Working with the Photo

Picking up trash is one way to keep the environment clean. **How do you keep the environment clean in your neighborhood?**
Start-Up Activities

Before You Read

What do you already know about the environment? Take the short quiz below. Keep a record of your answers.

**HEALTH QUIZ** Choose the best answer for each of the following:

1. Fossil fuels include
   a. wind power and solar power.
   b. nuclear power and hydroelectric power.
   c. coal and natural gas.

2. What gas high in the atmosphere protects you from the sun's harmful rays?
   a. nitrogen
   b. carbon dioxide
   c. ozone

3. The three Rs of conservation are reduce, reuse, and
   a. repair.
   b. recycle.
   c. remember.

**ANSWERS:** 1. c; 2. c; 3. b.

As You Read

Make this Foldable® to record what you learn in Lesson 1 about the causes and effects of air pollution. Begin with a plain sheet of 8½” × 11” paper or a sheet of notebook paper.

1. Fold the sheet of paper from top to bottom, leaving a 2” tab at the bottom.

2. Fold in half from side to side.

3. Unfold the paper once. Cut along the center fold line of the top layer only. This makes two tabs.

4. Label the tabs as shown.

Under the appropriate tab, take notes on the causes and effects of air pollution.

Visit glencoe.com and complete the Chapter 16 crossword puzzle.
How Pollution Affects Your Health

Lesson 1

Building Vocabulary
As you read this lesson, write each new highlighted term and its definition.
- pollution (p. 508)
- fossil fuels (p. 508)
- acid rain (p. 509)
- ozone (p. 509)
- smog (p. 509)
- groundwater (p. 510)
- sewage (p. 510)
- landfills (p. 510)
- biodegradable (p. 511)
- hazardous wastes (p. 511)

Focusing on the Main Ideas
In this lesson, you will be able to
- describe the causes and effects of pollution.
- identify which hazardous products may be in your home.

Reading Strategy
Organizing Information Write down all the main headings and subheadings in this lesson. Use these headings to create an outline as you read the lesson.

Foldables® Study Organizer Use the Foldable® on p. 507 as you read this lesson.

Quick Write
Which household products do you think could harm the environment if they were disposed of improperly? List these on a sheet of paper.

Pollution and the Environment

The global environment includes forests, mountains, rivers, oceans, and all living things on earth. Your environment includes all the living and nonliving things around you. Sometimes people act in ways that harm the environment. The result is pollution, dirty or harmful substances in the environment. Pollution harms the environment, can harm your health, and is often ugly. So it’s important for each person to do his or her part to keep the environment clean.

Air Pollution

Most air pollution comes from the burning of fossil fuels. Fossil fuels are the oil, coal, and natural gas that are used to provide energy. The energy from fossil fuels provides heat for homes and electricity to power factories, towns, and cities. Fossil fuels also power most motor vehicles.
**Acid Rain**

When fossil fuels burn, they release gases into the atmosphere. Chemicals in these gases mix with moisture in the air to form **acid rain**, which is *rain that is more acidic than normal rain*. Over time, acid rain can harm plants and even whole forests. It can contaminate freshwater supplies and harm aquatic life, too. Acid rain can even eat away at rock and stone.

**Smog**

Fossil fuels create other gases when they burn. Some of these gases are changed by heat and sunlight into ozone. **Ozone** is a gas *made of three oxygen atoms*. High up in the atmosphere, ozone occurs naturally and helps protect you from the sun's harmful rays.

Closer to ground level, ozone mixes with other gases to form smog. **Smog** is a *yellow-brown haze that forms when sunlight reacts with air pollution*. Ozone and smog can cause health problems or aggravate existing health problems. For example, people who have bronchitis, asthma, or emphysema have a very hard time breathing when smog is in the air. Many cities issue warnings on days when there is too much smog or ozone in the air. On such days, people sensitive to smog or ozone should limit the time they spend outside.

