

SECTION
1

Environmental Issues

DISCOVER

ACTIVITY

How Do You Decide?

1. On a sheet of paper, list the three environmental issues you think are most important.
2. Form a group with three other classmates. Share your lists. As a group decide which one of the issues is the most important.

Think It Over

Forming Operational Definitions

Based on your group's discussion, how would you define the term *environmental issue*?

GUIDE FOR READING

- ◆ What are the main types of environmental issues?
- ◆ What is environmental science?
- ◆ How do decision makers balance different needs and concerns?

Reading Tip Before you read, make a list of ways that humans depend on the environment. As you read, add examples from the text.

Here's a puzzle for you: What is bigger than the United States and Mexico combined; is covered with two kilometers of ice; is a source of oil, coal, and iron; and is a unique habitat for many animals? The answer is Antarctica. People once thought of Antarctica as a useless, icy wasteland. But when explorers told of its huge populations of seals and whales, hunters began going to Antarctica. Then scientists set up research stations to study the unique conditions there. They soon discovered valuable minerals beneath the thick ice.

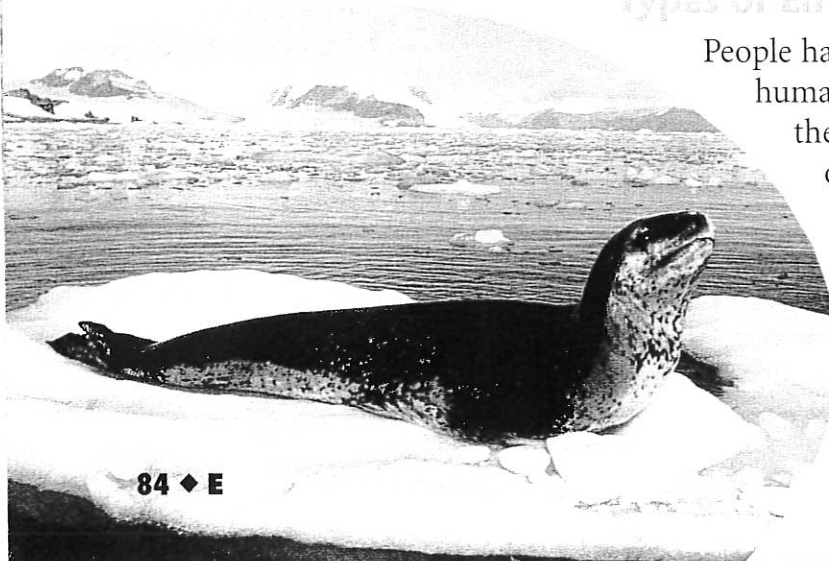
Now the puzzle is what to do with Antarctica. Many people want its rich deposits of minerals and oil. Others worry that mining will harm the delicate ecosystems there. Some people propose building hotels, parks, and ski resorts. But others feel that Antarctica should remain undisturbed. It is not even obvious who should decide Antarctica's fate.

In 1998, 26 nations agreed to ban mining and oil exploration in Antarctica for at least 50 years. As resources become more scarce elsewhere in the world, the debate will surely continue. What is the best use of Antarctica?

Types of Environmental Issues

People have always used Earth's resources. But as the human population has grown, so has its effect on the environment. People compete with each other and with other living things for Earth's limited resources. Disposing of wastes created by people can change ecosystems. And while people are continuing to take resources from the environment, many resources cannot be replaced. These resources could eventually run out.

Figure 1 This leopard seal's habitat could be affected if oil drilling is allowed in Antarctica. This tradeoff is an example of an environmental issue.



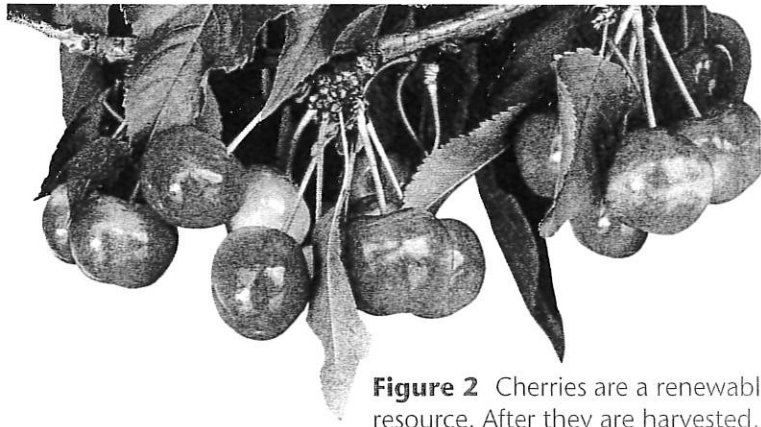
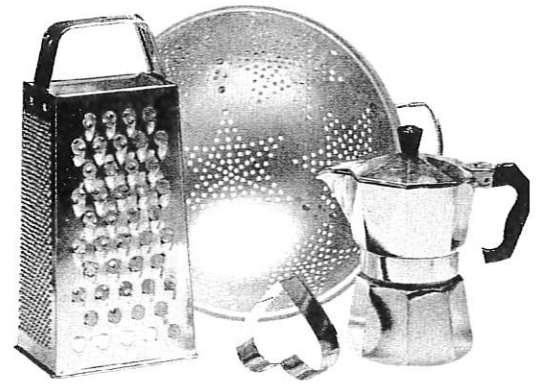


