

# Ecological Succession & Resource Partitioning

# TEKS

11D Describe how events and processes that occur during ecological succession can change populations and species diversity

12D Recognize that long term survival of a species is dependent on changing resource bases that are limited

12F Describe how environmental change can impact ecosystem stability

# Vocabulary

- Primary Succession
- Secondary Succession
- Pioneer species
- Habitat
- Niche
- Resource Partitioning
- Diversity
- Invasive species

# Prerequisite Questions

- What makes a community or ecosystem functional?
- What happens if an organism is removed or introduced to an established ecosystem?

# Essential Question #1

- What are the factors that can cause change in an ecosystem?

# Ecological Succession

**Ecological Succession** is the gradual process by which communities and ecosystems change and develop over time.

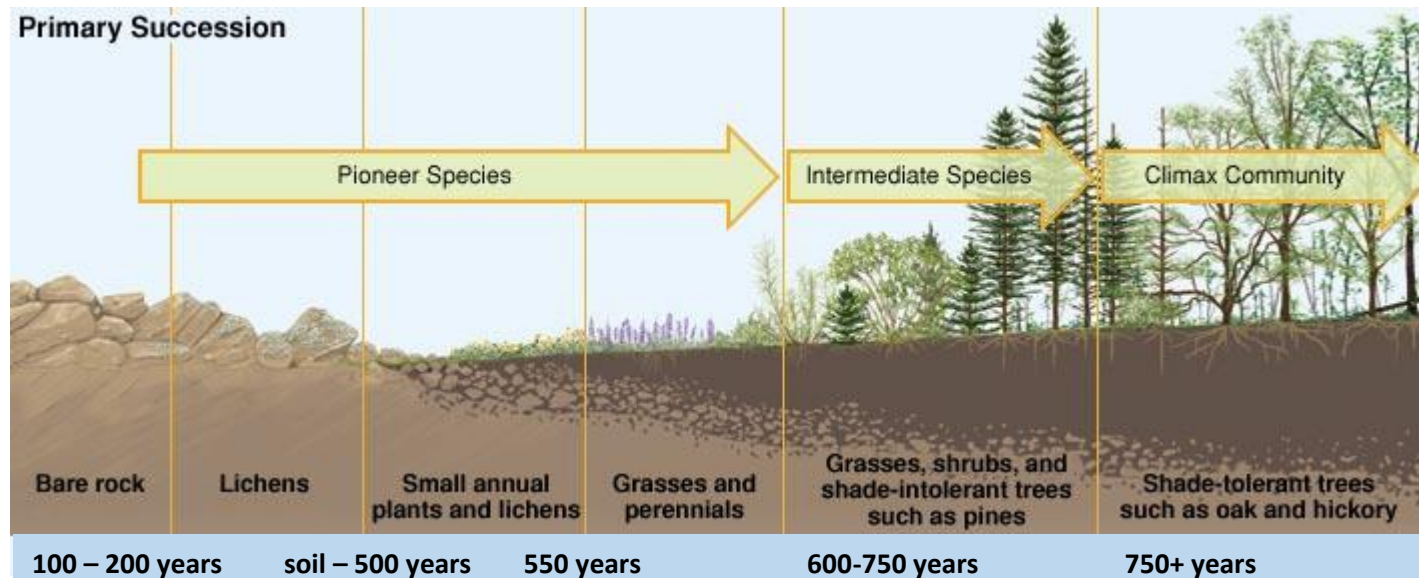
There are two types of ecological succession:

- 1) Primary succession
- 2) Secondary succession

# Primary Succession

**Primary succession** happens when a new, almost usually lifeless, ecosystem starts to build soil from bare rock.

Primary succession usually takes hundreds, if not thousands, of years to reach the climax community.



# Pioneer species

- Pioneer species are organisms that start or restart an ecosystem during succession.

Terrestrial (land) species: bacteria, lichens, mosses, algae, etc.

Aquatic (water) species: bacteria, algae, eel grass, etc.



