Chapter 6

Communities and Ecosystem Dynamics

Habitats, Niches, and Species Interactions

Habitat

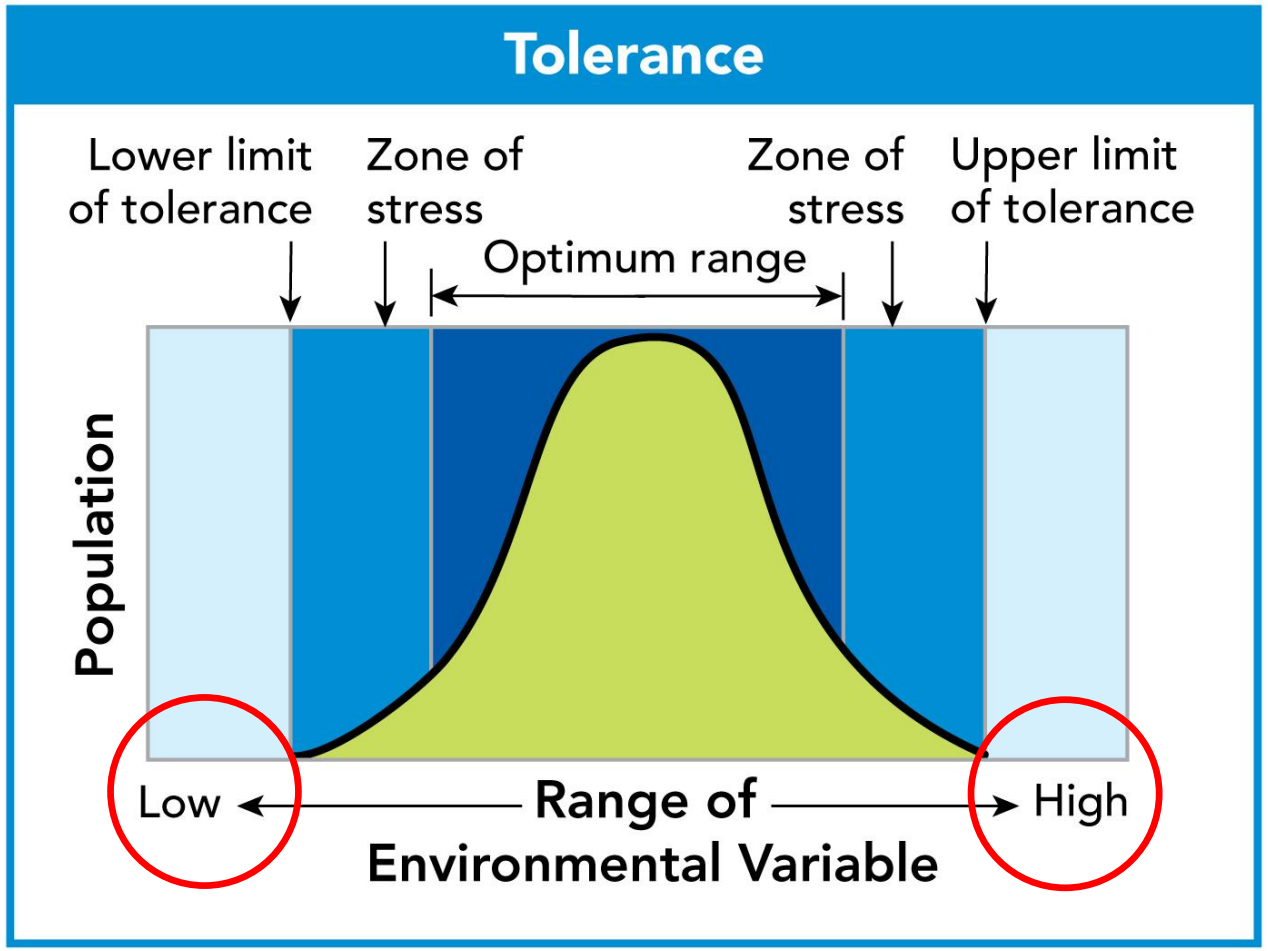
A **habitat** is an area with a particular combination of physical and biological environmental factors that affect which organisms can live within it.

