agree with Aldo Leopold’s statement that “all ethics . . . rest upon a single premise: that the individual is a member of a community of interdependent parts”? Do you think that you can make ethical decisions and have ethical convictions without believing that humans are part of an interconnected ecological community? Why or why not? *(Responses will vary.)*
- According to Leopold, is it possible to make an ethical decision that may benefit people, but harm the environment? Do you agree or disagree with him? Why? *(Leopold believes that it is not possible to make an ethical decision that only benefits humans. According to him, humans are inextricably linked with nature and, indeed, are actually part of nature. Therefore, an action that harms the natural world will inevitably harm humans in the end.)*

Topic 3: Our Common Responsibility

Key Teaching Points:

- Yosepha Alomang illustrates all of the ethical principles: She stood up for the environment because of the utility of nature, the injustice of mining, and her duty to her community.



Discussion Questions: Video #1: Yosepha Alomang, Indonesia, 2001

Summary: Yosepha Alomang (also called Mama Yosepha) is the matriarch of the Amongmai tribe of West Papua New Guinea. She fought to prevent the world's largest gold mining corporation from destroying the sacred mountain, as well as the surrounding forests and streams, where her people live. Use the following questions in your class discussion:

- How was gold and copper mining hurting the environment and Mama Yosepha's community? *(To mine the minerals, the corporation would have to cut down the forest and disrupt the local ecosystem. The waste products of the mining, called tailings, often contain high levels of toxics, and are dumped at a rate of 200,000 tons a day into rivers, polluting local water sources. This destruction seriously undermined the ability of the Amongmai to continue their subsistence lifestyle.)*
- Mama Yosepha said, "I will die for my people and my land." Why do you think she feels so strongly? What arguments does she use against the mine? *(Mama Yosepha draws on all three ethical principles in arguing against the mine: nature has value [utility], the mining imposes an unfair burden on her people [justice], and the environment must be protected because her people are part of the community of nature [duty].)*
- Do you think there is any way you could help Mama Yosepha and the Amongmai? What would happen if people didn't buy gold mined from there? Or if people spoke out against the mine and wrote letters to politicians or newspapers? *(Responses will vary.)*

Discussion Questions: Wrap-Up

Use this short commentary, and the subsequent questions, to encourage a final discussion about environmental ethics in your class. These questions will help students to summarize and synthesize what they have learned.

- **Commentary:** Although ethics is the study of right and wrong, in ethics there are no right or wrong answers. We all come to different conclusions based on our beliefs and experiences. However, we use ethical principles to justify our decisions. In this final discussion, think deeply about your own ethical principles, and how you use them to support your actions. Also, think about your relationship with the natural world.

- Has anything you learned in this course made you re-evaluate your opinions on environmental issues? How do your opinions and actions relate to utility, justice, or duty? *(Responses will vary.)*
- Should one of the three principles—utility, justice, or duty—take precedence over the others? In some cases, is one of the three privileged? What are some examples of times when one of the three may be more important than the others? *(The principle of duty frequently takes precedence because, to those who feel an ethical sense of duty, there is no room for compromise or debate. While utility is by no means negative, when it is privileged over justice, issues of environmental justice can arise. In a balanced ethical decision, all three principles should weigh equally, with duty often being the principle that leads to action, as has been demonstrated in the video profiles highlighting the actions of the Goldman Prize winners.)*
- Do you think your opinion on an environmental issue would change if you were in the minority that felt the most harm, like Mama Yosepha? For example, what if someone wanted to take away the land on which your house or school is built on to mine for minerals? What if this plan would also pollute your drinking water and poison your food? Would you oppose this plan, even if it would provide the greatest good to the greatest number? Why or why not? *(Responses will vary.)*
- Have you ever felt motivated by duty—an incredibly strong sense of responsibility, based on an ethical conviction—to undertake an action that may go against the principles of utility or justice? If so, describe the situation. If not, can you imagine an issue or situation that would cause this to happen? Did any of the Goldman Prize winners seem to be overpowered by a sense of duty, de-emphasizing one of the other two principles? *(All of the prize-winners were motivated by a sense of duty, and some of them had a sense of duty that strongly overpowered the principle of utility. For example, Terri Swearingen [in the "Air" lesson] privileged justice and duty over utility in her fight against a toxic-waste incineration facility in her hometown. And [in the "Forests" lesson] Colleen McCrory's sense of duty to protect intact forest ecosystems outweighed the utilitarian value that would be derived from logging Canada's old-growth forests.)*
- Have you ever come across or learned about someone who was driven by duty with whom you disagreed? Can duty ever be a dangerous principle upon which to hinge one's actions? *(Throughout history, people have felt the duty to do things that were later revealed to be intolerant, inhumane, or in some other sense unethical. For example, before the Civil War, some Americans felt it was their duty to hold slaves because, if freed, the slaves could not care for themselves. Some religious people felt it was their duty to convert others to their beliefs and punish them if they did not convert. Members of terrorist movements feel it is their duty to kill others in order to gain their objectives. A sense of duty can be dangerous unless based on honestly-evaluated ethical principles and on facts. Thus, we use the Eco-Ethical Mountain to ground our ethical beliefs in human appreciation, value, and scientific understanding before drawing on the ethical principles of utility, justice, and duty to support a sense of responsibility.)*

Activity Ideas

The following suggestions will help your students explore environmental issues in your community, and think about the responsibility they may feel to act in an ethical manner with respect to the environment. (Note that a student worksheet is provided for Activity #2.)

Activity #1: Special Places

Ask your students to write a personal essay on some local environment that is special to them. Use the following guiding statements and questions: Describe what appeals to you about this place. Do you possess an ethical commitment to conserve and protect this environment? If so, is this ethical commitment likely to affect actions you take if this environment is harmed in the process?

Activity #2: Thinking Locally and Globally

Have your students undertake a journaling exercise (based on the following list of questions) to consider how their sense of environmental ethics may have changed by learning about the Goldman Prize winners. They should also consider how learning more about how ethical principles can guide our beliefs and actions has affected their perspective.

- Make a list of actions that you consider to be your ethical duty to perform to conserve and protect *local* water, air, forests, wildlife, and mineral resources. Do the same for *national* and *global* water, air, forests, wildlife, and mineral resources.
- Does your sense of duty and responsibility change when considering the local versus the global environment? Why or why not?
- Do you feel more empowered to make a difference at the local or global level? Does this affect your willingness to undertake actions?
- Are these feelings of ethical duty and responsibility different from those you had before undertaking this environmental ethics unit? If so, in what ways?

Provide time for students to share an excerpt from their journal with the entire class.

Activity #3: In Your Community: Wetland Wonderland

Take your students on a field trip to examine the individual physical and biological properties of a nearby wetland, such as a lake, river, estuary, or shoreline. Through observation and with the aid of field guides, students should explore the relationships between the living and non-living elements of this environment. Have them create an ecosystem web diagram that demonstrates how the living and non-living components of the community depend on one another.

Upon returning to the classroom, ask your students to consider how humans are related to this natural setting and how they depend upon, benefit from, and contribute to this ecosystem. They should conduct research on the history of the wetland, particularly focusing on how people have used it in the past and how they use it now. (For example, did it used to be the local water source and provide food to the local community [through fishing or hunting]? Is it now part of a protected area

and "off limits" to human activities? Or does it still serve to provide drinking water, but now for a much larger community?) Did the shift in perspective—from examining individual elements of this environment to exploring its various relationships, including the human dependence—change their feelings about this place? Did it result in any greater ethical commitment to conserve and protect this area?