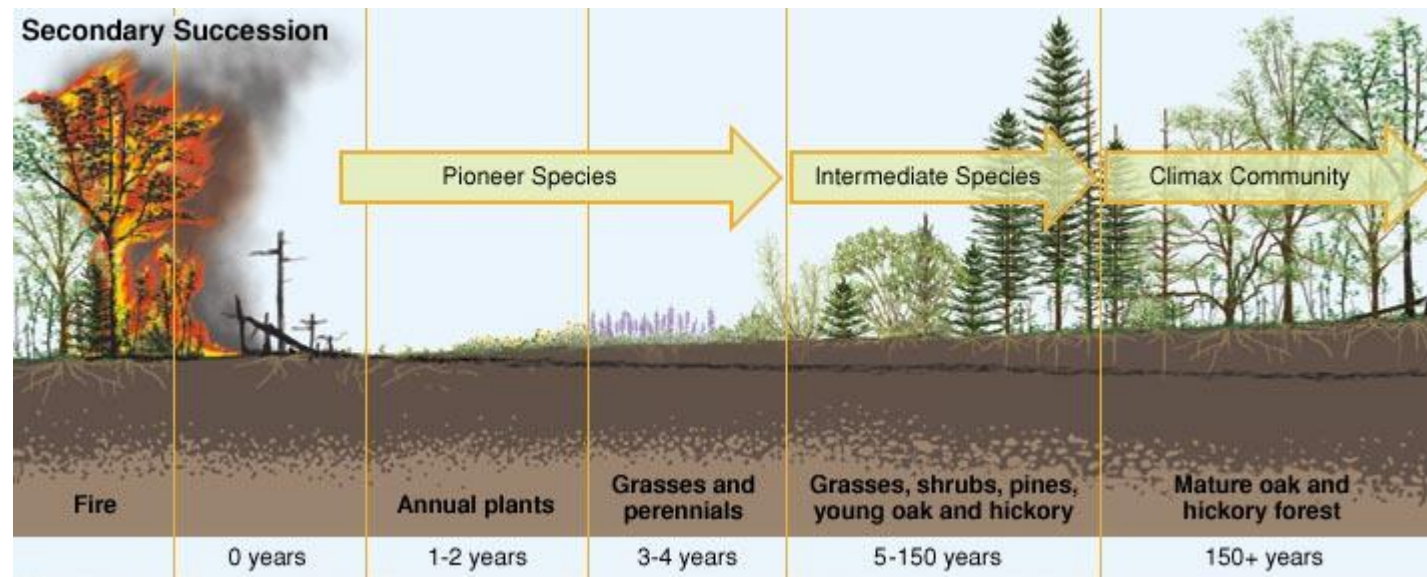


# Primary succession

- Primary succession usually happens on rocky surfaces that do not contain soil (dirt, detritus, humus, etc.)
- Examples:
  1. New volcanic islands that rise from the sea
  2. Strip mined quarries
  3. Violent, volcanic eruptions that blow out a mountain.

# Secondary Succession

- Secondary succession happens when an existing ecosystem has been disturbed drastically, and the ecosystems have to “regrow”
- Secondary succession happens much faster than primary, because the existing soil contains bacteria, seeds, fungi, decomposers, etc. already.



# Secondary succession

- Secondary succession happens faster because there is already an ecosystem in the existing soil.
- Examples:
  1. Wild fires/Forest fires
  2. Floods/Mudslides
  3. Hurricanes affecting islands and coastal areas



All of these examples leave the existing soil behind, they mostly affect the organisms above the soil.



