

The Importance of the Individual

Objectives

- ▶ Give examples of individuals who have influenced environmental history.
- ▶ Identify ways in which the choices that you make as an individual may affect the environment.

It is easy to feel that one person does not make much difference to the environment, but we all affect the environment with our daily actions. By learning about environmental problems and solutions, we are able to make responsible decisions. In addition, history has shown that one individual can have an influence on many others.

Influential Individuals

Some individuals who have influenced thinking about the environment in the United States are listed in **Table 4**. These people are famous because they brought attention to problems or convinced many people to think about new ideas. Many of these individuals wrote best-selling books about the subjects they knew well. These books were easy to understand and inspired people to think about environmental problems in a new way.

The 1960s Decade During the 1960s, environmental issues became widely known. It was then that biologists such as Paul Ehrlich, Barry Commoner, Rachel Carson, and Garrett Hardin drew public attention to environmental problems such as pollution, rapid population growth, and resource depletion.

Table 4 ▼

Some People Who Influenced Environmental Thinking in the United States	
Henry D. Thoreau (1817–1862) was a conservationist and writer who is best known for his essays about his stay in a cabin at Walden Pond in Massachusetts.	Paul Ehrlich (1932–) is a Stanford ecologist who warned of the dangers of rapid population growth with his 1968 book, <i>The Population Bomb</i> .
John Muir (1838–1914) was a Scottish-born naturalist and writer who founded the Sierra Club, explored the American West, and was a famous advocate for preserving western lands as wilderness.	Jane Goodall (1934–) studied chimpanzees in Tanzania’s Gombe Stream National Park. Her books raised awareness of the plight of several endangered species and prompted new thinking about primate behavior.
Theodore “Teddy” Roosevelt (1858–1919) was the first American president to strongly support conservation. He founded the Forest Service, expanded national forests by 400 percent, and created the first National Monuments.	Marion Stoddart (1928–) led efforts to save the Nashua River in Massachusetts from pollution and development. <i>A River Ran Wild</i> is a book about her efforts. She is still active in protecting the Nashua River.
Alice Hamilton (1869–1970) was the first American expert on diseases caused by working with chemicals. In the early 1900s, she warned workers about exposure hazards and opposed the addition of lead to gasoline.	Jacques Cousteau (1910–1997) was a world-famous French oceanographer who produced many popular books, films, and TV programs that documented over four decades of his undersea explorations.
Rachel Carson (1907–1964) was a biologist with the U.S. Forest Service who raised awareness of toxic pesticides with her 1962 book, <i>Silent Spring</i> .	Garrett Hardin (1915–) is a distinguished professor of human ecology who is best known for his 1968 essay “The Tragedy of the Commons.”

In *Silent Spring*, Rachel Carson argued that many public lands and resources were not adequately protected. She argued that resources such as water had to be protected and kept in natural, unpolluted conditions. Partly as a result of Carson's book, in 1964 Congress passed the Wilderness Act. This allowed the government to designate some federal lands as wilderness areas. These areas may only be used for low-impact recreation such as hiking and camping, and the number of visitors is limited.

Rising Awareness Also in the 1960s, several environmental disasters made headlines. Air pollution in New York City was blamed for 300 deaths. The bald eagle became endangered as a result of the widespread use of DDT. There was a massive oil spill near Santa Barbara. Lake Erie became so polluted that many of its beaches had to be closed. Eventually, pressure from the public led to new laws and efforts to reduce environmental damage. The first Earth Day, in 1970, was a historic demonstration of public concern for environmental issues.

Connection to History

Historical Writers Americans have been influenced by descriptions of America written by early explorers. An example is this passage written in 1805 by Meriwether Lewis, from his journal of the famous Lewis and Clark expedition:

"I beheld the Rocky Mountains for the first time . . . these points of the Rocky Mountains were covered with snow and the sun shone on it in such manner as to give me the most plain and satisfactory view. While I viewed these mountains I felt a secret pleasure in finding myself so near the head of the heretofore conceived boundless Missouri."



