



Ecological Succession- Refers to the series of changes that every community undergoes over long periods of time

What is the process of succession?

Pioneering Plants and Animals (the first organisms to appear in succession) appear in an area, forming a primitive community. This community will change and react to various environmental conditions and be replaced by increasingly more complex communities until a final, stable climax community is formed.

There are two types of succession:

1. Primary Succession: A sequence of changes that begin in an area where there is no soil or other forms of life. (For example, bare rocks that eventually become a coniferous forest).

An example of a series of 7 stages in primary succession is:

STAGE 1: BARE ROCK

STAGE 2: LICHENS (Pioneer Species)



STAGE 3: MOSS

Mosses catch windblown material to increase the amount of soil. They grow over the surface of the rock. The soil becomes deeper in this stage.

STAGE 4: HERB

There is now enough soil to support herbs such as fireweed, daisies and Canada thistle. The roots of herbs produce carbonic acid which attack rock. The soil becomes deeper and dead leaves add to its surface.

STAGE 5: SHRUB

There is now enough soil to support woody plants such as blueberry and raspberry plants. These plants continue to deepen the soil.

STAGE 6: DECIDUOUS TREE

There is now enough soil to support tall trees (examples of trees that grow at this stage are: white birch, and trembling aspen)

STAGE 7: CONIFEROUS FOREST

Coniferous trees grow up among the deciduous trees. They grow taller than them and shade them. Eventually the whole forest is filled with coniferous trees, such as white pine, white spruce, black spruce and balsam fir.







This final stage is now a **climax community** (a community of dominant organisms that will not undergo a change in species. Abiotic factors determine the type of climax community that will become established. These abiotic factors are: climate - temperature, precipitation and availability of sunlight; soil - salinity, fertility, moisture and texture; and geographical features - latitude, altitude, proximity to mountain ranges or large bodies of water). The interaction of these abiotic and the biotic factors present keep the climax community stable.



Stages of Primary Succession (the first 3 stages, bare rock, lichens and moss, are shown in the first 'block')

Secondary Succession: A sequence of changes that begin with soil already there because of an existing community that has been destroyed by such things as fire, clear cutting or volcano

An example of Secondary Succession: from Pond to Forest

<p>A colony of beavers dam a stream, creating an open pond in the forest, and the surrounding trees die.</p>	
<p>Plants that like damp conditions thrive around the edges of the pond.</p>	
<p>As these plants complete their life cycle and die, they add to the accumulating organic matter which is making the pond shallower</p>	
<p>As years pass the pond begins to dry out and the pond-edge plants (cattails and sedges) take over the whole pond.</p>	
<p>Around the ponds edges, the plants are being replaced by shrubs.</p>	
<p>Finally, the shrubs are replaced by trees...</p>	

- 2. Secondary Succession-** Occurs where an existing community has been partially destroyed and its balance upset. This would include areas destroyed by fire, cutting of trees, pollution and other human activity

The major difference between primary and secondary succession in a terrestrial environment is that in secondary succession, soil already exists. Seeds of plants will begin to grow. Those that do grow will come from dormant seeds already in the soil, or will come from plants in communities nearby. The seeds will establish a community but succession will eventually result in a climax community

Factors that influence succession:

1. Climate- temperature, precipitation, availability of sunlight
2. Soil-salinity, texture, fertility and moisture
3. Geographic Features- altitude, latitude, proximity of mountains and water.

Examples of Succession:

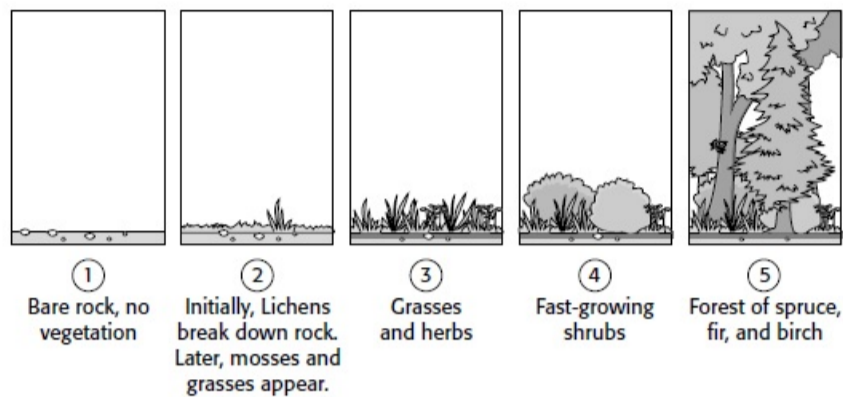
Bare Rock Succession
Pond Succession

PART A: MULTIPLE CHOICE

1. What is succession?
 (A) One community type replaces another over time
(B) A forest is destroyed and replaced by a pond
(C) A climax community is destroyed forever
(D) A series of natural changes leading from climax to pioneering community
2. Which is a major difference between primary and secondary succession?
 (A) The types of climax community are different.
 (B) Soil with seeds is characteristic of secondary succession.
(C) Soil with seeds is characteristic of primary succession.
(D) The steps leading to the climax community are identical in both.
3. What factors might result in a primary succession?
(A) A forest is destroyed by fire.
(B) A farmer abandons his fields.
(C) Pollution causes rapid plant growth in ponds.
 (D) An island is formed by volcanic activity.
4. What is a climax community?
 (A) The final stable community in a succession.
(B) Bare rock represents the climax community.
(C) The first types of plants and animals to be established.
(D) The point when all life forms become extinct.
5. Which statement is true of succession?
(A) Pioneer organisms represent the dominant forms of plant life.
(B) Grasses and shrubs are often replaced by mosses and lichens.
 (C) Primary succession generally occurs more slowly than secondary succession.
(D) Pioneer organisms are often the same as the climax organisms
6. Which of the following is not an example of primary succession?
(A) Vegetation colonising old lava fields on a volcanic island
(B) Salt marsh vegetation on a mud flat
(C) Moss growing on mountain cliffs
 (D) Grassland growing on the site of a previous rainforest

7. Lichen growing on the surface of rocks provides an example of
- (A) Facilitation
 - (B) Tolerance
 - (C) Secondary succession
 - ✓ (D) Primary succession

Use the diagram below to answer questions 8 to 16



8. A series of predictable changes that occur in a community over time is called...
- ✓ (A) Succession
 - (B) Climax community
 - (C) Ecosystem
 - (D) Pioneer species
9. What process is occurring?
- ✓ (A) Primary succession
 - (B) Secondary succession
 - (C) Biotic environment
 - (D) Abiotic environment
10. Which of the following could be a pioneer species?
- ✓ (A) Lichens
 - (B) Herbs and grasses
 - (C) Bare rock
 - (D) Spruce, fir, and birch trees
11. List the pictures from least stable ecosystem to the most stable ecosystem.
- (A) 1, 2, 3, 4, 5
 - ✓ (B) 5, 4, 3, 2, 1
 - (C) 5, 4, 1, 2, 3
 - (D) All of the pictures are equally stable
12. Which picture shows a climax community?
- ✓ (A) Only 5
 - (B) 1 and 5
 - (C) All of them show a climax community.
 - (D) None of them show a climax community because there are not any animals
13. If a tornado moves through the area ,what will happen next?
- (A) Primary succession
 - ✓ (B) Secondary succession
 - (C) A climax community will develop
 - (D) The ecosystem will be at equilibrium

14. The first species to populate the new area is called a
- (A) Primary succession
 - (B) Climax community
 - (C) Secondary succession
 - ✓ (D) Pioneer species
15. A type of succession that occurs in an area where no previous ecosystem existed, soil is newly being created and new species begin to populate the area describes which of the following?
- ✓ (A) Primary succession
 - (B) Secondary succession
 - (C) Climax community
 - (D) Pioneer species
16. A ecosystem that is stable and at the end stage of ecological succession where equilibrium is maintained is describing-
- (A) Primary succession
 - (B) Secondary succession
 - ✓ (C) Climax community
 - (D) Pioneer species
17. The first species to inhabit an area after a disturbance is a...
- (A) Secondary succession
 - (B) Primary succession
 - ✓ (C) Pioneer species
 - (D) Climax community
18. The final stage of of ecological succession is a...
- (A) Primary succession
 - (B) Seondary succession
 - ✓ (C) Climax community
 - (D) Pioneer species
19. What occurs after a disturbance occured that left no soil behind?
- (A) Climax Community
 - (B) Secondary Succession
 - ✓ (C) Primary Succession
 - (D) Pioneer Species
20. What happens after a disturbance where soil is left behind?
- (A) Pioneer species
 - (B) Primary succession
 - (C) Climax community
 - ✓ (D) Secondary succession

PART B: WRITTEN RESPONSE

1. A coniferous forest is a climax community because it has reached its final stage of succession. What type of abiotic factors resulted in this climax community being established?

2. After this fire is over, which kind of succession will begin to take place? Think of and describe at least one other example of this type of succession. (Think of disturbances other than fire. It may even be an example near where you live!).

3. How does primary succession begin? What kind of organisms would be found in the beginning stages (2 and 3)? How does this differ from secondary succession?

4. If left untouched, would many ponds in Newfoundland eventually be coniferous forest? Why, what is happening to them?

5. What does equilibrium mean in terms of a forest ecosystem?

6. Identify at least three conditions which help maintain equilibrium in a forest ecosystem.

7. In what ways have humans affected natural ecosystems such as a forest or large lake?

8. What are some of the human activities in your area that are having a negative impact on an ecosystem near you?

9. What can be done to help your local ecosystem recover?
