

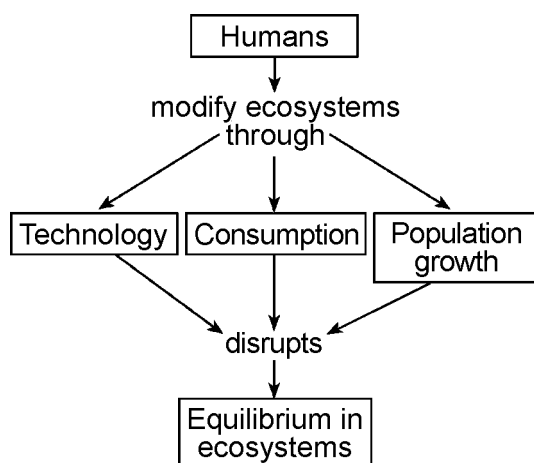
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## UNIT: HUMAN IMPACT ON ECOSYSTEMS

- 1) A major reason that humans can have such a significant impact on an ecological community is that humans
  - 1) reproduce faster than most other species
  - 2) are able to increase the amount of finite resources available
  - 3) can modify their environment through technology
  - 4) remove large amounts of carbon dioxide from the air
- 2) Which action illustrates an increased understanding and concern by humans for ecological interrelationships?
  - 1) eliminating pollution standards for industries that promote technology
  - 2) removing natural resources at a rate equal to the needs of the population
  - 3) implementing laws to regulate the number of animals hunted and killed each year
  - 4) importing organisms in order to stabilize existing ecosystems
- 3) Farming reduces the natural biodiversity of an area, yet farms are necessary to feed the world's human population. This situation is an example of
 

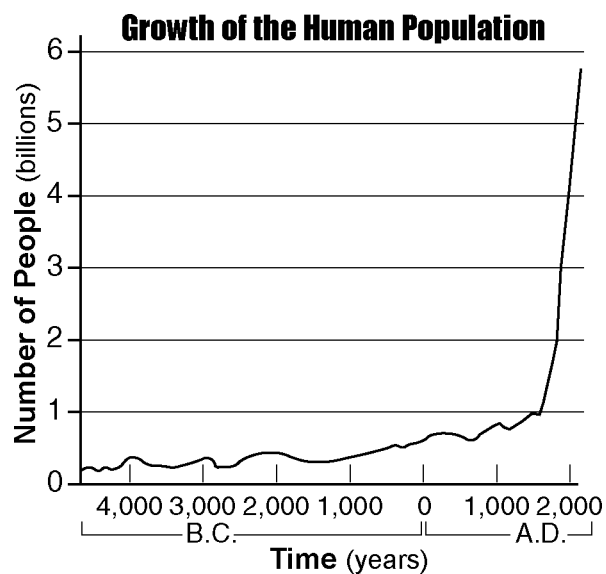
1) poor land use	3) conservation
2) a trade-off	4) a technological fix
- 4) A new automobile manufacturing plant is opening in a certain town. It will have some negative environmental impacts. This is a trade-off that the town officials had to consider carefully before giving final approval. They most likely gave their approval because the negative impacts would be offset by the
  - 1) release of pollutants into the environment
  - 2) increase of automobile traffic in the area around the plant
  - 3) decrease of property values in the area around the plant
  - 4) creation of new employment opportunities
- 5) Which human activity would have the *most* positive effect on the environment of an area?
  - 1) introducing a foreign plant species to the area
  - 2) clearing the area to eliminate weed species
  - 3) protecting native flowers and grasses in the area
  - 4) using fire to eliminate most plants in the area
- 6) Humans have altered ecosystems in many ways. The *most* positive impact on an ecosystem would result from
  - 1) planting many different plants that are native to the area in a vacant lot
  - 2) planting a single economically valuable crop in a 25-acre area
  - 3) seeding an area with valuable plants that are from another ecosystem
  - 4) filling in a swamp and planting grass and trees for a community park
- 7) Some organizations are buying up sections of forest land. 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
- 8) 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) throw the clippings into a stream or river to provide extra food for organisms living there
  - 2) leave the clippings to decompose in the lawn to form materials that enrich the soil
  - 3) burn the clippings and add the ashes to the soil
  - 4) spray the clippings in the lawn with imported microbes that use them for food
- 9) Many homeowners who used to collect, bag, and discard grass clippings are now using mulching lawnmowers, which cut up the clippings into very fine pieces and deposit them on the soil. The use of mulching lawnmowers contributes most directly to
  - 1) increasing the diversity of life
  - 2) the production of new species
  - 3) the control of pathogens
  - 4) recycling of nutrients
- 10) In most states, automobiles must be inspected every year to make sure that the exhaust fumes they emit do not contain high levels of pollutants, such as carbon monoxide. This process is a way humans attempt to
  - 1) maintain the quality of the atmosphere
  - 2) control energy flow in natural ecosystems
  - 3) control the water cycle
  - 4) recycle nutrients from one ecosystem to another
- 11) In order to reduce consumption of nonrenewable resources, humans could
  - 1) burn coal to heat houses instead of using oil
  - 2) increase industrialization
  - 3) heat household water with solar radiation
  - 4) use a natural-gas grill to barbecue instead of using charcoal

- 12) Which of the following results of technological advancement has a positive effect on the environment?
- 1) development of equipment that uses solar energy to charge batteries
  - 2) development of new models of cars that travel fewer miles per gallon of gasoline
  - 3) development of new models of computers each year, with disposal of the old computers in landfills
  - 4) development of equipment to speed up the process of cutting down trees
- 13) One likely reason some experimental automobiles have been developed to use electricity rather than gasoline is that
- 1) the use of electricity will eliminate the need for all antipollution laws
  - 2) gasoline is made from petroleum, a nonrenewable resource
  - 3) Earth has an unlimited supply of fossil fuels
  - 4) the use of electricity will increase the manufacture of antipollution devices for cars
- 14) Which concept is *best* represented in the diagram shown below?



