

1. A change in the acidity of mountain lakes would most likely be a result of
 - 1) ecological succession of the area at the top of the mountain
 - 2) the introduction of new species into the lakes
 - 3) air pollution from smoke stacks miles away
 - 4) planting grasses and shrubs around the lakes

2. 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) an increase in the sewage content in the water
 - 2) a change in the biodiversity in the water
 - 3) a change in the number of mutations in plants growing near the water
 - 4) a decrease in the amount of sunlight necessary for photosynthesis in the water

3. Fertilizers used to improve lawns and gardens may interfere with the equilibrium of an ecosystem because they
 - 1) cause mutations in all plants
 - 2) cannot be absorbed by roots
 - 3) can be carried into local water supplies
 - 4) cause atmospheric pollution

4. 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.

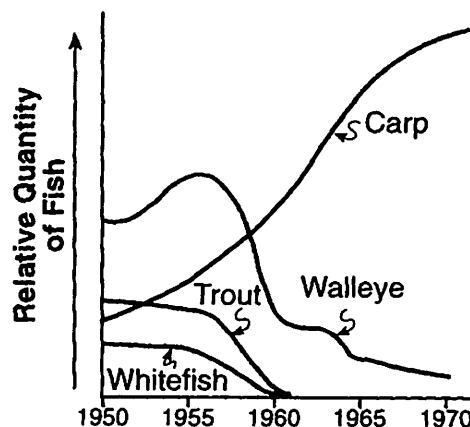
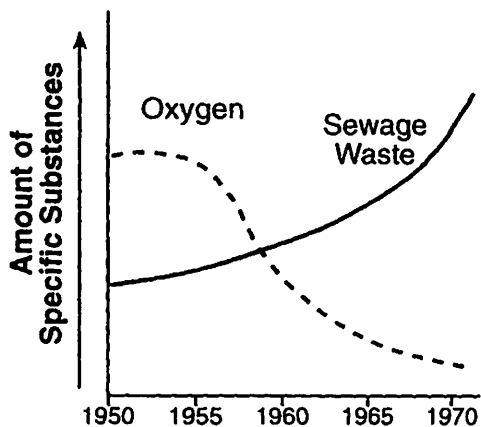
5. Deforestation of areas considered to be rich sources of genetic material could limit future agricultural and medical advances due to
 - 1) the improved quality of the atmosphere
 - 2) the maintenance of dynamic equilibrium
 - 3) an increase in the rate of evolutionary change
 - 4) the loss of biodiversity

6. In order to reduce consumption of nonrenewable resources, humans could
 - 1) burn coal to heat houses instead of using oil
 - 2) heat household water with solar radiation
 - 3) increase industrialization
 - 4) use a natural-gas grill to barbecue instead of using charcoal

7. 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

8. Which relationship can correctly be inferred from the data presented in the graphs below?

Oxygen Content and Fish Population in a Lake



- 1) As sewage waste increases, oxygen content decreases.
- 2) As sewage waste increases, oxygen content increases.

- 3) As oxygen content decreases, carp population decreases.
- 4) As oxygen content decreases, trout population increases.

9. 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

10. Which human activity would be *least* likely to disrupt the stability of an ecosystem?

- 1) disposing of wastes in the ocean
- 2) using fossil fuels
- 3) increasing the human population
- 4) recycling bottles and cans

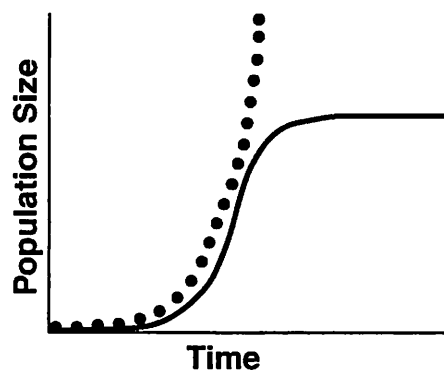
11. Which action by humans has had the most positive ecological impact on the environment?

- 1) use of pesticides to regulate insect populations
- 2) importation of organisms such as the Japanese beetle and the zebra mussel into the United States
- 3) overhunting of many predators to prevent the death of prey animals
- 4) reforestation and cover cropping to prevent soil erosion

12. 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

13. The dotted line on the graph below represents the potential size of a population based on its reproductive capacity. The solid line on this graph represents the actual size of the population.



