Out of the Penalty Box

Protecting the Environment Through Policies

Meet the scientists!

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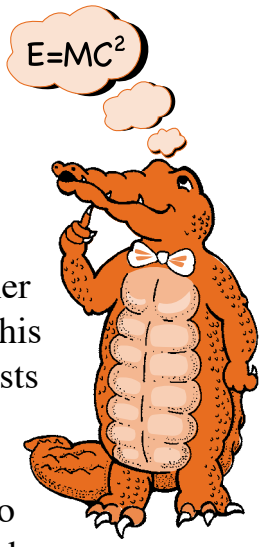
My favorite science experience was learning about urban growth and urban policies in South Korea. I learned about them when I was a visiting scientist at **Seoul** (Sôl) National University during the summer of 2004. Managing urban growth is important. It was exciting to see the effects of Korea's **policies** (**päl** uh s<u>e</u>s) to manage urban growth and protect the environment. Policies are like rules we must follow. A highlight was hiking the heavily used recreational trails that surround Seoul. Seoul is an urban area of more than 20 million people (which is more than twice the population of New York City!).

My favorite science experience was working with **Mayan** (**mi̲** yun) farmers and scientists to solve problems in **Chiapas** (ch<u>e</u> **op** us), Mexico. We worked on several projects. In one community, we worked on projects with trees to reduce global warming. In other communities, we discovered how to provide good soil for growing coffee. We also discovered how to provide **habitat** (**hab** uh tat) for **migratory** (**mi̲** gruh tôr <u>e</u>) birds. Habitat includes the physical things that plants and animals need to survive. Migratory birds are birds that move from place to place for breeding or feeding. Finally, in another community we examined what happened when crocodiles and fishermen wanted to be in the same place in the forests and **estuaries** (**es** ch<u>u</u> air <u>e</u>s). Estuaries are places where the ocean tide meets a river current.

Thinking About Science



Scientists learn as much as possible about their topic. They research the Internet, libraries, and other sources **(figure 1)**. They do this to discover what other scientists have found out. Once they have found the information, they have to understand it. To do this, scientists compare and contrast what they have found. Then they summarize the information in one document. You do this very thing when you prepare a paper for class. When scientists do this, it tells them two things. These things are: 1) what information is already known about a topic, and 2) what information is not known. Once they have learned as much as possible, they move forward with their own research.

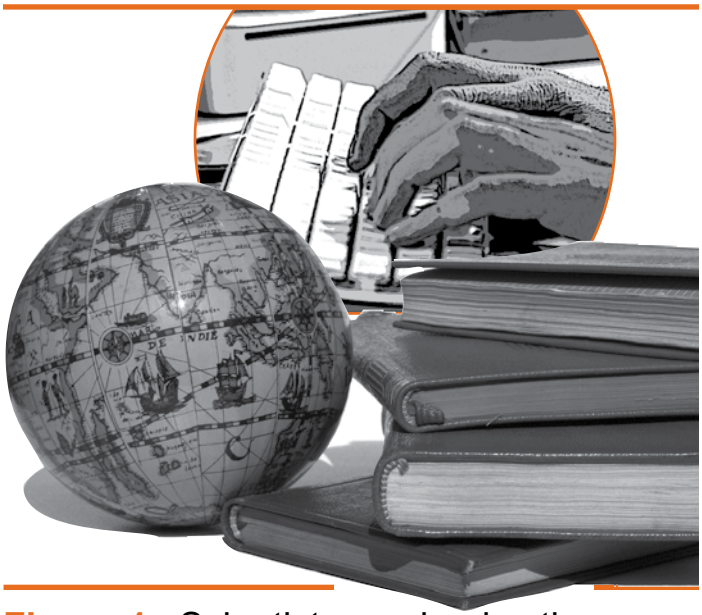


Figure 1. Scientists use books, the Internet, and many other sources for their research.

Thinking About the Environment

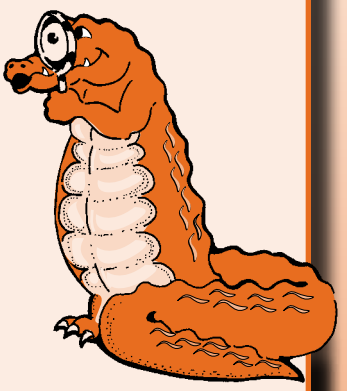
The United States population is increasing. This increase causes changes in the environment. As a society, we pass laws and make **policies** (**päl** uh ses) to manage these changes. Many of the policies and laws help to keep the environment healthy. Policies are like rules we must follow. Environmental policies can do two things to reduce unwanted changes in the environment. Policies can either manage **urban growth** (**ür** bun gr<u>o</u>th) or protect open space **(figures 2 and 3)**. Urban growth is the growth of a city. This growth is caused by an increasing population.

