

# Human Impact on Land

## ESSENTIAL QUESTION

**What impact can human activities have on land resources?**

By the end of this lesson, you should be able to identify the impact that human activity has on Earth's land.

*Human activities can carve up land features. A tunnel was cut into this mountain in Zion National Park, Utah, so that people may move around easily.*

### Sunshine State Standards

**SC.7.E.6.6** Identify the impact that humans have had on Earth, such as deforestation, urbanization, desertification, erosion, air and water quality, changing the flow of water.

# Land of Plenty

## Why is land important?

It is hard to imagine human life without land. Land supplies a solid surface for buildings and roads. The soil in land provides nutrients for plants and hiding places for animals. Minerals below the land's surface can be used for construction materials. Fossil fuels underground can be burned to provide energy. Land and its resources affect every aspect of human life.

Recreational

Residential

Commercial/Industrial

Transport

Agricultural



**Visualize It!** *Inquiry* **5 Relate** Imagine you live in this area. Choose two land uses shown here and describe why they are important to you.

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# What are the different types of land use?

We live on land in urban or rural areas. Cities and towns are urban areas. Rural areas are open lands that may be used for farming. Humans use land in many ways. We use natural areas for *recreation*. We use roads that are built on land for *transport*. We grow crops and raise livestock on *agricultural* land. We live in *residential* areas. We build *commercial* businesses on land and extract resources such as metals and water from the land.

## Recreational

*Natural areas* are places that humans have left alone or restored to a natural state. These wild places include forests, grasslands, and desert areas. People use natural areas for hiking, bird-watching, mountain-biking, hunting, and other fun or recreational activities.

## Transport

A large network of roads and train tracks connect urban and rural areas all across the country. Roads in the U.S. highway system cover 4 million miles of land. Trucks carry goods on these highways and smaller vehicles carry passengers. Railroads carrying freight or passengers use over 120,000 miles of land for tracks. Roads and train tracks are often highly concentrated in urban areas.

## Agricultural

Much of the open land in rural areas is used for agriculture. Crops such as corn, soybeans, and wheat are grown on large, open areas of land. Land is also needed to raise and feed cattle and other livestock. Agricultural land is open, but very different from the natural areas that it has replaced. Farmland generally contains only one or two types of plants such as corn or cotton. Natural grasslands, forests, and other natural areas contain many species of plants and animals.



**Active Reading 6 Identify** As you read, underline the ways rural areas differ from urban areas.

## Residential

Where do you call home? People live in both rural and urban areas. Rural areas have large areas of open land and low densities of people. Urban areas have dense human populations and small areas of open land. This means that more people live in a square mile of an urban area than live in a square mile of a rural area. **Urbanization** is the growth of urban areas caused by people moving into cities. When cities increase in size, the population of rural areas near the city may decrease. When an area becomes urbanized, its natural land surface is replaced by buildings, parking lots, and roads. City parks, which contain natural surfaces, may also be built in urban areas.

## Commercial and Industrial

As cities or towns expand, commercial businesses are built too, and replace rural or natural areas. Industrial businesses also use land resources. For example, paper companies and furniture manufacturers use wood from trees harvested on forest land. Cement companies, fertilizer manufacturers, and steel manufacturers use minerals that are mined from below the land's surface. Commercial and industrial development usually includes development of roads or railways. Transporting goods to market forms the basis of commerce.



**Active Reading 7 Identify** What effects does urbanization have on land?

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# Why is soil important?

Soil is a mixture of mineral fragments, organic material, water, and air. Soil forms when rocks break down and dead organisms decay. There are many reasons why soil is important. Soil provides habitat for organisms such as plants, earthworms, fungi, and bacteria. Many plants get the water and nutrients they need from the soil. Because plants form the base of food webs, healthy soil is important for most land ecosystems. Healthy soil is also important for agricultural land, which supplies humans with food.