- 1) Human actions are a threat to equilibrium in ecosystems.
  - 2) Equilibrium in ecosystems requires that humans modify ecosystems.
  - 3) Equilibrium in ecosystems directly affects how humans modify ecosystems.
  - 4) Human population growth is the primary reason for equilibrium in ecosystems.
- 15) The negative effect humans have on the stability of the environment is most directly linked to an increase in
- 1) supply of finite resources
  - 2) human population size
  - 3) predation and disease
  - 4) recycling activities by humans

- 16) Which human activity will most likely have a *negative* effect on global stability?
- 1) increasing world population growth
  - 2) increasing recycling programs
  - 3) decreasing habitat destruction
  - 4) decreasing water pollution levels
- 17) Which of the following long-term changes could directly cause the other three?
- 1) pollution of air and water
  - 2) scarcity of suitable animal habitats
  - 3) depletion of resources
  - 4) increasing human population
- 18) Which factor is primarily responsible for the destruction of the *greatest* number of habitats?
- 1) decreased use of renewable resources
  - 2) epidemic diseases
  - 3) human population growth
  - 4) spread of predatory insects
- 19) The graph below shows how the human population has grown over the last several thousand years.



Which statement is a valid inference that can be made if the human population continues to grow at a rate similar to the rate shown between 1000 A.D. and 2000 A.D.?

- 1) Future ecosystems will be stressed and many animal habitats may be destroyed.
- 2) Global warming will decrease as a result of a lower demand for fossil fuels.
- 3) All environmental problems can be solved without a reduction in the growth rate of the human population.
- 4) One hundred years after all resources are used up, the human population will level off.

- 20) Continued depletion of the ozone layer will most likely result in
- 1) a decrease in climatic changes
  - 2) an increase in marine ecosystem stability
  - 3) a decrease in atmospheric pollutants
  - 4) an increase in skin cancer among humans
- 21) Increased production of goods makes our lives more comfortable, but causes an increase in the demand for energy and other resources. One negative impact of this situation on ecosystems is an increase in
- 1) pollution levels in the atmosphere
  - 2) the diversity of plant species
  - 3) living space for wildlife
  - 4) renewable resources
- 22) A change in the acidity of mountain lakes would most likely be a result of
- 1) the introduction of new species into the lakes
  - 2) ecological succession of the area at the top of the mountain
  - 3) planting grasses and shrubs around the lakes
  - 4) air pollution from smoke stacks miles away
- 23) Which of the following situations is a result of human activities?
- 1) natural selection on an island changes gene frequencies
  - 2) acid rain in an area kills fish in a lake
  - 3) ecological succession following volcanic activity reestablishes an ecosystem
  - 4) decay of leaves in a forest adds to soil fertility
- 24) A five-year study was carried out on a population of algae in a lake. The study found that the algae population was steadily decreasing in size. Over the five-year period, this decrease most likely led to
- 1) a decrease in the amount of nitrogen released into the atmosphere
  - 2) an increase in the amount of water vapor present in the atmosphere
  - 3) a decrease in the amount of oxygen released into the lake
  - 4) an increase in the amount of oxygen present in the lake
- 25) The importation of organisms such as the Japanese beetle and gypsy moth to areas where they have no natural enemies *best* illustrates
- 1) a human activity that disrupts existing ecosystems
  - 2) attempts by humans to protect extinct species
  - 3) the use of abiotic factors to reduce pest species
  - 4) the selection of species to mate with each other to produce a new variety
- 26) Which human activity would have the *least* negative impact on the quality of the environment?
- 1) cutting down tropical rain forests for plywood
  - 2) using species-specific sex attractants to trap and kill insect pests
  - 3) adding animal wastes to rivers
  - 4) releasing chemicals into the groundwater
- 27) Humans are responsible for some of the negative changes that occur in nature because they
- 1) are able to preserve scarce resources
  - 2) are able to modify habitats more than any other species
  - 3) have passed laws to preserve the environment
  - 4) have encouraged the development of wildlife refuges and parks
- 28) Rabbits are herbivores that are not native to Australia. Their numbers have increased steadily since being introduced into Australia by European settlers. One likely reason the rabbit population was able to grow so large is that the rabbits
- 1) reproduced more slowly than the native animals
  - 2) were able to prey on native herbivores
  - 3) could interbreed with the native animals
  - 4) successfully competed with native herbivores for food
- 29) The dodo bird inhabited the island of Mauritius in the Indian Ocean, where it lived undisturbed for years. It lost its ability to fly and it lived and nested on the ground where it ate fruits that had fallen from trees. There were no mammals living on the island.
- In 1505, the first humans set foot on Mauritius. The island quickly became a stop over for ships engaged in the spice trade. The dodo was a welcome source of fresh meat for the sailors and large numbers of dodos were killed for food. In time, pigs, monkeys, and rats brought to the island ate the dodo eggs in the ground nests.
- Which statement describes what most likely happened to the dodo bird within 100 years of the arrival of humans on Mauritius?
- 1) Dodo birds developed the ability to fly in order to escape predation and their population increased.
  - 2) The dodo bird population became smaller because they preyed upon the introduced species.
  - 3) The dodo bird population increased after the birds learned to build their nests in trees.
  - 4) Human exploitation and introduced species significantly reduced dodo bird populations.
- 30) A forest is cut down and is replaced by a cornfield. A *negative* consequence of this practice is
- 1) a decrease in the amount of soil that is washed away during rainstorms
  - 2) an increase in the size of predators
  - 3) a decrease in biodiversity
  - 4) an increase in the carbon dioxide released into the atmosphere