Have each student use the basis of this class exploration to write a short editorial to a local newspaper describing the importance of this wetland, some of the issues threatening it, and what each student perceives to be her or his ethical commitment to protecting it.

Have students bring the Conclusion Worksheet: Wetland Wonderland Organizer with them on the field trip to record information. Tell students to refer to this organizer when they write their editorial.

CONCLUSION WORKSHEET

Wetland Wonderland Organizer

Record information from your field trip in the organizer; use the information to write your editorial.

What Did I Do?

Use this space to describe what you did on your field trip.

What Did I Learn?

Use this space to explain what you learned on the field trip.

How I Can Use This Information?

Use this space to record ideas on how you can use the information that you learned.

INTERNET RESOURCES

CIA Website / World Factbook
www.cia.gov/cia/publications/factbook

The Library of Congress Website / American Memory
<http://memory.loc.gov/ammem/gmdhtml/gmdhome.html>

United Nations Website / Cartographic Section
<http://www.un.org/Depts/Cartographic/english/htmain.htm>

University of Alaska Anchorage Website / Vocabulary Strategies For High School Students
<http://litsite.alaska.edu/uaa/workbooks/readingvocabulary.html>

Reading Online / Teaching Vocabulary to Adolescents to Improve Comprehension
http://www.readingonline.org/articles/art_index.asp?HREF=curtis/index.html

Curriculum Services Canada Website / Word Walls - A Support for Literacy in Secondary School Classrooms
<http://www.curriculum.org/tcf/teachers/projects/wordwalls.shtml>

National Center on Accessing the General Curriculum Website / Graphic Organizers
<http://www.cast.org/ncac/index.cfm?i=3015#vocabulary>

North Central Regional Educational Laboratory Website / Graphic Organizers
<http://www.ncrel.org/sdrs/areas/issues/students/learning/lr2grap.htm>

North Central Regional Educational Laboratory Website / KWL Charts
<http://www.ncrel.org/sdrs/areas/issues/students/learning/lr2kwl.htm>

Mid-continent Research for Education and Learning Website / K-12 Educational Standards
www.mcrel.org

Small Planet Communications / Create Your Own Website
<http://www.smpplanet.com/webpage/webpage.html>

Microsoft's Front Page in the Classroom Website
<http://www.actden.com/fp/>

PBS Website / Listen Up Youth Media Network
<http://www.pbs.org/merrow/listenup/psacampaign/index.html>

David Sheldrick Wildlife Trust Website
<http://www.sheldrickwildlifetrust.org/index.html>

BBC News Website / Stories

http://newswww.bbc.net.uk/2/hi/south_asia/2583891.stm

<http://www.bbc.co.uk/nature/wildfacts/factfiles/178.shtml>

Convention on International Trade in Endangered Species of Wild Fauna and Flora

www.cites.org

TRAFFIC Website

www.traffic.org

World Wildlife Fund Website / Wildlife Trade

www.worldwildlife.org/cites

Colorado State University Website / Backyard BioBlitz

www.nrel.colostate.edu/projects/iboy/biomonth/backbioblitz.html

Forest Stewardship Council Website

www.fscus.org

Sierra Club Website

www.sierraclub.org

Wilderness Society Website

www.wilderness.org

National Forest Protection Alliance Website

www.forestadvocate.org

American Forest Resource Council Website

<http://www.afrc.ws/>

Forest Resources Association Website

www.apulpa.org

Mountain Voices Website

<http://www.mountainvoices.org>

Peace Corp Website / Water in Africa

<http://www.peacecorps.gov/wws/water/africa/resources/index.html>

Marine Stewardship Council Website

www.msc.org

Audubon's Living Oceans Website / Seafood Lover's Guide

www.Audubon.org/campaign/lo/seafood/index.html

Monterey Bay Aquarium Website / Seafood Watch
www.mbayaq.org/cr/seafoodwatch.asp

Environmental Protection Agency Website / Surf Your Watershed
<http://cfpub.epa.gov/surf/locate/index.cfm>

U.S. Department of Energy Website / Fuel Economy
www.fueleconomy.gov

U.S. Department of Energy Website / Energy Savers
http://www.eere.energy.gov/consumerinfo/energy_savers/intro.html

New Hampshire Office of Energy and Planning Website / Resources
<http://nh.gov/oep/programs/energy/ReducingHomeEnergyCosts.htm>

Colorado State University Extension Website / Reducing Energy Costs
<http://www.ext.colostate.edu/pubs/columncc/cc011113.html>

World Policy Institute Website / Selections from "The Land Ethic"
<http://www.worldpolicy.org/globalrights/environment/leopold.html>

Environmental Protection Agency Website / Air Now
www.epa.gov/airnow

Map Quest Website
www.mapquest.com

Mining Certification Evaluation Project
www.minerals.csiro.au/sd/SD_MCEP.htm

Goldman Prize Website
www.goldmanprize.org

GLOSSARY

Acid Rain. rain or other precipitation that is acidic due to air pollution. Acids are sour liquids (think lemon juice) that corrode or break down the rock in statues and buildings and can have a negative impact on the health of humans and ecosystems.

Air. the mix of invisible, odorless and tasteless gases that surround the Earth.

Alpine Forest. the type of forest found in high elevations and latitudes, characterized by small, shrub-like evergreens due to harsh weather and poor soil conditions.

Appreciation. in ordinary language, "appreciation" means having a favorable opinion of someone or something. In this course, it is used in a special way: to know and understand the reasons why something is valuable.

Atmosphere. the layer of gases above the surface of the Earth that makes life possible by regulating temperature, cycling nutrients, and protecting us from meteorites.

Boreal Forest. a type of forest found in northern regions of North America and Eurasia, which is dominated by conifers, or evergreen trees that have needles and cones.

Campesino. in Spanish speaking countries, a farmer, farm worker, someone who lives in a rural area.

Canopy. the uppermost level in a forest, where one finds the tops of leafy branches.

CITES. this stands for the Convention on the International Trade in Endangered Species of Wild Fauna and Flora, an international treaty that regulates which plant and animal products can legally be bought and sold.

Climate Change. the disruption of the Earth's climate, or regular weather patterns. Although climate has changed naturally over thousands of years (for example the Ice Ages), scientists have concluded that pollution caused by humans is currently increasing the greenhouse effect and threatening to dramatically change our planet's climate.

Community. in ordinary language, a group of people living together. In ethics, the common interests and values that hold people together and encourage them to communicate and cooperate in sustaining the conditions of life.

Duty. an action that a person is obliged or required to do because of some ethical or legal rule or principle and can be blamed for failing to do.

Ecological Services. the services that intact natural ecosystems provide to humans, such as providing clean air and water, food, and protection from extreme weather.

Ecology. the science that studies the relationships, connections, and interactions that occur among various parts of the environment.

Endangered. a term that refers to a species of animals that has a very small population and is in danger of going extinct.

Environment. the physical and biological elements that surround and make possible the complexity of organic life.

Environmental Ethics. the study of how general principles and values apply to deciding what choices should be made to guide human interaction with the natural environment, particularly when protection and preservation of nature are in conflict with human uses of natural resources.

Erosion. the process by which wind, water and glaciers slowly wear away rock and soil. Erosion is a natural process, but in areas of deforestation, erosion can be more extreme and destructive, especially along riverbanks and coastlines.