# Habitat

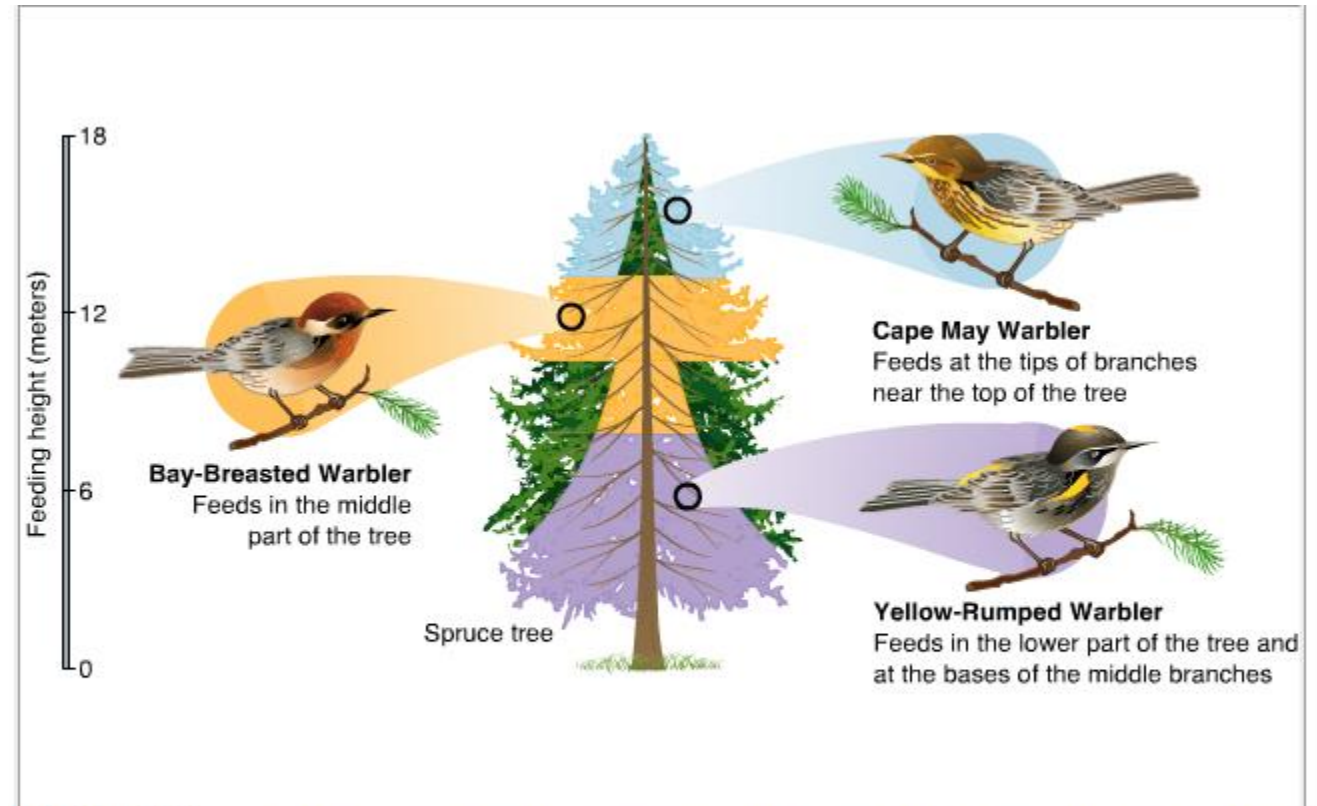
- An organism's **habitat** is where the organism lives in the ecosystem.



# Niche

- An organisms **Niche** is the ecological role that it performs in the environment.

Niches usually contains roles such as trophic levels (producer vs. consumers), decomposer, symbiotic relationships, and the like.