- 31) Deforestation of areas considered to be rich sources of genetic material could limit future agricultural and medical advances due to
- 1) the improved quality of the atmosphere
  - 2) an increase in the rate of evolutionary change
  - 3) the maintenance of dynamic equilibrium
  - 4) the loss of biodiversity
- 32) The rapid destruction of tropical rain forests may be harmful because
- 1) the removal of trees will limit the construction of factories that will pollute the environment
  - 2) energy cycling in the environment will stop
  - 3) genetic material that may be useful for future medical discoveries will be lost
  - 4) removing trees will prevent scientists from studying ecological succession
- 33) One irreversible effect of *both* deforestation and water pollution on the environment is the
- 1) increase in renewable resources
  - 2) thinning of the ozone shield
  - 3) depletion of atmospheric carbon dioxide levels
  - 4) extinction of species
- 34) Increased industrialization will most likely
- 1) decrease available habitats
  - 2) increase the stability of ecosystems
  - 3) decrease global warming
  - 4) increase environmental carrying capacity for native species
- 35) Water from nearby rivers or lakes is usually used to cool down the reactors in nuclear power plants. The release of this heated water back into the river or lake would most likely result in
- 1) a decrease in the amount of sunlight necessary for photosynthesis in the water
  - 2) a change in the number of mutations in plants growing near the water
  - 3) a change in the biodiversity in the water
  - 4) an increase in the sewage content in the water
- 36) One possible reason for the rise in the average air temperature at Earth's surface is that
- 1) decomposers are being destroyed
  - 2) deforestation has increased the levels of oxygen in the atmosphere
  - 3) industrialization has increased the amount of carbon dioxide in the air
  - 4) growing crops is depleting the ozone shield
- 37) Which of the following processes helps reduce global warming?
- |                   |                      |
|-------------------|----------------------|
| 1) burning        | 3) industrialization |
| 2) photosynthesis | 4) decay             |
- 38) Over the past few decades, many oil companies have discovered oil below the seafloor near the coasts of many states. Some states, however, refuse to permit offshore oil drilling, fearing it might damage the environment.
- Discuss both sides of this issue. In your answer, be sure to:
- (1) State *one* way in which offshore oil drilling might have a long-term *negative* effect on the environment.
  - (2) State *one* way in which offshore oil drilling could benefit society.
- 39) Our national parks are areas of spectacular beauty. Current laws usually prohibit activities such as hunting, fishing, logging, mining, and drilling for oil and natural gas in these areas. Congress is being asked to change these laws to permit such activities.
- Choose *one* of the activities listed above.
- (a) State *one* way that activity could harm the ecosystem.
  - (b) State *one* way allowing the activity you chose in *part (a)* could benefit society.
- Questions 40 through 42 refer to the following:
- The last known wolf native to the Adirondack Mountains of New York State was killed over a century ago. Several environmental groups have recently proposed reintroducing the wolf to the Adirondacks. These groups claim there is sufficient prey to support a wolf population in this area. These prey include beaver, deer, and moose. Opponents of this proposal state that the Adirondacks already have a dominant predator, the Eastern coyote.
- 40) Based on the reading passage and your knowledge of biology, state *one* effect the reintroduction of the wolf may have on the coyote population within the Adirondacks. [*Explain why it would have this effect.*]
- 41) Explain why the coyote population mentioned in the reading passage is considered a limiting factor in the Adirondack Mountains.
- 42) Based on the reading passage and your knowledge of biology, state *one* ecological reason why some individuals might support the reintroduction of wolves to the Adirondacks.

- 43) An individual has placed an editorial in the community newspaper stating that the local recycling program should be discontinued. Respond to this editorial by explaining the importance of the local recycling program for the environment. In your explanation be sure to:
- (1) State *one* effect the increasing human population will have on the availability of natural resources.
  - (2) State *one* reason why recycling is important.
  - (3) Identify *two* natural resources or products made from natural resources that can be recycled.

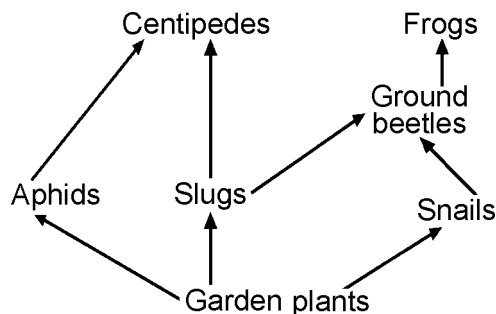
Questions 44 and 45 refer to the following:

Human activities have had a major impact on biodiversity. Scientists cannot solve this problem alone. Concerned individuals need to be involved in restoring and maintaining biodiversity.

- 44) State *one* specific action that you as a student can take in your community to help maintain or increase biodiversity.
- 45) Explain how a loss of biodiversity today can affect the survival of humans in the future.

Questions 46 and 47 refer to the following:

Gardeners sometimes use slug traps to capture and kill slugs. These traps were tested in a garden with a large slug population.



Organisms found in the trap after one week are shown in the table below.

**Organisms in Trap**

Organism	Number in Trap
slugs	8
snails	1
aphids	13
centipedes	1
ground beetles	98

- 46) In a process known as biological control, natural predators that prey on plant or animal pests are used to control the populations of the pests. Identify *one* organism in the food web shown that could be used as a biological control to replace the slug traps.
- 47) State *one* reason the slug traps in the experiment described are *not* the best method to control slugs.

Questions 48 through 51 refer to the following:

### **FIGHTING POLLUTION WITH BACTERIA**

You may think that all bacteria are harmful. Think again! Some bacteria are working to clean up the damage humans have caused to the environment.

In 1989, the oil tanker *Exxon Valdez* hit ground and a hole was ripped in its hull. Millions of gallons of crude oil spread along the coast of Alaska. In some places, the oil soaked 2 feet deep into the beaches. There seemed to be no way to clean up the spill. Then scientists decided to enlist the help of bacteria that are found naturally on Alaskan beaches. Some of these bacteria break down hydrocarbons (molecules found in oil) into simpler, less harmful substances such as carbon dioxide and water.

The problem was that there were not enough of these bacteria to handle the huge amount of oil. To make the bacteria multiply faster, the scientists sprayed a chemical that acted as a fertilizer along 70 miles of coastline. Within 15 days, the number of bacteria had tripled. The beaches that had been treated with the chemical were much cleaner than those that had not. Without this bacterial activity, Alaska's beaches might still be covered with oil.