Figure 8 ▶ Examples of individuals who have brought attention to environmental issues: **1** Rachel Carson, **2** Marion Stoddart, and **3** Jacques Cousteau.

QuickLAB



Making a Decision

Procedure

1. Apply the following decision-making model to an environmental issue that interests you. After choosing an issue, find sources of information and opinions on different sides of the issue. Make notes about the ideas that you consider.
2. Consider which values apply to the issue. Consider scientific, economic, health, ethical, and cultural values. Which value is most important to you? to your community? Who else is involved, and how might they feel?
3. Explore the consequences of different actions. What are some possible outcomes? What are the pros and cons of each? How reliably can the outcomes be predicted?
4. Make your decision. Explain your reasoning in terms of the above considerations.

Analysis

1. Share your decision with a partner or group. Do not debate the issue; try to understand each others' reasoning, and give each other feedback about how carefully you applied the decision-making process.

Figure 9 ► Voting is an opportunity to make a decision that affects the environment.

Applying Your Knowledge

What will you be in the future? At the very least, you can expect to be a citizen who has the right to vote, a consumer who has choices of how to spend your money, and a member of the human race who has a role in the global environment. To make the decisions you will face, you can draw on your knowledge of environmental science.

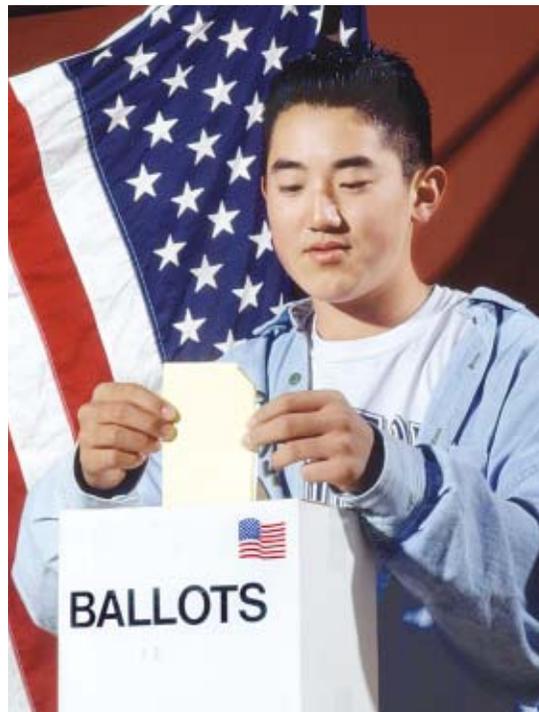
Voting One of the most important decisions you may make is in the act of voting, as shown in **Figure 9**. The people we elect will make decisions that affect our environmental future. You have the right to support the candidates and laws that you think are best in both local and national elections. You can easily find out what a candidate thinks about environmental issues before an election. You can find information about candidates through the media, voter organizations, and Web sites.

One way to take action on environmental problems is as part of a group of people who share your concerns and interests. You can find many groups in your community asking for volunteers for activities such as planting trees, picking up trash, or maintaining trails. Many large nonprofit organizations hold meetings, educational activities, and trips to natural areas all over the country.

Weighing the Evidence A popular environmental slogan is to “think globally, act locally.” This slogan reminds us that our everyday actions have broader effects. For example, every time we walk the dog, change the oil in a car, or toss aside a food wrapper, we may produce pollutants that will be washed into our drinking water supply by the next rain. Being aware of the effects

of our actions is an important step in making decisions that affect the environment. What choices of action could you make today that will affect your environment?

Each of us has the responsibility to educate ourselves as we make the decisions that affect the world around us. There is a wealth of information about environmental issues on the Internet, in libraries, and in the



media. When you research a topic, use reliable sources for statistics and information. Do not be misled by information that may look convincing but that has no supporting evidence.