## Active Reading

**8 Identify** As you read, underline the ways that soil is important to plants.

### It Is a Habitat for Organisms

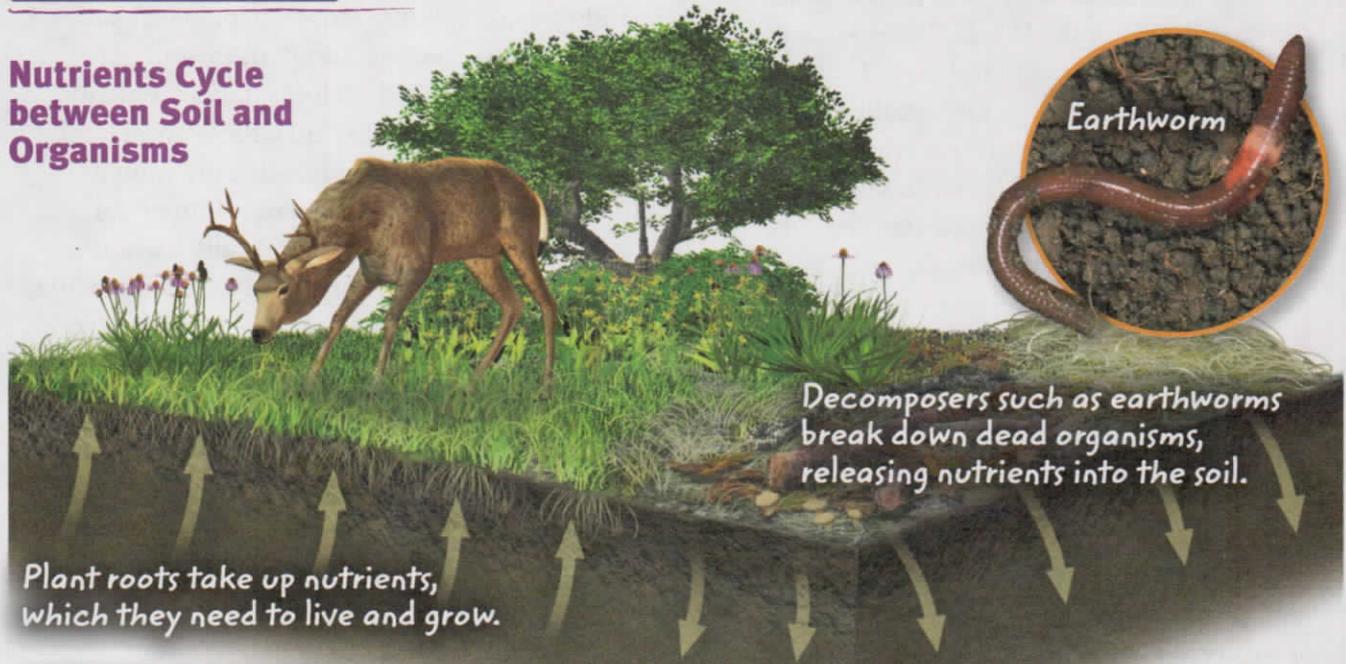
Earthworms, moles, badgers, and other burrowing animals live in soil. These animals also find food underground. *Decomposers* are organisms that break down dead animal and plant material, releasing the nutrients into the soil. Decomposers such as fungi and bacteria live in soil. Soil holds plant roots in place, providing support for the plant. In turn, plants are food for herbivores and are habitats for organisms such as birds and insects. Many animals on Earth depend on soil for shelter or food.

### It Stores Water and Nutrients

Falling rain soaks into soil and is stored between soil particles. Different types of soil can store different amounts of water. Wetland soils, for example, store large amounts of water and reduce flooding. Soils are also part of the nutrient cycle. Plants take up nutrients and water stored in soil. Plants and animals that eat them die and are broken down by decomposers such as bacteria and earthworms. Nutrients are released back into the soil and the cycle starts again.

## Visualize It!

### Nutrients Cycle between Soil and Organisms



**9 Relate** A chemical spill kills many of the decomposers in the soil. How might it affect nutrient cycles in the soil?

