

Human Impact on the Environment

Humans depend upon Earth's nutrient and energy cycles. We harness Earth's energy to power our televisions, radios, streetlights, automobiles, airplanes—and everything else in our homes and cities. Your cotton T-shirt and this paper page came from plants that depend on Earth's nutrient cycles. The water you drink comes from water sources replenished by the hydrologic cycle. We do not just use Earth's cycles, we are a part of Earth's cycles. Everything we eat, drink, and use comes from Earth. But the overuse of resources and the production of waste can cause disruptions in the energy and nutrient cycles of Earth.

Humans and Earth's Resources

Main Idea: The Earth has finite resources; increasing human consumption of resources places stress on the natural processes that renew some resources and depletes those resources that cannot be renewed.

Over millions of years, natural processes changed dead organisms into the substances that we use today as oil and coal. Oil and coal are the two main resources that we use for energy. These are **nonrenewable resources** because we deplete them, or use them much faster than they form. Recycling can extend the use of some types of nonrenewable resources, but it cannot replace them.

Not all resources are nonrenewable.

Renewable resources are ones that cannot be used up, or can be replaced as fast as they are used. Some resources, such as wind and solar energy, cannot be used up. The energy from flowing water can be harnessed to power electricity plants. Other resources, such as wood, can be renewable if they are re-grown as quickly as they are used. Good conservation practices can help protect renewable resources. For example, foresters in some areas of the country are required to selectively cut trees, or must plant a tree for every tree that is cut. Wood and other resources can

VOCABULARY

nonrenewable resources	global warming
renewable resources	biodiversity
pollution	deforestation
ozone shield	introduced species
acid rain	industrialization

quickly become nonrenewable if they are not used carefully.

The number of people that Earth can support depends on the use of Earth's resources. The United States uses more resources and produces more waste than any other country on Earth. This country's population throws away around one ton of waste per person each year.

NYS Regents Questions

- Which practice would most likely deplete a nonrenewable natural resource?
 - harvesting trees on a tree farm
 - burning coal to generate electricity in a power plant
 - restricting water usage during a period of water shortage
 - building a dam and a power plant to use water to generate electricity
- In some areas, foresters plant one tree for every tree they cut. This activity is an example of
 - lack of management of nonrenewable natural resources
 - a good conservation practice for renewable natural resources
 - a good conservation practice for nonrenewable natural resources
 - lack of concern for renewable natural resources

Our Effects on Ecosystems

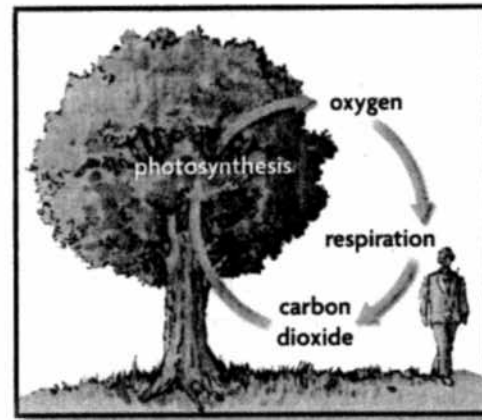
Main Idea: Natural ecosystems provide an array of basic processes that affect humans. Humans are changing many of these basic processes and the changes may be detrimental.

Humans have modified ecosystems more than any other animal and have had the greatest negative impact on world ecosystems. In the past, we have often lacked an understanding of how our activities affect the environment. Although it is sometimes easy to forget, humans are an important part of the biosphere.

Our actions have direct and indirect effects on Earth's natural cycles. Many materials cycle in a self-sustaining ecosystem. For example, bacteria and fungi help recycle materials. As decomposers, they break down dead organisms into nutrients that are used by other organisms. When we remove organic matter such as fallen leaves or grass clippings from our yard, we are preventing decomposers from recycling nutrients. Other natural cycles include the formation of soils by lichens and some mosses, the water cycle, and the oxygen and carbon cycles.

