Alteration And Recovery Of Ecosystem

1 Which human activity would interfere most directly with the production of oxygen in the environment?
(1) using fertilizer for agriculture
(2) using nuclear fuels
(3) accelerating deforestation
(4) preserving wetlands

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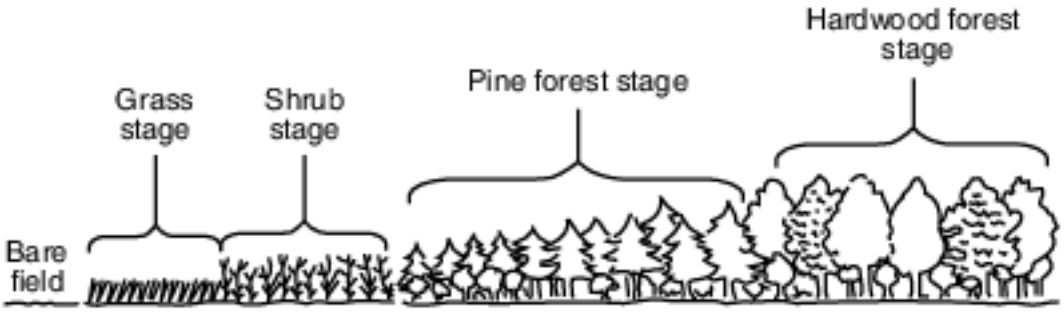
2 The diagram below represents the changes over time in an area.



Which example is not a natural process that could return a hardwood forest to the grass stage once again?
(1) a forest fire caused by a lightning strike
(2) the aging and falling of trees
(3) clearing the land for agriculture
(4) a hurricane or tornado

3 The Mississippi River Delta wetlands ecosystem is home to a large number of fish, birds, and other aquatic organisms. During the last century, this ecosystem has seen a decrease in wetland areas and species diversity due to land development, agriculture, and flooding. Conservation groups have been working to reconnect the Mississippi River with its flood plain and restore lost wetlands. One result of restoring wetland areas in this ecosystem would be
(1) an increase in abiotic factors that would cause organisms to develop new adaptations
(2) the development of an ecosystem that will prevent invasive species from settling there
(3) an increase in the carrying capacity of the ecosystem for wetland organisms
(4) to prevent the organisms that live in this eco- system from competing for food and shelter

4 The table below shows the results of a study on the lifespan of 115 individual song sparrows.

Song Sparrow Lifespan

Year	Number at Start of Year	Number at End of Year
1	115	25
2	25	19
3	19	12
4	12	2
5	2	1
6	1	0

The two most likely factors contributing to the decline in the number of these 115 sparrows during year 1 were

(1) favorable climate and a rapid reproduction rate
(2) lack of predators and an expanding habitat
(3) lack of mating and loss of nesting sites
(4) disease and predation

Base your answer to question 5 on the information below and on your knowledge of biology.

Dissolved oxygen (DO) can be found in an aquatic ecosystem and is often one factor that affects the size of populations of aquatic organisms. Water temperature is very important in determining the amount of DO in a water supply. The colder the temperature of the water, the more DO the water can hold.

5 State one possible reason why the biodiversity of an aquatic ecosystem could decrease if the water temperature were to increase. Support your answer. [1]

Base your answers to questions 6 on the information below and on your knowledge of biology.

Decline in the Amphibians

Declines in amphibian species, such as frogs, toads and salamanders, might affect the ways in which ecosystems function. Amphibians prey on many types of small organisms that survive by consuming leaf litter (leaf material on the ground of ecosystems). These small organisms include animals such as earthworms, centipedes, millipedes, pill bugs, and many species of insects. In turn, amphibians are preyed on by fish, herons, chipmunks, turkeys, foxes, coyotes, and other animals.

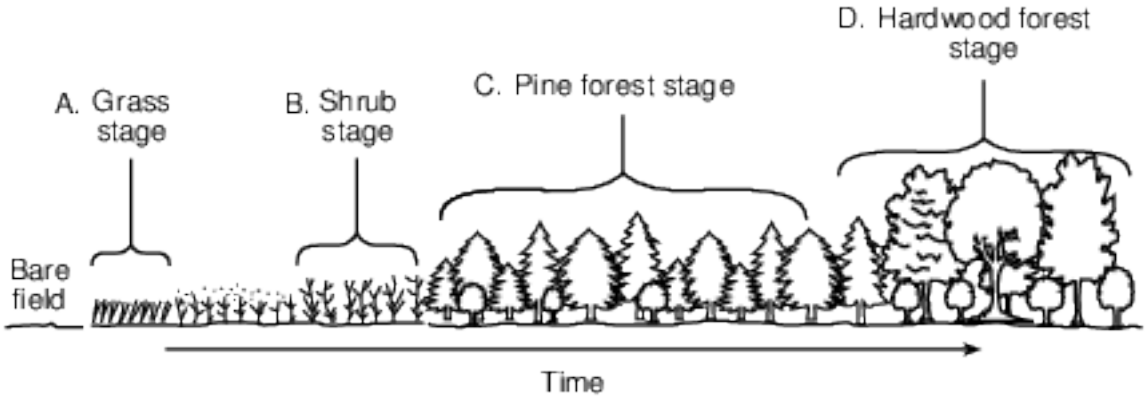
Human activities often cause a reduction in the size of amphibian populations. As amphibian populations are reduced, the organisms that are preyed on by amphibians increase in number. As the populations of small forest organisms increase, the amount of leaf litter decreases. The decrease in the amount of leaf litter on the forest floor may have negative effects on the forest ecosystem.

