

44. The color, taste, and juiciness of a particular variety of strawberry makes it very popular. Growers are able to plant hundreds of acres of this variety, and all the plants will be exactly the same, since they reproduce asexually. Explain why this lack of diversity in the strawberry field could prove to be a problem for the growers.
45. A forest community is made up of thousands of species of organisms and can exist practically unchanged for hundreds of years. This stability is due to the (1) diversity of organisms present (2) abundance of insects that feed on plants (3) changes in the climate of the area (4) lack of decomposers in the forest

Environmental Changes

Many environments, such as the bare rock on a mountaintop, have few resources that can provide homes for living organisms. Through natural processes, these environments will change over long periods of time to become habitats for many diverse species. The series of changes by which one habitat changes into another is called **ecological succession**.

In the process of ecological succession, each community causes modifications to its environment. The modifications result in changes that make it more suitable for another community. The original species that lived there may find it harder to adapt to these changes, while the new

species coming in may be able to compete more successfully for the new niches.

For example, as grasses grow in an area with very shallow soil, they add organic matter, making the soil deeper and more fertile. Shrubs are then able to live in this modified environment and will eventually produce enough shade to eliminate the grasses growing below them. Over a period of many years, these gradual changes may result in the formation of a stable forest community that can last for hundreds or even thousands of years. (In dry or cold climates, succession may not advance to the forest stage, but the final stage will be a stable ecosystem that can last for many years.)

Climatic changes, natural disasters, and the activities of animals (including humans) can alter stable ecosystems. These changes may occur rapidly, perhaps due to a forest fire or flood, or slowly, as when a long-term drought or climate change occurs. Altered environments undergo a slow series of successional changes that return them to a point where long-term stability is possible. In this process, an existing community of organisms is replaced by different communities over a period of time ranging from a few decades to thousands of years.

There are two commonly observed patterns of succession. A community of mostly bare rock will gradually accumulate soil, leading to a progression of vegetation types from grasses to shrubs, and eventually a forest. This process is seen in Figure 6-11.

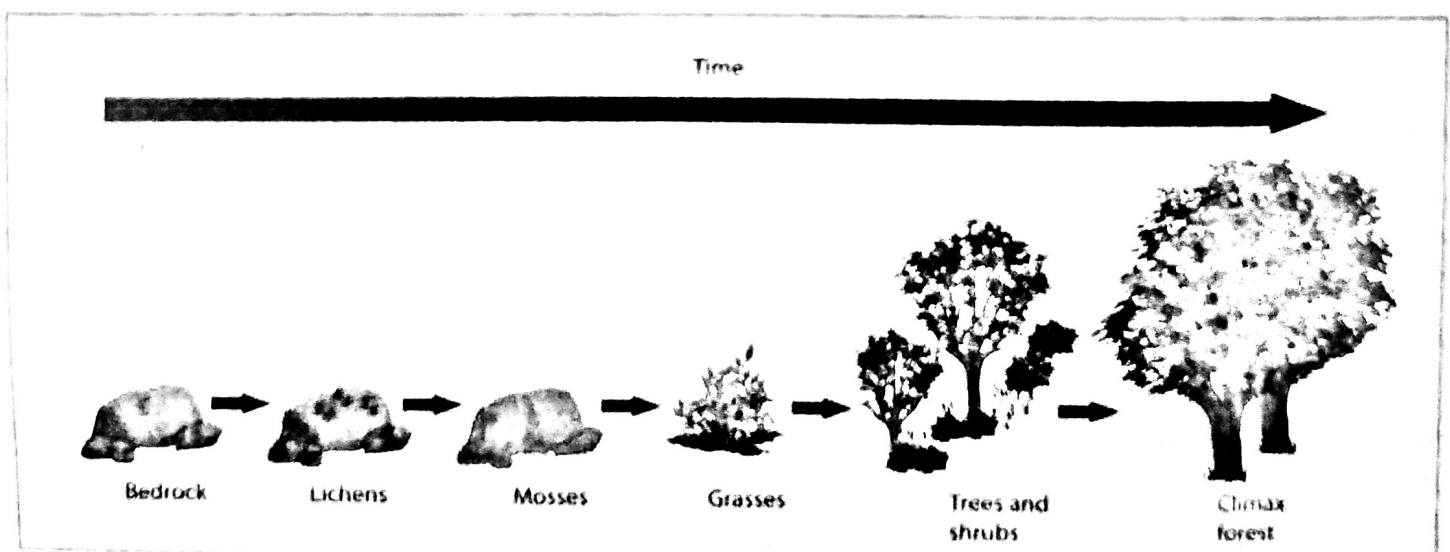


Figure 6-11. Succession from bare rock to a forest: As the depth of the soil increases, it can support the root systems of larger plants.