**The Ozone Layer**

The naturally occurring layer of ozone in the upper atmosphere shields the earth from the sun's harmful UV rays. In the 1970s, scientists discovered that the ozone layer was breaking down. Chemicals such as the propellants used in aerosol cans, emissions from automobiles, and the chemical that keeps refrigerators and air conditioners cool were damaging the ozone layer. Without the protection of this layer of gas, people are more likely to develop skin cancer and eye damage. That's why it's especially important to protect yourself from the sun's rays with sunscreen and sunglasses. Today, many countries are working to help restore the ozone layer by banning the use of the chemicals that damage it. You can do your part by using products that won't cause more damage to the ozone layer.

**Reading Check**

What are two types of air pollution?
**What can teens do to help protect the environment?**

I think teens can help protect the environment by picking up any garbage or trash lying around, and when they are dealing with something that can hurt the environment, they should be very careful. If we all pitch in, the environment will be a safe and fun place for years to come.

Roman B.
Boise, Idaho

---

**Water Pollution**

Water pollution is a widespread problem. Forty percent of all the nation’s rivers, lakes, streams, and oceans are too polluted to use for swimming, fishing, or drinking. Drinking water comes from sources both above and below the earth’s surface. Lakes, rivers, and streams are sources of water above the earth. **Groundwater** is water that collects under the earth’s surface. Water is dangerous to drink if it becomes polluted.

There are many sources of water pollution. **Sewage** is human waste, garbage, detergents, and other household wastes washed down drains and toilets. Sewage can spread diseases such as hepatitis A, typhoid fever, dysentery, and cholera. Factories are another source of water pollution. They can produce industrial waste or cause oil spills. Some factories dump chemical waste into water sources even though it is against the law.

Most of the pollution found in water comes from chemicals like fertilizers and pesticides used on farms or even on your front lawn. The oil that drips from your family car can also pollute water. When the oil mixes with water, it can sink into the earth or run into a stream. Eventually, the polluted water will end up in the ocean where it will hurt all kinds of sea life.

---

**Solid Waste**

Land may also become polluted. Many of the items we use in daily life are made of plastic and metal. When they are thrown away, these materials take a long time to break down, if they ever do. Much of this solid waste goes into **landfills**—huge, specially designed pits where waste materials are dumped and buried. Landfills may have walls or linings of clay or plastic so that water flowing through the landfill does not carry chemicals or other material into water supplies. In time, all landfills get filled up. When this happens, they are capped and sealed. A new landfill is made somewhere else.
Biodegradable Wastes

Not all solid waste ends up in landfills. Many discarded items are biodegradable, or easily broken down in the environment. For example, food waste, paper, and wood all break down naturally. Some people set up a compost pile, a place where biodegradable wastes can break down naturally and turn into fertilizer. Leaves, grass, shredded newspaper, and some food wastes are items that can be composted.

**Reading Check**

Define What does *biodegradable* mean?

Hazardous Wastes

Some wastes are hazardous to the health of all living things. These wastes should never go into a landfill. **Hazardous wastes** are human-made liquid, solid, sludge, or radioactive wastes that may endanger human health or the environment. Some examples of hazardous wastes are dangerous industrial chemicals, asbestos, radioactive materials, and some medical wastes. Hazardous substances from our homes include: motor oil, paint, insecticides, nail polish remover, antifreeze, bleach, and drain cleaner. Batteries, computers, and air conditioners also contain hazardous wastes.

Because hazardous wastes are dangerous to all living things and the environment, they need to be disposed of properly. Most are stored in facilities where they will not be released into the environment. If you need to dispose of household hazardous waste, contact your local health department or environmental agency.
Even computers need to be disposed of properly or they can harm the environment. **What other household products need to be disposed of as hazardous waste?**

They will explain how to get rid of it safely. Many communities have drop-off centers to collect household hazardous waste. Never put household hazardous wastes in the regular trash.

---

**Lesson 1 Review**

**Review this lesson for new terms, major headings, and Reading Checks.**

**What I Learned**

1. **Vocabulary** Define hazardous wastes.
2. **Explain** Describe how groundwater can become polluted.
3. **List** What are three items that can go into a compost pile? What do these items have in common?
4. **Identify** How is smog formed?

