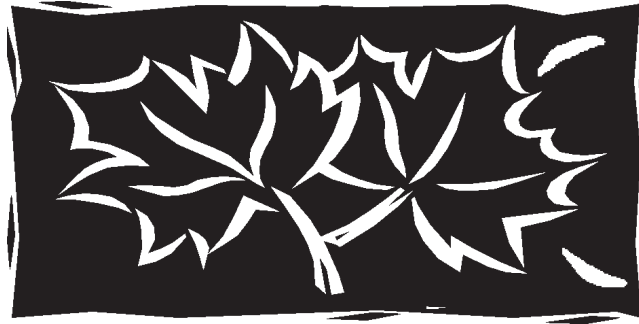

SECTION FOUR:



**HOW CAN WE
PROTECT BIODIVERSITY?**



Activity 4-1 Future Worlds

AT A GLANCE

Build a pyramid to reflect personal priorities for the future. Investigate the way humans affect the natural world and discover how people are working to protect the environment and improve the quality of life in Illinois and on earth.

OBJECTIVES

Express personal values by creating a personal vision for the future, especially as it relates to biodiversity. Reach group consensus using negotiation and conflict resolution skills. Discuss ways to arrive at the envisioned future. Analyze various approaches people in Illinois and around the world are taking to arrive at those futures.

SUBJECTS

English language arts, social science, physical development and health

SKILLS

gathering (brainstorming), organizing (prioritizing), analyzing (comparing and contrasting, discussing), interpreting (relating), presenting (articulating), citizenship (debating, evaluating the result of citizen action, planning citizen action, seeking consensus, working in a group)

LINKS TO ILLINOIS BIODIVERSITY BASICS CONCEPTUAL FRAMEWORK

values and beliefs; human values

VOCABULARY

conflict management, consensus, cultural diversity, global warming, invasive species, legislation, lichens, pollinating, racial justice, recycling, smart growth, stewardship, sustainable

TIME

two class periods

MATERIALS

copies of “Future Blocks,” “Priority Pyramid” and “Making It Happen” for each student and for each group; scissors; glue or tape

CORRELATION TO ILLINOIS LEARNING STANDARDS

English language arts 4.B.2a, 4.B.2d, 4.B.3d, 5.A.2a, 5.A.2b, 5.A.3a, 5.A.3b, 5.C.2b
social science 16.E.2c, 16.E.3b, 16.E.3c, 17.C.2c
physical development and health 22.C.2, 22.C.3a, 22.C.3b

Some people look into our future and see a gloomy, inhospitable picture: a world that is less healthy, less safe, less diverse, more crowded and more polluted. While such portraits of doom may scare some people into action, they often have the opposite effect. Negative forecasts can become self-fulfilling prophecies, making people—especially young people—resigned and hopeless. This activity doesn’t take a doom and gloom approach. Instead, it is designed to get your students to begin envisioning the future they want to inhabit and to learn about some real-life examples of how people in Illinois and around the world are working to make the future brighter.

CHICAGO PLANS FOR THE FUTURE

In 1909, the Commercial Club of Chicago released “Burnham’s Chicago Plan of 1909,” one of the most influential and famous city plans in world history. Among its many provisions, that plan envisioned that the shore of Lake Michigan and a regional network of natural landscapes be protected as public parklands. Because of this foresight the Chicago region is ecologically healthier and more beautiful than it might have been. The air is cleaner, the water purer, there are more lakeside, parkland and forest preserves than if previous generations had not thought of the future. Therefore, what we do today helps determine what will happen in the future. Today the Chicago Metropolitan Agency for Planning, the City of Chicago and the Metropolis 2020 Project are working on projects to promote sustainable long-range planning for Chicago.

BEFORE YOU BEGIN

Option #1

Make a copy of “Future Blocks,” “Priority Pyramid” and “Making It Happen” for each student and for each group. Also provide scissors and glue or tape.

Option #2

Make a copy of the “Priority Pyramid” and “Making It Happen” for each student and for each group. Also provide scissors and glue or tape.



Activity 4-1 Future Worlds (continued)

WHAT TO DO

Option #1

1. Make personal pyramids.

Give each student a pair of scissors and a copy of both the “Future Blocks” and the “Priority Pyramid.” Explain to the students that the blocks list 15 different possible conditions or components of their future world. Have the students read through all the conditions. Make sure they understand all the words in the blocks. Then ask them to think about which of these conditions they most want to have as part of their world when they’re 50 years old. Clean air? Cures for illnesses? Less crime?

Have the students rank all the components from the most important to the least important. Tell them to cut out the squares and arrange them in the pyramid. The most important component should be placed in the top box of the pyramid, the next two components on the next tier and so on. Once the students have arranged all the blocks, have them mark each block with the number that reflects the priority rating they gave it. (The priority rating numbers are one through five and correspond to the levels of the pyramid.)

2. Create group pyramids.

Arrange the group into teams of four or five students. Have the students work together to come up with a single pyramid that represents the team’s priorities for the future. Everyone on the team should record the priority ratings each member of the group gave each block and compare them with his or her own personal pyramid.

3. Suggest methods of reaching consensus.

It might not be easy for teams to reach consensus regarding their group pyramid. The students may discuss their reasons for various choices, prioritize options or try other methods of reaching a group decision. But if they get stuck or seem to be struggling to achieve a fair process, you may want to interrupt and share the following negotiation suggestions:



- a. Make a list of all the possibilities for the top spot. Are there more than three? If not, would everyone accept having his or her first choice listed among the top three? If that’s the case, students may have an easier time resolving the question of order.
- b. Give everyone a chance to present his or her choice for the top square of the pyramid and explain why it was chosen. The other students should listen closely to these explanations. A student who lists bees as a top priority, for example, may explain that she’s concerned with how bee pollination is critical for food production. Then other students who have pushed to place “enough food for all people” in the top spot may realize that they share the same concern as the “bees” proponent. This strategy may help narrow choices or change the nature of the discussion.
- c. If the students are still struggling to reach a resolution, have them take a time-out to reflect on the process. Are certain views being overlooked because some students are quieter or less stubborn than others? Is the group uncomfortable with anyone’s way of working out the problem? By reflecting on the dynamics of their discussion, the students may be able to isolate the obstacles to group consensus.



Activity 4-1

Future Worlds (continued)

- d. Encourage each student to offer a solution that involves concessions on all sides. Afterward, the students should vote on which compromise package they prefer. If there are ties, hold a tie-breaking vote.
- e. Another consensus-building technique that could be used by the students is the “Nominal Group Technique” (see “Resources” for World Wide Web site).

4. Discuss the consensus process.

Bring the class back together and ask a representative from each team to present the team’s top three priorities to the class. Students can also summarize some of the conflicts the group experienced, as well as how the conflicts were resolved.

After each team has made a presentation, ask your students to reflect on the process of reaching consensus. Were they surprised by the disagreement among the members of the group about future visions? Did any of the students change their own views by talking with other group members? How do they think their team’s decision-making process might reflect some of the challenges that communities and societies face in working toward a positive future? (Make sure the students think about how hard it is to make positive changes for their community or the world, especially if people have different ideas about what they want and what they feel is important or right.) How much harder would it have been if the students had only enough time or money to ensure that their top two or three priorities would be achieved? (Again, you might want to point out the difficulties encountered by governments and organizations that are struggling to improve Illinois or the world when their resources are limited.)