Consumer Choices Another environmental slogan you may have heard is “reduce, reuse, recycle.” As consumers, we can reduce the amount of things we buy and use, we can reuse things that are often used only once, and we can recycle many materials. How many examples can you think of to apply these ideas in your everyday life?

As a consumer, you may choose to buy products that are produced sustainably or that do less damage to the environment. It is not always easy to tell which products meet this standard. But as you learn more about environmental science, you’ll be prepared to make decisions that guarantee that your impact on the environment will be a positive one.



Figure 10 ▶ As consumers, we make many choices that affect the environment. What choices could you make today that will affect your environment?

SECTION 3 Review

1. **Give examples** of at least three individuals in history who have had an impact on environmental thinking. What do they have in common?
2. **Identify** at least three ways individual citizens can influence their environment.
3. **List** five choices that you could make today that would have some kind of effect on the environment.

CRITICAL THINKING

4. **Identifying Relationships** Think of one activity that you do often. Write a paragraph explaining all the environmental effects, positive or negative, that this activity might have over time. **WRITING SKILLS**
5. **Predicting Consequences** Choose one environmental issue that you have learned about in this book and describe all the ways that you could make a difference on this issue.

CHAPTER 21

Highlights

1 Economics and International Cooperation



Key Terms

sustainability, 533
economics, 536

Main Ideas

- ▶ To achieve sustainability will require co-operation and communication at many levels of society.
- ▶ Some international agreements on the environment have been achieved and successfully implemented. In some cases, goals have been set but not yet achieved.
- ▶ Economic systems operate within the environment by using resources and by returning both desired and undesired results. Economic systems sometimes fail to balance all the costs and benefits of people's actions.

2 Environmental Policies in the United States



Environmental Impact Statement, 541
lobbying, 543

- ▶ In the last century, the U.S. government has developed policies to address environmental problems and has established agencies to implement those policies.
- ▶ Citizens can influence policy at all levels of government but especially at the local level.
- ▶ Lobbying and the media also influence policy and public opinion.

3 The Importance of the Individual



- ▶ Individuals can have an effect on environmental interactions through leadership and education. Many environmental problems were brought to the public's attention by a few individuals.
- ▶ You make important decisions about the environment every day. How you choose to spend money, vote, and use resources will have an impact on the environment.
- ▶ You can apply scientific thinking and knowledge to any decisions that you may face.

Using Key Terms

Use each of the following terms in a separate sentence.

1. *sustainability*
2. *economics*

Use the correct key term to complete each of the following sentences.

3. Every federal project must complete a(n) _____.
4. Many groups try to influence government policies through _____.



STUDY TIP

Preparing for a Debate Participating in a debate can help you analyze an issue. To support a point of view, you must also understand opposing views. For practice, choose an issue discussed in this chapter or elsewhere in this book. At the top of a sheet of paper, state the basic problem. Draw two or more columns, and summarize different points of view at the top of each column. Then list the arguments in favor of each view. Try to find arguments that can be made against each other on similar points.

Understanding Key Ideas

5. Which of the following trends is *not* a challenge to achieving sustainability?
 - a. the increasing human population
 - b. the decreasing supply of fresh water in the world
 - c. disagreement among governments
 - d. advancement of scientific understanding
6. At the 1992 Earth Summit, representatives from around the world
 - a. created the Kyoto Protocol.
 - b. tried to balance economic development with environmental sustainability.
 - c. could not reach agreement on anything important.
 - d. talked about environmental problems for the first time ever.
7. International environmental agreements include
 - a. the Montreal Protocol on Ozone.
 - b. Earth Day.
 - c. the World Trade Organization.
 - d. the Wilderness Act of 1964.
8. Economic systems
 - a. do not depend on limited natural resources.
 - b. always balance the costs and benefits of every action.
 - c. should not include the costs of pollution with the costs of an action.
 - d. must operate within the environment.
9. Which of the following statements about U.S. environmental policy is *not* true?
 - a. During most of the 19th century, most Americans were not concerned about environmental consequences.
 - b. During the 1960s, several individuals had strong effects on public thinking about environmental issues.
 - c. Before Earth Day 1970, no one in the United States cared about the environment.
 - d. The Environmental Protection Agency was established at a time of increasing public awareness of environmental problems.
10. State and local environmental regulations
 - a. cannot be influenced by individuals.
 - b. simply enforce federal standards.
 - c. do not have to follow federal standards.
 - d. are often more strict than federal standards.
11. The main function of an Environmental Impact Statement is
 - a. to predict the effect a federal project might have on the environment.
 - b. to produce a record of environmental change throughout history.
 - c. to satisfy the requirements of international agreements.
 - d. to limit real estate development and the activities of businesses.
12. Local governments do not regulate
 - a. recycling.
 - b. sewage treatment.
 - c. garbage disposal.
 - d. Environmental Impact Statements.