Ethical Conflict. since there are many ethical values and principles, occasionally one set of principles may seem to require actions and choices that are different from those required by other principles. This leads to disagreement that is grounded in people's basic beliefs. One purpose of ethics is to attempt to explore these basic beliefs, to reconcile these apparent differences or to show which set of principles ought to prevail.

Ethics. in ordinary language, the values and principles that people use to guide their actions and behavior. In a more special sense, ethics means the study of reasons for right and wrong actions: that is, the study of how values and principles can be known and how they should be applied in deciding what actions are right.

Extinction. when a species of life completely dies off.

Genetic Diversity. the variety of genes within a population or species.

Greenhouse Effect. the natural process that regulates the Earth's temperature, in which greenhouse gases in the atmosphere trap heat from the sun.

Greenhouse Gases. a handful of gases, including carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), that play a role in the greenhouse effect. The amount of greenhouse gases in the atmosphere has increased dramatically due to human activity, which has increased the surface temperature of the Earth and may lead to further climate change.

Groundwater. water found in underground reservoirs, which we tap through wells and springs.

Groundwater Overdrafting. occurs when groundwater is removed faster than reserves are naturally replenished.

Hydrologic Cycle. the natural process by which water changes state and moves through the environment. The cycle includes evaporation, when water changes from a liquid to a gas and enters the atmosphere; condensation, when water changes from a gas to a liquid and falls from the sky as rain; freezing, when liquid water turns to ice; and melting, when ice turns back to liquid water.

Invertebrates. the large category of animals that do not have internal skeletons made of bone, but rather have a shell, or exoskeleton, or no firm structure or protective layer. Invertebrates include insects, spiders, worms, and snails.

Justice. the ethical principle that concerns the ways in which the goods of society are distributed to the participants in that society in a fair way: that is, in relation to their achievements, needs and contributions. **Intergenerational Justice** refers to the ways in which one generation ought to foresee and provide for the needs of other generations that will follow it and whom they will not personally ever know.

Keystone Species. certain plants or animals that play an important role in their ecosystem, whose decline can have disproportionate negative impacts on the environment and other species.

Mangroves. a type of forest found along the coast in tropical areas. Mangroves have a high tolerance of salt and fresh water, and control coastal erosion and protect coastal communities from adverse weather.

Mineral Resources. non-living resources that have accumulated through natural processes and are often found underground, including metals and gems.

Mining. the process of extracting minerals from underground, which often entails negative environmental and social impacts.

Over-fishing. removing for human consumption more fish, or other ocean and freshwater resources, than can be naturally replaced through reproduction. Over time, over-fishing decreases the population of a species, pushing it towards extinction. This also has negative consequences for the human communities that depend upon the species for their food or livelihood.

Ozone Hole. a decrease in ozone (O₃) in the high atmosphere caused by human pollution. The ozone layer protects the Earth's surface from dangerous ultra-violet (UV) radiation from the sun, and the thinning of this layer over the North and South poles has resulted in a "hole" through which more cancer-causing UV rays reach the planet.

Plankton. tiny organisms found in oceans and freshwater that float with the currents and are the foundation of the food web for marine and freshwater ecosystems. Phytoplankton refers to all the plant-like plankton which create their food from the sun's energy, and zooplankton are the animal-like plankton that feed primarily on phytoplankton, and themselves are food for larger organisms, such as small fish and whales.

Pollution. the wastes and side-effects of human industry and transportation systems that are released into the air and water and contaminate these resources, often with negative impacts on the health of humans and ecosystems.

Rain Forest. a type of forest found in areas with high precipitation and moisture levels. Tropical rain forests house a continuous canopy of leafy, evergreen trees and a large percentage of the world's biodiversity. Tropical rain forests, which are primarily found in developing countries, are threatened by deforestation due to the rapid conversion to farm and pastureland. Temperate rain forests are found in the Pacific Northwest and Southeast Alaska, where one finds some of the last old-growth stands of trees in North America.

Responsibility. the various duties and obligations that accompany certain roles, such as parents, teachers, citizens and, in a broader sense, as human beings living in a community. Responsibility can be based on **Duty** or on **Utility** or on **Justice**, as well as other moral principles. Responsibility also refers to the ability to act in a voluntary way and to be accountable for one's actions.

Smog. poor air quality in urban areas that results from either the combination of smoke and fog, or the chemical interaction of a soup of pollution emitted by cars and power plants reacting to ultra-violet radiation from the sun.

Tailings. the by-products of mining and processing minerals, often highly toxic, which pollute water bodies around mining sites.

Temperate Forest. a type of forest found in regions that experience four seasons of relatively mild weather and high rainfall. Temperate forests spread across much of the contiguous United States, and house a mix of leafy deciduous trees, which lose their leaves in fall and winter, and conifers, which have evergreen needles year-round.

Topsoil. the fertile surface layer of soil, which is made up of a high-level of organic material, and is threatened by erosion in areas of disturbance. Most of the roots of plants are found in the rich topsoil. Farmers also depend upon a healthy layer of topsoil in which to plant their crops.

Understory. the lower level of a forest, between the canopy and ground, where one finds small trees and shrubs.

Utilitarianism. one form of ethical theory that maintains that a choice or action is right only insofar as it aims at **achieving utility**. This theory is expressed in the Principle of Utility: "An action is ethical insofar as it contributes to the greater good or happiness of the greater number of people." In a broader sense, Utilitarianism means choosing to act in ways that improve human well-being and happiness.

Utility. in ordinary language, usefulness, the ability of something to serve some purpose. In ethics, the final goal or objective that people seek to obtain by their actions, usually called the "Good" and usually thought of as a happy or satisfied life.

Value. that which makes something attractive or desirable, the object of appreciation. Value is usually distinguished as either **Intrinsic** or **Instrumental**. **Intrinsic Value** means that something is good in itself, not only for what it can achieve; **Instrumental** means that something has value only in relation to what it can achieve. So, money has only instrumental value; happiness is an intrinsic value because it is good in itself. **Existence value**, as used in this course, means the same as **Intrinsic** value, that is, valuable in itself and not for what it can produce. **Use** value, as used in this course, means the same as **Instrumental** value.

Watershed. a geographic area that shares the same water resources due to the features of the landscape, which is best illustrated by a valley in which all the streams and rivers flow downhill and into a larger body of water. Any activities that pollute or otherwise impact the water resource upstream affect those living downstream, connecting people in a watershed community.