5. Discuss solutions.

Ask the students if they have ever thought much about how they want the world to look in 50 years. Is simply thinking about dreams for the future enough to make them come true? If not, is it valuable? Why or why not? Ask students to look over the blocks in

their pyramids. Can they think of anything they or other people are doing to ensure that these things will happen in the future? Are there other things they would add to the pyramid?

6. Hand out “Making It Happen” sheets.

Tell the students that they now have a two-part assignment. First, they should compare their personal pyramid to the pyramid their group created. How do they explain the similarities and differences? How do they feel about the process they went through? How do they feel about the result?

Next, hand out copies of “Making It Happen.” Ask the students to read about each of the projects and choose three approaches that they think best achieved the top three priorities set by their team’s pyramid. (See “Making It Happen Answer Sheet.”) They should write one or two sentences explaining how each of the projects they picked is working to achieve the specified objectives and what they think each project’s strongest and weakest aspects are.

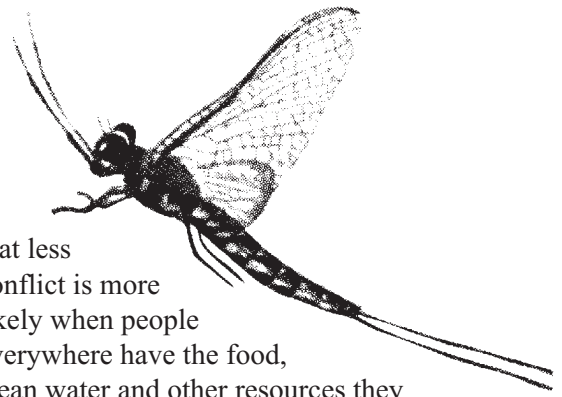
7. Have a wrap-up discussion.

After students have completed the assignment, make a list on the board of every priority square that made it onto a group’s top-three list. Then ask the students to describe the projects they matched to those squares. Did people pick different projects to achieve the same goal? Why? Do they think any of the actions address more than one objective?

Discuss possible strengths and weaknesses of the approaches listed. Do students think local projects are more effective than passing national legislation? Do they prefer preventive approaches (like education) or fix-ups (like pollution-cleaning technology)? Point out that there are a lot of ways to bring change to the world—such as educating people, passing legislation and developing innovative technologies or strategies.



Activity 4-1 Future Worlds (continued)



Option #2

1. Brainstorm about conditions for the future.

Ask the students to think about what they want the future to be like in Illinois. What things or conditions do they want when they're adults or when their own children are grown up? List their ideas on the chalkboard.

2. Make personal pyramids.

Give each student a copy of the "Priority Pyramid." Explain to the students that they need to fill in the pyramid with the conditions they want to see in Illinois in the future, ranking the conditions from the most to the least important. The most important condition should be placed in the top box of their pyramid, the next two conditions on the next tier, and so on. The students can use the ideas the group generated and add their own ideas.

3. Share personal pyramids and create group pyramids.

Arrange the class into groups of four or five students. Have the students share their pyramids with their team. Then have them work together to come up with a single pyramid that represents the team's priorities for the future. Everyone on the team should record the arrangement the group comes up with.

4. Suggest methods of reaching consensus.

See step three in Option #1.

5. Discuss the class process.

Bring the group back together and ask a representative of each team to present the team's top three priorities to the class. Students can also summarize some of their group's conflicts and how the conflicts were resolved.

As the groups present their pyramids, discuss with them the implications of each of their top three priorities. What kinds of things are entailed in each of their conditions? For example, if they chose less conflict as a condition of the future, they should see

that less conflict is more likely when people everywhere have the food, clean water and other resources they need for a satisfying and productive life. As the students discuss each condition, they should come to realize that everything they selected can be traced, at least in part, to a healthy environment.

When all the teams have presented their results, ask your students to reflect on the process of reaching consensus. See step 4 in Option #1.

6. Discuss solutions, hand out "Making It Happen" sheets and have a wrap-up discussion.

See steps five through seven in Option #1. Adapt the discussion to fit the different groups' pyramids.

MAKING IT HAPPEN—Answer Sheet

Each of the pyramid "blocks" can be matched with at least one of the "Making It Happen" examples. Here is a quick reference sheet for your use, but your students might make other connections that also work.

Bee Good to Your Lips: bees

Now, That's More Lichen It!: clean air

Beautifying Neighborhoods: less crime

A New Way of Doing Business: less trash

City Sewer Savvy: clean water

Ending the Conflict: less conflict

Restoring the Tallgrass Prairies: natural lands/open spaces

Concerned Citizens Unite: racial justice and diversity

The Power of Plants: cures for illnesses

Monarchs on the Net: environmental education

Planes, Trains & Automobiles: smart growth

Poached Eggs: healthy fish populations



Activity 4-1 Future Worlds (continued)

A New Crop of Farmers: enough food for
all people

Stewardship Volunteers Hard at Work:
fewer invasive species

Populations at Risk: barn owls and eagles

WRAPPING IT UP

Assessment

1. Use both “Priority Pyramid” worksheets and observed student interaction for the assessment. Inform the students that they will be evaluated on these assignments.
2. Before constructing pyramids, ask your students to write about their top priority for the future and the reasons it is most important to them. Use the following journal starter: “When I imagine a sustainable future, I think of . . .”
3. Have each student write a newspaper article on an imaginary, but realistic, event that addresses the number one concern from his or her personal pyramid.

Portfolio

The personal “Priority Pyramid” can be used in the portfolio.

Extension

1. Future logs

Have the students keep a “future log” for a day. Explain that the point of the log is to focus on how their activities, behaviors and even their thoughts can affect the future. In the log they should simply write down what they do, think, say and so forth—just as they would in a diary. In the log, however, they should use “bullet style” instead of paragraphs. At the end of the day, they should think about and write down how each “bullet” affects the world around them, either positively or negatively, and what the ramifications could be for the future. For example, if a bullet reads, “Had a PBJ sandwich for lunch, with a bag of chips and ginger ale,” the student might write down the fact that he or she recycled the soda can—a positive action for the future that saves natural resources and landfill space. But the student might also mention throwing away his or her lunch bag instead of using it again, or instead of bringing lunch to school in a heavy-duty container that can be used over and over. Have the students add ways that they can do more to create a positive future by changing their daily actions.

2. Class action project

Determine the block that holds the highest priority for the class. Have students brainstorm a range of activities that might be appropriate related to this block. Do the consensus-building activity/nominal group technique as a whole class to prioritize a class action that they would carry out. Then have students implement the goal by creating the “I Make a Difference Club.”



Activity 4-1 Future Worlds (continued)

Resources

Chicago Metropolis 2020. 2001. Internet site.

<http://www.chicagometropolis2020.org>

Chicagoland Environmental Network. 2001. Internet site.

<http://www.chicagoenvironment.org>

Chicago Wilderness. 2001. *Atlas for Biodiversity and Biodiversity Recovery Plan*. Internet site.

<http://www.chiwild.org>

Ford Motor Company. 2001. Internet site.

<http://www.ford.com>

Illinois Department of Natural Resources. 2001.

Internet site. <http://dnr.state.il.us>

Illinois Department of Natural Resources. 2001.

Division of Education Internet site.

<http://dnr.state.il.us/education>

Illinois Natural History Survey. 2001. Internet site.

<http://www.inhs.illinois.edu>

Illinois State Geological Survey. 2001. Internet site.

<http://www.isgs.illinois.edu>

Illinois State Water Survey. 2001. Internet site.

