Science Blizzard Packet

8th,7th, and 6th grade

8th grade: Complete the Inherited & Acquired Traits Worksheets and Genetic Vocabulary Words. Answer the following questions: If there is Global Warming on the earth, then explain why is it so cold? Does Global Warming have anything to do with it being so cold? Explain your answer.

7th grade: Read and answer all the questions on Section 4: Changes in Climate. Answer the following questions: If there is Global Warming on the earth, then explain why is it so cold? Does Global Warming have anything to do with it being so cold? Explain your answer.

6th grade: Read and answer all the questions on Section 4: Air Pollution. Answer the following questions: If there is Global Warming on the earth, then explain why is it so cold? Does Global Warming have anything to do with it being so cold? Explain your answer.

Name _____ Date _____

Flocabulary

Inherited & Acquired Traits

Use the text to answer each question below.

1. Every living thing has a set of characteristics. These are the things you use to identify something, like the fact that a tiger has black stripes or that a sea star has five legs. You have characteristics too, like your hair and eye color and your favorite foods and activities. Biologists call these things traits.

Which of the following is an example of a trait?

A. Goldfinches are yellow with black and white wings.

B. Sharks have multiple rows of teeth.

C. Marco has brown eyes.

D. all of the above

2. Have you ever seen someone who looks just like one of their parents? Children can look like their parents because of something called heredity. Heredity is the passing down of genes from generation to generation. Children got about half of their DNA from each of their biological parents. Together, genes tell the body how to function and what to look like. The traits that come from parents are called inherited traits. Your inherited traits are with you from birth.

Where do inherited traits come from?

A. what a person learns in school

B. a person's biological parents

C. a person's environment

D. a person's friends

3. There are many other things about you that don't depend on your DNA. Examples include what language you speak, what books you like to read, how you cut your hair and if you have any scars. All these things are affected by your environment and the things you've learned and experienced throughout your life. This makes them acquired traits. To acquire means to get, so these are the things you've picked up along the way throughout your life. Since they're not in your DNA, you won't pass them on to your children genetically. For example, if you have a scar from falling off your scooter, your children won't be born with that scar.

Which of the following describes a person's acquired trait(s)?

A. Drea has curly hair.

B. Damien has red hair and blue eyes.

C. Cerise has long arms and small hands.

D. Nicolle has strong legs from running every day.

4. Many traits are not simply inherited of acquired. Things like personality, intelligence, even height, are more complicated than just DNA or only what you've learned. Scientists refer to the question of what determines these traits as the nature vs. nurture debate. "Nature" describes things that are in your DNA. "Nurture" describes things that you've learned.

Height is an example of something that isn't as simple as what genes you have. While your DNA can determine how tall you can possibly be, environment and nutrition play a large role in determining how tall you actually grow. This makes a trait like height a combination of nature and nurture.

When scientists talk about something's nature, they are talking about its

A. nurture.

B. acquired traits.

C. inherited traits.

D. combined inherited and acquired traits.

Vocabulary Words

acquire
characteristic
DNA
environment
gene
heredity
inherit
nature
nurture
trait

Name _____ Class _____ Date _____

CHAPTER 17 Climate

SECTION 4

Changes in Climate

BEFORE YOU READ

After you read this section, you should be able to answer these questions:

- How has Earth's climate changed over time?
- What factors can cause climates to change?

National Science Education Standards

ES 1k, 2a

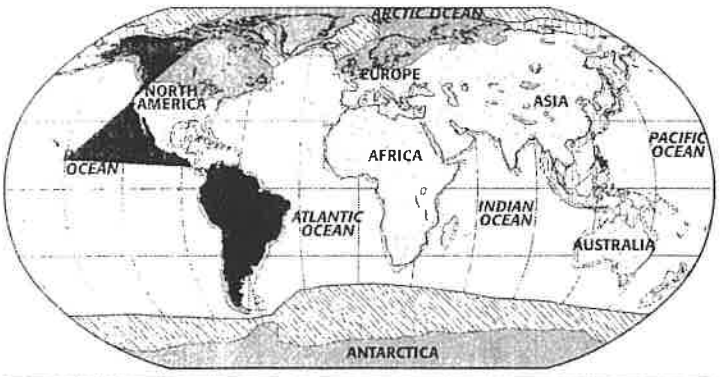
How Was Earth's Climate Different in the Past?