Short Answer

- What do world leaders do at gatherings such as the Earth Summit?
- Why are some treaties not successful?
- In what ways do state or local regulations differ from federal regulations?
- Describe several ways that citizens can influence environmental policy.
- How can a consumer affect the environment?

Interpreting Graphics

The figures below show a type of label that is required by law to be placed on all new appliances. Use the figures to answer questions 18–21.

- What is the most likely reason that the tag on the right has an “energy star” symbol?
- Which quantity on the tags is the most important piece of information about these appliances?
- Why do you think the government has required such labels to be placed on all new appliances?
- There are two types of refrigerators represented on these labels: top-freezer and side-by-side. Which type is generally more efficient? How can you tell?

Concept Mapping

- Use the following terms to create a concept map: *groups*, *individuals*, *lobbying*, *state laws*, *federal laws*, and *voting*.

Critical Thinking

- Expressing a Viewpoint** Read the section about influential individuals in this chapter. Describe at least one effect that one of these individuals may have had on your life.

READING SKILLS

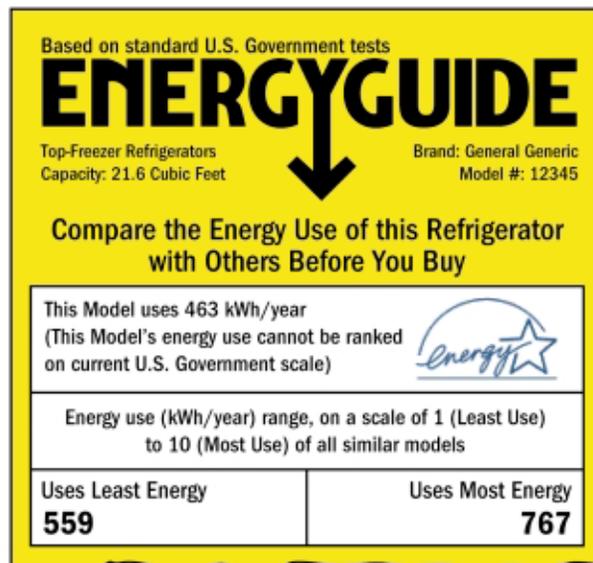
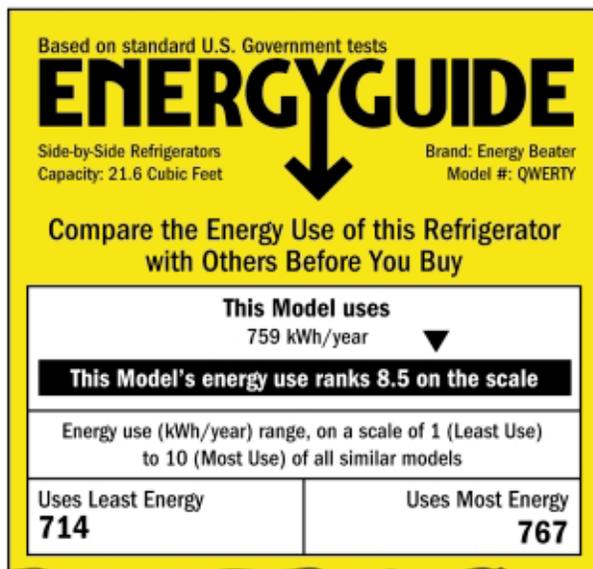
- Making Predictions** What might the effects be if the United States doubled the tax on gasoline over the next 10 years?