EDUCATION STANDARDS

MCREL Education Standards www.mcrel.org

Introduction to Environmental Ethics and the Eco-Ethical Mountain

Life Sciences

Standard 6

Understands relationships among organisms and their physical environment

Level IV Grade: 9-12

2. Knows how the amount of life an environment can support is limited by the availability of matter and energy and the ability of the ecosystem to recycle materials

5. Knows ways in which humans can alter the equilibrium of ecosystems, causing potentially irreversible effects (e.g., human population growth, technology, and consumption; human destruction of habitats through direct harvesting, pollution, and atmospheric changes)

Language Arts

Writing

Standard 1

Uses the general skills and strategies of the writing process

Level IV Grade: 9-12

6. Uses strategies to adapt writing for different purposes (e.g., to explain, inform, analyze, entertain, reflect, persuade)

7. Writes expository compositions (e.g., synthesizes and organizes information from first- and second-hand sources, including books, magazines, computer data banks, and the community; uses a variety of techniques to develop the main idea [names, describes, or differentiates parts; compares or contrasts; examines the history of a subject; cites an anecdote to provide an example; illustrates through a scenario; provides interesting facts about the subject]; distinguishes relative importance of facts, data, and ideas; uses appropriate technical terms and notations)

9. Writes persuasive compositions that address problems/solutions or causes/effects (e.g., articulates a position through a thesis statement; anticipates and addresses counter arguments; backs up assertions using specific rhetorical devices [appeals to logic, appeals to emotion, uses personal anecdotes]; develops arguments using a variety of methods such as examples and details, commonly accepted beliefs, expert opinion, cause-and-effect reasoning, comparison-contrast reasoning)

10. Writes descriptive compositions (e.g., uses concrete details to provide a perspective on the subject being described; uses supporting detail [concrete images, shifting perspectives and vantage points, sensory detail, and factual descriptions of appearance])

Listening and Speaking

Standard 8

Uses listening and speaking strategies for different purposes

Level IV Grade: 9-12

1. Uses criteria to evaluate own and others' effectiveness in group discussions and formal presentations (e.g., accuracy, relevance, and organization of information; clarity of delivery; relationships among purpose, audience, and content; types of arguments used; effectiveness of own contributions)
2. Asks questions as a way to broaden and enrich classroom discussions
4. Adjusts message wording and delivery to particular audiences and for particular purposes (e.g., to defend a position, to entertain, to inform, to persuade)

Viewing

Standard 9

Uses viewing skills and strategies to understand and interpret visual media

Level IV Grade: 9-12

1. Uses a range of strategies to interpret visual media (e.g., draws conclusions, makes generalizations, synthesizes materials viewed, refers to images or information in visual media to support point of view, deconstructs media to determine the main idea)

Geography

The World in Spatial Terms

Standard 6

Understands that culture and experience influence people's perceptions of places and regions

Level IV Grade: 9-12

1. Understands why places and regions are important to individual human identity and as symbols for unifying or fragmenting society (e.g., sense of belonging, attachment, or rootedness; symbolic meaning of places such as Jerusalem as a holy city for Muslims, Christians, and Jews)

3. Knows ways in which people's changing views of places and regions reflect cultural change (e.g., rural settings becoming attractive as recreation areas to people living in densely populated cities, old mining ghost towns becoming tourist and gambling centers)

Physical Systems

Standard 7

Knows the physical processes that shape patterns on Earth's surface

Level IV Grade: 9-12

3. Understands how physical systems are dynamic and interactive (e.g., the relationships between changes in land forms and the effects of climate such as the erosion of hill slopes by precipitation, deposition of sediments by floods, and shaping of land surfaces by wind)

Standard 8

Understands the characteristics of ecosystems on Earth's surface

Level IV Grade: 9-12

4. Knows the effects of both physical and human changes in ecosystems (e.g., the disruption of energy flows and chemical cycles and the reduction of species diversity, how acid rain resulting from air pollution affects water bodies and forests and how depletion of the atmosphere's ozone layer through the use of chemicals may affect the health of humans)

Environment and Society

Standard 14

Understands how human actions modify the physical environment

Level IV Grade: 9-12

2. Understands the role of humans in decreasing the diversity of flora and fauna in a region (e.g., the impact of acid rain on rivers and forests in southern Ontario, the effects of toxic dumping on ocean ecosystems, the effects of over-fishing along the coast of northeastern North America or the Philippine archipelago)

4. Knows how people's changing attitudes toward the environment have led to landscape changes (e.g., pressure to replace farmlands with wetlands in flood plain areas, interest in preserving wilderness areas, support for the concept of historic preservation)

Standard 16

Understands the changes that occur in the meaning, use, distribution and importance of resources

Level IV Grade: 9-12

4. Knows issues related to the reuse and recycling of resources (e.g., changing relocation strategies of industries seeking access to recyclable material, such as paper factories, container and can companies, glass, plastic, and bottle manufacturers; issues involved with the movement, handling, processing, and storing of toxic and hazardous waste materials; fully enforced vs. consistently neglected approaches to resource management)

Standard 18

Understands global development and environmental issues

Level IV Grade: 9-12

2. Understands why policies should be designed to guide the use and management of Earth's resources and to reflect multiple points of view (e.g., the inequities of access to resources, political and economic power in developing countries, the impact of a natural disaster on a developed country vs. a developing country)

Wildlife

Life Sciences

Standard 6

Understands relationships among organisms and their physical environment

Level IV Grade: 9-12

1. Knows how the interrelationships and interdependencies among organisms generate stable ecosystems that fluctuate around a state of rough equilibrium for hundreds or thousands of years (e.g., growth of a population is held in check by environmental factors such as depletion of food or nesting sites, increased loss due to larger numbers of predators or parasites)
2. Knows how the amount of life an environment can support is limited by the availability of matter and energy and the ability of the ecosystem to recycle materials
5. Knows ways in which humans can alter the equilibrium of ecosystems, causing potentially irreversible effects (e.g., human population growth, technology, and consumption; human destruction of habitats through direct harvesting, pollution, and atmospheric changes)

Standard 7

Understands biological evolution and the diversity of life

Level IV Grade: 9-12

2. Understands the concept of natural selection (e.g., when an environment changes, some inherited characteristics become more or less advantageous or neutral, and chance alone can result in characteristics having no survival or reproductive value; this process results in organisms that are well suited for survival in particular environments)
3. Knows how variation of organisms within a species increases the chance of survival of the species, and how the great diversity of species on Earth increases the chance of survival of life in the event of major global changes

Language Arts

Writing

Standard 1

Uses the general skills and strategies of the writing process

Level IV Grade: 9-12

6. Uses strategies to adapt writing for different purposes (e.g., to explain, inform, analyze, entertain, reflect, persuade)

10. Writes descriptive compositions (e.g., uses concrete details to provide a perspective on the subject being described; uses supporting detail [concrete images, shifting perspectives and vantage points, sensory detail, and factual descriptions of appearance])

11. Writes reflective compositions (e.g., uses personal experience as a basis for reflection on some aspect of life, draws abstract comparisons between specific incidents and abstract concepts, maintains a balance between describing incidents and relating them to more general abstract ideas that illustrate personal beliefs, moves from specific examples to generalizations about life)

Standard 2

Uses the stylistic and rhetorical aspects of writing

Level IV Grade: 9-12

5. Uses a variety of techniques to provide supporting detail (e.g., analogies; anecdotes; restatements; paraphrases; examples; comparisons; visual aids, such as tables, graphs, and pictures)

Standard 7

Uses reading skills and strategies to understand and interpret a variety of informational texts

Level IV Grade: 9-12

1. Uses reading skills and strategies to understand a variety of informational texts (e.g., textbooks, biographical sketches, letters, diaries, directions, procedures, magazines, essays, primary source historical documents, editorials, news stories, periodicals, catalogs, job-related materials, schedules, speeches, memoranda, public documents, maps)

3. Scans a passage to determine whether it contains relevant information

4. Summarizes and paraphrases complex, implicit hierarchic structures in informational texts, including the relationships among the concepts and details in those structures

6. Uses discussions with peers as a way of understanding information

7. Uses a variety of criteria to evaluate the clarity and accuracy of information

Thinking and Reasoning

Standard 1

Understands and applies the basic principles of presenting an argument

Level IV Grade: 9-12

1. Understands that when people try to prove a point, they may at times select only the information that supports it and ignore the information that contradicts it

