

# Environmental Problems and Solutions

## Teacher's Guide



**Editors:**

Brian A. Jerome, Ph.D.  
Stephanie Zak Jerome

**Assistant Editors:**

Anneliese Brown  
Louise Marrier

**Graphics:**

Lyndsey Canfield  
Dean Ladago  
Fred Thodal

# A Message from our Company . . .

*Visual Learning is a Vermont-based, family-owned company specializing in the creation of science programs. As former classroom science teachers we have designed our programs to meet the needs and interests of both students and teachers. Our mission is to help educators and students meet educational goals while experiencing the thrill of science!*

## Viewing Clearances

The video and accompanying teacher's guide are for instructional use only. In showing these programs, no admission charges are to be incurred. The programs are to be utilized in face-to-face classroom instructional settings, library settings, or similar instructional settings.

**Duplication Rights** are available, but must be negotiated with the *Visual Learning Company*.

**Television, cable, or satellite rights** are also available, but must be negotiated with the *Visual Learning Company*.

**Closed circuit rights** are available, and are defined as the use of the program beyond a single classroom but within a single campus. Institutions wishing to utilize the program in multiple campuses must purchase the multiple campus version of the program, available at a slightly higher fee.

**Video streaming** rights are available and must be negotiated with the *Visual Learning Company*.

**Discounts** may be granted to institutions interested in purchasing programs in large quantities. These discounts may be negotiated with the *Visual Learning Company*.

## Use and Copyright:

The purchase of this video program entitles the user the right to reproduce or duplicate, in whole or in part, this teacher's guide and the black line master handouts for the purpose of teaching in conjunction with this video, *Environmental Problems and Solutions*. The right is restricted only for use with this video program. Any reproduction or duplication, in whole or in part, of this guide and student masters for any purpose other than for use with this video program is prohibited.

The video and this teacher's guide are the exclusive property of the copyright holder. Copying, transmitting, or reproducing in any form, or by any means, without prior written permission from the copyright holder is prohibited (Title 17, U.S. Code Sections 501 and 506).

Copyright © 2008

ISBN 9781592342358

# Table of Contents

A Message from our Company	2
Viewing Clearances	2
Use and Copyright	2
National Standards Correlations	4
Student Learning Objectives	5
Assessment	6
Introducing the Program	7
Program Viewing Suggestions	7
Video Script	8
Answer Key to Student Assessments	12
Answer Key to Student Activities	13
Pre-Test	14
Post-Test	16
Video Review	18
Vocabulary	19
Writing Activity	20
Water Conservation	21
A Windy Future	23
Acidic Skies	24

# National Standards Correlations

## Benchmarks for Science Literacy

(Project 2061 – AAAS) Grades 3–5

### The Physical Setting – The Earth (4B)

By the end of the 8th grade, students should know that:

- The benefits of the earth's resources - such as fresh water, air, soil, and trees - can be reduced by using them wastefully or by deliberately or inadvertently destroying them. The atmosphere and the oceans have a limited capacity to absorb wastes and recycle materials naturally. Cleaning up polluted air, water, or soil or restoring depleted soil, forests, or fishing grounds can be very difficult and costly.
- Fresh water, limited in supply, is essential for life and also for most industrial processes. Rivers, lakes, and groundwater can be depleted or polluted, becoming unavailable or unsuitable for life.
- Some minerals are very rare and some exist in great quantities, but - for practical purposes - the ability to recover them is just as important as their abundance. As minerals are depleted, obtaining them becomes more difficult. Recycling and the development of substitutes can reduce the rate of depletion but may also be costly.

## National Science Education Standards

(Content Standards: K–4, National Academy of Sciences)

### Science in Personal and Social Perspectives – Content Standard F

As a result of activities in grades K-4, all students should develop an understanding of:

#### Changes in Environments

- Environments are the space, conditions, and factors that affect an individual's and a population's ability to survive and their quality of life.
- Changes in environments can be natural or influenced by humans. Some changes are good, some are bad, and some are neither good nor bad. Pollution is a change in the environment that can influence the health, survival, or activities of organisms, including humans.

#### Types of Resources

- Resources are things that we get from the living and nonliving environment to meet the needs and wants of a population.
- Some resources are basic materials, such as air, water, and soil; some are produced from basic resources, such as food, fuel, and building materials; and some resources are nonmaterial, such as quiet places, beauty, security, and safety.