<http://www.sws.illinois.edu>

Kellert, Stephen. 1996. *The value of life: biological diversity and human society*. Island Press, Washington, D.C. 263 pp.

National Recycling Coalition. 2001. Internet site.

<http://www.nrc-recycle.org>



Northeastern Illinois Planning Commission. 2001. Internet site. <http://www.nipc.org>

Owen, Oliver. 1993. *Eco-solutions: it's in your hands*.

Abdo and Daughters, Edina, Minnesota. 64 pp.

Solid Waste Agency of Lake County, Illinois. 2001. Internet site. <http://www.co.lake.il.us/swalco>

University of Kansas Entomology Program. 2004. Internet site. <http://www.monarchwatch.org>

Wilson, Edward O. 1992. *The diversity of life*. Belknap Press, Cambridge, Massachusetts. 424 pp.



MAKING IT HAPPEN

Bee Good to Your Lips

A company called Burt's Bees purchases beeswax for the production and sale of lip balm. That's good news for beekeepers across the United States who use the income from beeswax sales to better manage their honey bees.

Most people don't know it, but honey bee populations have declined in the last few years. If the trend continues, the cost to farmers could be billions of dollars a year. The reason? Bees are very important for pollinating crops. Saving bees will require changes on many fronts—from reducing pesticide use to saving bee habitats.



Now, That's More Lichen It!

Forest scientists need lots of high tech instruments to measure air quality, right? Well, traditionally, they have had to spend thousands of dollars a year to buy and operate electronic air-monitoring instruments. But now they have a new, more cost-effective instrument: lichens! Lichens are actually two organisms in one: a fungus and either an alga or a bacterium. Together these "partners," that grow on rocks and other surfaces, can live in some of the harshest environments on earth—including the frigid reaches of Antarctica. Tough as they are, though, lichens are very sensitive to air pollution. A botanist discovered how certain lichens respond to three different air

pollutants—ozone, sulfur dioxide and nitrogen oxide. By monitoring where lichens are growing and how healthy they are, scientists can draw conclusions about the presence of these pollutants in an area. And many forest scientists are doing just that!

Beautifying Neighborhoods

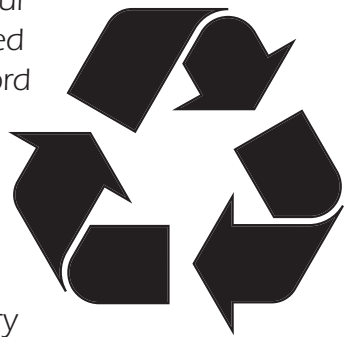
Want to help be a crime buster in your community? Follow the "Clean and Green" program example, a very successful Chicago program of community cooperation. The Chicago Alternative Policing Strategy or as it is better known the "CAPS program" co-sponsors "Clean and Green" a citywide cooperative effort to clean up Chicago neighborhoods. The Chicago Police Department, the Streets and Sanitation Department and area communities work together to spruce up neighborhoods from April to October, by clearing debris, planting flowers and implementing creative strategies to beautify inner city neighborhoods. The City provides tools, materials and pick up of trash and debris while the neighborhoods supply the volunteers. All 25 policing districts in Chicago have encouraged adoption of the "Clean and Green" program because it helps communities work on cooperative projects which in turn helps cut down on crime. It brings area residents and city workers together to improve neighborhood conditions in many ways. By getting people to work together in programs like "Clean and Green," they learn to work for positive improvements and take pride in their neighborhoods.



MAKING IT HAPPEN

A New Way of Doing Business

Taking recycling to a new level is Ford Motor Company's goal for this millennium. The company began recycling efforts in 1991, and the National Recycling Coalition has since awarded Ford the "Recycling Leadership Award" for efforts to recycle the company's own waste and for using recycled materials in auto production. During the 1990s, they used more than four billion pounds of recycled materials worldwide. Ford Motor Company uses plastic soda bottles and computer casings in automobile grills, reprocessed carpet in fan shrouds, auto battery casings in new splash shields and used tires in brake pedals and floor mats. Active recycling programs are in place in their facilities, like their paper recycling and reduction effort. North American plants alone are recycling 450 million pounds of waste each year, which has saved more than \$8 million annually for the company.



City Sewer Savvy

Kids around the country are spray painting messages on city streets. Are they breaking the law? No way! Working with local governments, they're helping to save their local rivers, streams and bays. By painting "DON'T DUMP: DRAINS TO LAKE OR STREAM" (or other waterway, depending on where they live) on city storm

drains, they're reminding residents that pollutants dumped down these drains flow into local waterways. And those waterways are important habitats for wildlife—not to mention critical fishing spots and valued places for recreation.

Ending the Conflict

Throughout history, many wars have been fought over natural resources such as land, forests and water. While problems regarding resources still exist, a number of groups are trying a new approach, called conflict management, to end conflicts before they escalate into fighting. In conflict management, disagreeing groups get together with an impartial party to discuss their concerns. Each side is asked to listen closely to the other side. The impartial party helps to clarify what each side is asking for. In many cases, once groups get beyond their anger and frustration, they find that their needs can be met. One way conflict management has been used is to find workable solutions for the issue of recreational water use. Jet ski and speed-boat users often are in direct conflict with canoeists and fishermen. Zoning for use of time and space on water bodies is often an effective compromise.

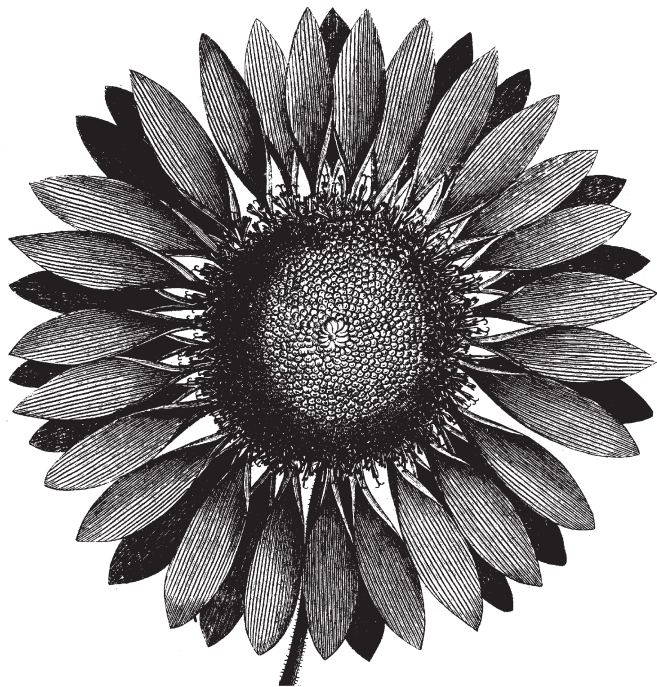




MAKING IT HAPPEN

Restoring the Tallgrass Prairies

The Midewin lands (southwest of Chicago) are a piece of the 36 million acres of prairie that once existed in Illinois. Beginning in the 1830s, the rich prairie soils were plowed by settlers, who wanted to farm the land. Later, with World War II looming, the U. S. Army commandeered many thousands of acres in Midewin for use as an ammunition plant. That use continued for more than 50 years, until the Army abandoned the land and environmentalists succeeded in winning approval for an ambitious plan to restore Midewin. Much planning, cooperation and hard work have gone into restoring this prairie. As part of the plan, the U. S. Forest Service is growing acres of native plants on parts of the site. The seeds of those plants are harvested and planted to create this new "prairie forest."



