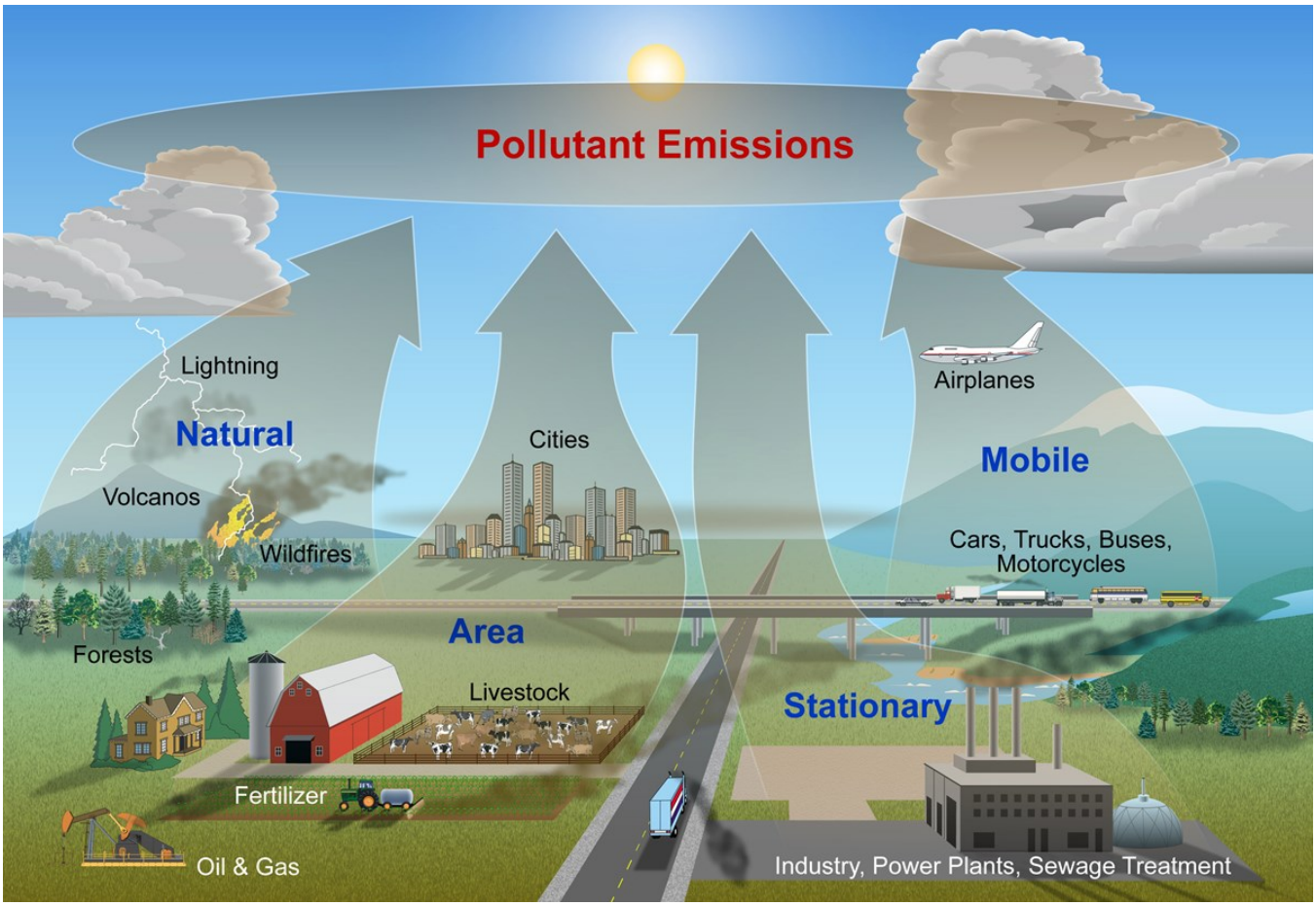
The effects of air pollution

By Gale/Cengage Learning, adapted by Newsela staff on 04.20.18
Word Count **760**
Level **860L**

Image 1. Heavy smog on January 30, 2018, in Shanghai, China. Smog comes from ozone that is close to the Earth's surface. Ozone occurs naturally in the Earth's lower atmosphere, but near ground level, ozone is formed when pollutants emitted by cars, power plants, and factories react chemically in the presence of sunlight. Photo: VCG/VCG via Getty Images.

Air pollution refers to chemicals in the Earth's atmosphere that hurt people or the environment. It is usually considered to be caused by humans. Most air pollution comes from humans using fossil fuels such as coal, oil and natural gas. Fossil fuels are formed when dead plants are buried in the Earth for millions of years.