# Student Learning Objectives

Upon viewing the video and completing the enclosed student activities, students will be able to do the following:

- Explain that the environment includes both living and non-living aspects. Living things include plants and animals, and non-living things include rain, rocks, the air, and buildings.
- Define ecology as the study of living things and the environment.
- Understand that when one aspect of the environment is changed or damaged, other aspects of the environment may also be affected.
- Explain that environmental problems can be thought of as issues that affect the health of the environment, whether it be the living or non-living aspects.
- Understand that people do not always agree on the definition of an environmental problem.
- Define pollution as the contamination of the environment.
- Describe how pollution can harm both non-living and living aspects of the environment.
- Provide an example of how people have taken action to eliminate a pollution problem, resulting in a cleaner environment.
- Briefly explain the cause and implications of the environmental problem of global warming.
- Define the term “extinction” and provide an example of species extinction.
- Differentiate between renewable and nonrenewable natural resources. Provide two examples of each.
- Describe the problems created by overconsumption of natural resources.
- Generally describe the concept of sustainability and explain why it must be achieved to preserve natural resources and the environment.

# Assessment

## **Preliminary Test (p. 14–15):**

The Preliminary Test is an assessment tool designed to gain an understanding of students' preexisting knowledge. It can also be used as a benchmark upon which to assess student progress based on the objectives stated on the previous pages.

## **Post-Test (p. 16–17):**

The Post-Test can be utilized as an assessment tool following student completion of the program and student activities. The results of the Post-Test can be compared against the results of the Preliminary Test to assess student progress.

## **Video Review (p. 18):**

The Video Review can be used as an assessment tool or as a student activity. There are two sections. The first part contains questions displayed during the program. The second part consists of a five-question video quiz to be answered at the end of the video.

# Introducing the Program

Ask students to provide an example of a time they have recycled. Their families may recycle at home, separating used materials into different categories, or they may have recycled paper at school. Next, ask students why they recycle. Responses might include “to save the Earth” and “because it’s good for the environment.” Explain to students that recycling is an important effort to reduce environmental problems. For example, recycling paper reduces the number of trees that need to be cut down, and recycling plastics reduces the amount of plastic that is thrown away.

Explain to students that environmental problems are issues that affect the health of the environment. Ask students to list some examples of different environmental problems. These might include pollution, deforestation, and global warming. Next, ask students to give examples of things they can do to reduce their impact on the environment. Tell students to pay close attention to the video to learn more about environmental problems and solutions.

## Program Viewing Suggestions

The student master “Video Review” (p. 18) is provided for distribution to students. You may choose to have your students complete this master while viewing the program or do so upon its conclusion.

The program is approximately 14 minutes in length and includes a five-question video quiz. Answers are not provided to the Video Quiz in the video, but are included in this guide on page 12. You may choose to grade student quizzes as an assessment tool or to review the answers in class.

The video is content-rich with numerous vocabulary words. For this reason you may want to periodically stop the video to review and discuss new terminology and concepts.

# Video Script

1. Every time you take a drink of water,...
2. ...breathe a fresh breath of air,...
3. ...bite into a piece of fruit,...
4. ...or ride in a car, you are using something from the Earth.
5. Even though you may not realize it, your survival is linked to the Earth and its health. And, at times, the health of the Earth and living things can be jeopardized.
6. Many people refer to these issues as environmental problems.
7. What exactly is the environment...
8. ...and what are environmental problems?
9. Why is the environment important?
10. And how can environmental problems be solved?
11. During the next few minutes, we will discuss these important questions...
12. ...as we explore some environmental problems and solutions.
- 13. Graphic Transition – The Environment**
14. When you hear the word “environment,”...
15. ...perhaps you think about a place with natural beauty, such as the seacoast,...
16. ...a forest,...
17. ...or a desert.
- 18. You Observe!** Describe this environment.
19. This is an urban environment in a city. The term “environment” can be applied to many different places.
20. Environment refers to our surroundings.
21. There are many different aspects of the environment, including living things, such as plants and animals,...
22. ...and non-living things, such as rain, rocks, the air, and buildings.
23. Ecology is the study of living things and the environment.
24. One of the key concepts of ecology is that everything is interconnected in the environment.
25. If just one aspect of the environment changes or is damaged, other aspects of the environment may also be affected.
- 26. Graphic Transition – What are Environmental Problems?**
27. Chances are, at some point during the past few weeks, you encountered a problem.
28. Maybe you had a hard time understanding your homework...
29. ...or you had a hard time playing music or a sport.
30. A problem is a situation or dilemma that has a difficult or uncertain solution.
31. Environmental problems can be thought of as issues that affect the health of the environment, whether it be the living or non-living aspects.
32. For example, hundreds of millions of people in the world do not have access to clean drinking water. This results in many life-threatening illnesses.
33. Sometimes people disagree on whether or not something is an environmental problem.