6 Identify one human activity and describe how that activity could directly or indirectly lead to a reduction in amphibian populations. [1]

Base your answers to question 7-8 on the diagram below and on your knowledge of biology. The diagram indicates a change in an ecosystem.

7-8 Identify some of the key events associated with the change. In your answer, be sure to:
- identify one natural event that could cause the disruption indicated in the diagram [1]
- state what would most likely happen to the new stable ecosystem in future years if no further disruptions occur [1]

Base your answers to questions 9 on the information below and on your knowledge of biology. The diagram represents an ecological process that occurs in New York State over a long period of time.



9 Identify the short-term effect that a forest fire during stage D would have on the biodiversity of the area. [1]

Base your answers to questions 10 on the information below and on your knowledge of biology.

Coral Reef Ecosystems

There are many ecological interactions that maintain the biodiversity present in coral reefs. In addition to coral, microscopic algae, seaweed, sea grasses, sponges and worms, and a variety of fish are among the organisms that live in reef ecosystems. Ocean currents often link different reef systems and move organisms from one reef area to another. This movement is a factor in repopulating a reef that has been damaged by environmental changes.

One environmental change involves an increased growth of seaweed. When the population of seaweed increases, the reef shifts from a coral-dominated ecosystem to a seaweed-dominated ecosystem. This change disrupts the relationships between the organisms that live there.

Studies have shown that, as the density of seaweed in a reef area increases, the number of fish that eat the seaweed in that area decreases. This may be due to the presence of more predators, or the taste of the more mature plants. The fish move to areas where there is less seaweed growth. As this trend continues, the reef areas are taken over by the seaweed. Once this happens, it is very hard to remove the seaweed and restore the reef to a healthy ecosystem.

In addition to this problem, temperature changes are threatening the ocean currents that connect the reef systems. A change in the currents would reduce the movement of fish larvae from one area to another. This contributes to the seaweed problem.

10 State one advantage of the fish larvae moving by ocean currents into a damaged reef ecosystem. [1]

Answer Keys

1 3

2 3

3 3

4 4

5 Allow 1 credit. Acceptable responses include, but are not limited to:
- — Warmer water holds less oxygen, so some species would not have enough oxygen to live.
- — There would be less oxygen available for organisms and some organisms may die off.

6 Allow 1 credit. Acceptable responses include, but are not limited to:
- — Building in the area destroys the habitat.
- — Deforestation reduces the area where animals can find food and shelter.
- — Burning fossil fuels leads to acid rain, resulting in the death of organisms.
- — Introducing nonnative species increases competition for resources and could cause the loss
- of an organism to an area.
- Note: Allow credit for a human activity, not the product of activities, not just “pollution” without
- an explanation.

7-8 The student’s response to the bulleted items in the question need not appear in the following order.
- 7. Allow 1 credit for identifying one natural event that could cause the disruption indicated in the
- diagram. Acceptable responses include, but are not limited to:
- — fire
- — volcanic eruption
- — hurricane/flood
- — earthquake
- 8. Allow 1 credit for explaining what would most likely happen to the new stable ecosystem in future
- years if no further disruptions occur. Acceptable responses include, but are not limited to:
- — The new stable ecosystem would probably continue in the area.
- — It would probably remain unchanged for many years.
- — It will remain a stable ecosystem.
- — It would remain the same.
- — It becomes a climax community/grassy field.

9 Allow 1 credit. Acceptable responses include, but are not limited to:
- — Biodiversity would decrease.
- — Many trees and animals would no longer be present.

10 Allow 1 credit. Acceptable responses include, but are not limited to:
- — The fish larvae could repair/repopulate the damaged reefs.
- — The reef might become more stable.
- — They might keep the seaweed under control/eat the seaweed.
- — It would provide the fish larvae with food/shelter.
- — The fish larvae would have less competition.