The oxygen cycle is shown in Figure 8.1. Plants release atmospheric oxygen as a byproduct during photosynthesis. In turn, humans and other organisms take in this oxygen and release it as carbon dioxide through respiration. Oxygen is also

Figure 8.1 In the oxygen cycle, oxygen is produced through photosynthesis. Living organisms take in this oxygen and release it as carbon dioxide through respiration.



indirectly transferred through an ecosystem by the cycling of other nutrients, including carbon.

Carbon can be found in many forms—such as gas in the atmosphere, dissolved in water, in fossil fuels such as oil and coal, in rocks such as limestone, and in the soil. Plants convert carbon dioxide from the air into carbohydrates. Carbohydrates get passed through the living world as one organism eats another. Processes such as respiration and the burning of fossil fuels return carbon to the atmosphere, as shown in Figure 8.2.

Each year humans add synthetic, or human-made, chemicals and materials to the Earth. Many

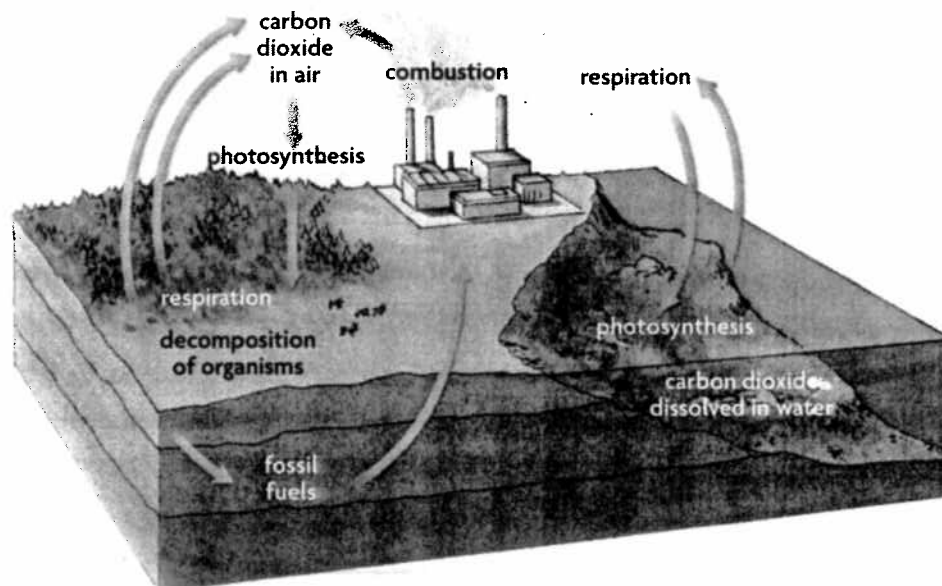


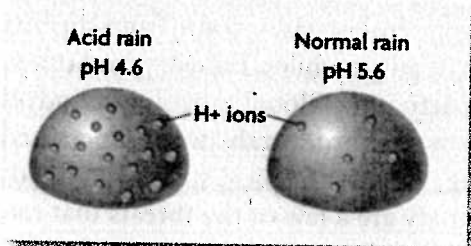
Figure 8.2 Carbon dioxide from the atmosphere is used by plants during photosynthesis. Respiration releases carbon dioxide back into the atmosphere. The burning of fossil fuels such as oil and gas releases carbon dioxide into the atmosphere as well. Carbon dioxide also returns to the atmosphere as dead organisms decompose.

of them cannot be integrated into normal ecosystem functions. The addition of these materials to the environment is called pollution. **Pollution** is the addition of any undesirable material to the air, water, or soil. A pollutant is any material that causes pollution. Pollutants are harmful to ecosystems and human health.

Pollution can occur in the air, water, or on land. The most common air pollution comes from the waste products produced by burning fossil fuels such as gas and oil. Chemical compounds released through this process can combine to form smog. Smog is a type of air pollution caused by the interaction of sunlight with pollutants produced by fossil fuel emissions. One component of smog is ozone. The ozone produced by pollution tends to stay close to the ground, where it can be harmful to human health and ecosystem function. Although ozone is harmful to organisms, it also plays an important protective role in Earth's upper atmosphere. High concentrations of ozone in the stratosphere, also known as the ozone layer or **ozone shield**, act as a shield protecting Earth against harmful ultraviolet rays found in sunlight. Unfortunately, the release of certain pollutants into the atmosphere has been linked to the thinning of Earth's ozone shield. The loss of ozone in the upper atmosphere results in an increased amount of ultraviolet (UV) light reaching Earth from the sun. UV rays can damage DNA in cells and cause mutations.