# Video Script

34. For example, wetlands, here in south Florida, have been reduced by about half their original size.
35. Wetlands have been converted to agriculture, housing developments, golf courses, and roads.
36. The loss of wetlands has had a devastating impact on many types of wildlife, including wading bird populations, which have been reduced in size by 90%.
37. Those who value plants and animals consider this to be a big problem.
38. But others view wetlands as useless and don't see this as a serious problem.
39. As you can see from these examples, defining environmental problems is not always an easy task.
- 40. Graphic Transition – Examples of Environmental Problems**
41. You've probably heard the expression "don't be a litter bug."
42. Littering is one form of pollution. Pollution involves contaminating or damaging the environment.
43. Air, water, and land are aspects of the environment that can become polluted.
44. The problem with pollution is that living things need clean air, water, and land to remain healthy.
45. Animals, which breathe air, drink water, and eat things grown in soil, can end up with pollutants in their bodies.
- 46. You Decide!** What problems can pollutants cause in animals?
47. Harmful pollutants can make living things sick and even cause death.
48. In many countries, great efforts have been made to control and solve pollution problems.
49. For example, most rivers and lakes are cleaner in the US today than they were in the 1960s.
50. This is because it is now illegal to discharge harmful pollutants, including human sewage, into bodies of water.
51. Air pollution, however, continues to be a major concern throughout the world.
52. One of the largest present-day concerns is the effect air pollution may have on the global climate.
53. This environmental problem is often referred to as global warming. Scientists have determined that increased amounts of carbon dioxide from the burning of fossil fuels, such as oil, gas, and coal, have created a reaction in the atmosphere, which has resulted in the warming of Earth.
54. The increased temperature of Earth's atmosphere has melted glaciers and negatively affected plant and animal life around the planet.
55. Global warming has the potential to drastically change life as we know it.
56. For this reason, scientists are calling for an immediate decrease in the burning of fossil fuels in an effort to slow the rate of global warming.

# Video Script

57. Another major environmental problem is biological extinction.
58. Extinction occurs when a type of animal completely dies out.
59. There used to be millions of passenger pigeons, but they are now extinct – gone forever.
60. Species extinction is on the rise. Extinction commonly results from over hunting, pollution, or habitat loss.
61. Habitat refers to the home of a living thing. When habitats are destroyed, things have no place to live and they die.
62. The American Bald Eagle was nearly extinct as a result of pesticides killing the developing young.
63. But by banning the use of certain pesticides, these majestic birds have made a remarkable recovery.
64. These are just a few examples of environmental problems.
- 65. Graphic Transition – Natural Resources**
66. When you woke up this morning, you may have used water to take a shower,...
67. ...had something to eat,...
68. ...and then dressed yourself with clothes.
- 69. You Decide!** What do all these things have in common?
70. They are all made from natural resources.
71. What are natural resources?
72. Natural resources are things from the natural environment that we use.
73. Almost everything we eat, see, and touch is a natural resource.
74. Food, water, and fuels are all natural resources.
75. There are two major types of natural resources – renewable and nonrenewable.
76. Natural resources, such as wind, water, trees, grass, and solar energy from the sun, are renewable resources.
77. Renewable resources can be replaced by nature over time.
78. Resources such as coal, oil, and minerals are nonrenewable natural resources.
79. Nonrenewable resources cannot be replaced by nature. Once they are used, they are gone.
80. Both renewable and nonrenewable resources can be overconsumed, or used too much.
81. If too much of a natural resource is used, it can become unavailable for some time.
82. Fortunately there are many things we can do to use natural resources wisely.
83. For example, certain natural resources, such as metals and paper products, can be recycled into new products.
- 84. Graphic Transition – Sustainability**
85. The grass in this field regrows faster than the rate at which the sheep eat it.
86. But what would happen if more sheep were allowed to graze in the meadow....