The geologic record shows that Earth's climate in the past was different from its climate today. During some periods in the past, Earth was much warmer. During other periods, Earth was much colder. In fact, much of Earth was covered by sheets of ice during some times in the past.

An **ice age** happens when ice at high latitudes expands toward lower latitudes. Scientists have found evidence of many major ice ages in Earth's history. The most recent one began about 2 million years ago. ☑

Many people think of an ice age as a time when the temperature is always very cold. However, during an ice age, there can be periods of colder or warmer weather. A period of colder weather is called a *glacial period*. A period of warmer weather is called an *interglacial period*.

During glacial periods, large sheets of ice grow. These ice sheets form when ocean water freezes. Therefore, sea level drops during glacial periods. The figure below shows the coastlines of the continents during the last glacial period. Notice that the continental coastlines extended further into the ocean than they do today.



STUDY TIP

Learn New Words As you read, underline any words that you don't know. When you figure out what they mean, write the words and their definitions in your notebook.

READING CHECK

1. Define Write your own definition for *ice age*.

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TAKE A LOOK

2. Explain Why is more land exposed during glacial periods than at other times?

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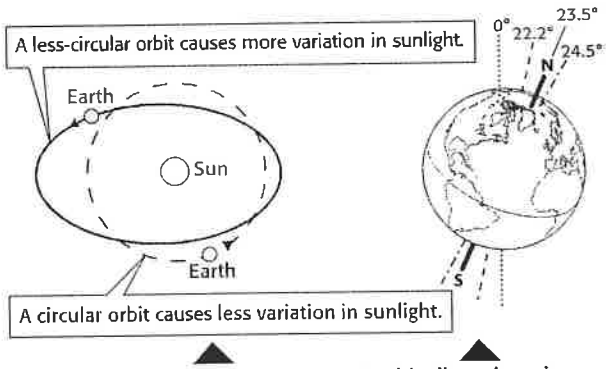
What Can Cause Climates to Change?

Scientists have several theories to explain ice ages and other forms of climate change. Factors that can cause climate change include Earth's orbit, plate tectonics, the sun's cycles, asteroid impacts, volcanoes, and human activities.

CHANGES IN EARTH'S ORBIT

A Serbian scientist, Milutin Milankovitch, found that changes in Earth's orbit and tilt can affect Earth's climate. He modeled the way Earth moves in space and found that Earth's movements change in a regular way. These changes happen over tens of thousands of years. For example, Earth's orbit around the sun is more circular at some times than others.

These variations in Earth's orbit and tilt affect how much sunlight Earth gets. Therefore, they can also affect climate. The figure below shows how these factors can change the amount of sunlight Earth gets.



Earth's orbit is more circular at some times than at other times. The amount of solar energy that Earth gets from the sun varies more when Earth's orbit is less circular.

Earth's tilt on its axis can vary. When the tilt is greater, the poles get more solar energy.

Earth's axis wobbles slightly. This affects how much sunlight Earth's surface gets at different times of the year.

Critical Thinking

3. Infer Could changes in climate over 100 years be caused by changes in Earth's orbit and tilt? Explain your answer.

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TAKE A LOOK

4. Identify How does the shape of Earth's orbit change?

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PLATE TECTONICS

Plate tectonics and continental drift also affect Earth's climate. When a continent is closer to the equator, its climate is warmer than when it is near the poles. Also, remember that continents can deflect ocean currents and winds. When continents move, the flow of air and water around the globe changes. These changes can strongly affect Earth's climate.

The locations of the continents can affect their climate. When India, Africa, South America, and Australia were part of Pangaea, they were covered with large ice sheets.

TAKE A LOOK

5. Identify How was the climate of India different when it was part of Pangaea?

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THE SUN

Some changes in Earth's climate are caused by changes in the sun. Many people think that the sun is always the same, but this is not true. In fact, the amount of energy that the sun gives off can change over time. The sun follows a regular cycle in how much energy it gives off. Because the sun's energy drives most cycles on Earth, these changes can affect Earth's climate. ☑

READING CHECK

6. Explain Why do changes in the sun's energy affect the climate on Earth?

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IMPACTS

Sometimes, objects from outer space, such as asteroids, crash into Earth. An *asteroid* is a small, rocky object that orbits the sun. If a large asteroid crashed into Earth, the climate of the whole planet could change.