This process of using organisms to eliminate toxic materials is called bioremediation. Bioremediation is being used to clean up gasoline that leaks into the soil under gas stations. At factories that process wood pulp, scientists are using microorganisms to break down phenols (a poisonous by-product of the process) into harmless salts. Bacteria also can break down acid drainage that seeps out of abandoned coal mines, and explosives, such as TNT. Bacteria are used in sewage treatment plants to clean water. Bacteria also reduce acid rain by removing sulfur from coal before it is burned.

Because Americans produce more than 600 million tons of toxic waste a year, bioremediation may soon become a big business. If scientists can identify microorganisms that attack all the kinds of waste we produce, expensive treatment plants and dangerous toxic dumps might be put out of business.

- 48) According to the reading passage, the chemical was sprayed along the Alaskan coastline in order to
- 1) increase the population of bacteria
  - 2) wash away oil that had been spilled
  - 3) dissolve oil that was spilled on the shore
  - 4) introduce new bacteria to the beaches

- 49) Which statement does *not* represent an example of bioremediation?
- 1) Duckweed removes heavy metals from ponds and lakes.
  - 2) Bacteria break down hydrocarbons in oil.
  - 3) Ragweed plants remove lead from the ground around factory sites.
  - 4) Ladybugs eliminate insect pests from plants.
- 50) State *one* economic advantage of bioremediation described in the reading passage.
- 51) Describe *one* biological problem that may possibly result from using microorganisms to fight pollution.

Questions 52 and 53 refer to the following:

The use of nuclear fuel can have positive and negative effects on an ecosystem.

- 52) State *one* positive effect on an ecosystem of using nuclear fuel to generate electricity.
- 53) State *one* negative effect on an ecosystem of using nuclear fuel to generate electricity.
- 54) Currently, Americans rely heavily on the burning of fossil fuels as sources of energy. As a result of increased demand for energy sources, there is a continuing effort to find alternatives to burning fossil fuels.

Discuss fossil fuels and alternative energy sources. In your answer be sure to:

- (1) State *one* disadvantage of burning fossil fuels for energy.
  - (2) Identify *one* energy source that is an alternative to using fossil fuels.
  - (3) State *one* advantage of using this alternative energy source.
  - (4) State *one* disadvantage of using this alternative energy source.
- 55) State *one* specific environmental problem that can result from burning coal to generate electricity.

Questions 56 and 57 refer to the following:

The ice fields off Canada's Hudson Bay are melting an average of three weeks earlier than 25 years ago. The polar bears are therefore unable to feed on the seals on these ice fields during the last three weeks in spring. Polar bears have lost an average of 10% of their weight and have 10% fewer cubs when compared to a similar population studied just 20 years ago. Scientists have associated the early melting of the ice fields with the fact that the average world temperature is about 0.6°C higher than it was a century ago and this trend is expected to continue.

- 56) What ecological problem most likely caused the earlier melting of the ice fields in the Hudson Bay area of Canada described in the reading passage?
- 57) State *one* specific long-term action that humans could take that might slow down or reduce the melting of the ice fields mentioned in the reading passage.
- 58) Explain why damage to the ozone shield is considered a threat to many organisms.
- 59) In many investigations, both in the laboratory and in natural environments, the pH of substances is measured.

Explain why pH is important to living things. In your explanation be sure to:

- (1) Identify *one* example of a life process of an organism that could be affected by a pH change.
- (2) State *one* environmental problem that is directly related to pH.
- (3) Identify *one* possible cause of this environmental problem.

Questions 60 and 61 refer to the following:

A factory in Florida had dumped toxic waste into the soil for 40 years. Since the company is no longer in business, government officials removed the toxic soil and piled it up into large mounds until they can finish evaluating how to treat the waste.

- 60) State *one* way the toxins mentioned in the excerpt could move from the soil into local ecosystems, such as nearby lakes and ponds.
- 61) State *one* way the toxins mentioned in the excerpt might affect local ecosystems.

Questions 62 through 65 refer to the following:

In recent years, the striped bass population in Chesapeake Bay has been decreasing. This is due, in part, to events known as "fish kills," a large die-off of fish. Fish kills occur when oxygen-consuming processes in the aquatic ecosystem require more oxygen than the plants in the ecosystem produce, thereby reducing the amount of dissolved oxygen available to the fish.

One proposed explanation for the increased fish kills in recent years is that human activities have increased the amount of sediment suspended in the water of Chesapeake Bay, largely due to increased erosion into its tributary streams. The sediment acts as a filter for sunlight, which causes a decrease in the intensity of the sunlight that reaches the aquatic plants in the Chesapeake Bay ecosystem.

- 62) Identify *one* abiotic factor in the Chesapeake Bay ecosystem involved in the fish kills described in the reading passage.
- 63) Identify the process carried out by organisms in the reading passage that uses oxygen and contributes to the fish kills.
- 64) State *one* way humans have contributed to the *decrease* of the Chesapeake Bay striped bass population mentioned in the reading passage.
- 65) State how a *decrease* in the amount of light may be responsible for the Chesapeake Bay area fish kills mentioned in the reading passage.
- 66) Identify *one* farming practice that could be a source of environmental pollution.
- 67) Mosquitoes are eaten by many birds and bats. In the New York City area, mosquitoes have been found to transmit West Nile Virus to some people who have been bitten by a mosquito carrying this virus. As a result, New York City health officials have sprayed pesticides into the air in order to kill as many mosquitoes as possible.

Discuss the use of pesticides to control the mosquito population. In your answer be sure to:

- (1) State *one* advantage of killing all of the mosquitoes.
- (2) State *one* disadvantage of killing all of the mosquitoes.
- (3) State *one* danger to humans of spraying pesticides into the air.

Questions 68 and 69 refer to the following:

You are the owner of a chemical company. Many people in your community have been complaining that rabbits are getting into their gardens and eating the flowering plants and vegetables they have planted. Your company is developing a new chemical product called *Bunny Hop-Away* that repels rabbits. This product would be sprayed on the plants to prevent the rabbits from eating them. Certain concerns need to be considered before you make the product available for public use.