2. Identifies techniques used to slant information in subtle ways

4. Identifies or seeks out the critical assumptions behind a line of reasoning and uses that to judge the validity of an argument

5. Understands that to be convincing, an argument must have both true statements and valid connections among them

7. Evaluates the overall effectiveness of complex arguments

Standard 5

Applies basic trouble-shooting and problem-solving techniques

Level IV Grade: 9-12

1. Applies trouble-shooting strategies to complex real-world situations
2. Understands that trouble-shooting almost anything may require many-step branching logic
5. Engages in problem finding and framing for personal situations and situations in the community

Standard 6

Applies decision-making techniques

Level IV Grade: 9-12

2. Analyzes current or pending decisions that can affect national or international policy and identifies the consequences of each alternative
5. Evaluates major factors that influence personal decisions

Geography

The World in Spatial Terms

Standard 6

Understands that culture and experience influence people's perceptions of places and regions

Level IV Grade: 9-12

1. Understands why places and regions are important to individual human identity and as symbols for unifying or fragmenting society (e.g., sense of belonging, attachment, or rootedness; symbolic meaning of places such as Jerusalem as a holy city for Muslims, Christians, and Jews)
3. Knows ways in which people's changing views of places and regions reflect cultural change (e.g., rural settings becoming attractive as recreation areas to people living in densely populated cities, old mining ghost towns becoming tourist and gambling centers)

Physical Systems

Standard 7

Knows the physical processes that shape patterns on Earth's surface

3. Understands how physical systems are dynamic and interactive (e.g., the relationships between changes in land forms and the effects of climate such as the erosion of hill slopes by precipitation, deposition of sediments by floods, and shaping of land surfaces by wind)

Standard 8

Understands the characteristics of ecosystems on Earth's surface

Level IV Grade: 9-12

1. Understands how relationships between soil, climate, and plant and animal life affect the distribution of ecosystems (e.g., effects of solar energy and water supply on the nature of plant communities)
4. Knows the effects of both physical and human changes in ecosystems (e.g., the disruption of energy flows and chemical cycles and the reduction of species diversity, how acid rain resulting from air pollution affects water bodies and forests and how depletion of the atmosphere's ozone layer through the use of chemicals may affect the health of humans)

Standard 13

Understands the forces of cooperation and conflict that shape the divisions of Earth's surface

Level IV Grade: 9-12

6. Understands how external forces can conflict economically and politically with internal interests in a region (e.g., how the Pampas in Argentina underwent a significant socioeconomic transformation in the 19th and early 20th centuries as a consequence of European demands for grain and beef; the consequences of the French colonization of Indochina (now Cambodia, Vietnam, and Laos) in the 19th century to procure tin, tungsten, and rubber; the friction between Hindus and Muslims in the Indian subcontinent in the 1940s which led to the formation of India and Pakistan)

Standard 18

Understands global development and environmental issues

Level IV Grade: 9-12

1. Understands the concept of sustainable development and its effects in a variety of situations (e.g., toward cutting the rain forests in Indonesia in response to a demand for lumber in foreign markets, or mining the rutile sands along the coast of eastern Australia near the Great Barrier Reef)
2. Understands why policies should be designed to guide the use and management of Earth's resources and to reflect multiple points of view (e.g., the inequities of access to resources, political and economic power in developing countries, the impact of a natural disaster on a developed country vs. a developing country)

Forests

Life Sciences

Standard 6

Understands relationships among organisms and their physical environment

Level IV Grade: 9-12

1. Knows how the interrelationships and interdependencies among organisms generate stable ecosystems that fluctuate around a state of rough equilibrium for hundreds or thousands of years (e.g., growth of a population is held in check by environmental factors such as depletion of food or nesting sites, increased loss due to larger numbers of predators or parasites)
2. Knows how the amount of life an environment can support is limited by the availability of matter and energy and the ability of the ecosystem to recycle materials
5. Knows ways in which humans can alter the equilibrium of ecosystems, causing potentially irreversible effects (e.g., human population growth, technology, and consumption; human destruction of habitats through direct harvesting, pollution, and atmospheric changes)

Standard 7

Understands biological evolution and the diversity of life

Level IV Grade: 9-12

1. Knows that heritable characteristics, which can be biochemical and anatomical, largely determine what capabilities an organism will have, how it will behave, and how likely it is to survive and reproduce
2. Understands the concept of natural selection (e.g., when an environment changes, some inherited characteristics become more or less advantageous or neutral, and chance alone can result in characteristics having no survival or reproductive value; this process results in organisms that are well suited for survival in particular environments)
3. Knows how variation of organisms within a species increases the chance of survival of the species, and how the great diversity of species on Earth increases the chance of survival of life in the event of major global changes
4. Knows that the basic idea of evolution is that the Earth's present-day life forms have evolved from earlier, distinctly different species as a consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, and (4) the ensuing selection by the environment of those offspring better able to survive and leave offspring

Language Arts

Writing

Standard 1

Uses the general skills and strategies of the writing process

Level IV Grade: 9-12

5. Uses strategies to address writing to different audiences (e.g., includes explanations and definitions according to the audience's background, age, or knowledge of the topic, adjusts formality of style, considers interests of potential readers)
6. Uses strategies to adapt writing for different purposes (e.g., to explain, inform, analyze, entertain, reflect, persuade)
7. Writes expository compositions (e.g., synthesizes and organizes information from first- and second-hand sources, including books, magazines, computer data banks, and the community; uses a variety of techniques to develop the main idea [names, describes, or differentiates parts; compares or contrasts; examines the history of a subject; cites an anecdote to provide an example; illustrates through a scenario; provides interesting facts about the subject]; distinguishes relative importance of facts, data, and ideas; uses appropriate technical terms and notations)

Standard 2

Uses the stylistic and rhetorical aspects of writing

Level IV Grade: 9-12

1. Uses precise and descriptive language that clarifies and enhances ideas and supports different purposes (e.g., to stimulate the imagination of the reader, to translate concepts into simpler or more easily understood terms, to achieve a specific tone, to explain concepts in literature)

Standard 7

Uses reading skills and strategies to understand and interpret a variety of informational texts

Level IV Grade: 9-12

1. Uses reading skills and strategies to understand a variety of informational texts (e.g., textbooks, biographical sketches, letters, diaries, directions, procedures, magazines, essays, primary source historical documents, editorials, news stories, periodicals, catalogs, job-related materials, schedules, speeches, memoranda, public documents, maps)
3. Scans a passage to determine whether it contains relevant information
4. Summarizes and paraphrases complex, implicit hierarchic structures in informational texts, including the relationships among the concepts and details in those structures
6. Uses discussions with peers as a way of understanding information
7. Uses a variety of criteria to evaluate the clarity and accuracy of information

Listening and Speaking

Standard 8

Uses listening and speaking strategies for different purposes

Level IV Grade: 9-12

1. Uses criteria to evaluate own and others' effectiveness in group discussions and formal presentations (e.g., accuracy, relevance, and organization of information; clarity of delivery; relationships among purpose, audience, and content; types of arguments used; effectiveness of own contributions)
2. Asks questions as a way to broaden and enrich classroom discussions
4. Adjusts message wording and delivery to particular audiences and for particular purposes (e.g., to defend a position, to entertain, to inform, to persuade)
8. Responds to questions and feedback about own presentations (e.g., clarifies and defends ideas, expands on a topic, uses logical arguments, modifies organization, evaluates effectiveness, sets goals for future presentations)
11. Understands reasons for own reactions to spoken texts (e.g., emotional appeals)