Concerned Citizens Unite

Altgeld Gardens is a Chicago Housing Authority community of about 10,000 people on the southeast side of Chicago. It is located in the center of a toxic doughnut of heavy industry and waste dumps. A mammoth water treatment plant that contains acres of waste-drying areas is present as are more than 100 industrial plants and 50 active or closed waste dumps. The area contains 90 percent of Chicago's landfills. Altgeld Gardens, whose residents are virtually all African-American, was built on the edge of an old industrial dump. Today airborne pollutants from this industrial area cause a host of ailments: watery and burning eyes; skin rashes; conjunctivitis; asthma; and other respiratory illness. Residents suffer from high rates of bladder and lung cancer. A citizens group, People for Community Recovery, working with other environmental groups, like the Southeast Environmental Task Force, decided to fight the area's powerful industrial companies. They have won some key battles. In 1998, an incinerator was shut down, and plans to build another landfill were blocked.

The Power of Plants

How did people treat illness and disease before there were grocery stores and pharmacies? They looked to nature to treat their symptoms. Many native plants in Illinois were used for food and for their healing properties. Bloodroot, a spring woodland wildflower, can be used to treat respiratory illnesses, including bronchitis, asthma and laryngitis. The compound salicin, closely



MAKING IT HAPPEN

related to aspirin, was discovered in the bark, leaves and buds of willow trees. Native medicinal plants, and the knowledge handed down by native cultures, is very valuable today, as we continue to find ways they can help control diseases.

Monarchs on the Net

A student in Illinois places a tag on a monarch butterfly's wing and releases this fragile creature. Later, a researcher finds the same monarch hundreds of miles away and enters the tag number on an Internet site for Monarch Watch. In this manner, students and researchers throughout the United States and in Mexico are learning more about this fascinating insect's life history. Developed by the University of Kansas' Entomology Program, students learn a lot about monarchs and migration, and they're participating in a project that gives a whole new meaning to the phrase "web of life."

Planes, Trains and Automobiles

Before the automobile was available, people had to live near their work, shopping centers and schools. Chicago was once a small trading town on the only water connection between Lake Michigan and the Mississippi River. When railroads came through the Midwest, the city began to grow. City planners like Daniel H. Burnham and Frederick Law Olmstead developed ways to preserve the beauty of Chicago while planning for its transportation and business growth. For

example, the Burnham Plan of 1909 addressed planning for roads and buildings in Chicago as well as parks and beaches along Lake Michigan. Today, balancing the population growth of Chicago with the expansion of buildings, roads, airports, sewers and utilities, has impacted our natural resources, resulting in air and water pollution, global warming and losing natural areas to development. A new movement called "Smart Growth" promotes ways of building and rebuilding neighborhoods and incorporates long-term planning practices to protect the area's natural resources.

Poached Eggs

Fossil records show that paddlefish have been swimming in Illinois waters since before dinosaurs ruled. Recent declines in the number and range of paddlefish have been caused by over-harvesting, water pollution, sedimentation of gravel areas needed for spawning and the construction of dams, altering natural water flow, water levels and water temperature and blocking migration and access to spawning grounds. Poaching (illegal killing) of paddlefish for their eggs creates other problems. The eggs can be used for caviar, although they may contain chemical contaminants, making them unsafe to eat. All these factors have made survival very difficult for these ancient creatures.



MAKING IT HAPPEN

Today, people throughout the Midwest are working hard to save the paddlefish. Since the fish travels great distances, fishermen and federal, state and tribal management agencies are co-operating to protect it. Commercial harvest and snag fishing of paddlefish is banned in most Illinois waters. Conservation police officers are working to catch poachers. Other projects that are helping paddlefish populations include stocking young paddlefish into water bodies, using radio transmitters to track the movement and habitat use of individual paddlefish and removal of some dams.

A New Crop of Farmers

Throughout Illinois farmers are working to protect and improve the quality of their land. Some have begun to practice “sustainable agriculture.” Sustainable agriculture considers weather patterns, soil type, ecoregions and crop requirements when making decisions. This type of farming can reduce the need for pesticides and large farm machinery, while lowering fuel costs and conserving fuel. A variety of food types may still be grown. The practice also benefits wildlife and water quality. The U. S. Department of Agriculture’s Sustainable Agriculture Research and Education program and the Illinois Department of Agriculture also support and promote sustainable agriculture.

Stewardship Volunteers Hard at Work

Illinois has many plant and animal species that have been brought here from all over the world, escaped from cultivation or captivity and now survive in the wild. These new residents are known as nonnative or exotic species. These organisms

often grow and/or reproduce faster than native species and have few or no natural control methods, like predators. In many cases these organisms replace native species. Volunteers throughout the state are working to eliminate some nonnative species. They help restore natural areas that have been overburdened with non-native species, such as kudzu and purple loosestrife.

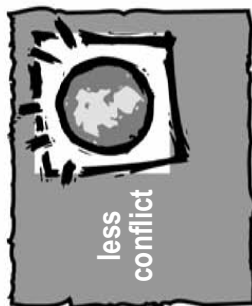
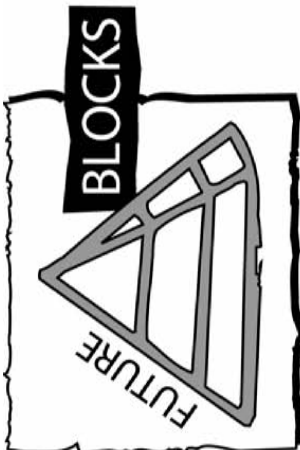
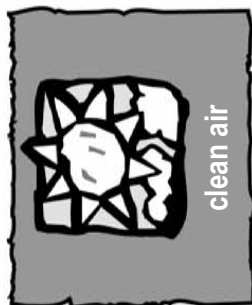
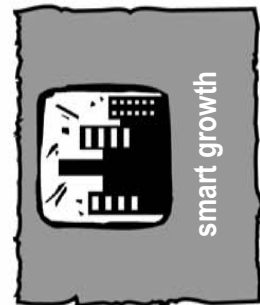
Populations at Risk

When you think of a lifesaver, chances are good that you don’t think about a law. But the Endangered Species Act, passed in 1973, is a law developed to protect all species in the United States from extinction. Each state has also adopted its own endangered species law to protect species that may be in trouble in the state but not throughout the nation. Using scientific information, federal and state agencies determine which species are threatened or endangered. Then they develop plans to help the species recover. According to the U. S. Fish and Wildlife Service, populations of more than half of the 1,320 plants and animals the Act protects in the United States are stable or growing. The most heralded success of the Act is the recovery of the bald eagle population with a tenfold increase in just 25 years. It also has aided the survival of the eastern prairie fringed orchid, the peregrine falcon and the Illinois chorus frog.