Another commonly observed example of ecological succession is the change from a lake community to a forest. The lake will gradually accumulate sediments from erosion and the buildup of organic debris from plants and dead

organisms. As the lake fills in, it becomes shallower. After many years, it may become a swamp. The filling-in continues, and eventually a mature forest may result. Successional changes from lake to forest are shown in Figure 6-12.

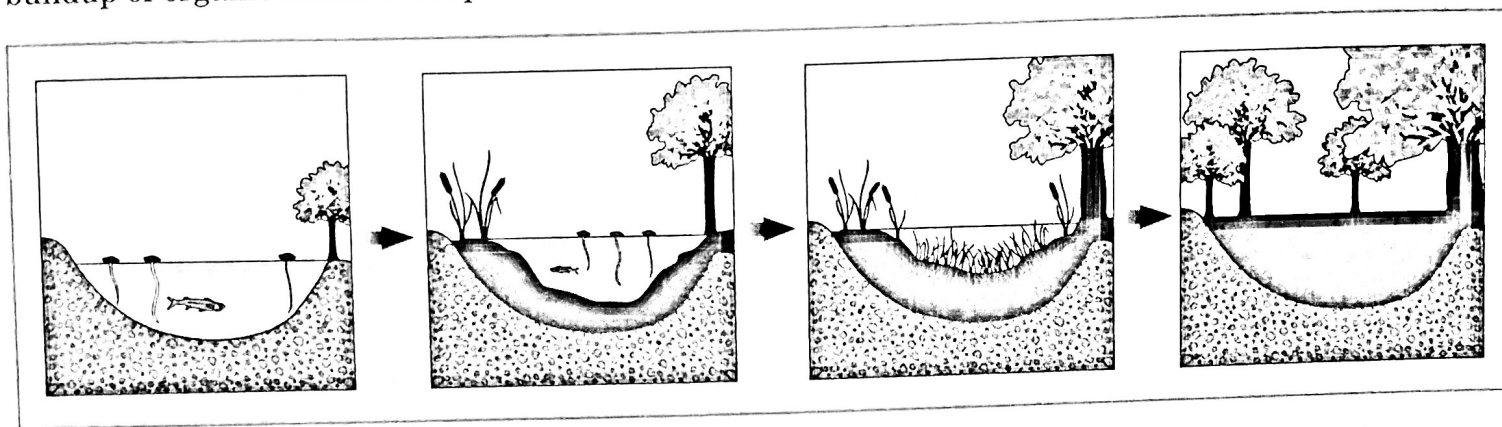


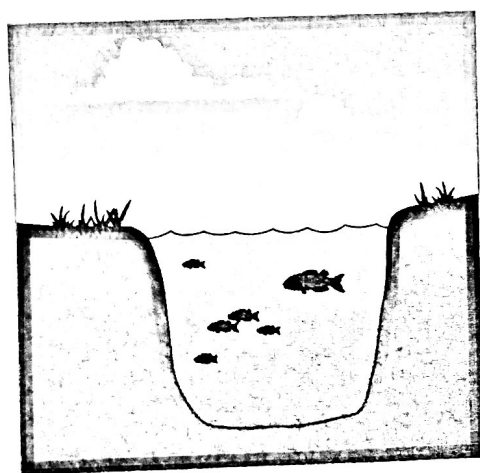
Figure 6-12. Succession from a lake to a forest



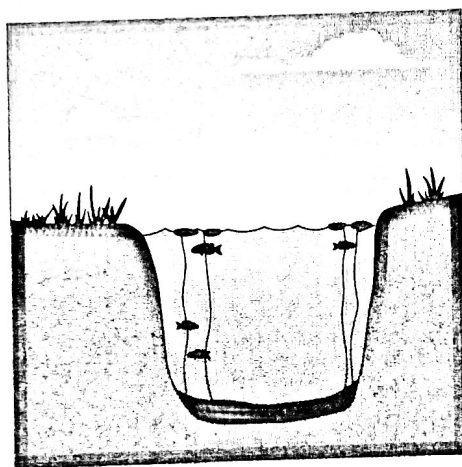
Review Questions

Base your answers to questions 46–49 on the following sequence of diagrams.