Chemicals produced from the burning of coal and oil can also become part of Earth's water cycle. **Acid rain**, illustrated in Figure 8.3, is produced when pollutants in the water cycle cause the pH of rain to drop below normal. While

Figure 8.3 Acid rain is a type of rain produced when pollutants in the water cycle cause rain pH to drop below normal levels.



a pH of 7 is neutral, all rain is slightly acidic and has a pH of around 5.6. When pollutants become part of the water cycle, they can react with water and oxygen and cause acid rain, which has a pH lower than 5.6. Acid rain falls in many areas of the United States. It threatens water supplies and harms ecosystems.

NYS Regents Questions

- 3 "Natural ecosystems provide an array of basic processes that affect humans." Which statement does *not* support this quotation?
 - (1) Bacteria of decay help recycle materials.
 - (2) Trees add to the amount of atmospheric oxygen.
 - (3) Treated sewage is less damaging to the environment than untreated sewage.
 - (4) Lichens and mosses living on rocks help to break the rocks down, forming soil.

- 4 Some homeowners mow their lawns during the summer, collect the grass clippings and dispose of them in a landfill. Instead of taking the clippings to a landfill, a more ecologically sound procedure would be to
 - (1) leave the clippings to decompose in the soil to form materials that enrich the soil
 - (2) spray the clippings in the lawn with imported microbes that use them for food
 - (3) burn the clippings and add the ashes to the soil
 - (4) throw the clippings into a stream or river to provide extra food for organisms living there

- 5 A major reason that humans have negatively affected the environment in the past is that humans have
 - (1) frequently lacked an understanding of how their activities affect the environment
 - (2) passed laws to protect certain wetlands
 - (3) attempted to control their population growth
 - (4) discontinued the use of certain chemicals used to control insects

6 Which human activity would have the most direct impact on the oxygen-carbon dioxide cycle?

- (1) reducing the rate of ecological succession
- (2) decreasing the use of water
- (3) destroying large forest areas
- (4) enforcing laws that prevent the use of leaded gasoline

Changing Ecosystem Equilibrium

Main Idea: Human beings are part of the Earth's ecosystems.

Today there are more than 6 billion people on Earth, and, as shown in Figure 8.4, the human population continues to grow. How many people can Earth support? Is there enough space to feed and shelter 10 billion people? 20 billion? We do not know of a limit to the amount of people Earth can hold. But some limit must exist. Earth cannot support an unlimited number of people.

Main Idea: Human activities can, deliberately or inadvertently, alter the equilibrium in ecosystems.

Humans have modified ecosystems as a result of population growth. The increase in human population can be tied to an increase in levels of air and water pollution, increased use of nonrenewable resources, and increased poverty and

malnutrition worldwide. Technologies developed by humans have allowed for continued human population growth. For example, developments in agriculture, medicine, and transportation have increased the number of people Earth can support.

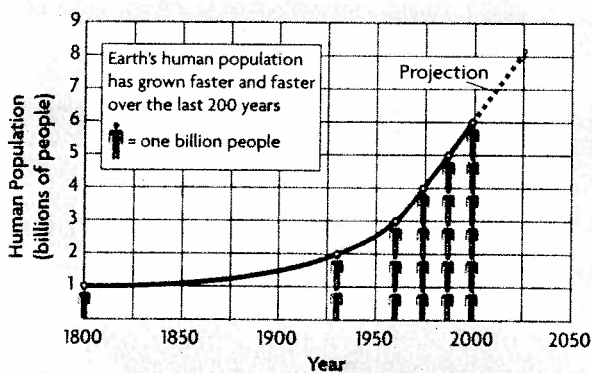
- **Agriculture** The development of gas-powered equipment and other technologies have made it possible to produce great amounts of food.
- **Medicine** Advancements in medicine have lowered infant deaths and limited the spread of disease.
- **Transportation** Trains, trucks, boats, and airplanes help move food and materials around the world.