The atmosphere contains several gases. It is made of 78 percent nitrogen, 21 percent oxygen, and 0.4 percent water vapor. Before humans used fossil fuels, the atmosphere was just 0.027 percent carbon dioxide. When humans burn fossil fuels, it releases carbon dioxide. This has increased the amount of carbon dioxide in the atmosphere to 0.04 percent in 2015. This increase is causing climate change.



The Greenhouse Effect

The greenhouse effect is a part of climate change. This natural effect happens when radiation from the sun enters the atmosphere. Half of this radiation hits the Earth and is absorbed. The other half changes to infrared radiation. We sense this as heat on our skin. Some infrared radiation bounces back up into space, but some gets trapped by greenhouse gases (GHGs). The main GHGs are carbon dioxide, methane and ozone. The more GHGs in the atmosphere, the more heat is trapped.

Air pollution also leads to health problems. The World Health Organization (WHO) keeps track of air pollution and disease. In 2012, the WHO estimated that air pollution caused 7 million deaths worldwide.

Ozone Depletion

Ozone is made up of three atoms of oxygen. The ozone layer, made of ozone, is 6 miles above the Earth. This layer prevents some of the sun's radiation from reaching the planet. However, air pollution has damaged the ozone layer, so now more radiation reaches the Earth.

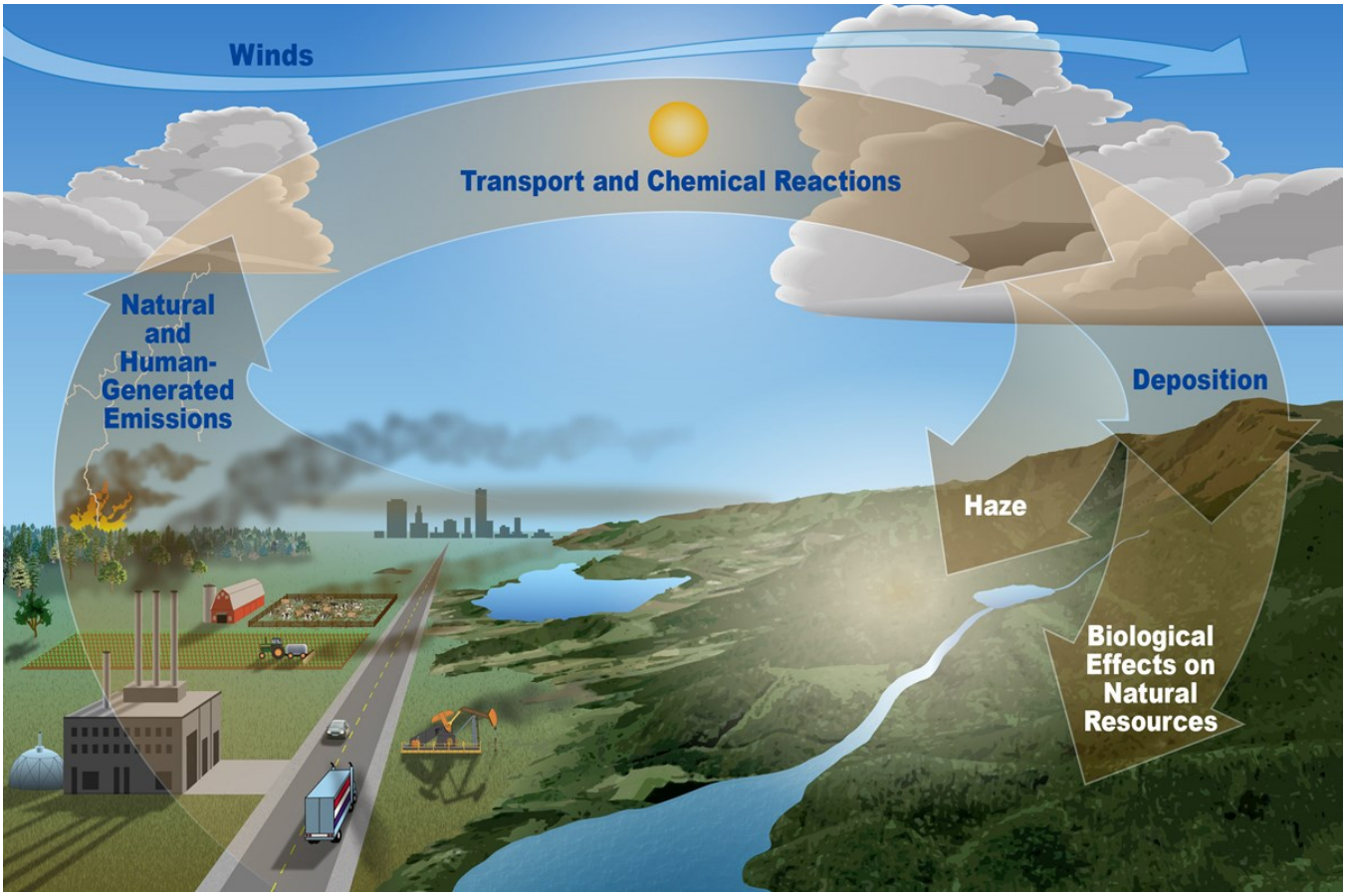
Spray bottles, air conditioners, and refrigerators used to contain CFCs and halogens. These chemicals destroyed ozone and broke apart the ozone layer. They made two large holes at the North and South Poles. However, most of these chemicals are now not allowed.