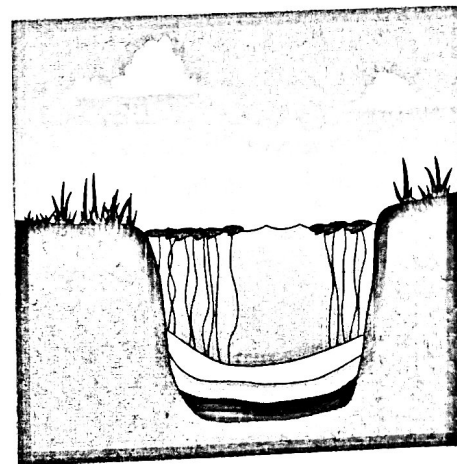
46. This sequence of diagrams best illustrates
 (1) succession (2) evolution (3) the effects of acid rain
 (4) a food chain



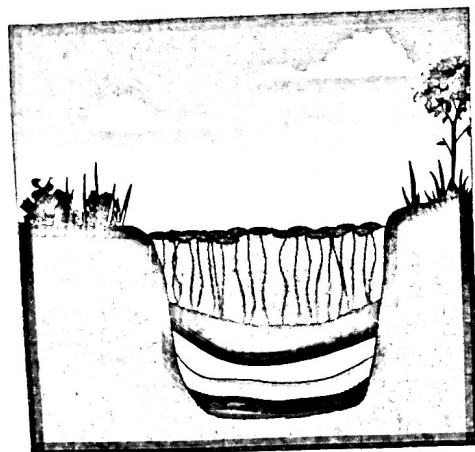
1840



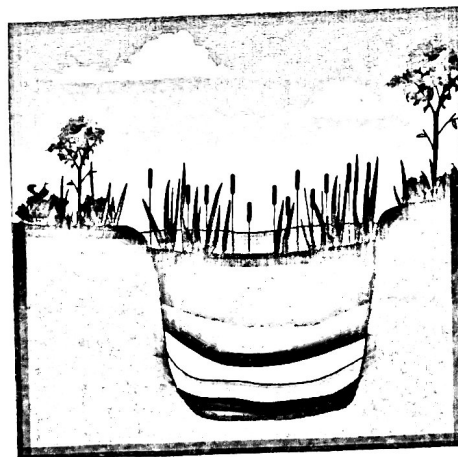
1870



1900



1930



1960



1990

47. If no human intervention or natural disaster occurs, by the year 2050 this area will most likely be a
(1) lake (2) swamp (3) desert (4) forest
48. The natural increase in the amount of vegetation from 1840 to 1930 is related to the (1) decreasing water depth (2) increasing amount of sunlight (3) presence of bottom-feeding fish (4) use of the pond for fishing
49. Describe what would happen over the following fifty years if a fire burned off all of the vegetation in the area.
-
- Base your answers to questions 50–51 on the information provided and on your knowledge of biology.**
- If you travel inland from the shores of the present Lake Michigan, which was once much larger than it is today, you would travel through the following areas:
- | | |
|----------------------------|---|
| 1. the present sandy beach | 2. grasses |
| 3. a cottonwood forest | 4. a pine forest |
| 5. an oak forest | 6. a beech-maple forest
(where the original shoreline was located) |
50. The above sequence of plant growth is an illustration of (1) succession (2) a food chain (3) evolution (4) an autotroph pyramid
51. Describe why the plants growing in the area of the old shoreline are beech and maple trees and no longer the grasses observed near the new shoreline.
52. When a stable forest community is destroyed by fire, the community usually is (1) not restored (2) restored in a series of successive changes (3) restored only if humans reforest the area (4) changed into a permanent grassland
53. In a pond, which change would most likely lead to land succession? (1) a decrease in the amount of particles suspended in the water of the pond (2) an increase in the speed of the water currents in the pond (3) a decrease in the number and diversity of organisms inhabiting the shallow water of the pond (4) an increase in the amount of sediment, fallen leaves, and tree limbs accumulating on the bottom of the pond.
54. The conditions that existed in a forest before a fire will be established mainly by (1) the water cycle (2) the carbon cycle (3) succession (4) evolution
55. When Mount St. Helens erupted in 1980, a portion of the surrounding area was covered by lava, which buried all of the vegetation. Four months later, *Anaphalis margaritacea* plants were found growing out of lava rock crevices. The beginning of plant regrowth in this area is a part of the process known as (1) species preservation (2) evolution (3) biotic competition (4) succession



Questions for Regents Practice

Part A

1. The members of an animal community are usually similar in
(1) size
(2) structure
(3) food requirements
(4) environmental requirements
2. Which is a biotic factor that affects the size of a population in a specific ecosystem?
(1) the average temperature of the ecosystem
(2) the number and kinds of soil minerals in the ecosystem
(3) the number and kinds of predators in the ecosystem
(4) the concentration of oxygen in an ecosystem