Main Idea: Human destruction of habitats is threatening current global stability, and if not addressed, ecosystems may be irreversibly affected.

Humans have destroyed habitats through pollution and caused dramatic atmospheric changes. For example, carbon dioxide is a natural part of Earth's atmosphere. The levels of carbon dioxide rise and fall over time as a natural part of Earth's climate cycles. Times of high carbon dioxide levels are also times of warmer global climate. Lower carbon dioxide levels are times of cooler global climates. Over the last 100 years, the average global temperature has risen. Global temperature changes are a normal part of Earth's climate cycle. But changes in temperature usually happen over tens of thousands of years—not over 100 years.

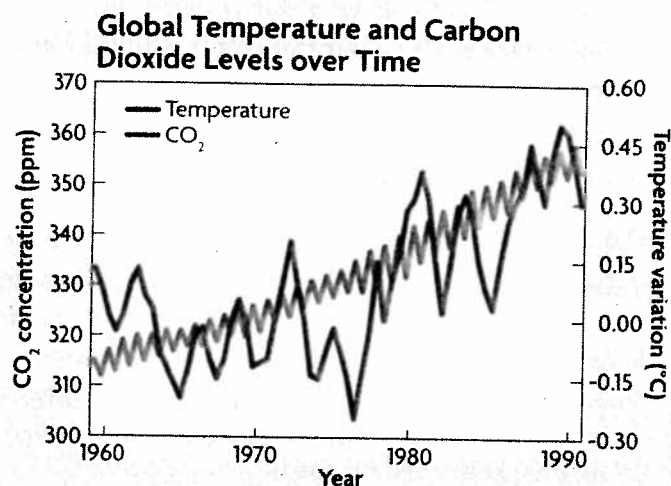
The trend of increasing global temperatures, shown in Figure 8.5 on the next page, is called **global warming**. The warming is a result of increases in gases in the environment that help to slow the loss of heat. The increases in these gases, called greenhouse gases, come from the burning of fuels in automobiles, industry, and other human activities. Global warming already threatens ecosystems around the world. Increased flooding, stronger tropical storms, and a loss of biodiversity are a few of the threats that may be

Figure 8.4 Human Population Growth



SOURCE: U.S. Bureau of the Census

Figure 8.5 Global Warming



Source: University of California, Scripps Institute of Oceanography/
Hadley Centre for Climate Prediction and Research

As automobile use and industry have grown, so have the levels of carbon dioxide and other greenhouse gases in the atmosphere. This graph shows average global temperature changes (blue) against atmospheric carbon dioxide levels (green) measured at Mauna Loa Observatory in Hawaii.

caused by global warming. The polar ice cap is melting, and may affect global weather patterns. The future of global warming is uncertain, but continued global warming could greatly change our planet.

Pollution can have major effects on water ecosystems. Chemical contaminants such as fertilizers, sewage, trash, and other wastes can end up in rivers, lakes, and other waters all over the world. One way scientists determine the health of an ecosystem is by studying particular organisms, called indicator species. Indicator species give a sign, or indication, of the health of an ecosystem. Frogs, for example, are sometimes used as indicator species for water quality. In polluted waters, frogs may have tumors or grow extra legs. Pollutants that dissolve in water will exit an organism through its wastes. Other types of pollutants do not dissolve in water, and will stay in the body fat of an organism. These pollutants will move from organism to organism throughout the food web.

Overharvesting by humans also destroys habitats. Overfishing of the world's oceans has changed marine ecosystems and caused a loss of biodiversity. Any decrease in an ecosystem's biodiversity has a ripple effect through an entire ecosystem, affecting all species.