Figure 2 Cherries are a renewable resource. After they are harvested, new cherries will grow in their place. In contrast, the aluminum and iron used to make these kitchen tools are nonrenewable resources.



The three main types of environmental issues are resource use, population growth, and pollution. These issues are all connected, making them very difficult to solve.

Resource Use Anything in the environment that is used by people is a natural resource. Some natural resources, called **renewable resources**, are naturally replaced in a relatively short time. Renewable resources include sunlight, wind, and trees. But it is possible to use up some renewable resources. For example, if people cut down trees faster than they can grow back, the supply of this resource will decrease.

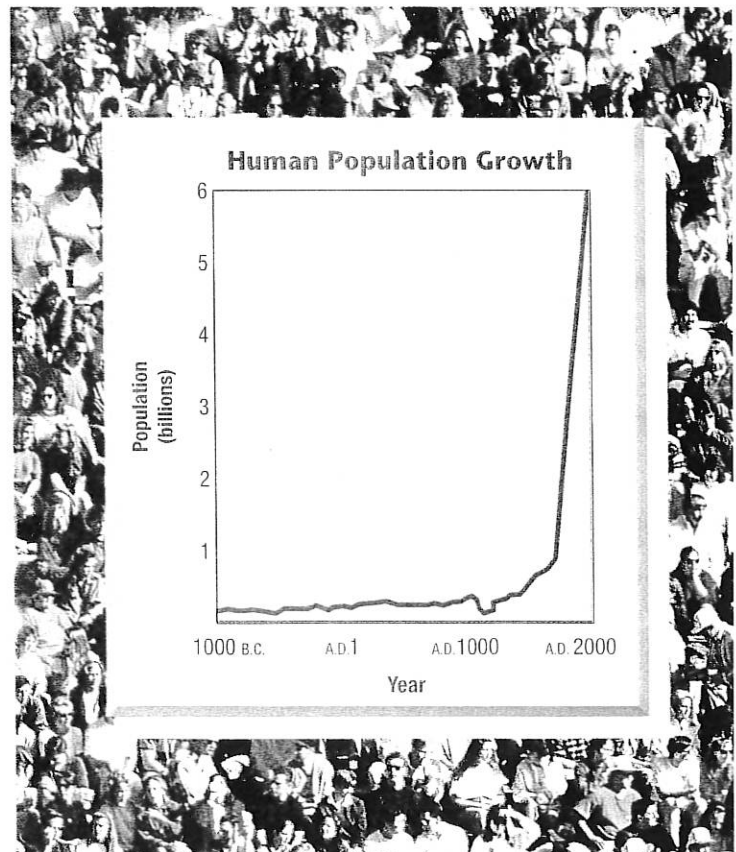
Natural resources that are not replaced as they are used are called **nonrenewable resources**. Most nonrenewable resources, such as coal and oil, exist in a limited supply. As nonrenewable resources are used, the supply may eventually be depleted.

Population Growth Figure 3 shows how the human population has changed in the last 3,000 years. You can see that the population grew very slowly until about A.D. 1650. Around that time, improvements in medicine, agriculture, and sanitation enabled people to live longer. The death rate decreased. But as the population has continued to grow, the demand for resources has also grown.

Pollution Any change to the environment that has a negative effect on living things is called **pollution**. Pollution is an issue because it is often the result of an activity that benefits humans. For example, generating electricity by burning coal can result in air pollution. Some pesticides used to kill insects that eat crops are harmful to other animals.

Checkpoint What is a natural resource?

Figure 3 If two's company, six billion is certainly a crowd! The human population has grown rapidly in the last few centuries. Calculating How much has the population grown since 1650?



Approaches to Environmental Issues

Dealing with environmental issues means making choices. These choices can be made at personal, local, national, or global levels. Whether to ride in a car, take a bus, or ride your bicycle to the mall is an example of a personal choice. Whether to build a land-fill or an incinerator for disposing of a town's wastes is a local choice. Whether the United States should allow oil drilling in a wildlife refuge is a national choice. How to protect Earth's atmosphere is a global choice.

Choices that seem personal are often part of much larger issues. Choices of what you eat, what you wear, and how you travel all affect the environment in a small way. When the choices made by millions of people are added together, each person's actions can make a difference.