When a large object hits Earth, particles of dust and rock fly into the atmosphere. This material can block some sunlight from reaching Earth's surface. This can cause temperatures on Earth to go down. In addition, plants may not be able to survive with less sunlight. Without plants, many animals would die off. Many scientists believe that an asteroid impact may have caused the dinosaurs to become extinct.

Critical Thinking

7. Identify Relationships Why may animals die off if there are fewer plants around?

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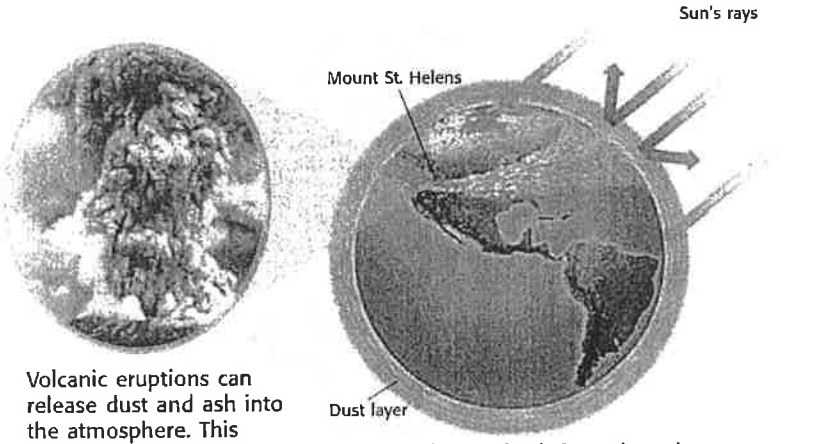
VOLCANIC ERUPTIONS

Volcanic eruptions can affect Earth's climate for a short time. They send large amounts of dust and ash into the air. As with an asteroid impact, the dust and ash block sunlight from reaching Earth's surface. The figure below shows how volcanic dust can affect sunlight.



Volcanic eruptions can release dust and ash into the atmosphere. This plume of dust and ash was produced by the eruption of Mount St. Helens, in Washington, in 1980.

The dust and ash from the volcano can spread throughout the atmosphere. Sunlight reflects off this dust and ash. Less sunlight reaches Earth's surface.

TAKE A LOOK

8. Compare How are the effects on climate of volcanic eruptions and asteroid impacts similar?

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What Is Global Warming?

A slow increase in global temperatures is called **global warming**. One thing that can cause global warming is an increase in the greenhouse effect. The **greenhouse effect** is Earth's natural heating process. During this process, gases in the atmosphere absorb energy in sunlight. This energy is released as heat, which helps to keep Earth warm. Without the greenhouse effect, Earth's surface would be covered in ice. ☑

READING CHECK

9. Define What is global warming?

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One of the gases that absorbs sunlight in the atmosphere is carbon dioxide (CO_2). If there is more CO_2 in the atmosphere, the greenhouse effect can increase. This can cause global warming.

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WHERE CO_2 COMES FROM

Much of the CO_2 in the atmosphere comes from natural processes, such as volcanic eruptions and animals breathing. However, human activities can also increase the amount of CO_2 in the atmosphere. ☑

When people burn fossil fuels for energy, CO_2 is released into the atmosphere. When people burn trees to clear land for farming, CO_2 is released. In addition, plants use CO_2 for food. Therefore, when trees are destroyed, we lose a natural way of removing CO_2 from the atmosphere.

READING CHECK

10. Identify What are two natural sources of carbon dioxide in the atmosphere?

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PROBLEMS WITH GLOBAL WARMING

Many scientists think that if global warming continues, the ice at Earth's poles could melt. This could cause sea levels to rise. Many low-lying areas could flood. Global warming could also affect areas far from the oceans. For example, the Midwestern part of the United States could become warmer and drier. Northern areas, such as Canada, may become warmer. ☑

READING CHECK

11. Explain Why may sea level rise if global warming continues?

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WHAT PEOPLE CAN DO

Many countries are working together to reduce the effects of global warming. Treaties and laws have helped to reduce pollution and CO_2 production. Most CO_2 is produced when people burn fossil fuels for energy. Therefore, reducing how much energy you use can reduce the amount of CO_2 produced. Here are some ways you can reduce your energy use:

- Turn off electrical devices, such as lights and computers, when you are not using them.
- Ride a bike, walk, or take public transportation instead of using a car to travel.
- Turn the heater to a lower temperature in the winter.
- Turn the air conditioner to a higher temperature in the summer.