# Video Script

87. ...until there were so many sheep they ate the grass faster than the grass could regrow?
  88. Eventually the grass would be overgrazed and there wouldn't be enough to feed all of the sheep, causing them to starve.
  89. Sustainability involves taking action to avoid damaging the environment or overusing natural resources so that they are available in good condition for the long term.
  90. There are many things involved in reaching sustainability, including dealing with pollution, overpopulation, and over consumption of resources, to name just a few.
  - 91. Graphic Transition – Summing Up**
  92. During the past few minutes, we have discussed some environmental problems and solutions.
  93. We began by defining environment as our surroundings and discussing the interconnection of living and non-living aspects of the environment.
  94. Next, we gave examples of environmental problems, such as air and water pollution, species extinction, and habitat loss, and we discussed how these problems impact the Earth and its inhabitants.
  95. We also discussed global warming, which involves Earth's temperature rising as a result of the overuse of fossil fuels.
  96. We explored the differences between renewable and nonrenewable resources.
  97. Finally, we discussed ways to sustain the environment, including recycling, reusing resources, and limiting our use of them.
  98. So, the next time you take a shower,...
  99. ...use a piece of paper,...
  100. ...or go for a ride in a car,...
  101. ...think about some of the things we have discussed during the past few minutes.
  102. You just might think about Earth's environmental problems and solutions a little differently.
  - 103. Graphic Transition – Video Assessment**
- Fill in the correct word to complete the sentence. Good luck and let's get started.
1. Environmental problems often affect the \_\_\_\_\_ of living things.
  2. \_\_\_\_\_ involves the contamination of air, land, or water.
  3. Global warming is thought to be caused by high levels of \_\_\_\_\_ \_\_\_\_\_ .
  4. \_\_\_\_\_ occurs when a type of animal dies out.
  5. Wind and solar energy are examples of \_\_\_\_\_ resources.

# Answer Key to Student Assessments

## Pre-Test (p. 14–15)

1. d - our surroundings
2. a - air, water, and soil
3. b - ecology
4. b - pollution
5. a - carbon dioxide
6. d - completely dies out
7. c - hunting, pollution, or habitat loss
8. c - natural resources
9. a - nonrenewable resources
10. b - sustainability
11. false
12. false
13. true
14. true
15. false
16. The environment refers to our surroundings and includes both living and non-living aspects.
17. Environmental problems are issues that affect the health of the living and non-living aspects of the environment.
18. Examples of pollution include littering, harmful pollutants discharged into bodies of water, and burning of fossil fuels.
19. The major cause of global warming is the increased amount of carbon dioxide released into the air from the burning of fossil fuels such as oil, gas, and coal.
20. Examples of natural resources students might have used include: water, food, and fuel.

## Post-Test (p. 16–17)

1. b - sustainability
2. c - natural resources
3. d - completely dies out
4. b - pollution
5. a - air, water, and soil
6. a - nonrenewable resources
7. c - hunting, pollution, or habitat loss
8. a - carbon dioxide
9. b - ecology
10. d - our surroundings
11. true
12. false
13. false
14. false
15. true
16. Examples of natural resources students might have used include: water, food, and fuel.
17. Examples of pollution include littering, harmful pollutants discharged into bodies of water, and burning of fossil fuels.
18. The environment refers to our surroundings and includes both living and non-living aspects.
19. Environmental problems are issues that affect the health of the living and non-living aspects of the environment.
20. The major cause of global warming is the increased amount of carbon dioxide released into the air from the burning of fossil fuels such as oil, gas, and coal.

## Video Review (p. 18)

1. This is an urban environment in a city.
  2. Harmful pollutants can make animals and other living things sick and even cause death.
  3. All of these things are made from natural resources.
- 
1. Environmental problems often affect the **health** of living things.
  2. **Pollution** involves the contamination of air, land, or water.
  3. Global warming is thought to be caused by high levels of **carbon dioxide**.
  4. **Extinction** occurs when a type of animal dies out.
  5. Wind and solar energy are examples of **renewable** resources.

# Answer Key to Student Activities

## Vocabulary (p. 19)

1. environment
2. environmental problems
3. pollution
4. global warming
5. biological extinction
6. habitat loss
7. natural resources
8. renewable natural resources
9. nonrenewable natural resources
10. sustainability

## Writing Activity (p. 20)

We live, learn, and play in different places. The term **environment** refers to our surroundings. There are different aspects of the environment, including **living** things, such as plants and animals, and **non-living** things, such as rain, rocks, the air, and buildings. If one aspect of the environment is damaged, other aspects of the environment may be **affected**. Environmental problems can be thought of as issues that affect the **health** of the environment. One problem is **pollution**, which involves the **contamination** of the environment. A serious problem caused by pollution involves the increased temperature of the atmosphere, referred to as **global warming**. Almost everything we eat, see, and touch is a **natural resource**. We cannot survive without these resources. It is very important that we use resources in a **sustainable** way so they are not overused or damaged for the long term.