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- Fertilizers used to improve lawns and gardens may interfere with the equilibrium of an ecosystem because they
 - cause mutations in all plants
 - cannot be absorbed by roots
 - can be carried into local water supplies
 - cause atmospheric pollution
- Which factor is often responsible for the other three?
 - increase in levels of toxins in both water and air
 - increase in human population
 - increased poverty and malnutrition
 - increased depletion of finite resources
- Which factor is a major cause of global warming?
 - increased burning of fuels
 - increased number of green plants
 - decreased mineral availability
 - decreased carbon dioxide in the atmosphere

10 Human impact on the environment is often more dramatic than the impact of most other living things because humans have a greater

- (1) need for water
- (2) need for food
- (3) ability to adapt to change
- (4) ability to alter the environment

11 By causing atmospheric changes through activities such as polluting and careless harvesting, humans have

- (1) caused the destruction of habitats
- (2) affected global stability in a positive way
- (3) established equilibrium in ecosystems
- (4) replaced nonrenewable resources

Loss of Diversity

Main Idea: Human activities that degrade ecosystems result in a loss of diversity of the living and nonliving environment. Biodiversity is the variety of organisms in an ecosystem. Biodiversity gives stability to an ecosystem, and helps an ecosystem adjust to changes. It is also important for medicine, as nearly half of all prescribed medicines are based on plant substances.

Many human actions threaten biodiversity. Loss of habitat and increased pollution are harming animal and plant populations around the world. Rain forests have the most biodiversity and are the most threatened ecosystems in the world. Cutting down any forest is called **deforestation**. Deforestation leads to increased carbon dioxide in the environment, as well as the disappearance of plant and animal species that are native to that environment. Due to the high number of native rain forest species that are found nowhere else on Earth, preserving habitat—and rain forests in particular—is an important part of preserving the biodiversity of our planet.

Main Idea: Land use decreases the space and resources available to other species, and pollution changes the chemical composition of air, soil, and water.

As the human population increases, our demand on the environment also increases. Human activities also form barriers, such as roads and highways, which prevent organisms from moving between different parts of their habitats. Barriers break a habitat into pieces, which prevents organisms from moving freely through their habitat. Some cities have recognized this problem and have built bridges and tunnels to connect habitats that are separated by roads.

How we use the land often also affects the health of our waters. For example, rivers that run through deforested areas often have higher nitrate (pollution) concentrations. Bacteria that live in tree roots can trap the nitrates and convert them to a more usable form of nitrogen, but when the trees are removed, so too are these beneficial bacteria. Likewise, runoff from fertilizers used in fields increases the amounts of phosphorus and nitrogen in water and can affect a lake ecosystem by causing plants and algae to overgrow. Buildup of algae can drastically lower the levels of dissolved oxygen in the water.

Dumping raw sewage or discharging warm water from industrial plants back into a river are two common practices that also lower the dissolved oxygen content of water. A reduction in dissolved oxygen can reduce the populations of many aquatic animals and will lower the biodiversity of the ecosystem. A lack of oxygen can even keep decomposers from breaking down waste materials. Over time, lakes and ponds may slowly begin to fill in and populations of aquatic organisms can be lost completely.

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- 12 Dumping raw sewage into a river will lead to a reduction in dissolved oxygen in the water. This reduction will most likely cause
- (1) an increase in all fish populations
 - (2) a decrease in most aquatic animal populations
 - (3) an increase in depth of the water
 - (4) a decrease in water temperature
- 13 Deforestation will most directly result in an immediate increase in
- (1) atmospheric carbon dioxide
 - (2) atmospheric ozone
 - (3) wildlife populations
 - (4) renewable resources
- 14 Deforestation would most immediately result in
- (1) the disappearance of native species
 - (2) industrialization of an area
 - (3) the depletion of the ozone shield
 - (4) global warming
- 15 Some organizations are buying up sections of forestland. Once purchased, these sections of forest will never be cut down. The main reason for protecting these sections of forest is to
- (1) cause the extinction of undesirable animal species
 - (2) prevent these trees from reproducing too fast
 - (3) maintain the diversity of the living environment
 - (4) provide more land for agricultural purposes
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Introduced Species

Main Idea: When humans alter ecosystems either by adding or removing specific organisms, serious consequences may result.