Microhabitats and Microbiomes

A **microhabitat** is a tiny part of a much larger habitat. It has its own set of environmental conditions called its microclimate. A **microbiome** is a microbial community.

Tolerance

Tolerance: the range of external conditions within which a species can survive and reproduce

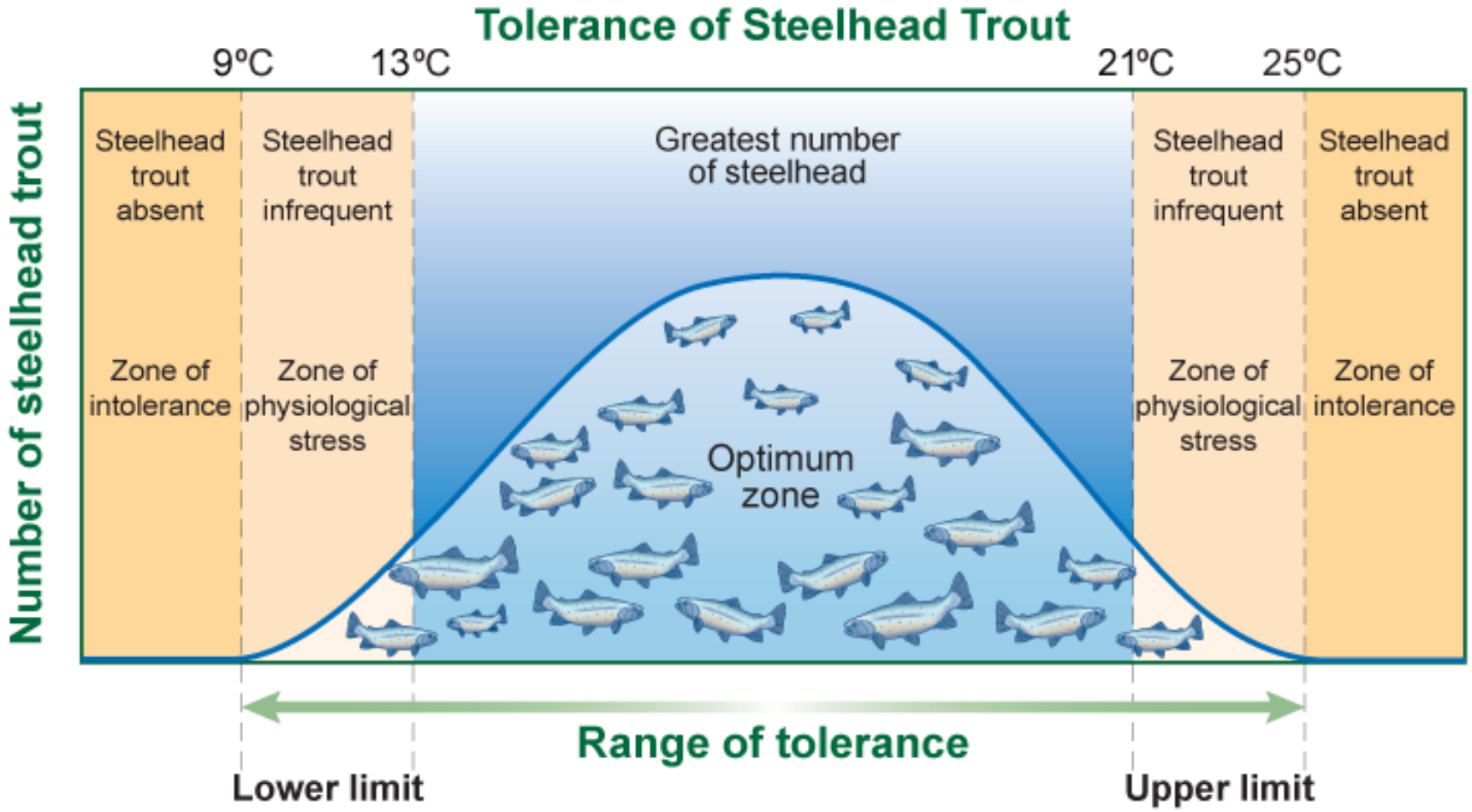


No survival

No survival

Community Ecology

Range of Tolerance



Range of Tolerance

Create a similar graph in your EOC notebook:

Title: Tolerance of Plant A and Elevation

Label the zones: intolerance, stress (both sides), optimum

Label the limits:

-Can live at elevation 1000-2000m

-Can live at elevation 5000-6000

-Cannot live above 6000m

-Grows best at 2000-5000m

-Cannot live below 1000m

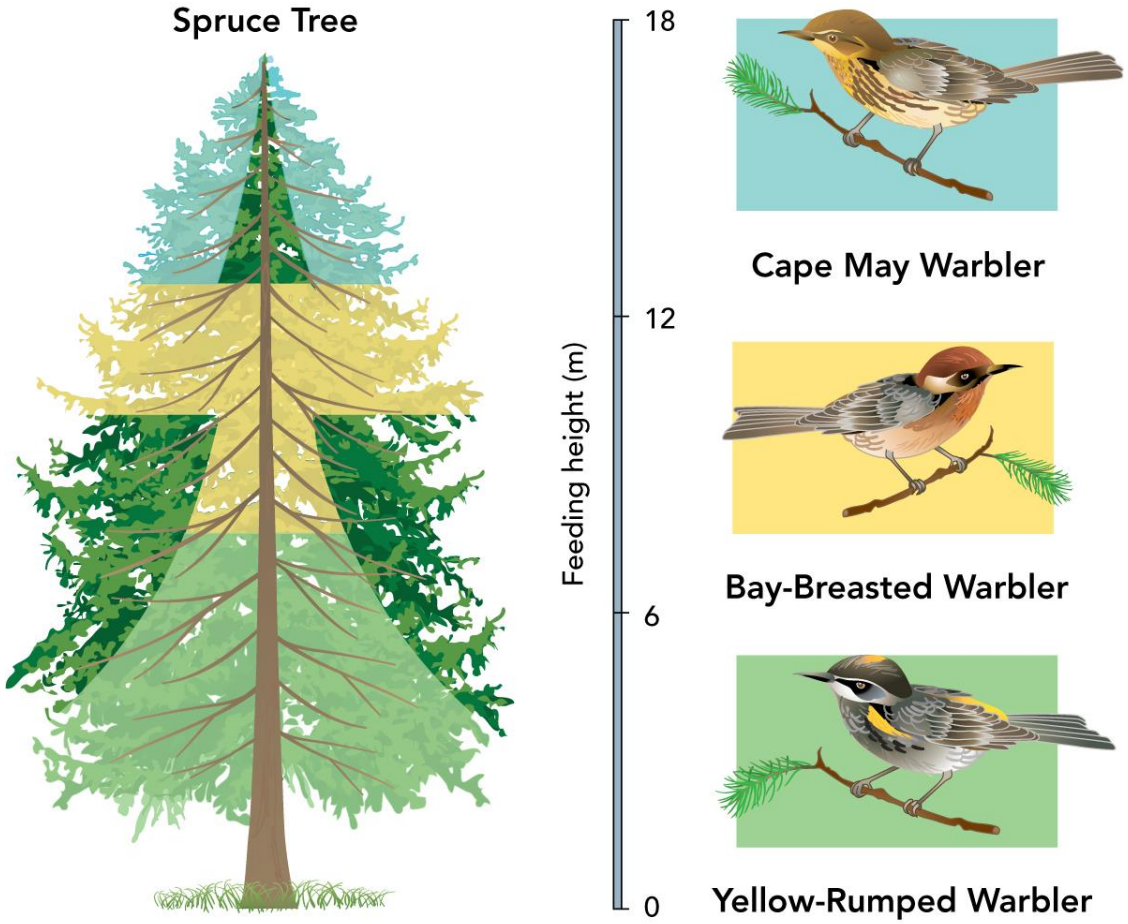
Keystone Species

A keystone species plays a vital and unique role in maintaining structure, stability, and diversity in an ecosystem

Keystone Species Video: https://www.youtube.com/watch?v=JGcIp4YEKrc

The Niche

A species niche includes the range of physical and biological conditions in which it can survive and reproduce, as well as the way it obtains the resources it needs.