- 68) State *two* environmental concerns that should be considered before the product described, *Bunny Hop-Away*, is sold and used by the public.
- 69) State one safety procedure that should be followed when the product described, *Bunny Hop-Away*, is sprayed on plants.
- 70) Certain insects are kept under control by sterilizing the males with x-rays so that sperm production stops. Explain how this technique reduces the survival of this insect species.
- 71) Oak trees in the northeastern United States have survived for hundreds of years, in spite of attacks by native insects. Recently, the gypsy moth, which has a caterpillar stage that eats leaves, was imported from Europe. The gypsy moth now has become quite common in New England ecosystems. As a result, many oak trees are being damaged more seriously than ever before.

State *one* biological reason that this imported insect is a more serious problem for the trees than other insects that have been present in the area for hundreds of years.

Questions 72 through 74 refer to the following:

Throughout the world, in nearly every ecosystem, there are animal and plant species present that were introduced into the ecosystem by humans or transported to the ecosystem as a result of human activities. Some examples are listed in the chart below.

### Examples of Introduced Species

Organism	New Location
purple loosestrife (plant)	wetlands in New York State
zebra mussel	Great Lakes
brown tree snake	Guam

- 72) State *one* reason why the introduced species shown in the table might be very successful in a new environment.
- 73) Identify *one* action the government could take to prevent the introduction of additional new species to foreign environments.
- 74) Identify *one* introduced organism from the given table or from your knowledge of biology and write down its name. Describe *one* way in which this organism has altered an ecosystem in its new location.

Questions 75 and 76 refer to the following:

The hedgehog, a small mammal native to Africa and Europe, has been introduced to the United States as an exotic pet species. Scientists have found that hedgehogs can transfer pathogens to humans and domestic animals. Foot-and-mouth viruses, Salmonella, and certain fungi are known pathogens carried by hedgehogs. As more and more of these exotic animals are brought into this country, the risk of infection increases in the human population.

- 75) Based on the reading passage, state *one* negative effect of importing exotic species to the United States.
- 76) State *one* way the human immune system might respond to an invading pathogen associated with handling a hedgehog.

- 77) Cargo ships traveling to the Great Lakes from the Caspian Sea in Eurasia often carry water in tanks known as ballast tanks. This water helps the ships to be more stable while crossing the ocean. Upon arrival in the Great Lakes, this water is pumped out of the ships. Often this water contains species that are not native to the Great Lakes environment. The zebra mussel is one species that was introduced into the Great Lakes in this way.

Although large numbers of zebra mussels often clog water intake pipes of power plants and other industries, the mussels have a benefit. Each mussel filters about a quart of water per day, absorbing cancer-causing PCB's from lake water in the process.

The goby, a bottom-feeding fish from Europe, was introduced into the Great Lakes in a similar way a few years later. The gobies have become a dominant species in the Great Lakes, eating small zebra mussels and the eggs and young of other fish. Gobies are eaten by large sport fish. These sport fish have been tested and PCB's have been found in their tissues. Recommendations have been made that people limit the number of sport fish they eat.

Explain how the introduction of foreign species can often cause environmental problems. In your answer be sure to:

- (1) State how the zebra mussels and gobies were introduced into the United States.
- (2) State *one* way either the zebra mussels or gobies have become a problem in their new environment.
- (3) Describe how *both* zebra mussels and gobies contribute to increasing the concentration of PCB's in sport fish.

Questions 78 through 80 refer to the following:

Gaurs, which are large oxlike animals found in South Asia, have been hunted for sport for many generations. Most recently, as human populations have increased, the gaur's habitats of forests, bamboo jungles, and grasslands have dwindled. The gaur is now considered an endangered species.

Scientists have succeeded in preserving endangered species by cloning. Recently, a gaur was cloned and the resulting embryo was placed inside a domestic cow, which then give birth to a baby gaur.

- 78) Based on the reading passage, describe how gaurs produced through normal means are different from gaurs produced by cloning.
- 79) State *one* biological benefit of preserving endangered species.



- 80) State *one* way, other than cloning, that the gaurs mentioned in the reading passage might be saved from extinction.

Questions 81 through 83 refer to the following:

**GREAT EFFECTS ON THE GREAT LAKES DUE TO GLOBAL WARMING**

Trees such as the jack pine, yellow birch, red pine, and white pine may no longer be able to grow in the Great Lakes region because summers are becoming warmer. However, other trees such as black walnut and black cherry may grow in the area, given enough time. The change in weather would favor these new tree species.

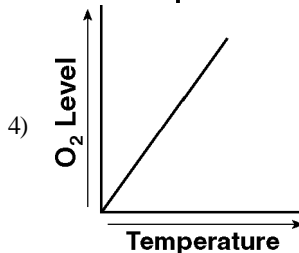
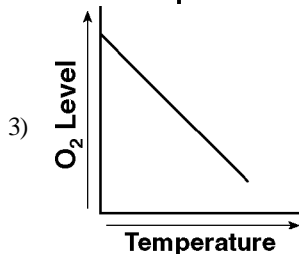
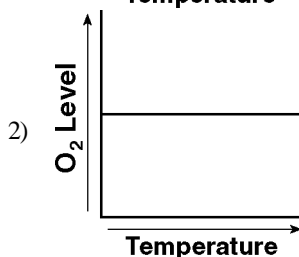
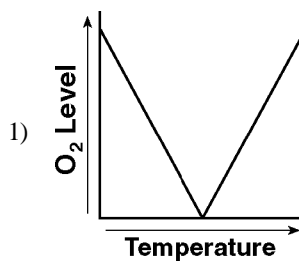
The Great Lakes region is the only place in the world where the endangered Kirtland's Warbler breeds. This bird species nests in young jack pine trees (5 to 23 years old). The vegetation must have specific characteristics or the birds will not nest. A specific area of Michigan is one of the few preferred areas. If the jack pines can no longer grow in this area, the consequences for the Kirtland's Warbler could be devastating.

