# What is Ecological Succession?

Worksheet

Ecological succession is the directional change in species composition over time: primary succession (bare rock soil plants) or secondary succession (disturbed land forest). It ends at a stable climax community.

## Questions

1. The first organisms to colonize bare rock are

A) trees
B) grasses
C) lichens and mosses
D) animals

2. Primary succession differs from secondary succession in that primary succession

A) occurs on soil
B) is faster
C) occurs on bare rock with no soil
D) produces different climax

3. What role do pioneer species play in succession?

A) they dominate forever
B) they modify the environment to make it suitable for later species
C) they prevent other species from arriving
D) they stabilize the climax community

4. A climax community is stable because

A) it has few species
B) it is resistant to disturbance
C) it has high biodiversity, full niche occupancy, and balanced nutrient cycling
D) both B and C

5. A forest fire burns down an established oak forest. The charred soil is still fertile. What type of succession occurs, and how quickly will trees return?

6. Bare rock is exposed by a glacier retreat. Describe the first stage of primary succession.

7. In a climax forest community, why is the species composition stable and resistant to change?

8. Define: What is ecological succession?

9. Define: What is primary succession?

10. Define: What is secondary succession?

# Answer Key

1. C) lichens and mosses - Lichens and mosses are pioneer species - hardy, can grow on bare rock, and break down rock to form early soil.

2. C) occurs on bare rock with no soil - Primary succession starts on bare rock (no soil); secondary succession starts on disturbed land with existing soil (faster recovery).

3. B) they modify the environment to make it suitable for later species - Pioneer species break down rock, trap organic matter, form soil, and prepare the environment for less hardy species to establish.

4. D) both B and C - Climax communities are stable due to high biodiversity (many species buffer against change) and efficient nutrient cycling.

5. Succession type: secondary succession (disturbed forest land with existing soil) Timeline: faster than primary (50-200 years vs 500+ years) Stages: shrubs and pioneer trees (aspen, pine) dominate first (5-20 years), then oak forest gradually returns Biotic role: pioneer tree seeds arrive from wind, animals, soil; they stabilize soil and prepare for shade-tolerant oaks

6. Pioneer species: lichens and mosses (first colonizers) Function: break down rock via acid secretion early weathering Role in succession: trapping dust, dead organic matter soil formation Timeline: 5-20 years until soil is deep enough for grasses Following stages: grasses, shrubs, trees

7. Stability reason: biodiversity is high (many species, complex food webs) Resource utilization: most available resources are claimed (full niche occupancy) Nutrient cycling: balanced (litter falls decomposition nutrient reuptake) Competitive advantage: shade-tolerant species dominate; resistant to pioneer-like invasions Disturbance resistance: dense vegetation, soil structure protect against erosion and small disturbances Note: large disturbances (fire, storm) can reset succession

8. Directional change in species composition over time: ecosystem develops from simple (few species) to complex (high diversity), ending in a stable climax community.

9. Succession on bare rock or new land (no soil). Starts with pioneer species (lichens, mosses); takes 500+ years to reach climax.

10. Succession on disturbed land with existing soil (e.g., burned forest, abandoned field). Faster than primary (50-200 years) because soil is already present.