**Thinking Critically**

5. **Analyze** What is the difference between ozone in the upper atmosphere and ozone nearer to ground level?

6. **Synthesize** Your older brother wants to pour a bottle of antifreeze down the drain. What would you say to encourage him to protect the environment and his health?

**Applying Health Skills**

7. **Advocacy** Create text and a logo for a sticker that people could put on cabinets that contain household products. The sticker should list common items that are household hazardous waste materials. It should also have space for a local hazardous waste information phone number.
Lesson 2

Protecting the Environment

Guide to Reading

Building Vocabulary
Write a sentence using each of these terms: recycle, nonrenewable resources, and conservation. Trade papers with a classmate. Write the possible meanings of the terms based on the sentences.
- Environmental Protection Agency (p. 513)
- Occupational Safety and Health Administration (p. 513)
- recycle (p. 515)
- nonrenewable resources (p. 516)
- conservation (p. 516)

Focusing on the Main Ideas
In this lesson, you will be able to
- identify what you can do to keep air and water clean.
- describe how you can reduce solid wastes.
- describe ways in which you can conserve energy and water.
- demonstrate decision-making skills to choose environment-friendly products.

Reading Strategy
Predicting Quickly skim this lesson, writing down all the major headings. Next to each heading, write down what you think the most important point of that section would be.

You Can Help Reduce Pollution

We can all do our part to help reduce pollution, and in turn, protect our health. When we work together as a community, we can do even more. All around the world, many local and national governments are working together to help stop pollution.

The Environmental Protection Agency (EPA) is an agency of the U.S. government that is dedicated to protecting the environment. The Occupational Safety and Health Administration (OSHA) is a branch of the U.S. Department of Labor that protects American workers. OSHA makes sure that work environments are safe and are free of hazardous materials.

Whenever you can, ride a bike rather than in a motor vehicle. It's better for the environment. What health benefits do you gain from riding a bike?
Chapter 16: The Environment and Your Health

Helping to Reduce Air Pollution

Reducing air pollution can help keep you and your community safe. Here are some strategies to help reduce air pollution in your community.

- **Carpool or take public transportation.** When you share rides, you burn less fuel. That helps cut down on pollution.
- **Ride your bike or walk to nearby activities.** When you ride a bike or walk rather than ride in a vehicle, you save fuel and reduce pollution.
- **Stay tobacco free.** Tobacco smoke is not only unhealthy for people who smoke, it pollutes the air.
- **Plant trees and other plants.** Plants convert carbon dioxide to oxygen, making the air clean.

Helping to Reduce Solid Waste

The key to reducing solid waste is simple: create as little of it as you can. Here are some strategies to help reduce solid waste in your community.

- **Create less waste** by reducing, reusing, and recycling. 
  - **Reduce** by using the three Rs: reduce, reuse, and recycle.
  - **Reusing** means using something again, like a bottle that you can fill with water instead of buying a new one.
  - **Recycling** means choosing products that are made from recycled materials.

**Figure 16.1** shows how using the three Rs can help reduce solid waste.

---

**Decision Making**

**Choosing Environment-Friendly Products**

Gus, a seventh grader, has a snack when he gets home from school every day. His favorite snack is prepackaged, single-serving crackers and cheese. This snack comes in a plastic tray. It has a plastic knife, crackers, and cheese; all of the items are wrapped in plastic. Gus’s sister sees the snack and asks Gus if he can think of another way to have crackers and cheese that doesn’t produce so much trash every day.

**What Would You Do?**

Use the six steps of the decision-making process to help Gus figure out some options that would produce less trash.

1. State the situation.
2. List the options.
3. Weigh the possible outcomes.
4. Consider your values.
5. Make a decision and act on it.
6. Evaluate the decision.

---

**Go Online**

**Topic: Being Proactive about the Environment**

Visit glencoe.com for Student Web Activities where you can learn about different ways to help the environment.

**Activity:** Using the information provided at the link above, create a “You Can Make a Difference” e-mail urging teens to help protect the environment and listing Web sites where they can find out how.