Recent research findings also suggest that algae production in Lake Ontario and several other Great Lakes will be affected as warmer weather leads to warmer lake water. An increase in water temperature reduces the ability of water to hold dissolved oxygen. These changes have implications for the entire Great Lakes food web. Changes in deep-water oxygen levels and other habitat changes may prevent the more sensitive cold-water fish from occupying their preferred niches in a warmer climate.

All other factors being equal, climatic changes may not have a negative effect on every species in the Great Lakes region. This is because the length of the growing season would be increased. Some temperature sensitive fish could move to cooler, deeper water when the surface water temperatures become too high. The total impact of global warming is difficult to predict.

- 81) Based on the reading passage, explain how the habitat of the Kirtland's Warbler may be changed as a result of global warming.
- 82) Based on the reading passage, identify *one* producer found in the water of Lake Ontario.

- 83) According to the reading passage, which graph *best* shows the relationship between changes in temperature in the Great Lakes waters and the amount of dissolved oxygen those waters can hold?



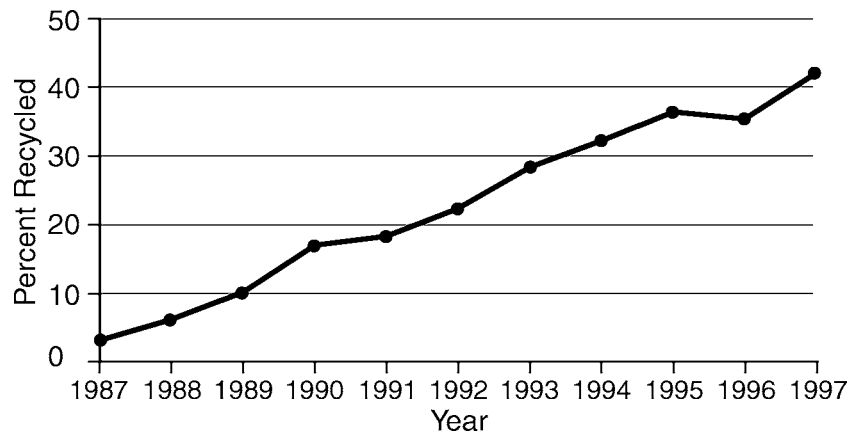
- 84) State *one* specific way the removal of trees from an area can have a negative impact on the environment.
- 85) Deforestation is viewed as a problem in the world today. Describe a cause and an effect of deforestation and a way to lessen this effect. In your answer, be sure to:
- (1) State *one* reason deforestation is occurring.
  - (2) State *one* environmental problem that results from widespread deforestation.
  - (3) State *one* way to lessen the effects of deforestation, other than planting trees.
- 86) Lawn wastes, such as grass clippings and leaves, were once collected with household trash and dumped into landfills. Identify *one* way that this practice was harmful to the environment.

- 87) Bacteria that are removed from the human intestine are genetically engineered to feed on organic pollutants in the environment and convert them into harmless inorganic compounds.

Row	Negative Effect	Positive Effect
(1)	Inorganic compounds interfere with cycles in the environment.	Human bacteria are added to the environment.
(2)	Engineered bacteria may out-compete native bacteria.	The organic pollutants are removed.
(3)	Only some of the pollutants are removed.	Bacteria will make more organic pollutants.
(4)	The bacteria will cause diseases in humans.	The inorganic compounds are buried in the soil.

Which row in the table above *best* represents the most likely negative and positive effects of this technology on the ecosystem?

- 1) 1                                      2) 2                                      3) 3                                      4) 4
- 88) The following graph shows the percentage of solid wastes recycled in between 1987 and 1997.

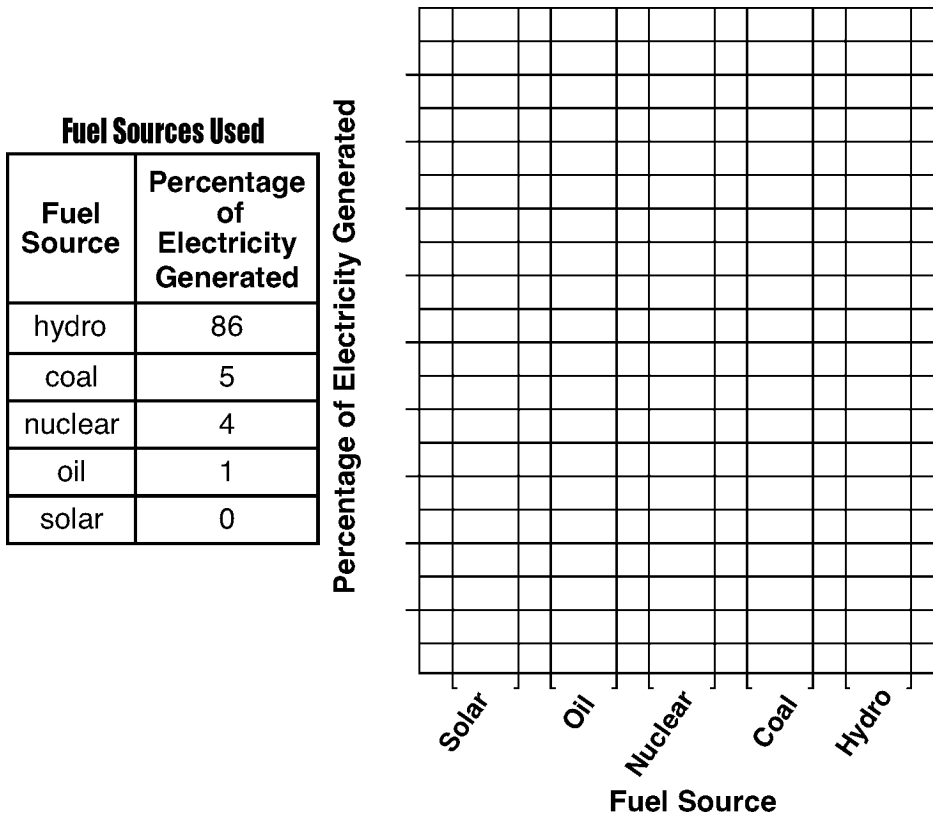


Discuss the impacts of recycling. In your answer be sure to:

- (1) Explain what recycling is and provide one example of a material that is often recycled.
- (2) State *one* specific positive effect recycling has on the environment.
- (3) State *one* specific reason that the percentage of solid wastes recycled increased between 1987 and 1997.