## In Your Own Words (p. 20)

1. Environmental problems are issues that affect the health of the environment, whether it be the living or non-living aspects. Some examples include global warming, pollution of drinking water, littering, and species extinction.
2. Global warming refers to the increased temperature of Earth's atmosphere. Increased amounts of carbon dioxide in the atmosphere has resulted in the warming of Earth, and has caused glaciers to melt, and negatively affected plant and animal life.
3. Renewable natural resources are resources that can be replaced by nature over time. Examples of renewable resources include water, wind, and trees. Nonrenewable natural resources cannot be replaced by nature. Once they are used, they are gone. Examples of nonrenewable resources include coal and oil.

## Water Conservation (p. 21–22)

1. Answers will vary.
2. Answers will vary.
3. Examples of things students can do to reduce water consumption: take shorter showers, turn the water off while brushing teeth, and turning off water while washing dishes by hand.

## A Windy Future (p. 23)

1. Wind blows over the blades of a turbine, causing them to turn. They are connected to a drive shaft, which turns a generator and produces electricity.
2. Wind power does not produce pollutants, it is renewable, and it does not require fossil fuels to operate.
3. A wind farm is a cluster of turbines scattered over a large area.
4. The burning of fossil fuels produces pollutants. Fossil fuels are also nonrenewable, which means that once they are used, they are gone forever.

## Acidic Skies (p. 24–25)

1. Acid precipitation is caused by harmful compounds, such as sulfur and nitrogen oxides, being emitted into the atmosphere. These compounds react and produce acids. The compounds are emitted by human activity, such as the burning of fossil fuels, factories, and cars.
2. Plants generally need water with a pH of 5 to 6. Rainwater with a pH of less than 5 has a negative effect on many plants. Vinegar has a pH of 2.4, which causes plants to wither and die.
3. Acid rain pollutes sources of freshwater and can cause some fish species to die.
4. Acid rain can be reduced by creating laws that require cleaner car emission standards. It can also be reduced by reducing the burning of fossil fuels, especially coal.

# Pre-Test

Name \_\_\_\_\_

Circle the best answer for each of the following questions.

- The term “environment” refers to:  
a. *just the oceans*      b. *the inner planets*      c. *the outer planets*      d. *our surroundings*
- Non-living aspects of the environment include:  
a. *air, water, and soil*      b. *plants and animals*      c. *humans*      d. *bacteria*
- The study of living things and the environment is:  
a. *microbiology*      b. *ecology*      c. *chemistry*      d. *geology*
- Contamination or damage caused to the environment is called:  
a. *fertilization*      b. *pollution*      c. *consumption*      d. *adaptation*
- The primary cause of global warming is increased amounts of this compound in the atmosphere:  
a. *carbon dioxide*      b. *water*      c. *nitrogen*      d. *air*
- Biological extinction occurs when a type of living thing:  
a. *thrives*      b. *reproduces*      c. *mutates*      d. *completely dies out*
- Species extinction commonly results from:  
a. *wildlife protection*      b. *genetic modification*      c. *hunting, pollution, or habitat loss*      d. *recycling*
- Things from the natural environment we use are called:  
a. *plastics*      b. *rubber*      c. *natural resources*      d. *tools*
- Resources such as oil and minerals that cannot be readily replaced by nature are:  
a. *nonrenewable resources*      b. *available resources*      c. *renewable resources*      d. *inorganic resources*
- Taking action to use and preserve resources for the long term is referred to as:  
a. *pollution*      b. *sustainability*      c. *consumption*      d. *overconsumption*

# Pre-Test

Name \_\_\_\_\_

## Write true or false next to each statement.

- 11. \_\_\_\_\_ The environment only includes living things.
- 12. \_\_\_\_\_ Defining and understanding environmental problems is always a simple task.
- 13. \_\_\_\_\_ Animals can end up with pollutants in their bodies from taking in polluted air and water.
- 14. \_\_\_\_\_ Global warming has the potential to drastically change life as we know it.
- 15. \_\_\_\_\_ Coal, oil, and minerals are considered renewable natural resources.

## Write a short answer for each of the following.

16. What is the environment?

---

---

17. What are environmental problems?

---

---

18. Describe an example of pollution.

---

---

19. What is the major cause of global warming?

---

---

20. List three natural resources you have used today.

---

---



# Post-Test

Name \_\_\_\_\_

Circle the best answer for each of the following questions.