Figures 2a and 2b. These two photos show urban growth. Have you seen urban growth where you live?

Pronunciation Guide

a	as in ape
ä	as in car
e	as in me
i	as in ice
o	as in go
ô	as in for
u	as in use
ü	as in fur
oo	as in tool
ng	as in sing

Accented syllables are in **bold**.



Figures 3a and 3b. Open spaces are areas in your community that are not highly developed areas. Examples of open areas are parks and pastures.

Introduction

Over the next 25 to 45 years, scientists think the Nation's population will double. As the population increases, cities, suburbs, and towns use more and more land. In order to keep some open space, the government makes environmental policies that everyone must follow.

These policies fall into three types. The policies either punish people or reward people for following the policy. The first type of policy limits or controls urban growth. Penalties are placed on people or organizations when they do not follow the rules. Penalties are used to protect the environment. In the second type, policies reward people or organizations for doing things to limit urban growth or protect open space. Rewards are used to protect the environment. In the third category, the government owns and takes care of the land.

Most of these policies are made by local governments. Some examples of local governments are cities, counties, townships, or parishes. State and federal governments also make environmental policies. Not much is known about how successful these policies have been in managing urban growth and protecting open space. This question is important. It is important because if society wants to reduce unwanted changes in the environment, we need to know which types of policies are most effective.

The scientists in this study wanted to answer two questions. The first question is: What are the characteristics of the policies that have been used to manage urban growth and protect open space? The second question is: Which of these types of policies has been most effective?

Environmental policies either use penalties or rewards to achieve their objectives. Think of two policies that you must follow at home or school, one based on penalties and the other based on rewards.

Think about whether you would follow the policy without the penalty or the reward. Is one type of policy more effective than the other or are they equally effective? Why or why not? You must think beyond whether you like the policy.

What are the questions the scientists wanted to answer in this study?

Method

The scientists did their research. They looked for documents that described environmental policies. They read science journals, books, government reports, and web sites. They found many environmental policies. In fact, they found so many policies that they had to figure out which ones to use.

They had to set **criteria** (kri **ter** e uh) for what they would include in their study. Criteria are standards or measures that are used in making a decision. They came up with three criteria. The scientists only included policies made after 1980. Second, the policies had to be made in the United States. Third, these policies had to be made by local, state, or federal governments.

When the scientists found a policy that fit their criteria, they placed it into one of three policy types. Two of those policy types are described in the "Introduction" section above. The third type was for any land purchased or managed by a government on behalf of the public **(figure 4)**.

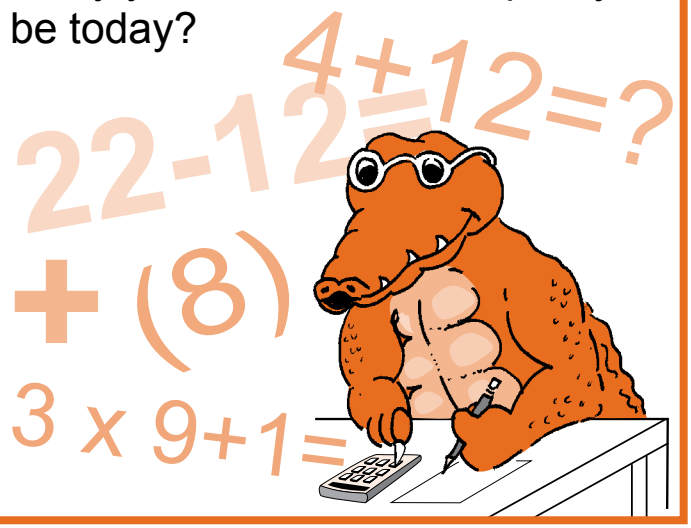
Figure 4. The three types of environmental policies are shown below.