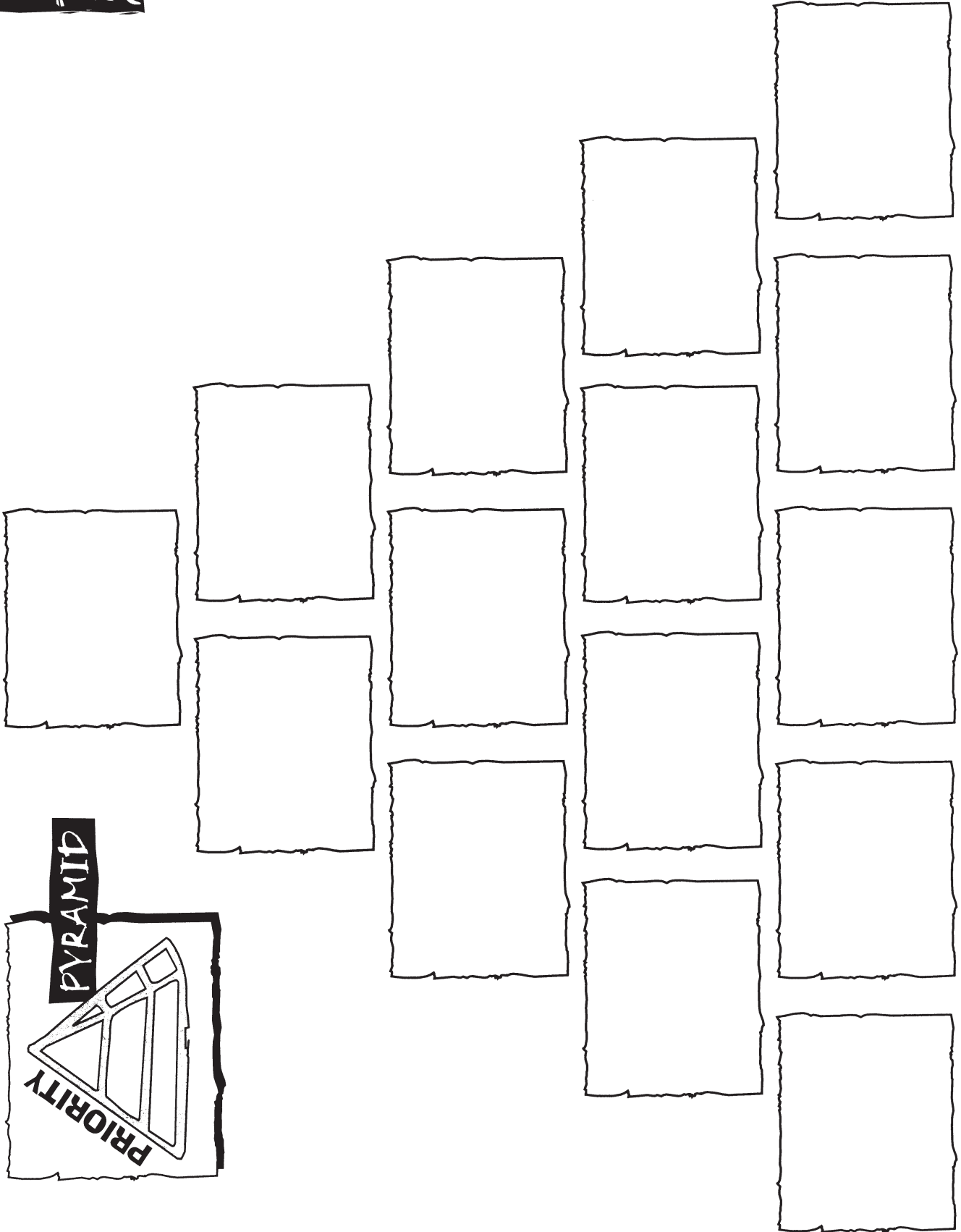
Student Page

Future Worlds (continued)





Student Page
Future Worlds (continued)





Activity 4-2 Career Moves

AT A GLANCE

Read profiles of people who work in biodiversity-related professions in Illinois. Conduct interviews of people in your community with similar occupations.

OBJECTIVES

Describe various careers related to biodiversity. Identify, analyze, and discuss biodiversity-related careers held by members of the community and people who have made significant contributions to the fields of science, technology and the environment. Conduct a successful interview.

SUBJECTS

English language arts, science, social science

SKILLS

gathering (reading comprehension, interviewing),
analyzing (questioning), interpreting (summarizing),
presenting (public speaking)

LINKS TO ILLINOIS BIODIVERSITY BASICS CONCEPTUAL FRAMEWORK

investigators in different fields; all sectors of society

VOCABULARY

See individual career profiles for possible unfamiliar words.

TIME

two to three class periods

MATERIALS

copies of “Tips and Tricks of Interviewing,” “Sample Interview Questions” and “Career Profiles” for each team of students

CORRELATION TO ILLINOIS LEARNING STANDARDS

English language arts 5.B.3a, 5.C.3c
science 13.B.2c, 13.B.3b, 13.B.3c
social science 17.C.2c

Protecting biodiversity can take many different forms. Some people, for example, focus on minimizing their own impact on the environment by shopping carefully, recycling as much as possible, avoiding the use of harsh chemicals on their gardens and in their homes, installing low-flow shower heads and other actions. Other people take more of a community-action approach, getting involved in local projects designed to protect or enhance the environment. And some people devote much of their lives to biodiversity and its protection through their choice of career.

Here’s a way to introduce your students to people with careers linked to biodiversity issues. Your students will find out what people are doing in Illinois, who in the local community works in a biodiversity-related field, and what kind of education is needed for particular careers. They might also discover some ways they can use their own interests and skills to get involved with biodiversity issues.

BEFORE YOU BEGIN

Make one copy of the “Career Profiles” and cut out each profile. Make one copy of “Tips and Tricks of Interviewing” for each student. (You may also make copies of the “Sample Interview Questions” for each team.)

WHAT TO DO

1. Divide the group into pairs and introduce the activity.

Discuss with your students ways people make contributions to issues they care about (volunteering, trying to live in a way that’s consistent with their values, helping others to become involved and so on). Point out that one way people contribute is by choosing a career related to an issue that’s important to them. Explain that they’ll be conducting interviews to learn about people whose careers are related to environmental issues, including biodiversity.



Activity 4-2

Career Moves (continued)

2. Hand out the “Career Profiles” (one profile per pair) and explain the project.

Give the students time to read the profile. Then tell them that each pair of students will be working together to locate and interview someone in the community who has an occupation similar to the one in the profile they read.¹ The work that the community member does may differ from the work of the person profiled, but the occupation should be the same or similar. For example, the journalist in the “Journalist with a Passion” profile focuses on television journalism. But the students may find an environmental journalist who writes for a local newspaper. (If the students are unable to find someone with an occupation similar to the one in their profile, they can choose another occupation from the “Career Corner” list.)

Explain that the students can conduct their interviews either over the phone, by e-mail or in person. Afterward, the students will be using the information they’ve gathered to develop a creative presentation.

3. Discuss ways to locate people to interview.

Your students may know people in the community whom they can interview, or they might have ideas about where to start looking. Write their ideas where everyone can see them, then add the following suggestions:

federal, state, regional, county and municipal levels of government

- local offices of federal agencies and departments (such as the U. S. Environmental Protection Agency, the U. S. Forest Service, the U. S. Fish and Wildlife Service and the Natural Resources Conservation Service)
- state agencies (such as the Illinois Department of Natural Resources, Illinois Environmental Protection Agency, Illinois Department of

Agriculture, Illinois Department of Commerce and Economic Opportunity, Illinois Pollution Control Board, Illinois Department of Public Health)

- regional forms of government (such as the Northeastern Illinois Planning Commission)
- county government and agencies (such as forest preserve districts, park districts, Association of Illinois Soil and Water Conservation District offices)
- municipal (such as park and recreation departments, public works offices and recycling centers)

private business, not-for-profit foundations, volunteer groups and professional organizations

- local zoos, aquariums or natural history museums
- nature centers
- local or regional environmental organizations
- professional development organizations related to a particular career
- universities and colleges
- community newspapers
- businesses with a strong environmental focus
- companies or stores that provide alternatives to environmentally harmful products (such as supermarkets that specialize in environmentally-sensitive products)
- organizations that have successfully integrated environmentally-sound programs into their operations (such as office-wide recycling or natural area restoration work)

Have each team write down a list of the people or organizations they’ll contact. Tell them to rank the list so that they contact their most likely resources first. (You may want to check their lists to make sure they’re on the right track and that several groups aren’t planning to contact the same organization.)