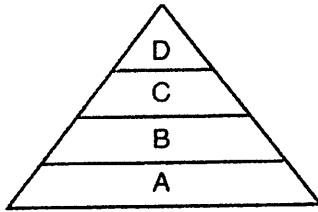
Which statement best explains why the actual population growth is *less* than the potential population growth?

- 1) Resources in the environment are limited.
- 2) More organisms migrated into the population than out of the population.
- 3) The birthrate gradually became greater than the death rate.
- 4) The final population size is greater than the carrying capacity.

14. 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) recycling of nutrients
- 3) the control of pathogens
- 4) the production of new species

15. The diagram below represents a food pyramid.



The concentration of the pesticide DDT in individual organisms at level D is higher than the concentration in individuals at level A because DDT is

- 1) synthesized by organisms at level D
- 2) excreted by organisms at level A as a toxic waste
- 3) produced by organisms at level C which are eaten by organisms at level D
- 4) passed through levels A, B, and C to organisms at level D

16. Before it was banned, the insecticide DDT was used to combat an organism called the red mite. An unexpected result of the use of DDT was that the population of the red mite increased rather than decreased, while the population of insect predators of the red mite decreased. What can be inferred from this situation?

- 1) Environmental changes that affect one population can affect other populations.
- 2) The red mite and its insect predators were all competing for the same resources.
- 3) The red mites were immune to the effects of insecticides.
- 4) Using insecticides is a reliable way to eliminate all insect predators.

17. A major reason that humans can have such a significant impact on an ecological community is that humans

- 1) can modify their environment through technology
- 2) reproduce faster than most other species
- 3) are able to increase the amount of finite resources available
- 4) remove large amounts of carbon dioxide from the air

18. One possible reason for the rise in the average air temperature at Earth's surface is that

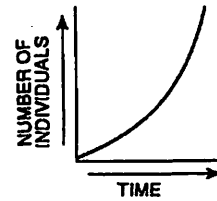
- 1) decomposers are being destroyed
- 2) deforestation has increased the levels of oxygen in the atmosphere
- 3) industrialization has increased the amount of carbon dioxide in the air
- 4) growing crops is depleting the ozone shield

19. Continued depletion of the ozone layer will most likely result in

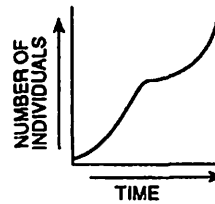
- 1) an increase in skin cancer among humans
- 2) a decrease in atmospheric pollutants
- 3) an increase in marine ecosystem stability
- 4) a decrease in climatic changes

20. Which graph best indicates the effects of successful population control in humans?

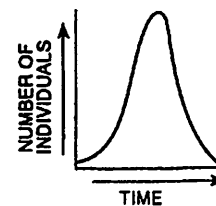
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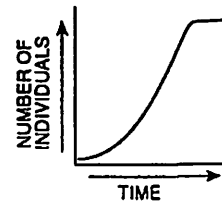
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3)



4)



21. Base your answer to the following question on the information below and on your knowledge of biology.

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

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.

Base your answers to questions 22 and 23 on the information below and on your knowledge of biology.

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.

22. State how a *decrease* in the amount of light may be responsible for fish kills in the Chesapeake Bay area.
23. Identify *one* abiotic factor in the Chesapeake Bay ecosystem involved in the fish kills.

Base your answers to questions 24 through 26 on the information below and on your knowledge of biology.

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

24. State *one* reason why an introduced species might be very successful in a new environment.
25. Identify *one* introduced organism and write its name in the space below. Describe *one* way in which this organism has altered an ecosystem in the new location.

Organism: _____

26. Identify *one* action the government could take to prevent the introduction of additional new species.
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Base your answers to questions 27 and 28 on the passage below and on your knowledge of biology.

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.

27. Describe one biological problem that may possibly result from using microorganisms to fight pollution.

28. State one economic advantage of bioremediation.

29. 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:

- state *one* way in which offshore oil drilling might have a long-term *negative* effect on the environment
- state *one* way in which offshore oil drilling could benefit society

30. Base your answer to the following question on the passage below and on your knowledge of biology.

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.

Explain how the habitat of the Kirtland's Warbler may be changed as a result of global warming.