Thinking and Reasoning

Standard 1

Understands and applies the basic principles of presenting an argument

Level IV Grade: 9-12

3. Identifies the logic of arguments that are based on quantitative data
4. Identifies or seeks out the critical assumptions behind a line of reasoning and uses that to judge the validity of an argument
5. Understands that to be convincing, an argument must have both true statements and valid connections among them
7. Evaluates the overall effectiveness of complex arguments

Geography

Environment and Society

Standard 14

Understands how human actions modify the physical environment

Level IV Grade: 9-12

2. Understands the role of humans in decreasing the diversity of flora and fauna in a region (e.g., the impact of acid rain on rivers and forests in southern Ontario, the effects of toxic dumping on ocean ecosystems, the effects of over-fishing along the coast of northeastern North America or the Philippine archipelago)

3. Understands the global impacts of human changes in the physical environment (e.g., increases in runoff and sediment, tropical soil degradation, habitat destruction, air pollution; alterations in the hydrologic cycle; increases in world temperatures; groundwater reduction)
4. Knows how people's changing attitudes toward the environment have led to landscape changes (e.g., pressure to replace farmlands with wetlands in flood plain areas, interest in preserving wilderness areas, support for the concept of historic preservation)

Standard 18

Understands global development and environmental issues

Level IV Grade: 9-12

1. Understands the concept of sustainable development and its effects in a variety of situations (e.g., toward cutting the rain forests in Indonesia in response to a demand for lumber in foreign markets, or mining the rutile sands along the coast of eastern Australia near the Great Barrier Reef)
2. Understands why policies should be designed to guide the use and management of Earth's resources and to reflect multiple points of view (e.g., the inequities of access to resources, political and economic power in developing countries, the impact of a natural disaster on a developed country vs. a developing country)

Water

Life Sciences

Standard 6

Understands relationships among organisms and their physical environment

Level IV Grade: 9-12

5. Knows ways in which humans can alter the equilibrium of ecosystems, causing potentially irreversible effects (e.g., human population growth, technology, and consumption; human destruction of habitats through direct harvesting, pollution, and atmospheric changes)

Geography

The World in Spatial Terms

Standard 8

Understands the characteristics of ecosystems on Earth's surface

Level IV Grade: 9-12

4. Knows the effects of both physical and human changes in ecosystems (e.g., the disruption of energy flows and chemical cycles and the reduction of species diversity, how acid rain resulting from air pollution affects water bodies and forests and how depletion of the atmosphere's ozone layer through the use of chemicals may affect the health of humans)

Environment and Society

Standard 14

Understands how human actions modify the physical environment

Level IV Grade: 9-12

2. Understands the role of humans in decreasing the diversity of flora and fauna in a region (e.g., the impact of acid rain on rivers and forests in southern Ontario, the effects of toxic dumping on ocean ecosystems, the effects of over-fishing along the coast of northeastern North America or the Philippine archipelago)

3. Understands the global impacts of human changes in the physical environment (e.g., increases in runoff and sediment, tropical soil degradation, habitat destruction, air pollution; alterations in the hydrologic cycle; increases in world temperatures; groundwater reduction)

4. Knows how people's changing attitudes toward the environment have led to landscape changes (e.g., pressure to replace farmlands with wetlands in flood plain areas, interest in preserving

wilderness areas, support for the concept of historic preservation)

Standard 15

Understands how physical systems affect human systems

Level IV Grade: 9-12

1. Knows changes in the physical environment that have reduced the capacity of the environment to support human activity (e.g., the drought-plagued Sahel, the depleted rain forests of central Africa, the Great Plains Dust Bowl, the impact of the economic exploitation of Siberia's resources on a fragile, sub-Arctic environment)

Standard 16

Understands the changes that occur in the meaning, use, distribution and importance of resources

Level IV Grade: 9-12

2. Understands programs and positions related to the use of resources on a local to global scale (e.g., community regulations for water usage during drought periods; local recycling programs for glass, metal, plastic, and paper products; different points of view regarding uses of the Malaysian rain forests)

Uses of Geography

Standard 18

Understands global development and environmental issues

Level IV Grade: 9-12

2. Understands why policies should be designed to guide the use and management of Earth's resources and to reflect multiple points of view (e.g., the inequities of access to resources, political and economic power in developing countries, the impact of a natural disaster on a developed country vs. a developing country)

Language Arts

Writing

Standard 1

Uses the general skills and strategies of the writing process

Level IV Grade: 9-12

6. Uses strategies to adapt writing for different purposes (e.g., to explain, inform, analyze, entertain, reflect, persuade)

9. Writes persuasive compositions that address problems/solutions or causes/effects (e.g., articulates a position through a thesis statement; anticipates and addresses counter arguments; backs up assertions using specific rhetorical devices [appeals to logic, appeals to emotion, uses personal anecdotes]; develops arguments using a variety of methods such as examples and details, commonly accepted beliefs, expert opinion, cause-and-effect reasoning, comparison-contrast reasoning)

Reading

Standard 7

Uses reading skills and strategies to understand and interpret a variety of informational texts

Level IV Grade: 9-12

1. Uses reading skills and strategies to understand a variety of informational texts (e.g., textbooks, biographical sketches, letters, diaries, directions, procedures, magazines, essays, primary source historical documents, editorials, news stories, periodicals, catalogs, job-related materials, schedules, speeches, memoranda, public documents, maps)

4. Summarizes and paraphrases complex, implicit hierarchic structures in informational texts, including the relationships among the concepts and details in those structures

6. Uses discussions with peers as a way of understanding information

Viewing

Standard 9

Uses viewing skills and strategies to understand and interpret visual media

Level IV Grade: 9-12

1. Uses a range of strategies to interpret visual media (e.g., draws conclusions, makes generalizations, synthesizes materials viewed, refers to images or information in visual media to support point of view, deconstructs media to determine the main idea)

Media

Standard 10

Understands the characteristics and components of the media

Level IV Grade: 9-12

1. Understands that media messages have economic, political, social, and aesthetic purposes (e.g., to make money, to gain power or authority over others, to present ideas about how people should think or behave, to experiment with different kinds of symbolic forms or ideas)

Air

Life Sciences

5. Knows ways in which humans can alter the equilibrium of ecosystems, causing potentially irreversible effects (e.g., human population growth, technology, and consumption; human destruction of habitats through direct harvesting, pollution, and atmospheric changes)

Nature of Science

Standard 11

Understands the nature of scientific knowledge

Level IV Grade: 9-12

2. Knows that scientific explanations must meet certain criteria to be considered valid (e.g., they must be consistent with experimental and observational evidence about nature, make accurate predictions about systems being studied, be logical, respect the rules of evidence, be open to criticism, report methods and procedures, make a commitment to making knowledge public)

Geography

The World in Spatial Terms

Standard 8

Understands the characteristics of ecosystems on Earth's surface

Level IV Grade: 9-12

4. Knows the effects of both physical and human changes in ecosystems (e.g., the disruption of energy flows and chemical cycles and the reduction of species diversity, how acid rain resulting from air pollution affects water bodies and forests and how depletion of the atmosphere's ozone layer through the use of chemicals may affect the health of humans)