Competition

When organisms attempt to use the same limited ecological resources in the same place at the same time.

Intraspecific: between members of the same species

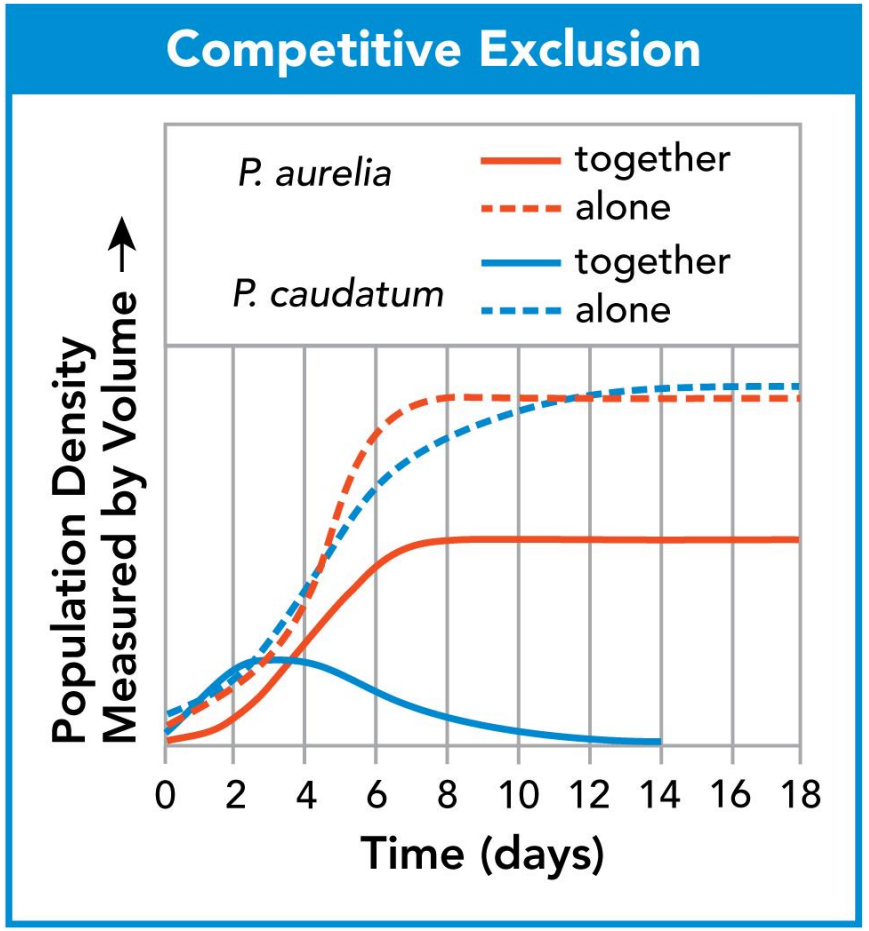
Interspecific: between members of different species

Competitive Exclusion Principle

No two species can occupy exactly the same niche in exactly the same habitat at exactly the same time.

How do the populations of each species vary when combined?

What happens to the population of P. caudatum when mixed with P. aurelia?