**List** What are some ways to reduce solid waste?
Helping to Reduce Water Pollution

Everyone needs clean drinking water that is free from disease-causing organisms and harmful chemicals. Clean water is important for aquatic plants and animals. The industries and farms that use water to produce the foods and beverages we eat and drink need clean water. We also need clean water for water recreation activities. To help keep water clean, follow these tips.

- Pick up pet waste from public areas to reduce toxic runoff.
- Use environment-friendly soaps, detergents, and cleaners.
- Pick up any litter that is not hazardous.
- Dispose of chemicals properly. Never pour them into a drain.

Reduce waste. Cut down on the amount of trash you throw away. Use baskets or cloth bags to carry groceries home. Avoid using paper plates and plastic cups, knives, forks, or spoons. Buy products in bulk to reduce the amount of packaging you throw away and buy items that have less packaging.

Reuse objects. Think of other ways to use items you would otherwise throw away. You can buy reusable food containers. Reuse plastic grocery bags as trash bags or to clean up after pets. Donate unwanted clothes to charity rather than throwing them out.

Recycle. To recycle means to change items in some way so that they can be used again. Find out how recycling works in your community. Learn which items can be recycled and how these items are collected. When you buy products made from recycled materials, you are continuing to help the environment.
Conserving Energy and Water

Some natural resources, like oil from oil wells, can only be used once. Oil is a nonrenewable resource. Nonrenewable resources are substances that cannot be replaced once they are used. Other examples are the natural gas used to heat many homes and the coal used by many power plants to produce electricity.

Other resources are always being renewed. For example, the supply of freshwater is constantly being renewed through the water cycle. The water cycle is the movement of water through, around, and over the earth. Even renewable resources, however, need to be protected. There is a limited amount of freshwater. Pollution makes freshwater more expensive because polluted water has to be cleaned before it is used. Conservation is a good way to protect resources such as water. Conservation is the saving of resources.

Lighting and appliances. Turn off lights when you leave a room. Turn off appliances, TVs, radios, and computers when they are not in use. Use fluorescent bulbs when possible. If possible, choose energy-efficient appliances. Insulate your hot-water heater. Wash clothes in cold water when you can. Dry clothes on a clothesline instead of in an electric dryer. When you cook a small amount of food, use a microwave oven. Don’t preheat an oven more than necessary. Keep the oven door closed while cooking.

Heating and cooling. Keep doors and windows closed when the furnace or air conditioner is running. Seal cracks around doors and windows. When possible, use fans instead of air conditioners. Dress to keep yourself at a comfortable temperature. For example, in cold weather, wear a sweater. In warmer weather, wear lightweight clothing.

Conserve resources is everybody's job. How does turning off lights help the environment?
CONSERVING WATER
This teen is conserving water by doing a full load of laundry. If water is a renewable resource, why do we have to conserve it?

• **Inside** Avoid running the washing machine or dishwasher until you have a full load. Run the washer at the lowest water level that will clean that load. Fix leaky faucets. Never let water run unnecessarily. Install water-saving showerheads. Take shorter showers.

• **Outside** Turn the hose off when you are washing the car. Use the hose only for rinsing the car. Water lawns only when needed. Use soaker hoses for watering gardens. Garden with plants that conserve water.

Lesson 2 Review

**What I Learned**

1. **Vocabulary** What is the Environmental Protection Agency?

2. **Give Examples** What can you do to reduce air pollution?

3. **List** Name three ways you can help keep water clean.

4. **Explain** What is a nonrenewable resource? Give one example of a nonrenewable resource.

5. **Identify** Why is it a good idea to turn off lights when you leave a room?

**Thinking Critically**

6. **Analyze** If conservation is a good idea, why do you think people might still need to be reminded to conserve resources?

7. **Synthesize** Explain how purchasing an item that has less packaging than another similar item can help conserve resources and reduce waste.

**Applying Health Skills**

8. **Advocacy** Write and illustrate a comic book that encourages teens to conserve electricity and water. In your comic book, be sure to explain why conservation of these resources is important.
What Does Accessing Information Involve?
Accessing information involves finding reliable information to make healthy choices. When looking at a source of information, ask yourself these questions:

- Is it scientific?
- Does it give more than one point of view?
- Does it agree with other sources?
- Is it trying to sell something?

