

Section 3.1.

How Changes Occur Naturally in Ecosystems.

Textbook pages 108 to 121.

Before You Read.

How do you think mature forests, such as the temperate rainforests of coastal British Columbia, change over time?

How do organisms adapt to change?

In **natural selection**, the best-adapted members of a species survive to reproduce. These individuals may pass favourable characteristics on to their offspring. As abiotic and biotic components of their environment change, **adaptive radiation** may result. This term describes the change from a common ancestor into a number of different species that “radiate out” to inhabit different niches. For example, thirteen species of finches that fill different niches on the Galapagos Islands are thought to have developed from a single species from mainland South America.

How do ecosystems change over time?

Ecological succession refers to changes that take place over time in the types of organisms that live in an area. There are two types of ecological succession:

1. Primary succession: **Primary succession** occurs in areas where no soil exists, such as following glaciation or a lava flow. Wind and rain carry spores of lichens to these areas. Lichens obtain nutrients by secreting chemicals that break down rock. As lichens decay, they add organic matter to the developing soil. The first organisms to survive and reproduce in an area are called **pioneer species**. They are adapted to grow in harsh, nutrient-poor conditions. In time, often over hundreds of years, the weathering of rocks and decay of pioneer species cause soil formation. The abiotic conditions of the ecosystem continue to change as new species of plants and animals colonize the area, each competing for nutrients, moisture, and sunlight. More niches are created and biodiversity increases.

Next page.

Eventually, primary succession leads to the development of mature **climax communities**, such as a boreal forest or grassland.

2. Secondary succession: Small disturbances, such a fire, often occur in ecosystems. **Secondary succession**— succession that occurs as a result of a disturbance to an area that already has soil and was once the home of living organisms—occurs as a result. It proceeds much faster than primary succession since micro-organisms, insects, seeds, and nutrients still exist in the soil.

How do natural events affect ecosystems?

Natural events can destroy habitats, reduce biodiversity, and cause regions to undergo succession. Some examples include:

- flooding: results in soil erosion, pollution, and disease when toxins or harmful bacteria from untreated sewage enter drinking water
- drought: plants and animals die due to lack of water
- insect infestations: often result in succession in forests because insects destroy older, weaker trees
- tsunamis: huge, rapidly moving ocean waves destroy habitats and salt water carried onto shore changes soil composition

This text is copyrighted and has been developed for the educational use of students using McGraw-Hill BC Science 10.