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Name _____ Class _____ Date _____

Section 4 Review

NSES ES 1k, 2a

SECTION VOCABULARY

global warming a gradual increase in average global temperature **greenhouse effect** the warming of the surface and lower atmosphere of Earth that occurs when water vapor, carbon dioxide, and other gases absorb and reradiate thermal energy	**ice age** a long period of climatic cooling during which the continents are glaciated repeatedly

1. **Identify Relationships** How is global warming related to the greenhouse effect?

2. **Describe** What did Milutin Milankovitch's research show can affect Earth's climate?

3. **Identify** Give two ways that plate tectonics can affect an area's climate.

4. **Predict Consequences** How could global warming affect cities near the oceans? Explain your answer.

5. **List** Give three ways that human activities can affect the amount of CO_2 in the atmosphere.

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Name _____ Class _____ Date _____

CHAPTER 15 The Atmosphere

SECTION 4

Air Pollution

BEFORE YOU READ

After you read this section, you should be able to answer these questions:

- What is air pollution?
- What causes air pollution?
- How does air pollution affect the environment?
- How can people reduce air pollution?

What Is Air Pollution?

Air pollution is the addition of harmful substances to the atmosphere. An *air pollutant* is anything in the air that can damage the environment or make people or other organisms sick. Some air pollution comes from natural sources. Other forms of air pollution are caused by things people do.

There are two kinds of air pollutants: primary pollutants and secondary pollutants. Primary pollutants are pollutants that are put directly into the air. Dust, sea salt, volcanic ash, and pollen are primary pollutants that come from natural sources. Chemicals from paint and other materials and vehicle exhaust are primary pollutants that come from human activities.

Secondary pollutants form when primary pollutants react with each other or with other substances in the air. Ozone is an example of a secondary pollutant. It forms on sunny days when chemicals from burning gasoline react with each other and with the air. Ozone damages human lungs and can harm other living things as well. ☑

STUDY TIP

Describe As you read, make a table describing the sources of air pollution discussed in this section.

Pollutant	Primary pollutant or secondary pollutant?	Natural or caused by people?
Car exhaust	primary	human-caused
Dust		
Ozone		
Paint chemicals		
Pollen		
Sea salt		
Volcanic ash		

READING CHECK

1. Explain Why is ozone called a secondary pollutant?

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TAKE A LOOK

2. Describe Fill in the blanks in the table.

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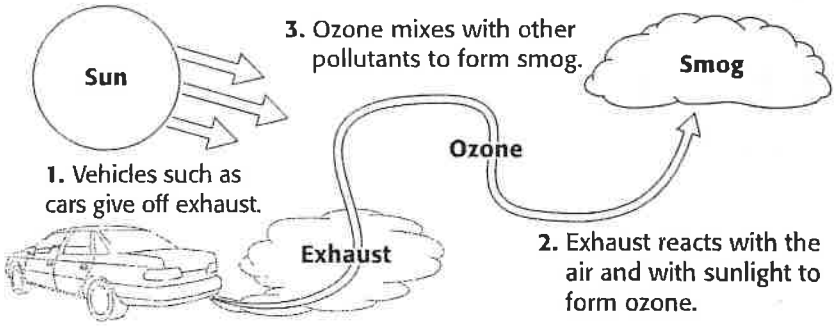
TAKE A LOOK

3. Identify What is the primary pollutant in this figure?

_____



What Is Smog?

On a hot, still, sunny day, yellowish brown air can cover a city. This is called *smog*. Smog forms when ozone mixes with other pollutants. During summer in cities such as Los Angeles, a layer of warm air can trap smog near the ground. In the winter, a storm can clear the air.

Say It

Discuss In a small group, discuss how the pollution shown in this photograph formed.

This is what Los Angeles looks like on a clear day.

This is what Los Angeles looks like when smog is trapped near the ground.

How Do Humans Cause Air Pollution?