¹ An alternative to having pairs of students setting up and conducting the interviews is to invite a professional, or a panel of professionals, to the class. The class as a whole could come up with interview questions in advance, and students could take turns asking the questions.



Activity 4-2 Career Moves (continued)

4. Review how to set up interviews.

Ask your students to describe or act out what they would say on the telephone if they called an organization to get the name of someone to interview. The following is an example of one approach they might take:

“Hello, my name is _____. I’m a student at _____, and I’m doing a class project that involves interviewing people about their careers. I’d like to interview a(n) _____. Do you know someone I might be able to interview? If not, is there anyone else available who might be able to suggest someone? What is your name, please? Thank you very much.”

Next ask your students to describe or act out how they would ask a particular individual for an interview. Here’s one approach:

“Hello, my name is _____. I got your name from _____. I’m a student at _____, and I’m doing a class project that involves interviewing people about careers related to biodiversity and the environment. Would you be willing to be interviewed? When would be a good time? Thanks very much for agreeing to talk with me.”

Remind the students that they’ll need to discuss a suitable time and place if the person agrees to be interviewed. They should also ask whether he or she would like to have a copy of the questions in advance. If the person does not wish to be interviewed, remind your students to thank him or her for speaking with them.

5. Develop interview questions and review “Tips and Tricks of Interviewing” (page 160).

Write on the board or hand out the “Sample Interview Questions.” Have your students brainstorm a list of general questions they think would be appropriate to ask during their interviews. Write their ideas on the board, then help the class organize and edit the list. Encourage the students to come up with open-ended questions rather than “yes or no” questions. The students can use the basic list as a guide when conducting the interviews. Each pair should also come up with additional questions that are specifically related to the career of the person they’re interviewing.

Next hand out copies of “Tips and Tricks of Interviewing.” Carefully explain each tip while the students follow along.

If you’d like to give your students practice conducting interviews, form groups of four by bringing two pairs together. Then have each pair develop five questions to ask the other pair. You might want to have one person in each pair ask the questions while the other takes notes, or you might have the two alternate so each student can practice asking questions and taking notes. You might also encourage your students to practice by interviewing their parents or neighbors.

6. Conduct the interviews.

Help your students determine the best way to conduct the interviews. In some cases, the interviewees might be able to come to the school. In other cases, they might be able to meet with the students after school at their place of work or another convenient location. And in some (perhaps most) cases, interviews might take place over the telephone or by e-mail.



Activity 4-2 Career Moves (continued)

7. Briefly discuss interviews and career options.

After the students have completed the interviews, give them time to discuss the process and share their experience with the group. Was the process easier or harder than they expected? Why? Which careers didn't they know about before? Which careers sounded the most interesting, and why? What did they learn that surprised them?

Some students might have been surprised to find out that a person doesn't need to have a career directly related to the environment to be able to make a difference. Point out that more and more careers include aspects of environmental protection. And many corporations are hiring people with environmental backgrounds. For example, 20 years ago it would have been hard to find an ecologist working for an electric power company, but today many ecologists are helping such companies make sure they aren't harming the environment.

8. Develop and give presentations.

Have each pair put together a brief presentation focusing on the career of the person they interviewed. Encourage the students to create posters, visual aids or use other multi-media techniques to explain and illustrate how the career they're highlighting relates to biodiversity. Make sure that both students in each pair are involved in the presentation. (You might also want the students to write their interview as an article.) Once the presentations are finished, ask students for their reactions to the careers they learned about.

WRAPPING IT UP

Assessment

1. Collect the students' interview notes. Compare the information gathered in the interview with the information included in the presentation.
2. Have the students write up their notes as an interview-style article.
3. Let the students use the following as a journal starter: "The jobs I found most interesting are . . . because . . ."

Portfolio

Interview notes can be used in the portfolio.

Extensions

1. Have the students research other careers that are related to biodiversity conservation or environmental protection. (See the list entitled "Career Corner" for ideas.) They can use their research as a launching pad to write career profiles of people in the community, conduct more interviews, create displays or write reports.
2. Have students investigate the life and career of someone who was instrumental in influencing the fields of science, the environment or technology. Identify how his/her contributions influenced the lives and careers of people today.

"One of the greatest challenges of conservation is preserving the incredible diversity of life while ensuring that people's needs are respected and protected."

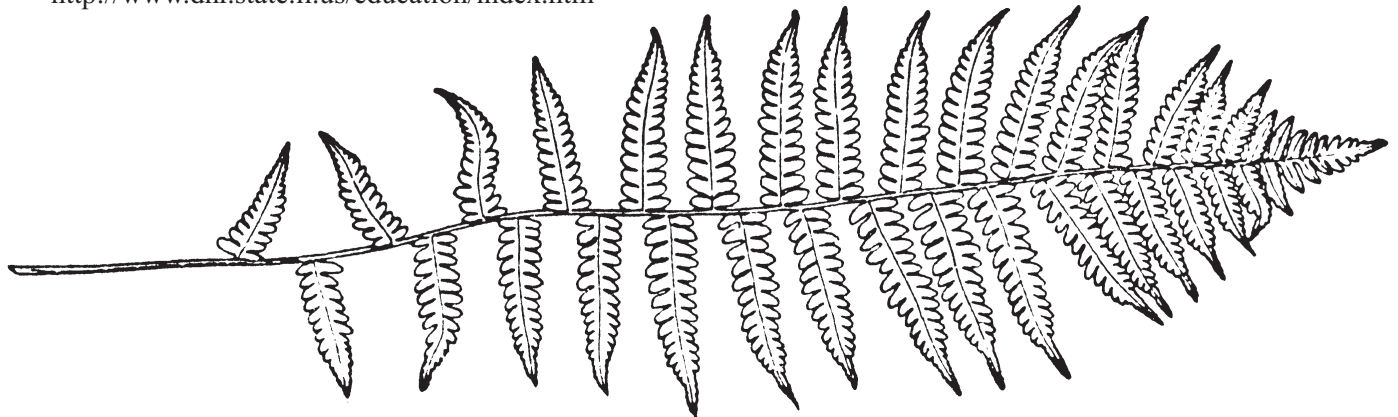
*—Henri Nsanjama, Vice President
WWF's Africa and Madagascar Program*



Activity 4-2 Career Moves (continued)

Resources

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Student Page Career Moves

CAREER CORNER

Botanist
Chemist
Community Activist
Conservation Biologist
Conservation Police Officer
Ecologist
Ecotourism Trip Leader
Environmental Educator
Environmental Journalist
Environmental Lawyer
Entomologist
Environmental Specialist at a Foundation
Fisheries Biologist
Forester
Hydrologist
Integrated Pest Management Specialist
Land-Use Planner
Limnologist
Natural History Museum Curator
Naturalist/Interpreter in a Park or a
Wildlife Sanctuary
Nature Photographer
Natural Resource Economist
Organic Farmer
Population Expert
Park/Preserve/Refuge Manager
Recycling Coordinator
Research Biologist/Scientist
Soil Conservation Specialist
Solid Waste Manager
Stewardship Volunteer
Toxicologist
Zookeeper
Zoologist

SAMPLE INTERVIEW QUESTIONS



Here are examples of some of the kinds of questions you might want to ask during your interview.