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# Footprints

## How can human activities affect land and soil?

Human activities can have positive and negative effects on land and soil. Some activities restore land to its natural state, or increase the amount of fertile soil on land. Other activities can degrade land. **Land degradation** is the process by which human activity and natural processes damage land to the point that it can no longer support the local ecosystem. Urbanization, deforestation, and poor farming practices can all lead to land degradation.

### Active Reading

**14 Identify** As you read, underline the effects that urbanization can have on land.

### Urban Sprawl

When urbanization occurs at the edge of a city or town, it is called *urban sprawl*. Urban sprawl replaces forests, fields, and grasslands with houses, roads, schools, and shopping areas. Urban sprawl decreases the amount of farmland that is available for growing crops. It decreases the amount of natural areas that surround cities. It increases the amount of asphalt and concrete that covers the land. Rainwater runs off hard surfaces and into storm drains instead of soaking into the ground and filling aquifers. Rainwater runoff from urban areas can increase the erosion of nearby soils.

### Erosion

*Erosion* (ih•ROH•zhuhn) is the process by which wind, water, or gravity transports soil and sediment from one place to another. Some type of erosion occurs on most land. However, erosion can speed up when land is degraded. Roots of trees and plants act as anchors to the soil. When land is cleared for farming, the trees and plants are removed and the soil is no longer protected. This exposes soil to blowing wind and running water that can wash away the soil, as shown in this photo.

### Think Outside the Book Inquiry

**13 Apply** With a classmate, discuss how you could help lessen the impact of urbanization on the land in the area where you live.



## Nutrient Depletion and Land Pollution

Crops use soil nutrients to grow. If the same crops are planted year after year, the same soil nutrients get used up. Plants need the right balance of nutrients to grow. Farmers can plant a different crop each year to reduce nutrient loss. Pollution from industrial activities can damage land. Mining wastes, gas and petroleum leaks, and chemical wastes can kill organisms in the soil. U.S. government programs such as Superfund help to clean up polluted land.



## Desertification

When too many livestock are kept in one area, they can overgraze the area. Overgrazing removes the plants and roots that hold topsoil together. Overgrazing and other poor farming methods can cause desertification. **Desertification** (dih•zer•tuh•fih•KAY•shuhn) is the process by which land becomes more desertlike and unable to support life. Without plants, soil becomes dusty and prone to wind erosion. Deforestation and urbanization can also lead to desertification.

## Deforestation

The removal of trees and other vegetation from an area is called **deforestation**. Logging for wood can cause deforestation. Surface mining causes deforestation by removing vegetation and soil to get to the minerals below. Deforestation also occurs in rain forests, as shown in the photo, when farmers cut or burn down trees so they can grow crops. Urbanization can cause deforestation when forests are replaced with buildings. Deforestation leads to increased soil erosion.



### Visualize It!

**15 Relate** How has human activity affected the forest in this photo?

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# Lesson Review

## Vocabulary

Draw a line to connect the following terms to their definitions.

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|---------------------------|---|
| <b>1</b> urbanization     | <b>A</b> the removal of trees and other vegetation from an area |
| <b>2</b> deforestation    | <b>B</b> the process by which land becomes more desertlike      |
| <b>3</b> land degradation | <b>C</b> the process by which human activity can damage land    |
| <b>4</b> desertification  | <b>D</b> the formation and growth of cities                     |

## Key Concepts

**5 Contrast** How are natural areas different from rural areas?

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**6 Relate** How might deforestation lead to desertification?

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**7 Relate** Think of an animal that eats other animals. Why would soil be important to this animal?

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## Critical Thinking

Use this photo to answer the following questions.



**8 Analyze** What type of land degradation is occurring in this photo?

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**9 Predict** This type of soil damage can happen in urban areas too. Outline how urbanization could lead to this type of degradation.

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**10 Apply** What kinds of land uses are around your school? Write down each type of land use. Then describe how one of these land uses might affect natural systems.

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