Lesson Overview

6.1 A Changing Landscape
6.1 Objectives

- Describe human activities that can affect the biosphere.

- Describe the relationship between resource use and sustainable development.
THINK ABOUT IT

The first humans to settle Hawaii came from Polynesia about 1600 years ago. They cut trees to plant farms, and they introduced nonnative plants, pigs, chickens, dogs, and rats. This combination drove many native plant and animal species to extinction.

Yet for centuries Hawaii’s ecosystems provided enough fresh water, fertile soil, fish, and other resources to keep the society self-sufficient. What happened next is an important lesson on managing limited resources.
The Effect of Human Activity

How do our daily activities affect the environment?
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Humans affect regional and global environments through agriculture, development, and industry in ways that have an impact on the quality of Earth’s natural resources, including soil, water, and the atmosphere.
The Effect of Human Activity

Beginning in the late 1700s, new waves of settlers arrived in Hawaii. They imported plants and animals that became invasive pests. They cleared vast tracts of forest to grow sugar cane, pineapples, and other crops that required lots of water. They also converted land for housing and tourism. Waikiki Beach, for example, is surrounded by built-up areas that support tourism.
The Effect of Human Activity

The effect of these activities on Hawaii’s ecosystems and its human inhabitants show what happens when a growing human population does not adequately manage natural resources.
Like all other organisms, humans affect the environment when we obtain food, eliminate waste products, and build places to live.

Most of us probably don’t think of land, food, and water as limited resources. But today human activity has used or altered roughly half of all the land that’s not covered with ice and snow.

Some people suggest that as the global population reaches 7 billion people, we may be approaching the carrying capacity of the biosphere for humans.
Agriculture

Modern agricultural practices have enabled farmers to double world food production over the last 50 years.

Monoculture, for example, is the practice of clearing large areas of land to plant a single highly productive crop year after year. Monoculture enables efficient sowing, tending, and harvesting of crops using machines.
Agriculture

However, agriculture impacts natural resources, including fresh water and fertile soil. Fertilizer production and farm machinery also consume large amounts of fossil fuels.
As modern society developed, many people chose to live in cities. Then, as urban centers became crowded, people moved to suburbs.

This development has environmental effects. Dense human communities produce lots of wastes that, if not disposed of properly, can affect air, water, and soil resources.
Development

In addition, development consumes farmland and divides natural habitats into fragments. Development in Florida, for example, has lead to fragmentation of the forests there.
Industrial Growth

The conveniences of modern life require a lot of energy to produce and power. Most of this energy is obtained by burning fossil fuels—coal, oil, and natural gas—and that affects the environment.

In addition, industries have traditionally discarded wastes from manufacturing and energy production directly into the air, water, and soil. Smog, for example, is formed by chemical reactions among pollutants released into the air by industrial processes and automobile exhaust.
Sustainable Development

What is the relationship between resource use and sustainable development?
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Sustainable development provides for human needs while preserving the ecosystems that produce natural resources.
Sustainable Development

*Goods* are things that can be bought and sold, that have value in terms of dollars and cents.

*Services* are processes or actions that produce goods.

Ecosystem goods and services are the goods and services produced by ecosystems that benefit the human economy.
Ecosystem Goods and Services

Healthy ecosystems provide many goods and services naturally and largely free of charge, like breathable air and drinkable water.
Ecosystem Goods and Services

But, if the environment can’t provide these goods and services, society must spend money to produce them.

In many places, for example, drinkable water is provided naturally by streams, rivers, and lakes, and filtered by wetlands.
Ecosystem Goods and Services

If the water sources or wetlands are polluted or damaged, water quality may fall. Cities and towns must then pay for mechanical or chemical treatment to provide safe drinking water.
Renewable and Nonrenewable Resources

Ecosystem goods and services are classified as either renewable or nonrenewable.

A renewable resource can be produced or replaced by a healthy ecosystem. Wind is a renewable resource.
Renewable and Nonrenewable Resources

Some resources are **nonrenewable** resources because natural processes cannot replenish them within a reasonable amount of time. Fossil fuels like coal, oil, and natural gas are nonrenewable resources formed from buried organic materials over millions of years.
Sustainable Resource Use

Using natural resources in a way that does not cause long-term environmental harm is called **sustainable development**.

Sustainable development should cause no long-term harm to the soil, water, and climate on which it depends. It should consume as little energy and material as possible.

Sustainable development must be flexible enough to survive environmental stresses like droughts, floods, and heat waves or cold snaps.

Sustainable development must also take into account human economic systems as well as ecosystem goods and services.
6.1 Assessment: List the three primary types of human activities that have affected regional and global environments. For each, give one benefit and one environmental cost.

**Agriculture**
Benefit- Food production  
Cost- impacts on fresh water and fertile soil

**Development**
Benefit- higher standard of living  
Cost- production of lots of wastes

**Industrial Growth**
Benefit- conveniences of modern life  
Cost- requires lots of energy to produce and power products
6.1 Assessment: How might more productive agriculture practices affect a developing nation’s population? Its environmental health?

More productive agricultural practices would increase a nation’s population since there would be more food available. However, it would likely worsen the nation’s environmental health.
6.1 Assessment: What is sustainable development? How can it help minimize the negative impacts of human activities?

Sustainable development means using resources in an environmentally conscious way. It provides for human needs while preserving ecosystems that produce natural resources.
6.1 Assessment: Explain why energy from the sun is a renewable resource but energy from oil is a nonrenewable resource.

Energy from the sun is renewable because it can be replaced. Energy from natural processes cannot be replenished within a reasonable amount of time.