Cross-Disciplinary Connection

- History** Some people argue that developing nations should be allowed to create polluting industries in order to develop economically, just as the developed nations did in the past. Explain your opinion of this argument.

Portfolio Project

- An International Treaty** Write a proposal for a new international treaty that would address a pressing environmental problem and that you think could be agreed upon by many nations.

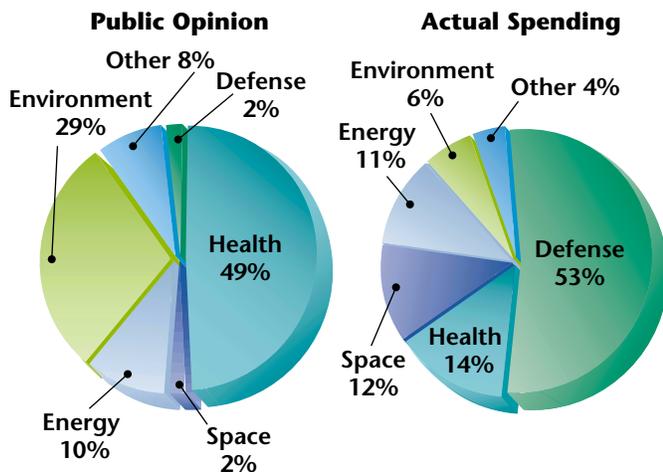
WRITING SKILLS



MATH SKILLS

Use the graphs below to answer question 27.

- 27. Analyzing Data** The graph on the left shows the proportions of federal money that the public thinks should be spent on different types of research and development, based on a 1993 poll. The graph on the right shows how the money was actually spent. Which types of spending show close agreement between government spending and public opinion? Which types show the greatest difference?



WRITING SKILLS

- 28. Communicating Main Ideas** Describe some signs that the world may be progressing toward a sustainable future. What are some likely challenges ahead?
- 29. Expressing Original Ideas** Describe your vision of a sustainable future. Consider lifestyles, technology, forms of government, economic systems, and social organizations.



READING FOLLOW-UP

Now that you have read the chapter, take a moment to review your answers to the **Reading Warm-Up** questions in your **EcoLog**. If necessary, revise your answers.

STANDARDIZED TEST PREP

Read the passage below, and then answer the questions that follow.

Theodore Roosevelt was a unique and memorable president. A 1902 photograph shows him riding a moose across a river. Roosevelt thought of public lands as economic assets, to be used for timber harvesting, mining, and recreation. He felt that natural resources should be regulated and managed for the public benefit. He did not see these lands as refuges for threatened plants and animals. Roosevelt was considered to be the first conservationist president.

Roosevelt had some conflicts with preservationists such as John Muir. Preservationists believe in preserving public lands as untouched wilderness for future generations to study and enjoy. These conflicting views over how to use U.S. public lands continue today.

- According to the passage, what is meant by the term *conservationist*?
 - the same thing as *preservationist*
 - one who believes in managing natural resources for the public benefit
 - one who believes nature should be preserved untouched
 - the same thing as *environmentalist*
- According to the passage, which of these ideas about the uses of U.S. public lands was debated about 100 years ago?
 - Mining should be legal.
 - Wolves should be reintroduced into Yellowstone.
 - Motors should be allowed in parks.
 - Public lands should be preserved.
- With which of the following opinions did both Roosevelt and Muir most likely agree?
 - Public lands should not be used for mining or timber harvesting.
 - The United States should own and regulate public lands.
 - Wolves should be exterminated.
 - Roosevelt was a preservationist.