- **Policies that use penalties.**
- **Policies that use rewards.**
- **Policies that call for buying and managing land for public use, such as public parks, forests, and recreation areas.**

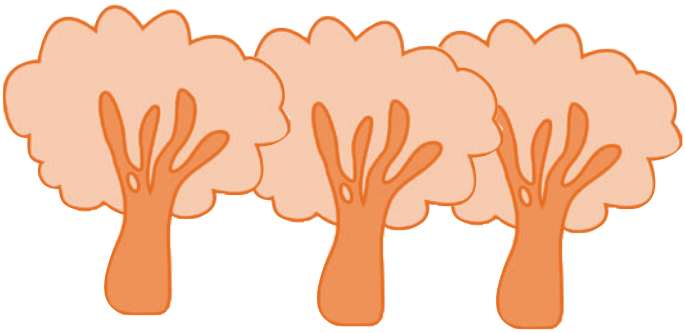
The scientists then studied the policies in each of the three policy types. They took notes on each policy. Then they compared the policies by looking for similarities and differences. Some of the policies had been **evaluated** (e **val** u ated) to see if they were effective or ineffective. Evaluated means examined and judged carefully. The scientists took notes on why the policy was judged to be effective or ineffective.

Number Crunches

If a policy was made in 1981, how many years old would the policy be today?



- Name at least two of the criteria used by the scientists to select which environmental policies to study.
- Think about the last time you chose to buy something. This could be a piece of clothing, a CD, or any other item. Name two criteria that you used when you decided which item to buy.
- Examine figure 4. The third type of environmental policy is land that is or was purchased by a government and managed for the benefit of the public. Name one area in your community that would fit into that policy type.



Findings

The scientists found 87 documents that fit their criteria. Examples for each of the policy types are shown in **figure 5**.

The scientists looked to see what policies had been evaluated. The scientists found that not many of the policies had been evaluated. Therefore, it was difficult to figure out which types of policies were most effective. Although the scientists did not find much information, the scientists drew these conclusions from studying the policies:

A policy was more effective if:

1. **The land area it affected was clearly identified.**
2. **Someone kept a close check on whether the policy was being followed.**
3. **Any required paperwork was easy to fill out.**
4. **The policy was started quickly.**

The scientists also discovered that it was better to use several policies at one time. The use of several policies protected more open space and limited urban growth better. For example, using a combination of the policies from figure 5 would bring more success than just using one.

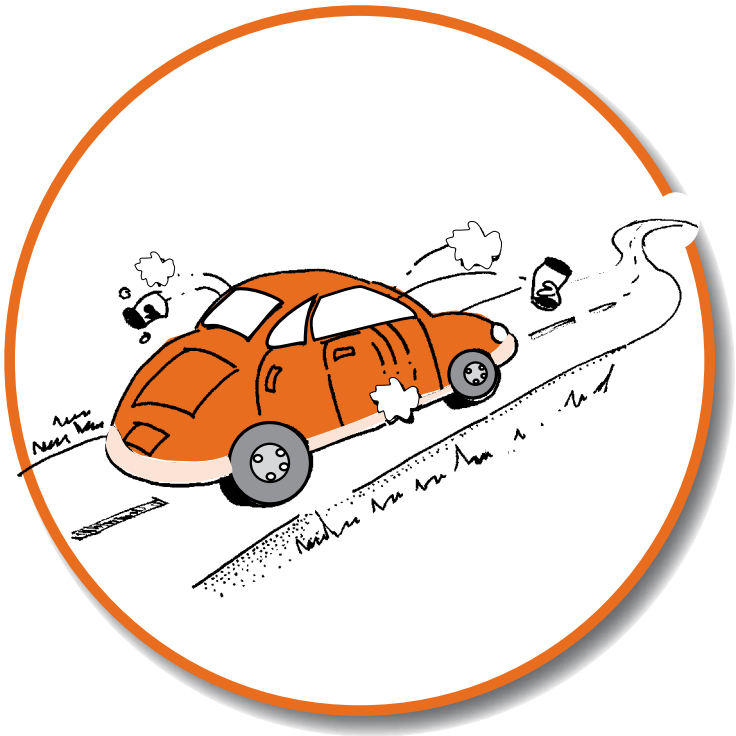
Finally, the scientists found that communication is important. Policies were more successful when the policies were discussed with the people they would affect.

Figure 5. Examples of each type of environmental policy are listed below.