Environment and Society

Standard 14

Understands how human actions modify the physical environment

Level IV Grade: 9-12

2. Understands the role of humans in decreasing the diversity of flora and fauna in a region (e.g., the impact of acid rain on rivers and forests in southern Ontario, the effects of toxic dumping on ocean ecosystems, the effects of over-fishing along the coast of northeastern North America or the Philippine archipelago)

3. Understands the global impacts of human changes in the physical environment (e.g., increases in runoff and sediment, tropical soil degradation, habitat destruction, air pollution; alterations in the hydrologic cycle; increases in world temperatures; groundwater reduction)

4. Knows how people's changing attitudes toward the environment have led to landscape changes (e.g., pressure to replace farmlands with wetlands in flood plain areas, interest in preserving wilderness areas, support for the concept of historic preservation)

Standard 15

Understands how physical systems affect human systems

Level IV Grade: 9-12

1. Knows changes in the physical environment that have reduced the capacity of the environment to support human activity (e.g., the drought-plagued Sahel, the depleted rain forests of central Africa, the Great Plains Dust Bowl, the impact of the economic exploitation of Siberia's resources on a fragile, sub-Arctic environment)

Standard 16

Understands the changes that occur in the meaning, use, distribution, and importance of resources

Level IV Grade: 9-12

2. Understands programs and positions related to the use of resources on a local to global scale (e.g., community regulations for water usage during drought periods; local recycling programs for glass, metal, plastic, and paper products; different points of view regarding uses of the Malaysian rain forests)

3. Understands the impact of policy decisions regarding the use of resources in different regions of the world (e.g., the long-term impact on the economy of Nauru when its phosphate reserves are exhausted, the economic and social problems related to the over-cutting of pine forests in Nova Scotia, the impact of petroleum consumption in the United States and Japan)

Uses of Geography

Standard 18

Understands global development and environmental issues

Level IV Grade: 9-12

2. Understands why policies should be designed to guide the use and management of Earth's resources and to reflect multiple points of view (e.g., the inequities of access to resources, political and economic power in developing countries, the impact of a natural disaster on a developed country vs. a developing country)

Language Arts

Writing

Standard 1

Uses the general skills and strategies of the writing process

Level IV Grade: 9-12

6. Uses strategies to adapt writing for different purposes (e.g., to explain, inform, analyze, entertain, reflect, persuade)

11. Writes reflective compositions (e.g., uses personal experience as a basis for reflection on some aspect of life, draws abstract comparisons between specific incidents and abstract concepts, maintains a balance between describing incidents and relating them to more general abstract ideas that illustrate personal beliefs, moves from specific examples to generalizations about life)

Standard 4

Gathers and uses information for research purposes

Level IV Grade: 9-12

3. Uses a variety of primary sources to gather information for research topics

Reading

Standard 5

Uses the general skills and strategies of the reading process

Level IV Grade: 9-12

6. Understands the philosophical assumptions and basic beliefs underlying an author's work (e.g., point of view, attitude, and values conveyed by specific language; clarity and consistency of political assumptions)

Standard 7

Uses reading skills and strategies to understand and interpret a variety of informational texts

Level IV Grade: 9-12

1. Uses reading skills and strategies to understand a variety of informational texts (e.g., textbooks, biographical sketches, letters, diaries, directions, procedures, magazines, essays, primary source historical documents, editorials, news stories, periodicals, catalogs, job-related materials, schedules, speeches, memoranda, public documents, maps)

4. Summarizes and paraphrases complex, implicit hierarchic structures in informational texts, including the relationships among the concepts and details in those structures

6. Uses discussions with peers as a way of understanding information

Viewing

Standard 9

Uses viewing skills and strategies to understand and interpret visual media

Level IV Grade: 9-12

1. Uses a range of strategies to interpret visual media (e.g., draws conclusions, makes generalizations, synthesizes materials viewed, refers to images or information in visual media to support point of view, deconstructs media to determine the main idea)

Thinking & Reasoning

Standard 6

Applies decision-making techniques

Level IV Grade: 9-12

5. Evaluates major factors that influence personal decisions

Visual Arts

Standard 3

Knows a range of subject matter, symbols, and potential ideas in the visual arts

Level IV Grade: 9-12

2. Applies various subjects, symbols, and ideas in one's artwork

Minerals

Life Sciences

Standard 6

Understands relationships among organisms and their physical environment

Level IV Grade: 9-12

5. Knows ways in which humans can alter the equilibrium of ecosystems, causing potentially irreversible effects (e.g., human population growth, technology, and consumption; human destruction of habitats through direct harvesting, pollution, and atmospheric changes)

Geography

Places and Regions

Standard 4

Understands the physical and human characteristics of place

Level IV Grade: 9-12

2. Understands why places have specific physical and human characteristics in different parts of the world (e.g., the effects of climatic and tectonic processes, settlement and migration patterns, site and situation components)

3. Knows the locational advantages and disadvantages of using places for different activities based on their physical characteristics (e.g., flood plain, forest, tundra, earthquake zone, river crossing, coastal flood zone)

The World in Spatial Terms

Standard 8

Understands the characteristics of ecosystems on Earth's surface

Level IV Grade: 9-12

4. Knows the effects of both physical and human changes in ecosystems (e.g., the disruption of energy flows and chemical cycles and the reduction of species diversity, how acid rain resulting from air pollution affects water bodies and forests and how depletion of the atmosphere's ozone layer through the use of chemicals may affect the health of humans)

Environment and Society

Standard 14

Understands how human actions modify the physical environment

Level IV Grade: 9-12

2. Understands the role of humans in decreasing the diversity of flora and fauna in a region (e.g., the impact of acid rain on rivers and forests in southern Ontario, the effects of toxic dumping on ocean ecosystems, the effects of over-fishing along the coast of northeastern North America or the Philippine archipelago)
3. Understands the global impacts of human changes in the physical environment (e.g., increases in runoff and sediment, tropical soil degradation, habitat destruction, air pollution; alterations in the hydrologic cycle; increases in world temperatures; groundwater reduction)
4. Knows how people's changing attitudes toward the environment have led to landscape changes (e.g., pressure to replace farmlands with wetlands in flood plain areas, interest in preserving wilderness areas, support for the concept of historic preservation)

Standard 15

Understands how physical systems affect human systems

Level IV Grade: 9-12

1. Knows changes in the physical environment that have reduced the capacity of the environment to support human activity (e.g., the drought-plagued Sahel, the depleted rain forests of central Africa, the Great Plains Dust Bowl, the impact of the economic exploitation of Siberia's resources on a fragile sub-Arctic environment)

Standard 16

Understands the changes that occur in the meaning, use, distribution and importance of resources

Level IV Grade: 9-12

2. Understands programs and positions related to the use of resources on a local to global scale (e.g., community regulations for water usage during drought periods; local recycling programs for glass, metal, plastic, and paper products; different points of view regarding uses of the Malaysian rain forests)
4. Knows issues related to the reuse and recycling of resources (e.g., changing relocation strategies of industries seeking access to recyclable material, such as paper factories, container and can companies, glass, plastic, and bottle manufacturers; issues involved with the movement, handling, processing, and storing of toxic and hazardous waste materials; fully enforced vs. consistently neglected approaches to resource management)