Objectives

- ▶ **USING SCIENTIFIC METHODS** Research a current environmental issue that requires an informed policy decision.
- ▶ **USING SCIENTIFIC METHODS** Prepare and present a report that is intended to inform the appropriate policy decision makers.

Materials

file folders
 markers or colored pencils
 note cards
 posterboard
 paper

optional materials: computer for word processing, graphing, or making a presentation

▶ **Scientific Reports** Scientists often present their findings in reports that can be reviewed by other scientists and by the public. Try to give your report a style and organization like that used by professional scientists.

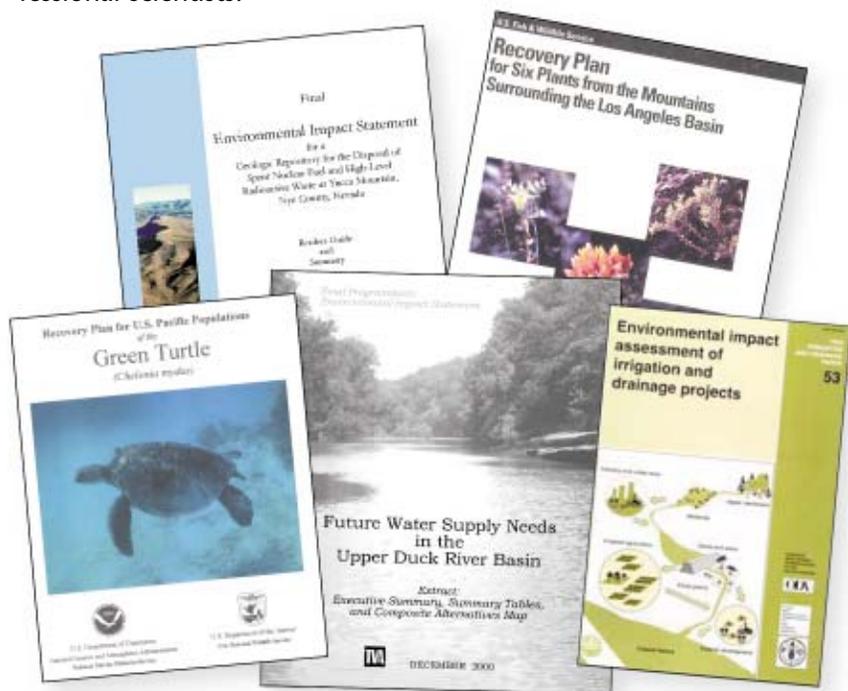
Be an Environmental Scientist

Are you ready to put your knowledge of environmental science to work? Environmental scientists are often asked to help decision makers in government when there is a policy decision to be made that may affect the environment. Decision makers often want to make an informed decision based on a scientific analysis of a situation. Environmental scientists may be asked to study a situation or predict the results of an action and present their findings to the interested decision makers.

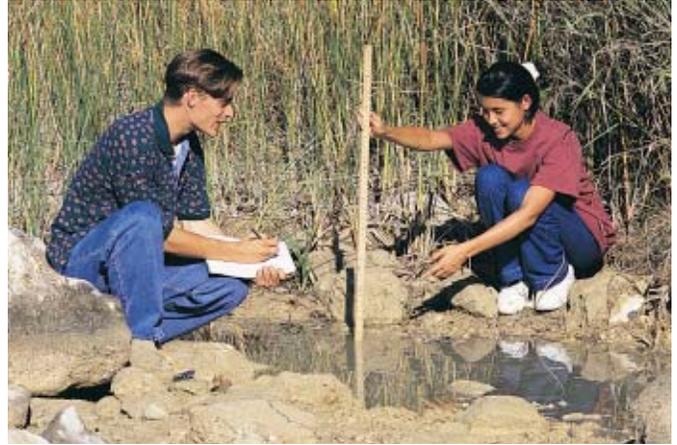
In this lab, you will be an environmental scientist who has been asked to prepare a report. The purpose of the report is to inform a group of decision makers of the possible results of their choices. You are expected to prepare an unbiased, thorough, and accurate report. And like a professional scientist's report, your report will be reviewed by your peers.