Types of policies ↓	Goal of policies: Managing urban growth	Goal of policies: Protecting open space
Government purchase and management of land	Public ownership of parks, recreation areas, forests, wildlife areas, wilderness areas to manage urban growth	Public ownership of parks, recreation areas, forests, wildlife areas, wilderness areas to protect open space
Control and punishment	Placing an upper limit on the number of new buildings allowed to be built every year	Requiring developers to set aside some open space for every new home constructed in a subdivision
Reward	Lowering taxes for new businesses to take over existing but unused buildings, rather than building new buildings	Lowering taxes on land that is to be kept as open space

Reflection Section

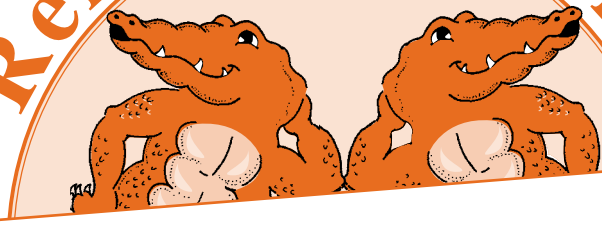
- Look at the list of four reasons a policy was more effective. Which of the four applies most to the policies that you must follow at home?
- In most communities, people can be fined if they throw litter on the ground. Into which row and column in figure 5 would you place this policy? Why would you place it there?



Discussion

Based on this research, the scientists decided several things. The scientists decided that citizens should be involved in making policies for the environment. Citizens should also be involved in putting them into practice. Better communication would make policies for the environment more successful. As the Nation's population continues to grow, we must find ways to manage urban growth and protect open space.

Reflection Section



- Think about the conclusions of the scientists, outlined in the "Discussion" section, above. Based on these conclusions, what is one important aspect of implementing a successful policy?
- Do you think it is important to manage urban growth and protect open space? Why or why not?

FACTivity

In pairs or in groups, identify five policies that exist in your school. Complete the following chart for each policy you choose.

	Policy 1	Policy 2	Policy 3	Policy 4	Policy 5
Name or description of the policy					
What is the goal of the policy?					
Who developed the policy?					
Who implements the policy?					
Does the policy use rewards or penalties?					
Whose support is needed for the policy to succeed?					
How does the school identify if the policy is succeeding?					
Who or what benefits from the policy?					
How could the policy be improved?					

FACTivity *continued*

After all groups have completed their figures for the policies, hold a class discussion about the policies. Use these questions to get started:

1. How many different policies were identified?

2. As a class, place the policies into different categories. Categories can be made up by the students. Some examples include hallway behavior, classroom behavior, lunch room procedure, and policies to keep people safe.

3. What categories did you develop?

4. What do you think, overall, is the goal of these policies?

5. Which policies are effective?

6. Why are the policies effective or not effective?

If you are a PLT trained educator, you may use PLT Activity #55, "Planning the Ideal Community", Activity #56, "We Can Work It Out", Activity #58, "There Ought to be a Law," as an additional activity resource.

FACTivity Extension

Identify policies in your school that are specifically intended to protect the school's natural environment. Complete the same table on page 33 for these policies.

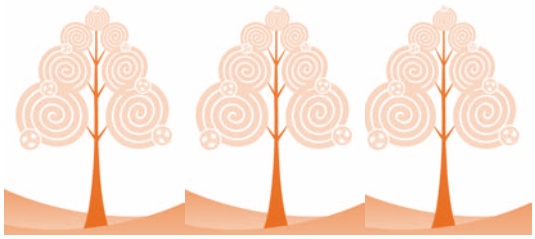
If there are no policies specifically intended to protect the school's natural environment, then your groups will begin to develop some policies. In your groups, develop two new policies aimed at improving the school's natural environment. Fill out the table on page 33 for your new policies. Develop a plan to get the policies implemented. Some examples to get you started include:

- No littering on school grounds.
- Recycle paper, cans, and plastic within the school.
- Use only recycled paper.
- Increase the use of computers.
- Plant five trees every year on school grounds.
- Develop and maintain a wildflower garden on school grounds.
- Develop and maintain a small pond on school grounds.
- Support bird life with bird houses and bird baths on school grounds.
- Reduce the use of pesticides and herbicides on school grounds.

Useful Web Resources:

NASA's Urban Sprawl
http://science.nasa.gov/headlines/y2002/11oct_sprawl.htm

Kids and Community—Learn about an Urban Planner!
http://www.planning.org/kidsandcommunity/



Adapted from: Bengston, D.N., Fletcher, J.O., and Nelson, K.C. (2004). Public policies for managing urban growth and protecting open space: Policy instruments and lessons learned in the United States. *Landscape and Urban Planning*, 69: 271-286. http://www.treesearch.fs.fed.us/pubs/13284.