Questions 89 through 91 refer to the following:

Each year, a New York State power agency provides its customers with information about some of the fuel sources used in generating electricity. The table below applies to the period of 2002-2003.



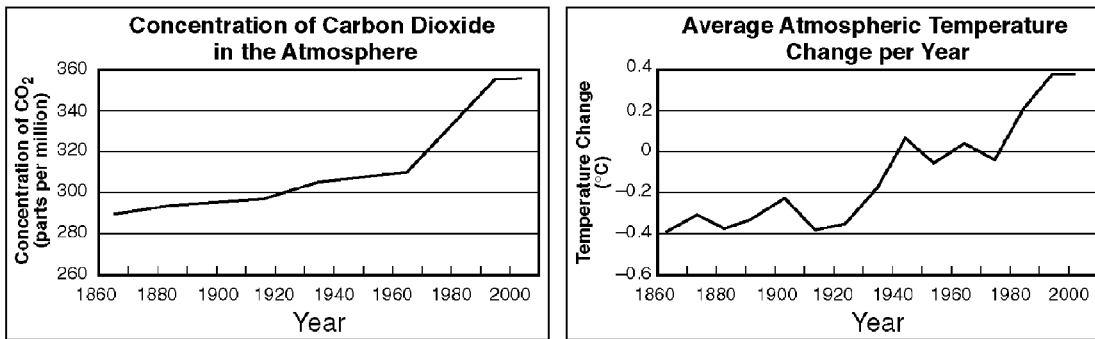
- |  |   |
|--|---|
| <p>89) (a) On the grid provided, mark an appropriate scale on the axis labeled "Percentage of Electricity Generated."</p> <p>(b) Construct vertical bars to represent the data. Shade in each bar.</p> | <p>90) Identify <i>one</i> fuel source in the given table that is considered a fossil fuel.</p> <p>91) Identify <i>one</i> fuel source in the given table that is classified as a renewable resource.</p> |
|--|---|

Questions 92 through 94 refer to the following:

Scientists are increasingly concerned about the possible effects of damage to the ozone layer.

- 92) Damage to the ozone layer has resulted in mutations in skin cells that lead to cancer. Will the mutations that caused the skin cancers be passed on to offspring? [Support your answer.]
- 93) State *two* specific ways in which an ocean ecosystem will change (other than fewer photosynthetic organisms) if populations of photosynthetic organisms die off as a result of damage to the ozone layer.

94) For over 100 years scientists have monitored the carbon dioxide concentrations in the atmosphere in relation to changes in the atmospheric temperature. The graphs below show the data collected for these two factors.



Discuss the overall relationship between carbon dioxide concentration and changes in atmospheric temperature and the effect of these factors on ecosystems. Your answer must include:

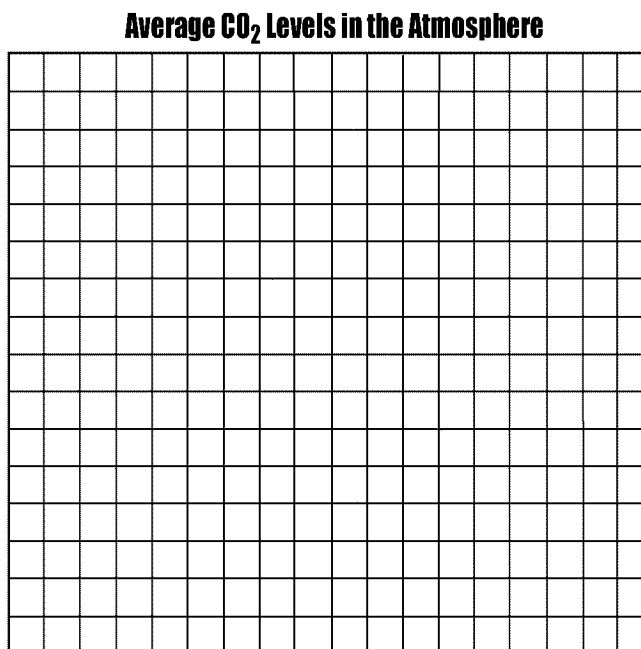
- (1) a statement identifying the overall relationship between the concentration of carbon dioxide and changes in atmospheric temperature
- (2) *one* way in which humans have contributed to the increase in atmospheric carbon dioxide
- (3) *one* specific negative effect the continued rise in temperature would be likely to have on an ecosystem
- (4) *one* example of how humans are trying to reduce the problem of global warming

Questions 95 through 98 refer to the following:

The average level of carbon dioxide in the atmosphere has been measured for the past several decades. The data collected are shown in the table below.