- ✓ What's a typical day on the job like for you?
- ✓ What's your educational background?
- ✓ What skills are especially useful in your profession?
- ✓ What types of scientific skills or technology do you need to do your job?
- ✓ Does your job involve protecting biodiversity? If so, how?
- ✓ What's the most challenging aspect of your job?
- ✓ What's the most rewarding aspect of your job?
- ✓ How did you become interested in your field?
- ✓ Did you always want to be involved in a career like the one you're in?
- ✓ Who inspired you to enter this field?
- ✓ Do you have any advice for students who may be considering a career like yours?
- ✓ How does your job influence or contribute to other people's lives?
- ✓ Are there people in other countries who do work similar to your work?



Student Page Career Profiles

Cyndi Duda

Educating for the Future

What does teaching have to do with the environment? Plenty when you're Cyndi Duda, an environmental education specialist for the U. S. Fish and Wildlife Service. She helps her agency protect, preserve and restore habitats in the six-county Chicago region by raising the awareness and appreciation of groups and individuals for the values of natural resources. Through teacher workshops, special events and presentations, she educates students and adults about the value of habitats and encourages them to become involved in actions to help the environment.

Cyndi came to education after previously working for the U. S. Army Corps of Engineers, regulating wetland use. She realized that implementing regulations would be more effective if she was working with people who understood the values of wetlands and the impacts developments would have on them. She returned to college to earn a teaching degree, which armed her with skills that have paved the way for her success. She notes that her most important asset is a solid science background that enables her to understand the issues and present good information to the public.

Cyndi works with people from a wide variety of backgrounds and ages. Her greatest reward is seeing people she has worked with doing something to make a difference, such as planting a wetland with native plants, working to clean up a watershed or developing a class unit. Cyndi's advice to people entering the field is to gain a broad general background as well as science skills so you can understand the biological, social and economic forces at play in environmental issues.

Mark Pfister

Variety is the Spice of Life

Variety attracted Mark Pfister, Interim Director of Environmental Health Services at the Lake County Health Department, to the field of limnology—the study of fresh water, specifically lakes and ponds. The variety of lake types and ecosystems, daily jobs and people he comes in contact with is what Mark likes. Mark says, "The terrestrial habitats are pretty cut and dry (no pun intended), but the aquatic ecosystems are very dynamic. Everything is interrelated. Many different physical and biological factors both in the lake and on the land surrounding the lake must be considered before you can make management recommendations." He goes on to say, "I was very lucky while I was growing up, my grandfather had a farm and my father, brothers and I would spend every spare minute outdoors."

Before Mark entered the Peace Corps as a biology and genetics teacher, he wasn't sure if he was going to be an oceanographer or a limnologist. But while in Africa, Lake Nyos exploded killing thousands of people, cattle and wildlife. The internal lake processes that caused the explosion were so fascinating to him that it swayed him toward limnology. Upon returning from Africa he began working on an advanced degree in limnology



Student Page Career Profiles (continued)

and hydrology at Indiana State University. While there, Mark was the coordinator of the Indiana Volunteer Lake Monitoring Program and analyzed the water quality and phytoplankton populations of over 200 Indiana lakes.

In Illinois, many of our lakes and ponds are privately owned. Therefore, much of what Mark does is give technical assistance to park districts, associations and homeowners. He works with them on water quality issues, plant types and shoreline erosion. Since a lake is a reflection of its watershed, he also focuses attention on watershed issues, such as nonpoint source pollution. On any given day Mark can be found either on the phone, writing reports or doing field work. "It's a great field to get into!" he says.

Carol Lerner

Tallgrasses Make for Tall Tales

Carol Lerner has been a writer and illustrator of children's nonfiction for many years. On a typical day, Carol can be found studying nature in a prairie, forest, garden or even a library. Then again, she may be polishing her prose or finishing a book with illustrations of plants and animals.

Carol's background in history has helped her become a good researcher but "there is a trick to writing difficult concepts simply for children," she says. Her interest in the natural world developed from curiosity. Over time she gained an appreciation for the complex strategies that enable plants and animals to survive. Carol, who has written books such as *Seasons of the Tallgrass Prairie*, says her biggest reward is seeing something that began as an idea turn into an attractive and interesting book. She says being a writer is not the best-paying career, and her advice for those who want to make it a career is "do it because you love it." Lerner holds the Chicago Public Library's Carl Sandburg Award, the annual award of the Children's Reading Round Table and three of her titles were named Notable Children's Books by the American Library Association.

Kruti Patel

Waste Not Want Not

Kruti Patel has been working in the environmental field for more than 15 years as a scientist, engineer and educator. Currently, she is employed in the Environmental, Health and Safety (EHS) division for Waste Management Upstream. A typical day for Kruti involves interfacing with employees who work in industries, such as automotive and petrochemical, and providing guidance with environmental, health and safety issues. Kruti's academic background in environmental and business administration has led her to a variety of jobs during her career. Her educational training combined with her passion for protecting the environment has enabled her to excel in her career. Kruti says, "Working for a company that shares the same passion as I do is very gratifying."



Student Page

Career Profiles (continued)

Bill Kurtis

Journalist with a Passion

Known for his sense of humor and exciting productions, Bill Kurtis, the Emmy award-winning television journalist, has been reporting about world-altering events for many years. He was among the first Chicago correspondents to travel to world hot spots like Vietnam and Northern Ireland. He has covered numerous special stories about animals, like the endangered black rhino in Africa. Bill Kurtis is also creator and producer of the Peabody Award-winning science-adventure series, *The New Explorers*.

Bill was born in Kansas and has a background in journalism and law. He has cultivated his professional skills with his personal concerns. Bill has demonstrated a responsibility for the environment by participating on the Board of Directors of the National Park Foundation and The Nature Conservancy. He has educated many people with his television productions that often focus on nature and how to protect biodiversity all over the world.

Michael Jeffords

Going Buggy over Bugs

Like many youngsters, Michael Jeffords had a passion for insects at an early age. However, he never knew his calling in life would be to become a scientist in entomology at the University of Illinois Urbana-Champaign. Michael teaches college students about biodiversity and its preservation. In addition, he is the co-author and photographer of a book on Illinois habitats, called *Illinois Wilds*, and helps to develop other programs on biodiversity.

Michael's educational background is varied, from community college to medical school, to his doctoral degree in entomology. He feels that his specialized knowledge in his field of science and his capacity for integrated thinking has helped him to creatively apply his knowledge to looking at larger problems. His personal efforts have brought him more opportunities than the skills he has gained through academics. He says, "Everything you learn will be helpful to you at some point, so don't limit yourself in whatever you can try or gain knowledge about."



Student Page Career Profiles (continued)

Dennis Dreher

Planning for the Future

Playing in creeks and seeing how water flowed fascinated Dennis Dreher when he was a child. Today, he works with many organizations to ensure that communities will become more sustainable through environmental planning. Currently employed as the Vice-Chairman of the McHenry County Regional Planning Commission, Dennis works to design and implement the 2030 Comprehensive Plan for McHenry County. His job requires making presentations, writing proposals and publications and trying to find common ground between different interest groups.