Accessing Information
Practicing Healthful Behaviors
Stress Management
Analyzing Influences
Communication Skills
Refusal Skills
Conflict Resolution
Decision Making
Goal Setting
Advocacy

Finding Facts About the Environment

Follow the Model, Practice, and Apply steps to help you master this important health skill.

1. **Model**

   *Read how Cory uses Internet research to access valuable health information.*

   Cory has asthma and wanted to find out if there is a link between indoor air pollution and asthma. He started by looking on the Internet. Three sites stated that indoor air pollution has contributed to the increase in asthma cases. Two sites were for pharmaceutical companies. These sites featured ads for asthma drugs. The addresses of those Web sites ended in “.com.”

   A third site was sponsored by a well-known government agency and ended in “.gov.” Cory decided the information was probably accurate since all three sites agreed. However, he questioned whether other information at the first two sites was reliable because they were trying to sell medicines. He had more confidence in what he found at the government’s site.
Apply what you have learned about accessing information to complete the activity below.

Choose an area of the environment that interests you. For example, you may choose pollution or a way to conserve resources such as energy or water. Use three reliable sources of information to find four environmental health facts that teens should know. For example, you might access the Environmental Protection Agency’s (EPA) Web site or go to the library to find a book by an expert on the environment. Report your facts to the class. Explain why you think each source that you used is a reliable one.

Self-Check
- Did I find four facts about the environment? Did I use three valid sources?
- Can I tell why each source is reliable?

Practice

Help Brandon use accessing-information skills to determine if the Web site information provided by a furnace manufacturer is valid.

Brandon wants to find out what could be done to reduce indoor air pollution. He searched the Internet and found a Web site sponsored by a furnace manufacturer. The site suggested that replacing an old, inefficient furnace with one that was properly vented would help reduce indoor air pollution.

1. Should Brandon accept this information as valid? Why or why not?
2. Explain the steps that he could take to determine if this information is valid.
Managing the Packaging

Packaging can be useful when it protects a product. Packaging can also be wasteful. Unnecessary packaging uses up the earth’s resources and can harm the environment when discarded.

What You Will Need

- Small bag of potato chips
- Wrapped slices of cheese
- Video game (in original packaging)
- Batteries (in original packaging)
- Graph paper and pencil

What You Will Do

1. Work in small groups to create a graph.
2. Determine the unnecessary packaging of each of the four products. Rate them on a scale from 1 to 5, with 5 being the most unnecessary. Mark the product’s rating on the graph’s vertical (y) axis.
3. On a scale from 1 to 5, with 5 being the highest, rate the likelihood that a product could be recycled or reused. Mark the product’s rating on the horizontal (x) axis.
4. Draw a horizontal line out from the product’s packaging rating. Draw a vertical line up from the product’s recycling rating. Where the lines meet, write the name of the product.

Wrapping It Up

Which items are easy to rate and which are hard? What did you consider before deciding where to place the product on the graph? Where on the graph do you find the objects that are the most environment-friendly? Where are the least environment-friendly objects?
Lesson 1  How Pollution Affects Your Health

Main Idea  Pollution harms the environment and your health, and is often ugly.

- Pollution is made up of dirty or harmful substances in the environment.
- Burning fossil fuels such as coal, oil, and natural gas pollutes the air.
- Gases given off during the burning of fossil fuels mix with moisture in the atmosphere to form acid rain.
- Ozone mixes with other air pollutants to form smog.
- Smog worsens respiratory conditions like asthma, bronchitis, and emphysema.
- Chemicals used on land are the primary source of water pollution.
- Water polluted with sewage contains pathogens that can cause disease.
- Landfills are huge, specially constructed pits where solid waste is buried.
- Hazardous waste includes human-made, liquid, solid, sludge, or radioactive wastes.
- Hazardous waste should never be thrown out with the regular trash.
- Biodegradable waste, like food, wood, and paper, is solid waste that can be easily broken down in the environment.