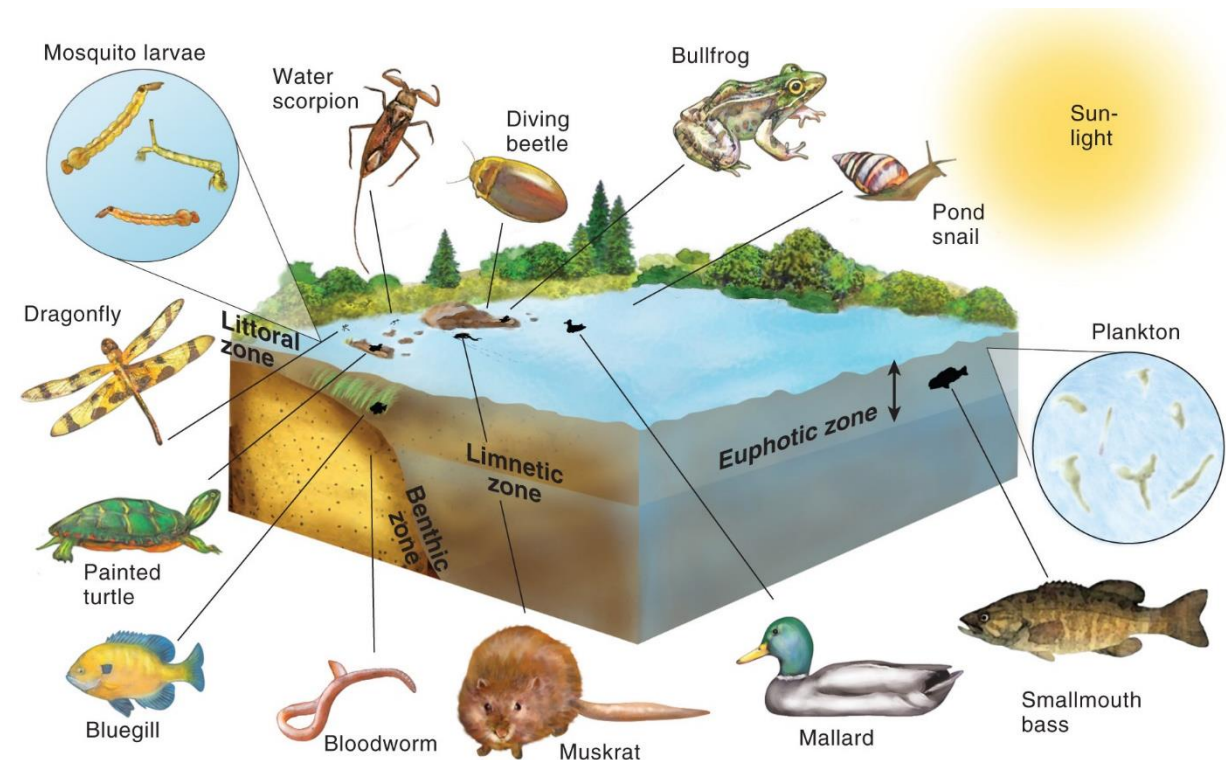


**Warbler Niches** Each of these warbler species has a different niche in its spruce tree habitat. By feeding in different areas of the tree, the birds avoid competing with one another for food. **Inferring** What would happen if two of the warbler species attempted to occupy the same niche?



# Resource Partitioning

- In order to fulfill multiple niches in a small area, like one lake, a tree or a field) individuals need to break up the resources into small areas to use, this is known as **Resource Partitioning**.
- The entire lake is not used by catfish, only the bottom of the lake. Perch will use a different section of the lake for resources.



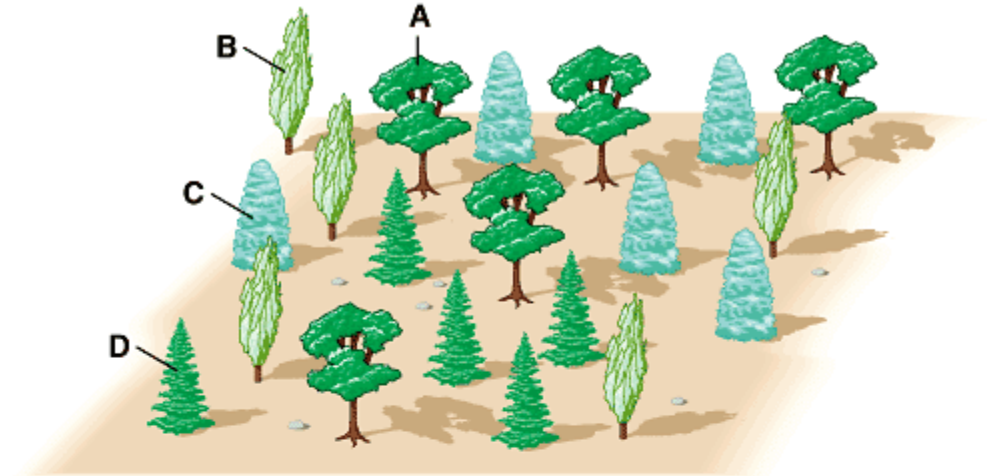
# Species Diversity

- The more diverse an ecosystem is the better it can withstand change (diseases, invasive species, secondary succession, etc.)



# Biodiversity

- The more biodiversity in an ecosystem the healthier the ecosystem is.
- If there is more biodiversity, then any changes will not cause an ecosystem crash  
(like in Yellowstone National Park when the wolves were removed)



**Community 1**  
A: 25% B: 25% C: 25% D: 25%



**Community 2**  
A: 80% B: 5% C: 5% D: 10%



# Limiting Factors

- When resources are abundant (a lot), then there are no reasons for organisms to compete.
- When resources are limited, then competition sets in.
- When organisms compete in nature, one of them (possibly both) is going to lose.
- In the natural world, if you are outcompeted, you are usually removed from the ecosystem.

# Threats to diversity

- **Endangered** organisms typically have a declining population and are on the verge of dying off.



- **Extinct** organisms have died off. No more living specimens can be found.



# Invasive species

- Invasive species are organisms that have been moved, or have moved, to a location that does not naturally support them.
- Usually invasive species will out compete the native species.



Fire ant



Texas leaf cutter ant



# Invasive species