Many of our daily activities cause air pollution. The main source of human-caused air pollution in the United States is motor vehicles. Cars, motorcycles, trucks, buses, trains, and planes all give off exhaust. *Exhaust* is a gas that contains pollutants that create ozone and smog. ☑

READING CHECK

4. Identify What is the main source of human-caused air pollution in the United States?

_____

Factories and power plants that burn coal, oil, and gas also give off pollutants. Businesses that use chemicals, such as dry cleaners and auto body shops, can add to air pollution.

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What Causes Air Pollution Indoors?

Sometimes the air inside a building can be more polluted than the air outside. There is no wind to blow pollutants away and no rain to wash them out of the air indoors. Therefore, they can build up inside. It is important to air out buildings by opening the windows or using fans that bring fresh air in from outside. ☑

READING CHECK

5. Explain Why can air pollution indoors be worse than air pollution outdoors?

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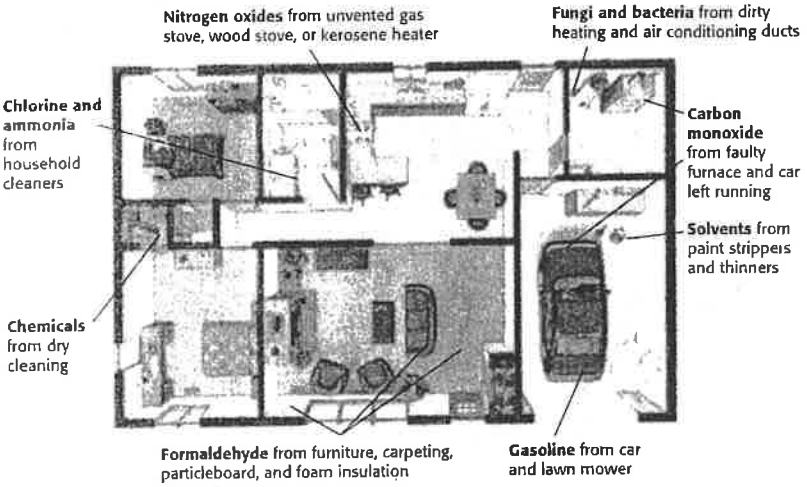
Sources of Indoor Air Pollution



TAKE A LOOK

6. Identify Name two sources of indoor air pollution shown here that may be in your own home.

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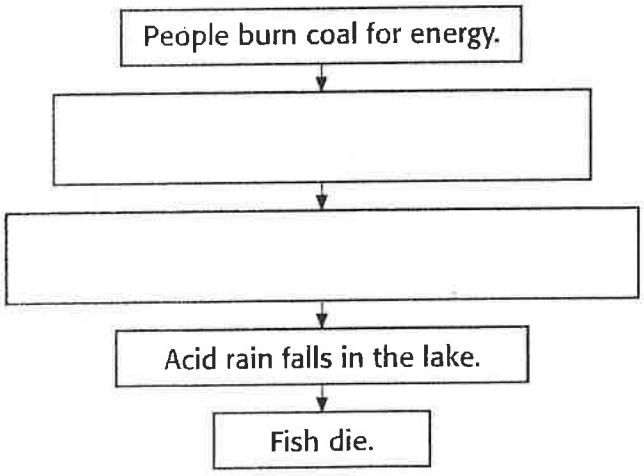
What Is Acid Precipitation?

Acid precipitation is rain, sleet, or snow that contains acids from air pollution. When we burn fossil fuels, such as coal, pollutants such as sulfur dioxide are released into the air. These pollutants combine with water in the atmosphere to form acids.

Acid precipitation can kill or damage plants, damage soil, and poison water. When acid rain flows into lakes, it can kill fish and other aquatic life.



TAKE A LOOK

7. Sequence Complete the graphic organizer to show how burning coal can cause fish to die.

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What Is the Ozone Hole?

Close to the ground, ozone is a pollutant formed by human activities. However, high in the stratosphere, ozone is an important gas that forms naturally. The ozone layer absorbs harmful ultraviolet (UV) radiation from the sun. Ultraviolet radiation can harm living things. For example, it can cause skin cancer in humans. ☑

READING CHECK

8. Explain How is the ozone layer helpful to humans?

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In the 1980s, scientists noticed that the ozone layer over the poles was getting thinner. This hole in the ozone layer was being caused by chemicals called CFCs, which destroy ozone. CFCs were being used in air conditioners and chemical sprays. Many CFCs are now banned. However, CFCs can remain in the atmosphere for 60 to 120 years. Therefore, the ozone layer may slowly recover, but it will take a long time.