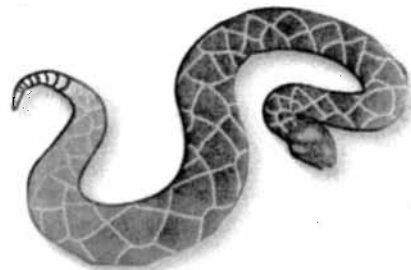
Native species are organisms with evolutionary histories in a particular habitat. In contrast, an **introduced species** is any organism that was brought to an ecosystem as the result of human actions. Introduced species can disrupt an ecosystem in many ways.

- Introduced species can prey on native species. This predation decreases the populations of native species.
- Introduced species may not have predators in the habitat where they were introduced. As a result, they may have very large populations.
- Introduced species may be better competitors than native species in a particular niche, pushing the native species out of the niche.

Some species have been introduced because of irresponsible human activities. Other species have been introduced by accident, as humans travel the globe. Still other species have been introduced on purpose, but without any idea that the species could cause harm.

One example of the devastation that can be caused by an introduced species has occurred recently. The island of Guam is an ecosystem with plants and animals that have evolved together for tens of thousands of years. A snake called a brown tree snake is an introduced species in this ecosystem, first arriving with cargo from the South Pacific. The snake population skyrocketed

Figure 8.6 The release of pets, such as snakes, into the wild is one way that non-native species get introduced into ecosystems.



in this new environment where prey was abundant and no natural predators existed. Before humans realized how big the snake population had grown, it had already caused the extinction of many native bird species on the island and endangered the populations of the remaining native birds and other small vertebrates.

Introduced insects can cause equal devastation. For example, the gypsy moth had already seriously damaged forests across Europe and Asia before it took hold in North America. Gypsy moth caterpillars eat leaves, and can ultimately cause the death of many types of hardwood trees. In Massachusetts, the gypsy moth was one of various moth species being bred in an outdoor laboratory for its silk-producing abilities. When a storm caused damage to the lab, the moths' eggs and caterpillars were released into the environment. There was not much concern raised until a couple of decades later when there were so many gypsy moths that people began noticing trees that were completely stripped of their leaves. Gypsy moth infestations continue to be a concern in some areas of the country today.

Introduced species of plants also disrupt ecosystems. A plant called kudzu was introduced to the U.S. in the late 1800s as a houseplant. It was also planted outdoors. This plant was meant to be helpful in controlling erosion. However, it is now a problem in many of the eastern states. It grows very fast and covers native plants, blocking them from sunlight.

Introduced species can also cause economic damage. The common house mouse, for example, was introduced to Australia in the late 1700s. These mice can cause big problems for farmers by eating through their crops. During 1993–1994, it was estimated that mice cost Australian farmers \$65 million in lost crops.

Figure 8.7 Mice are an introduced species in Australia that have caused economic damage.



NYS Regents Questions

- 16 The tall wetland plant, purple loosestrife, was brought from Europe to the United States in the early 1800s as a garden plant. The plant's growth is now so widespread across the United States that it is crowding out a number of native plants. This situation is an example of
- (1) the results of the use of pesticides
 - (2) the recycling of nutrients
 - (3) the flow of energy present in all ecosystems
 - (4) an unintended effect of adding a species to an ecosystem
- 17 Imported animal species often disrupt an ecosystem because in their new environment, they will most likely
- (1) eliminate the genetic variation of autotrophs
 - (2) increase the number of mutations in the herbivores
 - (3) have no natural enemies
 - (4) be unable to produce offspring
- 18 The importation of organisms such as the Japanese beetle and gypsy moth to areas where they have no natural enemies best illustrates
- (1) the use of abiotic factors to reduce pest species
 - (2) the selection of species to mate with each other to produce a new variety
 - (3) attempts by humans to protect extinct species
 - (4) a human activity that disrupts existing ecosystems
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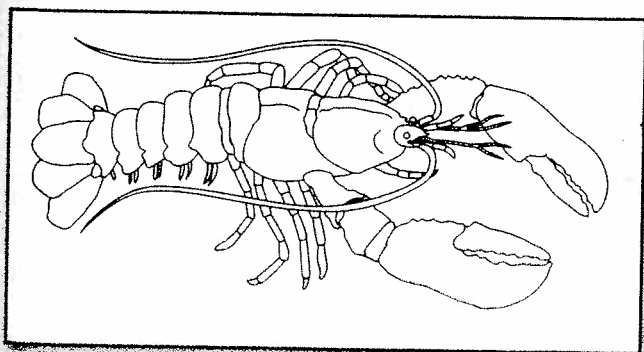
Industrialization