- Taking action to use and preserve resources for the long term is referred to as:  
a. *pollution*      b. *sustainability*      c. *consumption*      d. *overconsumption*
- Things from the natural environment we use are called:  
a. *plastics*      b. *rubber*      c. *natural resources*      d. *tools*
- Biological extinction occurs when a type of living thing:  
a. *thrives*      b. *reproduces*      c. *mutates*      d. *completely dies out*
- Contamination or damage caused to the environment is called:  
a. *fertilization*      b. *pollution*      c. *consumption*      d. *adaptation*
- Non-living aspects of the environment include:  
a. *air, water, and soil*      b. *plants and animals*      c. *humans*      d. *bacteria*
- Resources such as oil and minerals that cannot be readily replaced by nature are:  
a. *nonrenewable resources*      b. *available resources*      c. *renewable resources*      d. *inorganic resources*
- Species extinction commonly results from:  
a. *wildlife protection*      b. *genetic modification*      c. *hunting, pollution, or habitat loss*      d. *recycling*
- The primary cause of global warming is increased amounts of this compound in the atmosphere:  
a. *carbon dioxide*      b. *water*      c. *nitrogen*      d. *air*
- The study of living things and the environment is:  
a. *microbiology*      b. *ecology*      c. *chemistry*      d. *geology*
- The term "environment" refers to:  
a. *just the oceans*      b. *the inner planets*      c. *the outer planets*      d. *our surroundings*



# Post-Test

Name \_\_\_\_\_

## Write true or false next to each statement.

- 11. \_\_\_\_\_ Animals can end up with pollutants in their bodies from taking in polluted air and water.
- 12. \_\_\_\_\_ Coal, oil, and minerals are considered renewable natural resources.
- 13. \_\_\_\_\_ Defining and understanding environmental problems is always a simple task.
- 14. \_\_\_\_\_ The environment only includes living things.
- 15. \_\_\_\_\_ Global warming has the potential to drastically change life as we know it.

## Write a short answer for each of the following.

16. List three natural resources you have used today.

---

---

17. Describe an example of pollution.

---

---

18. What is the environment?

---

---

19. What are environmental problems?

---

---

20. What is the major cause of global warming?

---

---

# Video Review

Name \_\_\_\_\_

**While you watch the video, answer these questions:**

**1. You Observe!**

Describe this environment.

---

---

---

**2. You Decide!**

What problems can pollutants cause in animals?

---

---

---

**3. You Decide!**

What do all these things have in common?

---

---

---

**After you watch the video, test your knowledge with these questions.**

1. Environmental problems often affect the \_\_\_\_\_ of living things.
2. \_\_\_\_\_ involves the contamination of air, land, or water.
3. Global warming is thought to be caused by high levels of \_\_\_\_\_.
4. \_\_\_\_\_ occurs when a type of animal dies out.
5. Wind and solar energy are examples of \_\_\_\_\_ resources.

# Vocabulary

Name \_\_\_\_\_

Use these words to fill in the blanks next to the sentences below.

Words	nonrenewable natural resources	sustainability	pollution	environment
	global warming	habitat loss	renewable natural resources	
	environmental problems	biological extinction	natural resources	

- \_\_\_\_\_ Our surroundings; includes both living and non-living aspects.
- \_\_\_\_\_ Issues that affect the health of the environment.
- \_\_\_\_\_ The contamination of the environment.
- \_\_\_\_\_ Increase in temperature of atmosphere due to pollution.
- \_\_\_\_\_ Occurs when a living species completely dies out.
- \_\_\_\_\_ The elimination of the “home” of a living thing.
- \_\_\_\_\_ Things from the natural environment we use.
- \_\_\_\_\_ Resources that can be replaced by the natural environment; examples include wind, water, trees, and solar energy.
- \_\_\_\_\_ Resources that cannot be replaced by nature; examples include oil and minerals.
- \_\_\_\_\_ The act of carefully using and caring for resources so they are available for the long term.

# Writing Activity

Name \_\_\_\_\_

Words	global warming	non-living	natural resource	sustainable	pollution
	contamination	environment	affected	living	health

Use the correct word from above to complete the sentences in the following paragraph.