TAKE A LOOK

9. Compare Fill in the chart to show the differences between ozone in the atmosphere and ozone near the ground.

Ozone in the statosphere	Ozone near the ground
Forms naturally	
Not a pollutant	
	harmful to living things

How Does Air Pollution Affect Human Health?

Air pollution can cause many health problems. Some are short-term problems. They happen quickly and go away when the air pollution clears up or the person moves to a cleaner location. Others are long-term health problems. They develop over long periods of time and are not cured easily. The table below lists some of the effects of air pollution on human health. ☑

READING CHECK

10. Compare What is the difference between short-term effects and long-term effects of air pollution?

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Long-term effects	Short-term effects
Emphysema (a lung disease)	Headache
Lung cancer	Nausea and vomiting
Asthma	Eye, nose, and throat irritation
Permanent lung damage	Coughing
Heart disease	Difficulty breathing
Skin cancer	Upper respiratory infections
	Asthma attacks
	Worsening of emphysema

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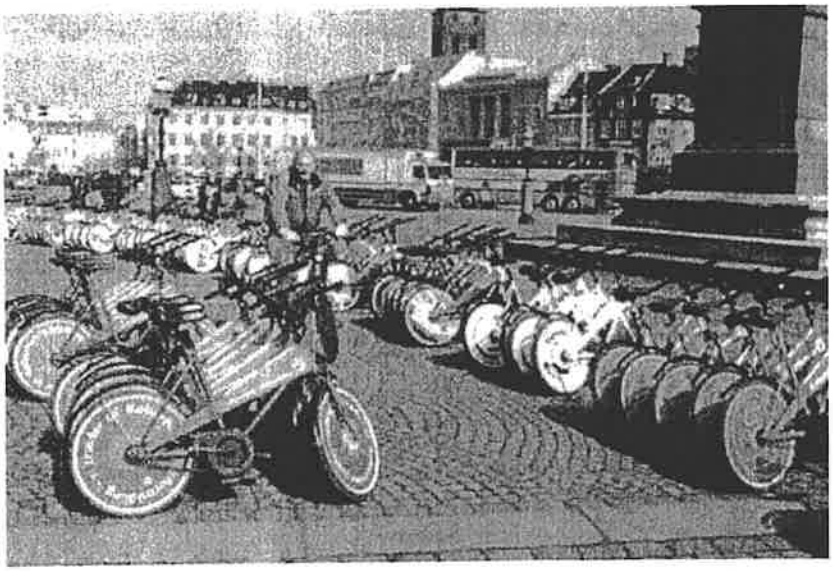
What Can We Do About Air Pollution?

Air pollution in the United States is not as bad now as it was 30 years ago. People today are much more aware of how they can cause or reduce air pollution. Air pollution can be reduced by new laws, by technology, and by people changing their lifestyles.

The United States government and the governments of other countries have passed laws to control air pollution. These laws limit the amount of pollution that sources such as cars and factories are allowed to release. For example, factories and power plants now have scrubbers on smokestacks. A *scrubber* is a tool that helps remove pollutants from smoke before it leaves the smokestack.

Many cars are more efficient now than they used to be, so they produce less pollution. Individuals can do a lot on their own to reduce air pollution, as well. For example, we can walk or bike instead of driving.



In Copenhagen, Denmark, companies lend bicycles for anyone to use for free. The program helps reduce automobile traffic and air pollution.

Critical Thinking

11. Analyze Processes
Electric cars don't give off any exhaust. They don't cause pollution in the cities where they are driven. However, driving them can cause pollution in other places. How? (Hint: Where does most electricity come from?)

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Name _____ Class _____ Date _____

Section 4 Review

SECTION VOCABULARY

acid precipitation rain, sleet, or snow that contains a high concentration of acids	**air pollution** the contamination of the atmosphere by the introduction of pollutants from human and natural sources

1. **Identify Relationships** How are fossil fuels related to air pollution and acid precipitation?

2. **Compare** Complete the table below to compare different pollutants.

Pollutant	Source	Negative effects	Solutions
CFCs			banning CFCs
Ozone			
Sulfur dioxide	burning of fossil fuels		

3. **Infer** Name three things, other than humans, that can be harmed by air pollution.

4. **Explain** Why is the hole in the ozone layer dangerous?

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