Procedure

1. Choose a current environmental issue that requires an informed policy decision. You might research legislation that is being considered in national or state governments. Or find out if any local projects or laws that have environmental effects are being debated in your community.
2. Do some simple beginning research to become familiar with the issue. Start in the library and then also try to find information from government agencies, scientific publications, and any private groups that are involved with the issue.
3. Write a brief description of the issue or proposal and a plan of how you will research and present your findings. Get your teacher's approval before proceeding.
4. Carry out your research. Don't forget to get help from librarians. Be sure to keep track of your sources of information, and check that they are reliable sources. Keep your teacher informed of your progress, and ask for help if you need it.
5. Create an outline of your report. Get your teacher's approval before proceeding.



6. Create the report. Be sure to do the following:
 - a. Present the major options or different opinions being considered and the main arguments or reasons for each.
 - b. For each option or potential action, explain the effects or consequences that might result.
 - c. Create diagrams, tables, graphs, or other representations of the science involved.
 - d. Provide citations of sources in a bibliography or other format, as approved by your teacher.
 - e. Give a citation for each fact you present. Think critically about all sources of information you use. Try to find more than one source for information that seems doubtful.
 - f. Be clear about how much data is available. Explain when there does not seem to be enough data to make a conclusion or establish a fact.
7. Present your report to your classmates and teacher.



► **Further Research** Like a real scientist, your research may lead you to new questions. You may wish to propose or conduct further research into the issue you have studied.

Analysis

1. **Analyzing Results** Read and listen to your classmates' reports, and evaluate them as described below.

Conclusions

2. **Evaluating Results** Evaluate your classmates' reports or presentations. Use the following criteria:
 - a. What evidence or research did the scientist present to support his or her facts and conclusions?
 - b. Was every conclusion supported by data or by scientific opinion?
 - c. Was every fact or piece of data documented and supported by other sources?
 - d. Were the concepts presented clearly? Did the report/presentation flow logically?
 - e. Did the diagrams help you understand ideas?
 - f. Was the report unbiased, or did the presenter show his or her opinion on the subject?

Extension

1. **Communications** Present or submit your report to a group that is making decisions about the issue you studied.

STUDENT CLUB SAVES EAGLES AND MORE

Not many people get to see a bald eagle up close, and most people never get to hold one. When Jeremy had the chance to care for an injured bald eagle and then return it to the wild, he felt “it was a life experience.” Jeremy is just one of the hundreds of current and former members of the Southwestern High School Conservation Club (SWCC) in Somerset, Kentucky.

This club is unique in many ways. The SWCC’s core mission is to help students understand the natural world through hands-on activities. In many ways, the club is an extension of a variety of environmental science classes offered at the school. However, the club is very busy and is involved in a wide variety of activities. Most important, the club members all feel that they are learning responsibility and important skills while making a difference in their environment.

Hands-On Science

Students at Southwestern High School (SWHS) can choose from six different environmental science courses, such as raptor biology or greenhouse management. In all of these classes, students spend more time getting their hands dirty than they spend using pencils and paper.

One SWHS science teacher said, “Biology is out there, beyond the classroom; you have to get outside to fully study it.” Thanks to the hard work and leadership of students and teachers, the science facilities at SWHS now include a working greenhouse, native plant landscapes, a nature trail, an outdoor amphitheater, computer labs, and a weather station. The most exciting and unique facility at the school is the Raptor Rehabilitation Center, where SWCC members work every afternoon.

A Second Chance for Raptors

Raptors are birds of prey, such as owls, hawks, vultures, and eagles. Raptors in the United States have suffered many threats to their existence, from pollution to injury by cars or gunshots. Several federal and state laws are intended to protect raptors from such threats, but at least 300 raptors have been rescued from these threats by the students of SWHS.