Year	CO <sub>2</sub> (in parts per million)
1960	320
1970	332
1980	350
1990	361
2000	370

CO<sub>2</sub> (parts per million)



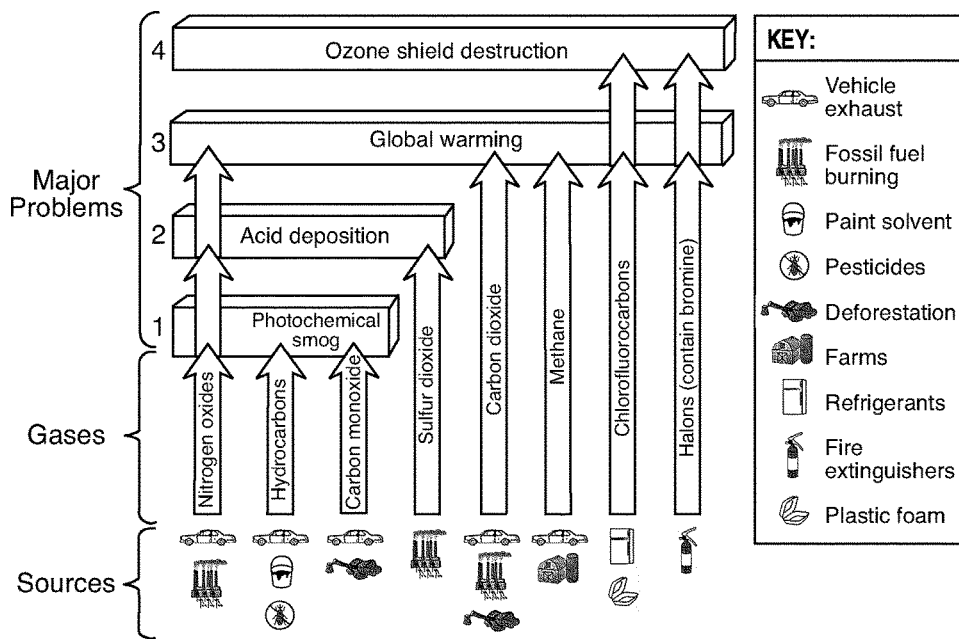
Year

- 95) Using the information in the data table shown, construct a line graph on the grid provided following the directions below.
- (a) Mark an appropriate scale on each labeled axis.
- (b) Plot the data on the grid. Surround each point with a small circle and connect the points.



- 96) Identify *one* specific human activity that could be responsible for the change in carbon dioxide levels shown in the data table from 1960 to 2000.
- 97) State *one* possible *negative* effect the change in CO<sub>2</sub> level shown in the data table has had on the environment of Earth.
- 98) Based on the given data table, calculate the net change in CO<sub>2</sub> level in parts per million (ppm) during the years 1960 through 2000.

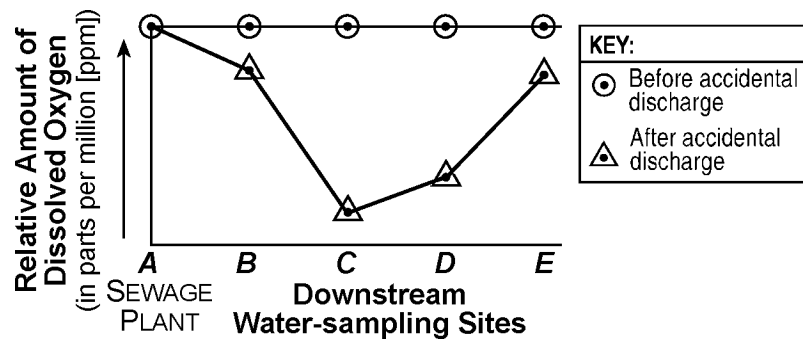
- 99) The diagram below shows some of the gases that, along with their sources, contribute to four major problems associated with air pollution.



Select *one* of the four major problems from the diagram shown and record the number of the problem on your paper. Identify a gas that contributes to the problem you selected and state *one* way in which the amount of this gas can be reduced.

Questions 100 through 102 refer to the following:

Untreated organic wastes were accidentally discharged into a river from a sewage treatment plant. The graph below shows the dissolved oxygen content of water samples taken from the river at specific distances downstream from the plant, both before, and then three days after the discharge occurred.



- 100) State why the accident described would be expected to benefit the decomposers in the river below the sewage plant.
- 101) Explain why an energy-releasing process occurring in the mitochondria of the decomposer organisms is most likely responsible for the change indicated by the data taken at sampling site C in the graph shown.
- 102) Based on the given information and your knowledge of biology, state *one* reason why the following statement is correct: "The effects of the accidental discharge are *not* expected to last for a long time."

103) **YELLOW FEVER:**

**Paragraph A:** A team of doctors was sent to Havana, Cuba, to study a yellow fever epidemic. The doctors wanted to find out how the pathogenic microbe that causes yellow fever is transferred from those who are sick to those who are well. Some people thought that the disease was spread by having contact with a person who had the disease or even through contact with clothing or bedding that they had used.

**Paragraph B:** It was known that yellow fever occurred more frequently in swampy environments than in environments that were dry. Consequently, some people thought that the disease was due to contact with the atmosphere of the swamps. A respected doctor in Havana was convinced that a particular species of mosquito, *Aedes calopus*, spread the disease.

**Paragraph C:** The team of doctors carried out several experiments and collected data. They built poorly ventilated houses in which American soldiers volunteered to sleep on bedding used by individuals who had recently died of yellow fever in local hospitals. The soldiers also wore the nightshirts of those who had died. The houses were fumigated to kill all mosquitoes and the doors and windows of the houses were screened. None of the soldiers living in these houses contracted the disease, though the experiment was tried repeatedly.

**Paragraph D:** In another experiment, the team built houses that were tightly sealed. The doors and windows were screened. The insides of the houses were divided into two parts by mosquito netting. One part of the house contained a species of mosquito, *Aedes calopus*, that had been allowed to bite yellow fever patients in the hospital. There were no mosquitoes in the other part of the house. A group of volunteers lived in each part of the house. A number of those who lived in the part of the house with the mosquitoes became infected; none of those in the other part of the house did.

**Paragraph E:** Putting these facts together with other evidence, the team concluded that *Aedes calopus* spread the disease. The validity of this conclusion then had to be tested. All newly reported cases of yellow fever were promptly taken to well-screened hospitals and their houses were fumigated to kill any mosquitoes. The breeding places of the mosquitoes in and around Havana were drained or covered with a film of oil to kill mosquito larvae. Native fish species known to feed on mosquito larvae were introduced into streams and ponds. The number of yellow fever cases steadily declined until Havana was essentially free of the epidemic.

Explain why the use of native fish (described in paragraph *E* of the given reading passage), rather than the use of pesticides, is less likely to have a negative impact on the environment.