SCIENCE & History

Making a Difference

Can one individual change the way people think? The leaders featured in this time line have influenced the way that many people think about environmental issues.



1892

California writer John Muir founds the Sierra Club. The group promotes the setting aside of wild areas as national parks. Muir's actions lead to the establishment of Yosemite National Park.

1905

Forestry scientist Gifford Pinchot is appointed the first director of the United States Forest Service. His goal is to manage forests scientifically to meet current and future lumber needs.

1875

1900

1925



Theodore Roosevelt (left) and John Muir (right)

1903

President Theodore Roosevelt establishes the first National Wildlife Refuge on Pelican Island, Florida, to protect the brown pelican.

The first step in making environmental decisions is to understand how humans interact with the environment. **Environmental science is the study of the natural processes that occur in the environment and how humans can affect them.**

When people make decisions about environmental issues, the information provided by environmental scientists is a starting point. The next step is to decide what to do with the information. But environmental decisions also involve discussions of values, not just facts and figures. Environmental decisions usually require considering many different points of view. Most of these viewpoints fall into one of these three categories: development, preservation, or conservation.

Checkpoint What is an example of a local choice about an environmental issue?

In Your Journal

Find out more about one of the people featured in this time line. Write a short biography of the person's life explaining how he or she became involved in environmental issues. What obstacles did the person overcome to accomplish his or her goal?

1949

Naturalist Aldo Leopold publishes *Sand County Almanac*. This classic book links wildlife management to the science of ecology.

1969

At the age of 79, journalist Marjory Stoneman Douglas founds Friends of the Everglades. This grassroots organization is dedicated to preserving the unique Florida ecosystem. She continues to work for the Everglades until her death in 1998.



1950

1975

2000

1962

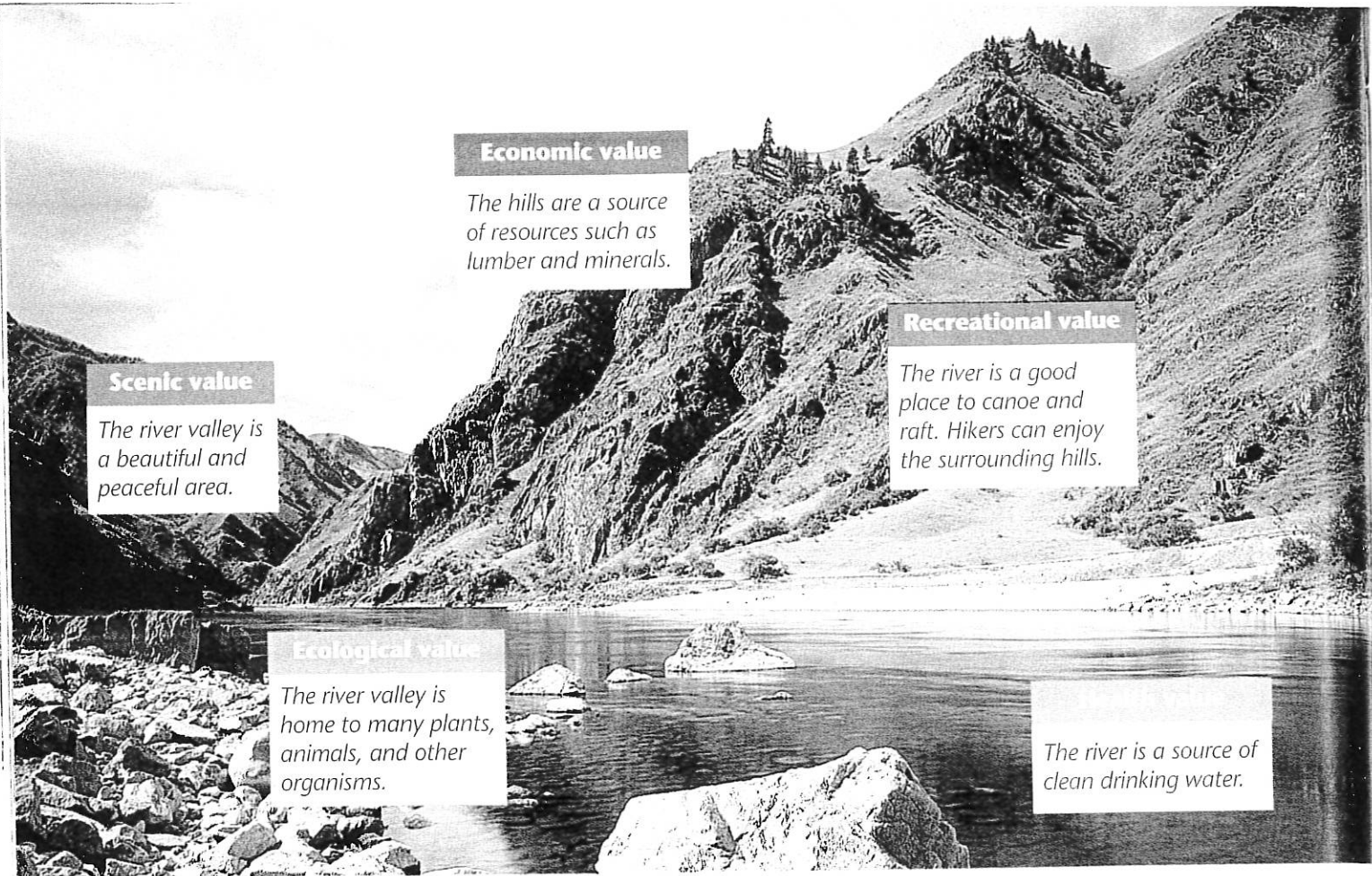
Biologist Rachel Carson writes *Silent Spring*, which describes the harmful effects of pesticides on the environment. The book raises awareness of how human activities can affect the environment.