We live, learn, and play in different places. The term \_\_\_\_\_ refers to our surroundings. There are different aspects of the environment, including \_\_\_\_\_ things, such as plants and animals, and \_\_\_\_\_ things, such as rain, rocks, the air, and buildings. If one aspect of the environment is damaged, other aspects of the environment may be \_\_\_\_\_. Environmental problems can be thought of as issues that affect the \_\_\_\_\_ of the environment. One problem is \_\_\_\_\_, which involves the \_\_\_\_\_ of the environment. A serious problem caused by pollution involves the increased temperature of the atmosphere, referred to as \_\_\_\_\_. Almost everything we eat, see, and touch is a \_\_\_\_\_. We cannot survive without these resources. It is very important that we use resources in a \_\_\_\_\_ way so they are not overused or damaged for the long term.

## In Your Own Words

1. What are environmental problems? Give an example.

---

---

---

2. What is global warming? How has pollution contributed to the problem?

---

---

---

3. What is the difference between a renewable and nonrenewable natural resource? Give an example of each.

---

---

---

# Water Conservation

Name \_\_\_\_\_

**Background:** All living things, including humans, need water to survive. You use water throughout the day. For example, when you got up this morning, you probably took a shower, brushed your teeth, and flushed the toilet. And you probably had a glass of water when you were thirsty.

Although it might seem like there is an endless supply of water for humans to use, this is not true. About 80% of Earth's surface is covered with water. However, the vast majority of Earth's water is saltwater and humans need freshwater to survive. In fact, only 2.5% of Earth's water is freshwater and most of it is frozen in glaciers and ice sheets. Water is constantly cycled throughout our environment. This means that there is always the same amount of water on Earth. However, the amount of usable water is becoming reduced as a result of pollution. As you can see, water is a very valuable and limited resource that needs to be conserved.

In this activity, you will calculate the amount of water you use everyday.

**Activity: Part I**

1. Estimate how many liters of water you use everyday.
2. Write your estimate here: \_\_\_\_\_ liters
3. The table below lists many everyday activities that require water. Every time you do one of these activities, put a check mark in the frequency column next to it. Start in the morning and record every activity until you go to bed. If you take a shower, time how long you are in the shower. If you do not do one of the activities, put a zero in the column next to it.
4. There also might be other activities you do that are not included in the chart. If there are, write these in the blank spaces.

Activity	Frequency
Brush teeth	
Flush toilet	
Shower	
Wash hands	
Wash face	
Drink a glass of water	
Wash dishes by hand	
Run dishwasher	
Wash clothes (machine)	
Take a bath	

# Water Conservation

Name \_\_\_\_\_

## Activity: Part II

1. Transfer your information from the chart on p. 21 to the chart below.
2. Calculate the approximate amount of water you used for each activity. To do this, multiply the average amount of water used (2nd column) by your frequency (3rd column). Enter this total in the 4th column.
3. To determine the approximate total amount of water you use every day, add together all the numbers in the fourth column.

Activity	Average amount of water used	Your frequency	Total amount of water per activity
Brush teeth	3.8 liters		
Toilet flush	11.4 liters		
Shower	7.6 liters/minute		
Wash hands	3.8 liters		
Wash face	3.8 liters		
Drink a glass of water	.2 liters/glass		
Wash dishes by hand	18.9 liters/load		
Run dishwasher	75.7 liters/load		
Wash clothes (machine)	37.9 liters/load		
Bath	189.3 liters		

## Questions:

1. Approximately how much water do you use everyday? How does this compare to your estimate? Are you surprised by the results?
  
2. What activity uses the most water over the course of a day?
  
  
  
  
  
  
  
  
  
  
3. List three things you can do to reduce your water intake.

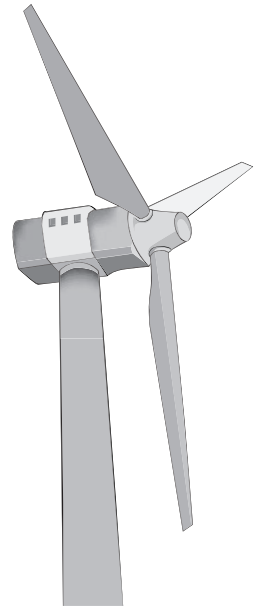
# A Windy Future

Name \_\_\_\_\_

**Directions:** Read the information below and answer the questions that follow.

We use electricity everyday. Electricity powers the alarm clock that wakes you up in the morning, the refrigerator that keeps your food cold, and the lights that illuminate your school. Much of the electricity you use comes from the burning of fossil fuels, such as coal and oil. Fossil fuels emit harmful substances into the atmosphere, such as carbon dioxide and sulfur dioxide, which pollute our environment. Fossil fuels are also nonrenewable resources, which means once they are used up, they are gone forever.