Dennis' college education was in water resources engineering. He finds water issues to be a major part of educating decision-makers about creating more ecologically friendly communities. "The best part of my job is working with committed and passionate people," he says, "especially when I see positive changes in attitudes and practices." His advice to students is to "get a solid but broad analytical background; don't just follow the money ... follow your passion. Do something that will make a difference; and don't be afraid to make changes along the way if you're not happy."

Dave Brandt

The Dirt on Soil

To most homeowners and farmers, soil is a seedbed for plants. To engineers, soil is a construction material. To a parent, soil is something to get out of clothes. For all of us, soil is a natural resource. As a District Conservationist for the Natural Resources Conservation Service (NRCS), Dave Brandt works with individuals, groups and students to promote wise use of soil and all natural resources. "My goal is to make people aware of soil and to teach them why conservation is important."

Dave received his Bachelor of Science degree in Outdoor Recreation and Natural Resources Management from Southern Illinois University (SIU). He found soils so interesting that he took every soils class SIU offered. Dave worked at NRCS offices in Saline, Gallatin and Jasper counties. Now employed in McHenry County, he tackles a mix of urban and agricultural issues. He has found that there are similar natural resource issues throughout the state. "All of the land has been impacted in some way. What is left in the place of native plants are a handful of European invaders, such as buckthorn and reed canary grass."

Dave feels that people who are interested in protecting natural areas need to make a life-long commitment in order to help find solutions. He recommends that students interested in the natural resources fields take a broad spectrum of classes such as biology, botany, geology and water quality rather than focusing on a specific area, so that they will be able to understand the connections among resources.



Student Page Career Profiles (continued)

June Keibler

Sharing the Thrill of Discovery

June Keibler is on a mission. The mission began 17 years ago when she helped form the Kane County Natural Areas Volunteers. Today the group is 200 strong, working to protect and restore biodiversity in the natural areas of Kane County. Because of her efforts with the Natural Areas Volunteers, June was a logical choice when The Nature Conservancy asked for assistance in coordinating the recovery of the endangered eastern prairie fringed orchid in Illinois. Through this effort, June helps to coordinate work to recover and expand the population of this flower. When asked why she feels her work is important, June's thoughts turn to the future. "The orchid is an indicator for how we are treating our landscape. With more than 95 percent of the wetlands in Illinois destroyed, orchids are increasingly rare. Every time we lose another species, we are denying future generations the surprise of finding it. We are taking away the thrill of discovery. We also do not know what may disappear with it."

June recommends spending time outdoors and volunteering to help groups that are working to protect and restore local biodiversity. "If there is something interesting to you, pursue it. The opportunities for involvement will be there, or you will help to create them." June practices what she teaches. Along with two colleagues she started a business, Witness Tree Native Landscapes. The business acts as both consultant and designer for the restoration of natural areas and the elimination of exotic species on public and private lands.

The Maierhofers

All in the Family

For the Maierhofers, conservation practices have become a part of the family farming business. The family grows corn and soybeans on their 500-acre farm in Seneca. The farm has been in the family since 1878. The last glacial period left the land in this area with a hilly landscape, so soil conservation on the farm is crucial. As a result, the family has applied a number of soil conservation practices. Ridges of soil, called terraces, break up the slope of the land and control the movement of soil by water. Lines of trees, called windbreaks, are used to stop the movement of soil by wind. Six acres of land has been taken out of crop production and set aside to increase the diversity of the area, enhance the natural beauty of the landscape and provide food and shelter for wildlife. The Maierhofers practice conservation tillage, using a minimum tillage system on their corn fields and no-tillage where soybeans are raised.

The Maierhofer's daughter and two sons help out on the family farm on weekends. For one of the sons, Les, growing up on the family farm has helped him gain a perspective valuable for his career. After studying agricultural economics at the University of Illinois, he began working for the Farm Services Agency (FSA). Les is now county executive director for the FSA in Kendall, Kane and DuPage counties. As county executive director, Les oversees federal farm programs at the local level. One of these programs offers monetary incentives to farmers who are interested in applying conservation practices. Working on the family farm helped him gain an understanding of these practices as well as issues that farmers face. Les believes that "conservation practices are necessary to protect land and water quality. The topsoil that farmers grow their crops in takes thousands of years to form. It is rewarding to see that these practices really do work. Terraces and conservation tillage help control the movement of water which helps reduce the erosion of soil. Ponds and native landscaping are not only aesthetically pleasing but help to attract deer and other wildlife."



Student Page
Career Profiles (continued)

Barrie McVey

Planting Forests for the Future

When she was growing up, Barrie McVey's adventures with her family while on vacation throughout the United States led her to develop an appreciation of nature and the interaction of all things within it. She pursued her interest and now works as a District Forester for the Illinois Department of Natural Resources.

Each year foresters plant trees on many acres of land that were once forested but have since been cleared. The tree plantings help to reduce soil erosion, improve water quality, provide homes for wildlife and create future forest products. Foresters also assist private landowners with proper woodland management to improve the quality of their forests. Working on public lands is also part of a forester's job, to ensure that the citizens of Illinois can enjoy healthy forests.

Barrie enjoys being able to work outside in all the different seasons of the year. She says that the woods can be a completely different place between the summer and the winter. She enjoys going back to a tree planting on old farm ground after a few years and seeing a productive young forest. "It's great to see the trees growing and to see all of the wildlife that moves back in! And it's very satisfying to teach people, both young and old, about the importance of trees."



Student Page

Career Profiles (continued)

Wayne Frankie

Rock Detective

As a geologist with the Illinois Natural History Survey, Wayne Frankie has the opportunity to work outdoors, travel and learn about the variety of geology within our state. Wayne says that a geologist is really a scientific detective. One of the most rewarding aspects of his job is working with and meeting people and sharing information with them.

Wayne's job includes many responsibilities. He leads public geological science field trips, plans and participates in a variety of teacher workshops and exhibits and responds to questions from teachers, students and the general public. Wayne offers the following advice to students who may be interested in becoming a geologist: "Do your very best in all of your school subjects. Look at the world around you and ask questions." You never know what you may discover!





Before the Interview

- ✓ When you call to set up an interview, introduce yourself on the phone. State your name, school, grade level, and the purpose of the interview.
- ✓ Set up an appointment far enough in advance to give you and the interviewee time to prepare.
- ✓ Carefully prepare your questions in advance. Limit the number of questions to about 10 or so. (Most people don't have time for long interviews, and too many questions will make it difficult for you to process all the information.)
- ✓ Find out if the interviewee would like a list of your questions in advance. If so, send them out as soon as you can.
- ✓ If you want to use a tape recorder, ask permission first. And make sure that it works and you know how to use it before your interview.
- ✓ If you are working in pairs, decide who will be asking the questions and who will be taking notes. (If the person taking notes thinks of additional questions during the interview, he or she can ask them. Try to make sure any new questions are brief and appropriate to the subject.)



During the Interview

- ✓ Be polite and considerate.
- ✓ Before you begin asking questions, explain how you will use the information.
- ✓ Ask your questions clearly and give the interviewee time to think and respond.
- ✓ Before you end the interview, thank the interviewee for taking the time to help you with your project.
- ✓ If you will be writing up the interview as an article, ask the interviewee if he or she would like a copy of it. If so, get the interviewee's address, and then be sure to follow through on getting the article to him or her as soon as you can.
- ✓ Ask for the interviewee's mailing address so that you can send a thank-you note or any other material after the interview.

After the Interview

- ✓ Send a thank-you note a few days after the interview.
- ✓ If you are working in pairs, meet with your interviewing partner soon after the interview to compare notes, impressions and information.