Acid Rain

Acid rain is rain that is acidic. When fossil fuels are burned, sulfur dioxide and nitrogen dioxide are released into the air. In the air, they mix with water, oxygen and other chemicals to form sulfuric acid and nitric acid. Then these mix with water and fall to the ground.

Acid rain harms the planet. It wears away buildings and cars. If lakes and rivers become too acidic, fish can die. Soils that are too acidic make it hard for plants to grow in. Trees at high altitudes are often harmed by acid rain. It damages their leaves and stunts tree growth.

Climate Change



According to the U.S. Environmental Protection Agency (EPA), changes to the Earth's climate are because of more GHGs in the atmosphere. Usually, radiation from the sun hits the Earth and bounces back into space. However, GHGs hold onto that radiation. This traps heat in the atmosphere. When GHG particles fall on snow and ice, they melt faster. With temperatures rising, the planet's glaciers and polar ice caps are dissolving, increasing sea levels worldwide.

Indoor Air Pollution

Most people think of air pollution as an outdoor problem. However, indoor air pollution can also be harmful. One cause of indoor air pollution is cigarette smoke. It also comes from chemicals in objects such as carpeting, electronics, old lead paint and plastics.

Indoor air pollution is especially bad in poorer, developing countries. In these places, many people cook with a fire indoors. These fires create pollution. According to the WHO, 3.8 million people worldwide die each year from illnesses caused by air pollution in the home.

Stopping Air Pollution

Air pollution causes heart disease, lung infections, and more. In the 1970s, many countries created laws to limit air pollution.

In the United States, the Clean Air Act of 1963 was the first law to limit air pollution. The EPA estimates the law has saved thousands of lives. The Acid Rain Program has also been successful. Between 1995 and 2011, sulfur and nitrogen emissions decreased.

Internationally, the most successful treaty dealing with air pollution was the United Nations' 1987 Montreal treaty. It was signed by every nation on Earth. It stopped pollutants that harmed the ozone layer. Now, the hole in the ozone layer at the South Pole is much smaller.

Quiz

1 Read the following paragraph from the section "Ozone Depletion."

> *Spray bottles, air conditioners, and refrigerators used to contain CFCs and halogens. These chemicals destroyed ozone and broke apart the ozone layer. They made two large holes at the North and South Poles. However, most of these chemicals are now not allowed.*

What is the MOST accurate summary of this paragraph?

(A) Chemicals that used to be in things people use every day caused a lot of damage to the ozone, but most of those chemicals are no longer used.

(B) The ozone layer no longer prevents any of the sun's radiation from reaching the planet because so many chemicals have caused damage.

(C) People are only allowed to use spray bottles, air conditioners and refrigerators that contain chemicals at the North and South Poles.

(D) The ozone used to have small holes all over, but now it only has two that are growing larger because of damage from chemicals.

2 Read the section "Stopping Air Pollution."

Which sentence from the section BEST supports the conclusion that laws limiting air pollution have helped people?

(A) In the United States, the Clean Air Act of 1963 was the first law to limit air pollution.

(B) The EPA estimates the law has saved thousands of lives.

(C) The Acid Rain Program has also been successful.

(D) Internationally, the most successful treaty dealing with air pollution was the United Nations' 1987 Montreal treaty.

3 Use Image 2 and information from the article to select the TRUE statement.

(A) Most greenhouse gases that rise into the atmosphere come from natural sources, not humans.

(B) When humans burn fossil fuels, they release greenhouse gases that trap heat in the atmosphere.

(C) Pollutants created by cities and cars rise into the atmosphere and continue out into space.

(D) Staying inside buildings and cars can protect people from the problems of air pollution.

4 Examine Image 3 and read the selection from the section "Acid Rain."

> *When fossil fuels are burned, sulfur dioxide and nitrogen dioxide are released into the air. In the air, they mix with water, oxygen and other chemicals to form sulfuric acid and nitric acid. Then these mix with water and fall to the ground.*

How does the image support the information in the selection above?

(A) It shows that air pollution and acid rain become worse on days when the air looks hazy.

(B) It shows that the burning of fossil fuels causing acid rain comes ony from human activities.

(C) It shows how pollution cycles up into the atmosphere and returns to affect resources on the ground.

(D) It shows how water and oxygen react with other chemicals to form sulfuric acid that becomes rain.