1977

Biologist Wangari Maathai founds the Green Belt Movement. This organization encourages restoring forests in Kenya and other African nations.





Economic value

The hills are a source of resources such as lumber and minerals.

Scenic value

The river valley is a beautiful and peaceful area.

Recreational value

The river is a good place to canoe and raft. Hikers can enjoy the surrounding hills.

Ecological value

The river valley is home to many plants, animals, and other organisms.

The river is a source of clean drinking water.

Figure 4 The environment is valued for many different reasons. *Applying Concepts* In what other ways might this area be valuable?

Development The belief that humans should be able to freely use and benefit from all of Earth's resources is referred to as the **development viewpoint**. This viewpoint considers the environment in terms of economics. Economics involves business, money, and jobs. According to the development viewpoint, the most valuable parts of the environment are those resources that are most useful to human beings.

Preservation The belief that all parts of the environment are equally important, no matter how useful they are to humans, is the **preservation viewpoint**. This viewpoint considers humans to be the caretakers of nature. Preservationists feel that Earth and its resources should be a source of beauty, comfort, and recreation. The preservation viewpoint is that living things and ecosystems should not be disturbed for the benefit of people.

Conservation The **conservation viewpoint** is the belief that people should use resources from the environment as long as they do not destroy those resources. Conservationists feel that people must balance development and preservation. The conservation viewpoint is that people should manage Earth's resources for the future, not just for today.

Checkpoint What are three viewpoints about how humans should interact with the environment?

Weighing Costs and Benefits

Lawmakers work with many different government agencies to make environmental decisions. Together they must consider the needs and concerns of people with many different viewpoints. **To help balance these different opinions, decision makers weigh the costs and benefits of a proposal.**

Costs and benefits are often economic. Will a proposal provide jobs? Will it cost too much money? But costs and benefits are not only measured in terms of money. For example, building an incinerator might reduce the beauty of a natural landscape (a scenic cost). But the incinerator might be safer than an existing open dump site (a health benefit). It is also important to consider short-term and long-term effects. A proposal's short-term costs might be outweighed by its long-term benefits.

Consider the costs and benefits of drilling for oil in Antarctica. Drilling for oil would have many costs. It would be very expensive to set up a drilling operation in such a cold and distant place. Transporting the oil would be difficult and costly. An oil spill in the seas around Antarctica could harm the fish, penguins, and seals there.

On the other hand, there would be many benefits to drilling in Antarctica. A new supply of oil would provide fuel for heat, electricity, and transportation. The plan would create many new jobs. There would be a greater opportunity to study Antarctica's ecosystems. Do the benefits of drilling outweigh the costs? This is the kind of question lawmakers ask when they make environmental decisions.

Sharpen your Skills

Communicating

Form a group with two other students. Each person will be assigned a different viewpoint toward the environment. Hold a panel discussion in which each person proposes how the continent of Antarctica should be used. What similarities and differences are there among your responses?



Section 1 Review

1. List the three main types of environmental issues.
2. Define environmental science.
3. What is one way to balance different viewpoints on an environmental issue?
4. How has the growth of the human population affected the environment?
5. List three costs and three benefits of drilling for oil on Antarctica.
6. **Thinking Critically Comparing and Contrasting** Compare renewable and nonrenewable resources. Give an example of each type of resource.

Check Your Progress

Stake out a square plot measuring 1.5 meters on each side. Record the date, time, temperature, and weather. Observe the organisms in your plot, and record them with notes and drawings. Include enough detail so that you can identify any unfamiliar organisms later. (*Hint:* Also note evidence such as feathers or footprints that shows that other organisms may have visited the plot.)

CHAPTER
PROJECT
3