Lesson 2  Protecting the Environment

Main Idea  There are many things that you can do to protect the environment.

- Walking, riding a bike, carpooling, taking public transportation, staying tobacco free, and planting trees can all help reduce air pollution.
- Reduce waste by not using plastic cups, plates, forks, knives, and spoons.
- Think of other ways to reuse objects, like grocery bags instead of throwing them away.
- Buy goods made from recycled materials.
- Picking up after pets, picking up litter, using environment-friendly products, and disposing of chemicals properly can all reduce water pollution.
- Some resources, such as fossil fuels, are nonrenewable, meaning that they can be used only once.
- Conserving energy and heat helps reduce pollution and saves natural resources.
- It is important to conserve water because it is a limited resource.
Now that you have read the chapter, look back at your answers to the Health Quiz on the chapter opener. Would you change any of them? What would your answers be now?

Reviewing Vocabulary and Main Ideas

On a sheet of paper, write the numbers 1–9. After each number, write the term from the list that best completes each statement.

- pollution
- acid rain
- ozone
- smog
- sewage
- groundwater
- landfills
- biodegradable
- hazardous wastes

Lesson 1 How Pollution Affects Your Health

1. _______ are huge, specially designed pits where waste materials are dumped and buried.
2. _______ can carry pathogens that cause disease.
3. Up in the atmosphere, _______ protects people from UV rays; closer to earth, it is part of smog.
4. Waste that is _______ can easily break down in the environment.
5. _______ include antifreeze and nail polish remover.
6. Water that is stored under the earth’s surface is called _______.
7. Dirty or harmful substances in the environment are _______.
8. _______ can ruin forests and even eat away at stone.
9. The yellow-brown haze that hangs over cities is called _______.

Lesson 2 Protecting the Environment

On a sheet of paper, write the numbers 10–15. Write True or False for each statement below. If the statement is false, change the underlined word or phrase to make it true.

10. Riding a bike instead of getting a ride in a car can reduce air pollution.
11. The EPA is a government agency that helps reduce pollution.
12. Buying a food container that can be used many times to store food is an example of recycling.
13. Oil, natural gas, and coal are renewable resources.
14. Using fluorescent light bulbs can save electricity.
15. Conservation is the wasting of resources.

On a sheet of paper, write the numbers 16 and 17. After each number, write the letter of the answer that best completes each statement.

16. Planting trees
   a. can help clean the air.
   b. pollutes the air.
   c. reduces solid waste in the environment.
17. Burning fossil fuels
   a. creates renewable resources.
   b. eliminates hazardous waste.
   c. contributes to air pollution.

Visit glencoe.com and take the Online Quiz for Chapter 16.
**Thinking Critically**

*Using complete sentences, answer the following questions on a sheet of paper.*

18. **Infer** What do you think is meant by the saying “We all live downstream”?

19. **Interpret** A volcanic eruption can send tons of smoke and ash into the air. Do volcanoes pollute? Explain your answer.

**Write About It**

20. **Persuasive Writing** Write a short essay explaining why you think some products have more packaging than necessary. Include ideas as to how reducing excess packaging could help the environment.

---

**Standardized Test Practice**

**Reading**

Read the passage and then answer the questions.

Landfills fill up quickly, often because people use and throw away so much plastic. Years ago, before plastics were popular, many items that people threw away would biodegrade fairly easily. Objects made of wood, paper, cotton, or wool would break down naturally over time. Plastic does not break down, so plastic wastes must be stored in a landfill. Recently, scientists have discovered a way to make a sturdy, durable plastic that biodegrades when buried in dirt. Scientists are optimistic that using biodegradable plastic will help reduce the amount of waste buried in landfills.

1. What is the main point of the passage?
   A. Life was better years ago.
   B. Wood and paper are biodegradable.
   C. Biodegradable plastic will reduce the waste in landfills.
   D. Throwing away more plastic will actually reduce the waste in landfills.

2. What does **optimistic** mean in this sentence?
   Scientists are optimistic that using biodegradable plastic will help reduce the amount of waste buried in landfills.
   A. certain
   B. doubtful
   C. hopeful
   D. worried