Injured birds and orphaned fledglings are brought to the Raptor Rehabilitation Center from across the United States. The school has a special license to keep and care for raptors. The rehabilitation program requires veterinary equipment and supplies, specially designed cages, and a professional level of knowledge and training.

SWHS teacher and club sponsor Frances Carter started the rehabilitation program when the high school opened in 1993. She had previous experience with raptors and knew professionals in the field of wildlife management. These professionals asked her to help care for some of the birds

that were being found because there were no other raptor facilities in the area.

A typical day in a raptor biology class involves about 30 min of instruction and an hour of bird maintenance. Additional bird care is done by SWCC members during nonschool hours. For example, club members Jeremy, Ben, and Grant spent hours each day for months—including holidays—working with two bald eagles.

Maintenance on a live bird usually involves grinding down excess growth on the beak, trimming the talons, exercising the bird, conducting a physical exam, and giving medications. Cages have to be cleaned weekly. Special diets have to be prepared. All of these tasks can be dangerous and messy. Handling the large birds requires training and skill.

They Say the Birds Choose You

The first goal of raptor rehabilitation is to be able to return the birds to the wild. This goal involves a tricky balance between building trust with each bird and



► **An eagle named Justice** was the first bald eagle to be rehabilitated and released in Kentucky, thanks to the SWCC. “I got chills,” said one of the club members who was present, “It was gorgeous. That’s a feeling you only get a few times in your life.”

preserving its wild instincts. The raptor program has succeeded in releasing more than 30 percent of its birds. Yet for many students, letting the birds go is the hardest part of the work.

Imagine being handed three fuzzy, softball-sized baby owls, squawking for their lost mother. You might guess that these young great horned owls stole the hearts of the students at Southwestern. The students named them Bert, Ernie, and Elmo. Club members Amy and Valerie virtually adopted these baby owls and even took the birds home over vacations and gave them round-the-clock care. Amy recalls 3 A.M. feedings of dead mice or chicken livers rolled in calcium. “Killing mice by myself—nasty stuff. I thought it was the grossest thing I ever had to do in my life,” she said.

However, Amy learned that the owls depended on her, “and that was the only thing that mattered.” Eventually, the three owls grew to be healthy adults and were released. Amy reflected, “It was hard to watch the ‘babies’ fly off, never to be seen again.”

Responsibility and Reward

In addition to the news-making events when the club releases another raptor into the wild, the club makes many efforts to educate their community. Presentations in which live raptors are perched on a student’s hand are popular events at other schools, community fairs, and teacher training workshops. These presentations are also opportunities to educate people about wildlife and environmental issues. The school provides leadership, resources, and workshops for over 40 other schools in Kentucky. Also, club



► **Students in SWCC** are multitalented. They do everything from cleaning birdcages to making presentations around the nation and from picking up litter to competing in the national Envirothon competition. The Club’s latest plan is to build a nature center.

members participate in a yearly environmental science competition called the *Envirothon*. The club advanced to national level in 2001.

The raptor rehabilitation program, greenhouse, nature trail, weather stations, and computer lab sound like a lot of fun, but most club members say that responsibility and making a difference are the important reasons to be in the club. Everyone in the club has a job title, from Club Reporter to Greenhouse Manager to Webmaster.

What Will They Do Next?

For the club and the teachers at SWHS, there is always more to be done. Club members do most of the planning, fundraising, and manual labor in a variety of projects. Recent projects include landscaping the school grounds with native plants, creating composting and recycling centers, and expanding the school’s facilities. The school hopes to unite these facilities into a complete nature center that would educate tourists,

students, and scientists from around the nation.

Club members have developed career interests in veterinary medicine, wildlife biology, conservation, or environmental science fields. Jeremy may be a firefighter or a civil engineer. Amy and Cara may go into journalism. They all say that the club has given them unique opportunities and that they will never forget the experience.

What Do You Think?

Are there any groups like the SWCC in your area? Would you like to be like these students? What other ways can students make a difference for the environment? Explain your answers.