

# Lesson 1

## HOW DO HUMANS IMPACT THE ENVIRONMENT?

### WORDS TO KNOW

ecosystem

fossil fuel

pollution

## THE BIG IDEA

- As human populations grow, so do impacts to the environment.
- Humans can use engineering and technology to help solve environmental problems.

## WHAT I NEED TO KNOW

Anytime you pick up a rock, stroll across the grass, or eat fruits or vegetables you are interacting with your local **ecosystem**. An ecosystem is all the living and nonliving things in a place or region that interact with each other. We use natural resources from ecosystems in many ways, and those human uses can have positive or negative impacts.

Human activities can negatively impact the environment. For example, wading birds in the Everglades National Park depend on clean water for breeding. As more and more people move to South Florida, the quality and quantity of water is affected. As a result, the populations of wading birds in the national park has declined by about 90 percent in the last century.

Humans can positively impact their environment by using fewer nonrenewable resources, such as **fossil fuels**. Fossil fuels are nonrenewable resources made from the remains of plants or animals that died millions of years ago. These include coal, petroleum, and natural gas. Because we cannot replace these resources within our lifetime, they are nonrenewable. By using less coal to generate electricity and less crude oil to produce gasoline for cars, humans can lessen their impact on the environment.

In the United States, fossil fuels are the main source of energy; they are often used to provide electricity, power cars, and run factories. Burning fossil fuels leads to air **pollution**. Pollution is any substance introduced to an ecosystem that can cause damage or harm. For example, pollutants from car emissions can cause smog, and pollutants from coal plants can cause acid rain.

### THINK ABOUT IT

Think about how you interact with living and nonliving things every day. You can lessen the negative impact on Earth's ecosystems by using fewer resources such as gasoline, oil, water, and plastic.

Burning fossil fuels is not the only way they can cause pollution. Extracting fossil fuels also has impacts. Oil pipelines or tanker ships can have accidents leading to major oil spills. Drilling for natural gas can destroy land and pollute water. As water moves through the water cycle, any pollution added at one place can end up at another place, causing a wider impact.



Using natural resources can have many negative impacts, but humans can also create solutions to many problems. Humans can use technology to solve environmental problems. We can use wind energy to lessen our dependence on coal for electricity. Another alternative to fossil fuels is nuclear energy, which requires uranium. In a nuclear power plant, energy is converted to electrical energy. However, nuclear energy is also nonrenewable—there is only a limited supply of uranium on Earth.

### ▶ TURN AND TALK

Work with a classmate to create a list of at least five actions you can take to lessen your negative impact on the environment.

Other alternatives to fossil fuels are renewable. A renewable resource is a resource that we can replace as quickly as we use it. We can gather many renewable resources directly from the natural environment. Energy from the sun shines on solar cells, which convert solar energy to electrical energy. Energy from the wind turns turbines, which convert mechanical energy to electrical energy. Moving water turns turbines in a dam, also converting mechanical energy to electrical energy. Even heated geothermal water below Earth's surface can be used to generate steam, which turns turbines to produce electrical energy.



Renewable resources are more widely available, but we still must use them carefully. For example, water is a renewable resource, but building dams to capture water can harm fish populations. With a global population of more than 7.5 billion people, many natural resource supplies are strained. Both human actions and engineered solutions can make sure these resources are around for future generations to use.

## WHAT I HAVE LEARNED

### 1. What is an ecosystem?

- (A) All the living things on Earth
- (B) All the nonliving things on Earth
- (C) All the plants and animals that interact with each other on Earth
- (D) All the living and nonliving things in a place or region that interact with each other

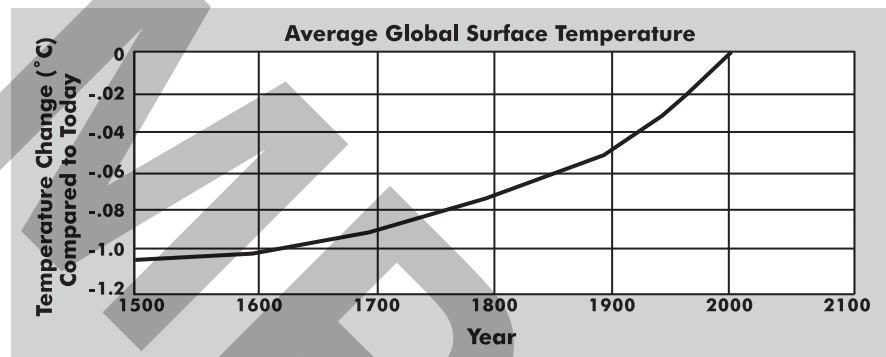
2. What are some human activities that have the greatest negative impact on the environment?

- (A) Running and walking
- (B) Mining and construction
- (C) Eating food and drinking water
- (D) Using solar panels and wind turbines for energy

**HINT, HINT**

Subtract 400 years from the starting year, 2000, to arrive at your target year.

3. A student used the data below to decide whether increased levels of pollution are causing global temperatures to rise. If the average temperature of a region in the year 2000 was  $13^{\circ}\text{C}$ , what would the average surface temperature have been 400 years previously?



- (A)  $3^{\circ}\text{C}$
- (B)  $12^{\circ}\text{C}$
- (C)  $25^{\circ}\text{C}$
- (D)  $300^{\circ}\text{C}$

4. How does pollution harm the environment?

- (A) Pollution increases acid rain and dirties the air.
- (B) Pollution creates more water in the water cycle.
- (C) Pollution increases the number of animal habitats.
- (D) Pollution creates more human demand for water and minerals.

5. Which of the following are all examples of fossil fuels?
- (A) Water, trees, and soil
  - (B) Minerals, groundwater, and trees
  - (C) Gasoline, wind, solar, and minerals
  - (D) Coal, natural gas, and crude oil
6. A student is trying to decide which of the following would be the best way to lessen the negative human impact on the environment. Which option would be the **best** for her to choose?
- (A) Create a fish tank or aquarium in her house.
  - (B) Use more water to help keep the water cycle flowing.
  - (C) Use fewer plants so that the need for farming is decreased.
  - (D) Choose technology such as rechargeable batteries that use fewer natural resources.