Main Idea: Industrialization brings an increased demand for and use of energy and other resources including fossil and nuclear fuels. This usage can have positive and negative effects on humans and ecosystems.

The development of industry, or **industrialization**, has drastically changed the way that humans live. We live much more comfortably than before industrialization, and have greater access to goods. But with the positive effects on our lives, it has also drastically changed our environment for the worse. Industry has high energy demands, and the massive burning of fossil fuels by industry is our greatest source of air pollution on Earth. Nuclear energy burns much cleaner than fossil fuels, but its waste product is radioactive and must be disposed of carefully.

Sulfur dioxide released from the smoke stacks of coal-burning factories and nitrogen oxides from automobile exhausts combine with water vapor in the air to cause acid rain. The lowered pH of lakes from acid rain has caused the death of aquatic plants, animals, and other organisms, and has likewise killed many forests of trees. Toxic chemicals produced by industry as waste has been dumped into rivers and oceans, as we once thought that diluting the toxins in this way was the best way to get rid of them. Instead, we have made the fish and shellfish that live in many regions unfit to eat as the toxins accumulate in their body tissues.

Figure 8.8 Pollution has caused fish and shellfish in many parts of the world to be inedible, as the pollutants build up in their body tissues.



Factories are not the only problem. Besides nitrogen oxides, cars emit carbon monoxide and carbon dioxide from the burning of gasoline and motor oil. Carbon monoxide is an odorless yet lethal gas, and the increased carbon dioxide levels on Earth may cause global warming. Fortunately, many states now require yearly automobile emissions tests to help maintain the quality of our air.

NYS Regents Questions

- 19 Methods used to reduce sulfur dioxide emissions from smokestacks are an attempt by humans to
- (1) lessen the amount of insecticides in the environment
 - (2) eliminate diversity in wildlife
 - (3) lessen the environmental impact of acid rain
 - (4) use nonchemical controls on pest species
- 20 Car exhaust has been blamed for increasing the amount of carbon dioxide in the air. Some scientists believe this additional carbon dioxide in the air may cause
- (1) global warming
 - (2) increased biodiversity
 - (3) habitat preservation
 - (4) ozone destruction
- 21 Some factories have a negative impact on Earth's ecosystems because they
- (1) have high energy demands that require the use of fossil fuels and nuclear fuels
 - (2) utilize agricultural technology that decreases soil erosion
 - (3) decrease the need for finite resources
 - (4) limit the amount of emissions produced each year

22 Toxic chemicals called PCBs, produced as a result of manufacturing processes, were dumped into the Hudson River. What was most likely a result of this action on fish in the Hudson River?

- (1) Some fish became unfit to eat.
- (2) The fish populations increased.
- (3) Thermal pollution of the river increased, decreasing the fish population.
- (4) The carrying capacity for fish increased in the river.

Societal Decisions

Main Idea: Societies must decide on proposals which involve the introduction of new technologies. Individuals need to make decisions which will assess risks, costs, benefits, and trade-offs.

Many decisions that we make individually, and as a local and global community, will affect the environment. Often, such decisions have both positive and negative consequences. It is important for us to be able to make informed decisions that weigh benefits against the costs of certain actions.

