

Changes in Communities

Reading Preview

Key Concept

- How do primary and secondary succession differ?

Key Terms

- succession
- primary succession
- pioneer species
- secondary succession

Target Reading Skill

Comparing and Contrasting As you read, compare and contrast primary and secondary succession by completing a table like the one below.

Factors in Succession	Primary Succession	Secondary Succession
Possible cause	Volcanic eruption	
Type of area		
Existing ecosystem?		

Changes in a Yellowstone community ▼



Lab zone

Discover Activity

What Happened Here?

1. The two photographs at the bottom of this page show the same area in Yellowstone National Park in Wyoming. The photograph on the left was taken soon after a major fire. The photograph on the right was taken a few years later. Observe the photographs carefully.
2. Make a list of all the differences you notice between the two scenes.

Think It Over

Posing Questions How would you describe what happened during the time between the two photographs? What questions do you have about this process?

In 1988, huge fires raged through the forests of Yellowstone National Park. The fires were so hot that they jumped from tree to tree without burning along the ground. Huge trees burst into flame from the intense heat. It took months for the fires to burn themselves out. All that remained were thousands of blackened tree trunks sticking out of the ground like charred toothpicks.

Could a forest community recover from such disastrous fires? It might seem unlikely. But within just a few months, signs of life had returned. First, tiny green shoots of new grass poked through the sooty ground. Then, small tree seedlings began to grow. The forest was coming back! After 15 years, young forests were flourishing in many areas.

Fires, floods, volcanoes, hurricanes, and other natural disasters can change communities very quickly. But even without disasters, communities change. The series of predictable changes that occur in a community over time is called **succession**.

1 Volcanic Eruption
Shortly after a volcanic eruption, there is no soil, only ash and rock.

2 Pioneer Species
The first species to grow are pioneer species such as mosses and lichens.

3 Soil Creation
As pioneer species grow and die, soil forms. Some plants grow in this new soil.

FIGURE 19
Primary Succession

Primary succession occurs in an area where no soil and no organisms exist. **Applying Concepts** What determines the particular species that appear during succession?

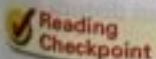
Primary Succession

Primary succession is the series of changes that occur in an area where no soil or organisms exist. Such an area might be a new island formed by the eruption of an undersea volcano or an area of rock uncovered by a melting sheet of ice.

Figure 19 shows the series of changes an area might undergo after a violent volcanic eruption. The first species to populate the area are called **pioneer species**. They are often carried to the area by wind or water. Typical pioneer species are mosses or lichens, which are fungi and algae growing in a symbiotic relationship. As pioneer species grow, they help break up the rocks. When the organisms die, they provide nutrients that enrich the thin layer of soil that is forming on the rocks.

Over time, plant seeds land in the new soil and begin to grow. The specific plants that grow depend on the climate of the area. For example, in a cool, northern area, early seedlings might include alder and cottonwood trees. Eventually, succession may lead to a community of organisms that does not change unless the ecosystem is disturbed. Reaching this mature community can take centuries.

4 Fertile Soil and Maturing Plants
As more plants die, they decompose and make the soil more fertile. New plants grow and existing plants mature in the fertile soil.



What are some pioneer species?



- 1 Abandoned Field**
Grasses and wildflowers have taken over this abandoned field.

- 2 Tree Growth Begins**
After a few years, pine seedlings and other plants replace some of the grasses and wildflowers.

FIGURE 20

Secondary Succession

Secondary succession occurs following a disturbance to an ecosystem, such as clearing a forest for farmland.

Secondary Succession

The changes following the Yellowstone fire were an example of secondary succession. **Secondary succession** is the series of changes that occur in an area where the ecosystem has been disturbed, but where soil and organisms still exist. Natural disturbances that have this effect include fires, hurricanes, and tornadoes. Human activities, such as farming, logging, or mining, may also disturb an ecosystem. **Unlike primary succession, secondary succession occurs in a place where an ecosystem currently exists.**

Secondary succession usually occurs more rapidly than primary succession. Consider, for example, an abandoned field in the southeastern United States. You can follow the process of succession in such a field in Figure 20. After a century, a hardwood forest is developing. This forest community may remain for a long time.



**Reading
Checkpoint**

What are two natural events that can disturb an ecosystem?

Go  Online

SCILINKSSM
NSTA

For: Links on succession
Visit: www.SciLinks.org
Web Code: scn-0514



- 3 **A Forest Develops**
As tree growth continues, the trees begin to crowd out the grasses and wildflowers.

- 4 **Mature Community**
Eventually, a mixed forest of pine, oak, and hickory dominates the landscape.

Section 4 Assessment

- Target Reading Skill **Comparing and Contrasting** Use the information in your table to help you answer Question 1 below.

Reviewing Key Concepts

- a. **Defining** What is primary succession? What is secondary succession?
- b. **Comparing and Contrasting** How do primary succession and secondary succession differ?
- c. **Classifying** Grass poking through a crack in a sidewalk is an example of succession. Is it primary succession or secondary succession? Explain.

Lab
zone

At-Home Activity

Community Changes Interview a family member or neighbor who has lived in your neighborhood for a long time. Ask the person to describe how the neighborhood has changed over time. Have areas that were formerly grassy been paved or developed? Have any farms, parks, or lots returned to a wild state? Write a summary of your interview. Can you classify any of the changes as examples of succession?