Uses of Geography

Standard 18

Understands global development and environmental issues

Level IV Grade: 9–12

1. Understands the concept of sustainable development and its effects in a variety of situations (e.g., toward cutting the rain forests in Indonesia in response to a demand for lumber in foreign markets, or mining the rutile sands along the coast of eastern Australia near the Great Barrier Reef)
2. Understands why policies should be designed to guide the use and management of Earth's resources and to reflect multiple points of view (e.g., the inequities of access to resources, political and economic power in developing countries, the impact of a natural disaster on a developed country vs. a developing country)

Language Arts

Writing

Standard 1

Uses the general skills and strategies of the writing process

Level IV Grade: 9–12

6. Uses strategies to adapt writing for different purposes (e.g., to explain, inform, analyze, entertain, reflect, persuade)
9. Writes persuasive compositions that address problems/solutions or causes/effects (e.g., articulates a position through a thesis statement; anticipates and addresses counter arguments; backs up assertions using specific rhetorical devices [appeals to logic, appeals to emotion, uses personal anecdotes]; develops arguments using a variety of methods such as examples and details, commonly accepted beliefs, expert opinion, cause-and-effect reasoning, comparison-contrast reasoning)

Reading

Standard 7

Uses reading skills and strategies to understand and interpret a variety of informational texts

Level IV Grade: 9–12

1. Uses reading skills and strategies to understand a variety of informational texts (e.g., textbooks, biographical sketches, letters, diaries, directions, procedures, magazines, essays, primary source historical documents, editorials, news stories, periodicals, catalogs, job-related materials, schedules, speeches, memoranda, public documents, maps)

4. Summarizes and paraphrases complex, implicit hierarchic structures in informational texts, including the relationships among the concepts and details in those structures

6. Uses discussions with peers as a way of understanding information

Viewing

Standard 9

Uses viewing skills and strategies to understand and interpret visual media

Level IV Grade: 9-12

1. Uses a range of strategies to interpret visual media (e.g., draws conclusions, makes generalizations, synthesizes materials viewed, refers to images or information in visual media to support point of view, deconstructs media to determine the main idea)

Media

Standard 10

Understands the characteristics and components of the media

Level IV Grade: 9-12

Conclusion: Thinking Like a Mountain

Life Sciences

Standard 6

Understands relationships among organisms and their physical environment

Level IV Grade: 9-12

2. Knows how the amount of life an environment can support is limited by the availability of matter and energy and the ability of the ecosystem to recycle materials

5. Knows ways in which humans can alter the equilibrium of ecosystems, causing potentially irreversible effects (e.g., human population growth, technology, and consumption; human destruction of habitats through direct harvesting, pollution, and atmospheric changes)

Geography

The World in Spatial Terms

Standard 6

Understands that culture and experience influence people's perceptions of places and regions

Level IV Grade: 9-12

1. Understands why places and regions are important to individual human identity and as symbols for unifying or fragmenting society (e.g., sense of belonging, attachment, or rootedness; symbolic meaning of places such as Jerusalem as a holy city for Muslims, Christians, and Jews)

3. Knows ways in which people's changing views of places and regions reflect cultural change (e.g., rural settings becoming attractive as recreation areas to people living in densely populated cities, old mining ghost towns becoming tourist and gambling centers)

Physical Systems

Standard 7

Knows the physical processes that shape patterns on Earth's surface

Level IV Grade: 9-12

3. Understands how physical systems are dynamic and interactive (e.g., the relationships between changes in land forms and the effects of climate such as the erosion of hill slopes by precipitation, deposition of sediments by floods, and shaping of land surfaces by wind)

Standard 8

Understands the characteristics of ecosystems on Earth's surface

Level IV Grade: 9-12

2. Knows ecosystems in terms of their biodiversity and productivity (e.g., the low productivity of deserts and the high productivity of mid-latitude forests and tropical forests) and their potential value to all living things (e.g., as a source of oxygen for life forms, as a source of food for indigenous peoples, as a source of raw materials for international trade)

4. Knows the effects of both physical and human changes in ecosystems (e.g., the disruption of energy flows and chemical cycles and the reduction of species diversity, how acid rain resulting from air pollution affects water bodies and forests and how depletion of the atmosphere's ozone layer through the use of chemicals may affect the health of humans)

Environment and Society

Standard 14

Understands how human actions modify the physical environment

Level IV Grade: 9-12

2. Understands the role of humans in decreasing the diversity of flora and fauna in a region (e.g., the impact of acid rain on rivers and forests in southern Ontario, the effects of toxic dumping on ocean ecosystems, the effects of over-fishing along the coast of northeastern North America or the Philippine archipelago)

4. Knows how people's changing attitudes toward the environment have led to landscape changes (e.g., pressure to replace farmlands with wetlands in flood plain areas, interest in preserving wilderness areas, support for the concept of historic preservation)

Standard 16

Understands the changes that occur in the meaning, use, distribution, and importance of resources

Level IV Grade: 9-12

4. Knows issues related to the reuse and recycling of resources (e.g., changing relocation strategies of industries seeking access to recyclable material, such as paper factories, container and can companies, glass, plastic, and bottle manufacturers; issues involved with the movement, handling, processing, and storing of toxic and hazardous waste materials; fully enforced vs. consistently neglected approaches to resource management)

Standard 18
Understands global development and environmental issues
Level IV Grade: 9-12

2. Understands why policies should be designed to guide the use and management of Earth's resources and to reflect multiple points of view (e.g., the inequities of access to resources, political and economic power in developing countries, the impact of a natural disaster on a developed country vs. a developing country)

Language Arts

Writing

Standard 1
Uses the general skills and strategies of the writing process

Level IV Grade: 9-12

6. Uses strategies to adapt writing for different purposes (e.g., to explain, inform, analyze, entertain, reflect, persuade)

7. Writes expository compositions (e.g., synthesizes and organizes information from first- and second-hand sources, including books, magazines, computer data banks, and the community; uses a variety of techniques to develop the main idea [names, describes, or differentiates parts; compares or contrasts; examines the history of a subject; cites an anecdote to provide an example; illustrates through a scenario; provides interesting facts about the subject]; distinguishes relative importance of facts, data, and ideas; uses appropriate technical terms and notations)

9. Writes persuasive compositions that address problems/solutions or causes/effects (e.g., articulates a position through a thesis statement; anticipates and addresses counter arguments; backs up assertions using specific rhetorical devices [appeals to logic, appeals to emotion, uses personal anecdotes]; develops arguments using a variety of methods such as examples and details, commonly accepted beliefs, expert opinion, cause-and-effect reasoning, comparison-contrast reasoning)

11. Writes reflective compositions (e.g., uses personal experience as a basis for reflection on some aspect of life, draws abstract comparisons between specific incidents and abstract concepts, maintains a balance between describing incidents and relating them to more general abstract ideas that illustrate personal beliefs, moves from specific examples to generalizations about life)

Standard 4
Gathers and uses information for research purposes

Level IV Grade: 9-12

2. Uses a variety of print and electronic sources to gather information for research topics (e.g., news sources such as magazines, radio, television, newspapers; government publications; microfiche; telephone information services; databases; field studies; speeches; technical documents; periodicals; Internet)

5. Synthesizes information from multiple research studies to draw conclusions that go beyond those found in any of the individual studies

Viewing

Standard 9
Uses viewing skills and strategies to understand and interpret visual media

Level IV Grade: 9-12

1. Uses a range of strategies to interpret visual media (e.g., draws conclusions, makes generalizations, synthesizes materials viewed, refers to images or information in visual media to support point of view, deconstructs media to determine the main idea)

NOTES

NOTES

NOTES
