

Chapter 6 – Organisms Depend on a Healthy Environment

6.1: The Dynamics of Nature: Succession

Vocabulary:

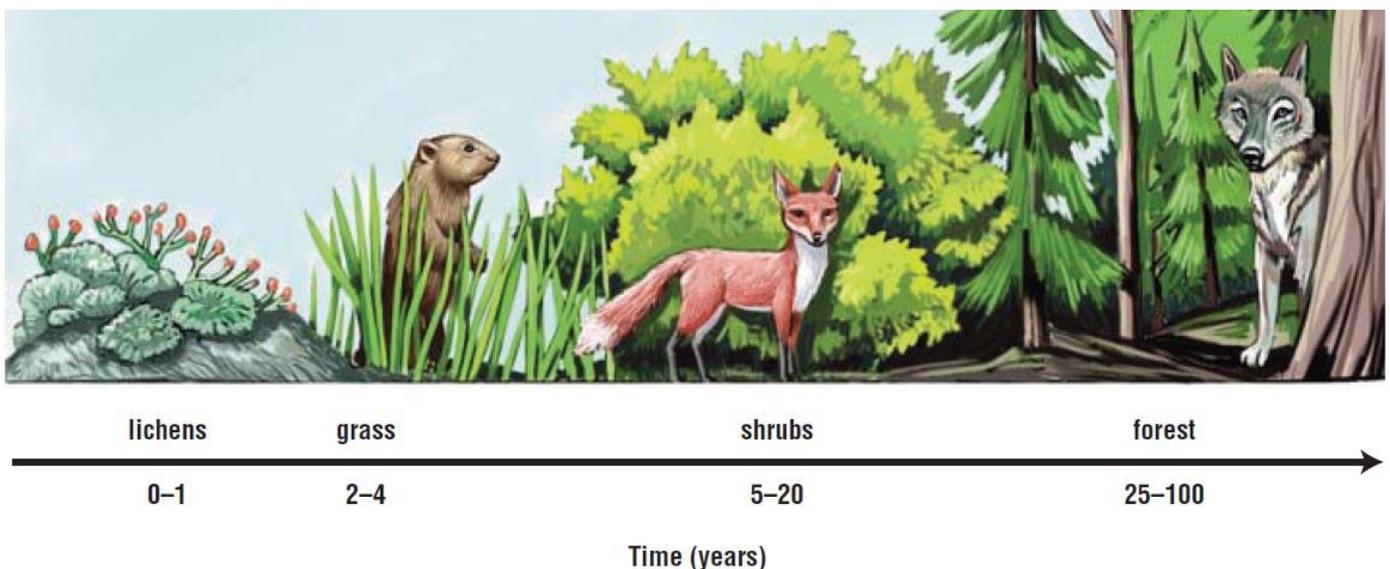
succession – a series of gradual changes that result in the replacement of one community of plants and animals by other

primary succession – succession that develops a community of plants and animals in an area where no living things existed before

lichens - the first organisms to live in a previously-barren area

- produce acids that break down the rock into soil, allowing mosses and other small plants to grow
- vital for primary succession because they are able to grow on bare rock

secondary succession – succession that develops a community that has previously sustained life, but has been disturbed



1. (a) Primary succession is a type of succession in which a community of plants and animals develops in a place where no living things existed before.

(b) Lichen a complex organism consisting of fungi and algae growing together in symbiosis that often appears as grey, green, or yellow patches on rocks, trees, and other surfaces

are vital for primary succession because they are able to grow on bare rock. They are the first organisms to live in an area that has previously been barren. Lichens produce acids that break down the rock into soil, allowing mosses and other small plants to grow.

2. Primary succession occurs in an area where no living things exist. **Secondary succession** occurs in an area that has previously sustained life, but has been disturbed by a natural or human-made event.

3. If a forest is clear-cut and then left alone to re-establish, the first organisms to arrive would be grasses and wildflowers. They would grow when their seeds blew into the area from surrounding communities. When these plants die, they enrich the soil and larger plants can grow, like bushes and small trees. Bushes and small trees provide food and shelter for animals such as mice, snakes, and nesting birds. Later, larger trees begin to grow. Animals that prefer larger trees inhabit the area.

4. One way humans can interfere with succession: Humans may clear-cut a forest and eliminate an entire ecosystem. Instead of allowing the area to recover through succession, humans may plant one type of tree, such as pine trees. As a result, there are fewer animals that can live in the area because there is only one type of plant to eat. In addition, this increases the likelihood of the area being wiped out by a disease or pest invasion.

6.2: Human Impact on Ecosystems

Vocabulary:

biodiversity – the variety of plant and animal life in an ecosystem

endangered species – species that are at risk of becoming extinct due to either reduction in numbers or an environmental threat

extinction – the complete disappearance of a species from anywhere on Earth

invasive species – a species that has been introduced into an area where it did not exist before

- often reproduces so aggressively that it replaces some of the original species

native species – species that occur naturally in an area

1. Habitat loss occurs when areas of land are cleared for human use, destroying the places where wild organisms live.

2. (a) Biodiversity is a measure of the number of different species in an ecosystem.