Fortunately, there are different ways to produce electricity from renewable and clean resources. One example is the wind. Wind power is harnessed through the use of wind turbines. Turbines consist of two or three blades, which form a rotor. The rotor is mounted on a tower at least 30 meters (98 feet) above ground, where the wind is faster and less turbulent. Some turbines are much taller, reaching a height of 125 meters, or 415 feet! Wind blows over the blades, causing them to turn. The blades are connected to a drive shaft, which turns a generator and produces electricity. Often, wind turbines are built near others as part of a wind power plant, commonly referred to as a wind farm. Wind farms are clusters of turbines scattered over a large area. Wind farms range in size from a few turbines to as many as 400. Many turbines are often built on agricultural farmland. The turbines themselves take up very little ground space, so crops are able to grow and cattle can graze around them. Some wind farms are located off the shores of large lakes or the ocean, where winds are consistently strong.



Wind energy is considered a “green” source of energy because its operation does not produce sulfur dioxide, carbon dioxide, mercury, or other types of air pollutants. It also does not require fuel to operate. However, one drawback has to do with the variability of wind. Sometimes wind blows very hard and other times it blows very little. Other types of energy need to be used during times when there is little wind. The other types of energy usually come from the burning of fossil fuels, which produce pollutants. Scientists are also concerned about the impact of wind turbines on bird and bat populations.

Because people are becoming more and more concerned about the impact of pollution on our environment, wind energy is becoming increasingly popular. As of 2006, Germany was the leading producer of wind power, supplying 28% of the world’s wind-powered energy. Electricity produced from wind makes up 6.3% of Germany’s total electricity. The United States has added more wind energy than any other country in recent years. It has become the second largest producer of the world’s wind energy supply. However, only 1% of the United States’ electricity is produced from the wind. The country that relies the most on wind power is Denmark, which generates 20% of its electricity from the wind. In the future, more and more countries will be turning to wind to produce electricity.

## Questions:

1. How does a wind turbine work?
2. List two benefits of wind power.
3. What is a wind farm?
4. How does the burning of fossil fuels damage our environment?

# Acidic Skies

Name \_\_\_\_\_

**Background:** Acid rain is a term used to describe rain that is unusually acidic. Acid precipitation is a more accurate term because all forms of precipitation, including rain, snow, and sleet, can be acidic. Acid precipitation is largely caused by humans emitting harmful compounds into the atmosphere, such as sulfur oxides and nitrogen oxides. These compounds are produced by human activity through the burning of fossil fuels in power plants, factories, and cars. The compounds react in the atmosphere to produce acids, such as sulfuric acid and nitric acid, which combine with water droplets and fall as acid precipitation.

Acid precipitation can have a detrimental impact on living and non-living things. For example, some insects and fish species can die as a result of acid rain polluting lakes and streams. Acid precipitation also damages soils, having a negative impact on plants that grow in the soil. Buildings and monuments can also be damaged by acid rain. In this activity, you will use vinegar to understand how acid rain affects plant life. Although vinegar usually does not get into our water supply, its effects on plant life are similar to those of sulfuric acid.

## Materials:

vinegar  
litmus paper and pH scale  
two spray bottles  
water  
two small plants

## Activity:

1. Your instructor will explain how the pH scale is used to measure the level of acidity of different substances, and how litmus paper is used to measure acidity.
2. Use litmus paper to test the acidity of the tap water you are using.
3. Next, use litmus paper to test the acidity of the vinegar.
4. Put tap water in one spray bottle and vinegar in the other.
5. Spray one plant with water and the other with vinegar. Do this for several days.
6. Each day, record your observations in the chart on the following page.
7. Continue doing this experiment until there is an obvious difference in the two plants.
8. Describe the difference between the two plants. Be sure to look at all parts of the plants.
9. Take a sample of the soil from both plants and add water to each. Use litmus paper to test the acidity of the soil.
10. Answer the questions on the next page.



# Acidic Skies

Name \_\_\_\_\_

**Directions:** In the chart below, describe the appearance of the plant sprayed with water and the plant sprayed with vinegar.

Day	Plant sprayed with water	Plant sprayed with vinegar
1		
2		
3		
4		
5		
6		

## Questions:

1. What causes acid precipitation?
2. What impact did the vinegar have on the plants?
3. What impact can acid rain have on fish?
4. What can be done to reduce acid rain?