Sometimes, laws can guide such decisions. For example, when a company is proposing an action that might affect the environment, they must prepare an analysis of possible effects and often must present the proposal at a public forum for discussion. The building of a new shopping mall, for example, may cause harm to a habitat, but may also create many jobs for people that live in the area. Decisions such as this are made every day, and often require a public vote. The issues can range from large-scale decisions that will affect many, to small-scale choices that will affect only a few. For example, a proposal for a nuclear power plant that will provide cheap energy to a community must also address the disposal of radioactive waste. Other alternative energy sources—such as wind power, water power, or solar energy—may be beneficial for the environment but may also cost more, be less reliable, or

be impractical to use in certain regions of the country.

On a more local level, a pesticide spraying program to control mosquito populations should consider the effects that the chemical may have on other organisms and if there are alternative solutions available. Because mosquitoes require water for breeding, increasing the number of native fish species that eat the aquatic mosquito larvae may help control populations. This solution might eliminate the need for adding more toxins into the environment that may have serious effects on organisms other than mosquitoes.

NYS Regents Questions

- 23 To minimize negative environmental impact, a community should
- (1) approve the weekly spraying of pesticides on the plants in a local park
 - (2) grant a permit to a chemical manufacturing company to build a factory by one of its lakes, with no restrictions on waste disposal
 - (3) make a decision about building a new road in a hiking area based only on the economic advantages
 - (4) set policy after considering both the risks and benefits involved in building a toxic waste site within its boundaries
- 24 A new automobile manufacturing plant is opening in a certain town. It will have some negative environmental impacts. This is a trade-off that the town officials had to consider carefully before giving final approval. They most likely gave their approval because the negative impacts would be offset by the
- (1) release of pollutants into the environment
 - (2) creation of new employment opportunities
 - (3) decrease of property values in the area around the plant
 - (4) increase of automobile traffic in the area around the plant

25 Which phrase would be appropriate for area A in the chart below?

Technological Device	Positive Impact	Negative Impact
Nuclear power plant	Provides efficient, inexpensive energy	A

- (1) produces radioactive waste
 - (2) results in greater biodiversity
 - (3) provides light from radioactive substances
 - (4) reduces dependence on fossil fuels
- 26 Communities have attempted to control the size of mosquito populations to prevent the spread of certain diseases such as malaria and encephalitis. Which control method is most likely to cause the *least* ecological damage?
- (1) draining the swamps where mosquitoes breed
 - (2) spraying swamps with chemical pesticides to kill mosquitoes
 - (3) spraying oil over swamps to suffocate mosquito larvae
 - (4) increasing populations of native fish that feed on mosquito larvae in the swamps

Future Generations

Main Idea: The decisions of one generation both provide and limit the range of possibilities open to the next generation.

Humans need natural resources to survive, but the way these resources are used threatens the well-being of the human population. The responsible use of resources can help to keep these resources for future generations. Currently, most use of natural resources is unsustainable. This unsustainable use of resources meets current needs, but is harmful to future generations. Sustainable development is a practice in which natural resources are used and managed in a way that meets current needs and does not harm future generations. Changes to current practices can lead to a more sustainable use of resources.

Figure 8.9 Bald eagle populations recovered after laws helped to protect this species.



Some laws, such as the Endangered Species Act, protect individual species. For the protected species to survive, its habitat must be protected. Because the habitat is protected, other species that live in the same habitat also benefit. As a result, the entire ecosystem can benefit from efforts to save a single species.

All living things, including humans, share Earth and its resources. Humans can have a very negative impact on our environment by polluting, destroying habitats, and introducing species. But humans also have the ability and the technology to change the extent of the damage to our planet. Our economies and our lives depend on a healthy, sustainable Earth. We can

- control population growth by controlling birth rates
- develop technology to produce more food and less waste
- change our practices to limit the damage to ecosystems
- take action to protect ecosystems

Public actions also help to preserve and protect the future of our planet. Currently, for example, there are laws that protect air, water, and particular species. There are also national parks that protect natural areas from development, and public transportation systems to help limit the amount of pollution that automobile traffic causes.

NYS Regents Questions

- 27 One way to help provide suitable environments for future generations is to urge individuals to
- (1) apply ecological principles when making decisions that will have an environmental impact
 - (2) control all aspects of natural environments
 - (3) agree that population controls have no impact on environmental matters
 - (4) work toward increasing global warming
-