(b) When habitat loss occurs, the biodiversity of an area generally declines.

3. (a) An **invasive species** is a species that did not originate in an area, but has been introduced (generally due to human actions) and now out-competes the native species. **Native species** are those that occur naturally in an area.

(b) Invasive species generally do not have natural predators in their new environment. This means that they can grow and reproduce quickly and successfully, out-competing the native species for resources. As a result, the native species are often pushed out and the biodiversity of the area decreases.

(c) Sample answer: Zebra mussels and garlic mustard are two invasive species in Ontario. Zebra mussels clog intake pipes of treatment plants. They also affect food chains by competing with native species for food. Garlic mustard out-competes native plants for nutrients and space. The animals that feed on the native plant species lose a food source.

6.4: Protecting the Environment

Vocabulary:

steward – a person who carefully manages a resource by taking responsibility for their actions and educating others

1. (a) An **ecological footprint** is an estimate of the amount of land and water needed to produce all of the things a person consumes and to absorb all of the waste the person produces.

(b) The average North American's ecological footprint is about 12.4 hectares.

(c) There are about 2 hectares available for every person on Earth.

2. Conserving ecosystems means using the resources of the ecosystems wisely.

3. Organic farming helps to conserve ecosystems because it uses compost and biological pest control techniques to keep soil productive without destroying the soil's natural balance.

4. In improperly built landfill sites, water from rain and snow soaks through the waste and carries contaminants into the soil and groundwater.

5. Sample answer: People can help restore ecosystems by planting trees and by increasing the variety of plant species growing in lawns.

6.5: Traditional Knowledge and Stewardship of Earth

1. (a) Traditional Knowledge is knowledge, experience, and practices gained by Aboriginal peoples over many generations of living and working with the environment.

(b) It is passed from generation to generation through actions, stories, poems, songs, paintings, rituals, and other traditions.

2. Aboriginal people can teach us how to use natural resources in a sustainable way by teaching us their skills and techniques for managing the land and its resources.

3. The message in the poem at the beginning of this section: Humans should not always put themselves first or think of themselves as the most important part of the community. All organisms are important and should be thought of as occupying an important role in the community. In the rainy darkness, the old man stops to help the toads in the road, despite the writer's impatience and indifference. In addition, the poem reflects the idea of learning from elders, as it is the old man in the story who imparts his wisdom to someone younger.

Chapter 6 Review

1. An **endangered** species is one that is still found on Earth, but is in danger of becoming extinct. An **extinct** species is one that no longer exists on Earth.
2. An **ecological footprint** is an estimate of the amount of land and water needed to regenerate the resources a person uses and to absorb the wastes the person produces.
3. Sample answer: **Preserving** means leaving an area undisturbed. For example, there are areas of untouched forest in northern Ontario that should be protected from future logging. “**Conserving**” means using ecosystems wisely. An example is using organic farming methods. “**Restoring**” means taking steps to repair damage done by human activity. An example is planting trees to repair soil erosion.
4. (a) The environmental “three R’s” are reduce, reuse, and recycle.
(b) **Reducing** the amount of products we consume helps the environment because making food, clothing, and other products uses natural resources. If we consume fewer products, fewer natural resources are consumed, which helps conserve Earth’s resources.
Reusing products helps the environment because it reduces the amount of waste we produce. Wastes can cause pollution and other environmental problems.
Recycling products protects the environment because it reduces both the amount of energy and other resources required to make products and reduces the amount of waste we produce.
5. Sample answer: The **sustainability** of a process describes whether the process can continue to occur in its current state without depleting resources.

6. Sample answer: **Succession** is the gradual change in the communities that exist in an ecosystem.

7. Most lawns contain mainly Kentucky bluegrass. Kentucky bluegrass is not native to North America, so it is a non-native species. Because it can out-compete some native grasses, it is crowding them in some natural areas. Therefore, it is an invasive species.

8. **Aboriginal** peoples understand how all things are interconnected and the importance of people living in harmony with Earth. They have used their local resources in a sustainable way for many years and work to promote biodiversity. They can teach us to use natural resources in a sustainable way.

9. The more organisms that live in an ecosystem, the higher the ecosystem's **biodiversity**. In general, ecosystems with high biodiversity (a large number of different kinds of organisms) are better able to survive stresses, such as floods and disease, without collapsing.

10. Examples of human activities that have **reduced biodiversity**:

- e.g. #1 – A development company builds a large shopping centre just outside town. They pave a large field and part of a forest to build the centre and the parking lots and roads around it. When they do that, they destroy habitats for the plants and animals that live in the field and forest. Some of the plants and animals that live there die.

- e.g. #2 - some people in town plant non-native shrubs in their yards for landscaping. None of the local animals eat the shrubs, and the bushes are spreading throughout the town and nearby fields. Some of the native plants are also disappearing.

- e.g. #3 - People use pesticides to kill the mosquitoes and other insects. A lot of bats and birds eat those insects. Since people started using pesticides, there are fewer bats and birds.