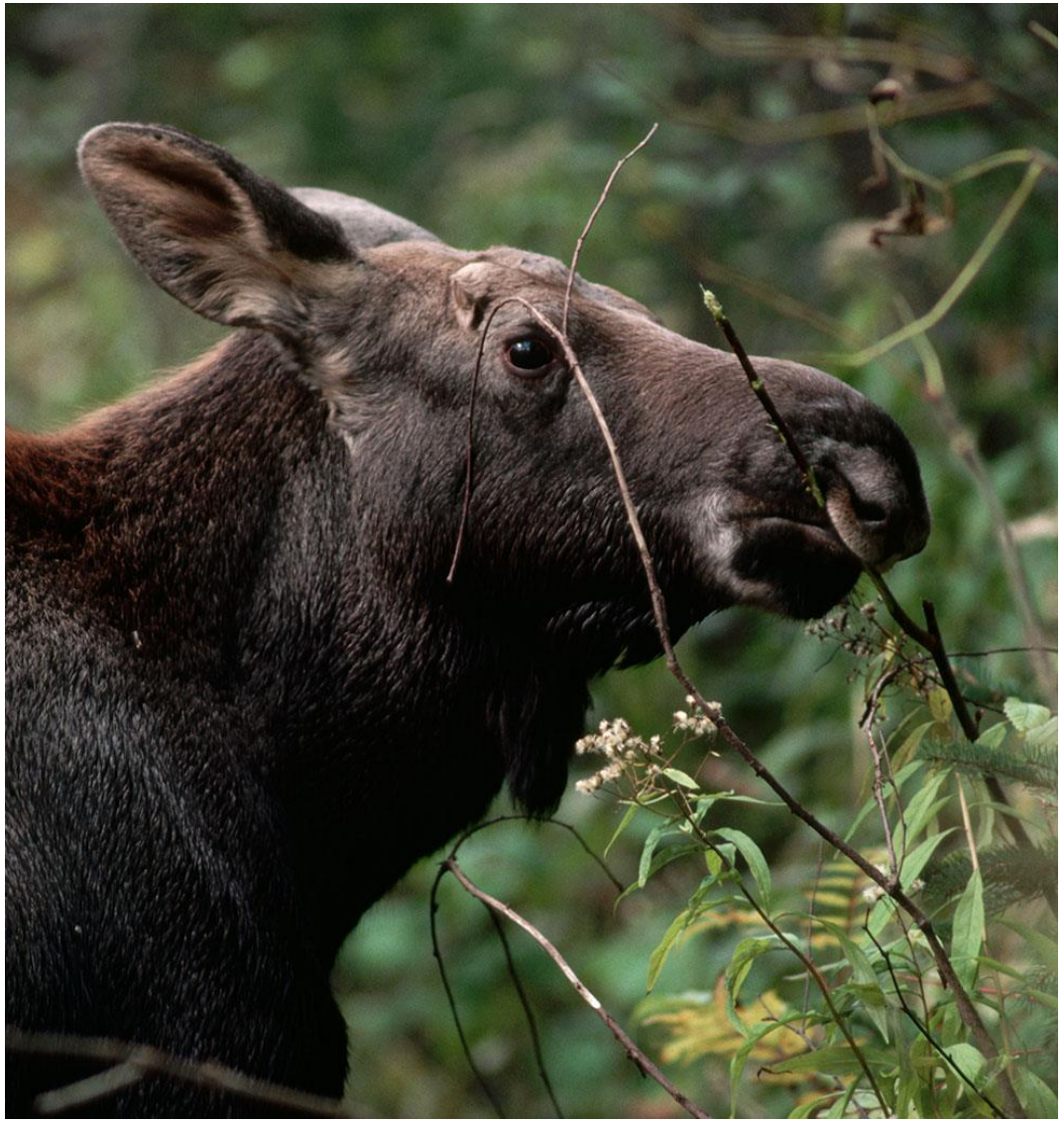


Herbivory

Herbivores affect the plant population's:

- Size
- Growth
- Distribution
- Survival

Similar to predator-prey relationship



Organisms and Their Relationships

Symbiotic Relationships

- The close relationship that exists when two or more species live together

As you watch the video, write a description of the 3 main types of symbiosis

Untamed Science Symbiosis

- Mutualism
- Commensalism
- Parasitism

Symbioses

Commensalism
A relationship in which one organism benefits and the other is neither helped nor harmed.

Mutualism
A relationship between two species in which both species benefit.

Parasitism
A relationship in which one organism lives inside or on another organism and harms it.

Clownfish and sea anemones help each other survive.

Good Buddies Game

while you play the game, record the relationships in the correct column. Use ☺ to show if an organism is helped, ☹ if an organism is harmed, if it is not affected 😐

Commensalism	Mutualism	Parasitism
		Ex) flea ☺, dog ☹

Community Ecology

Ecological Succession

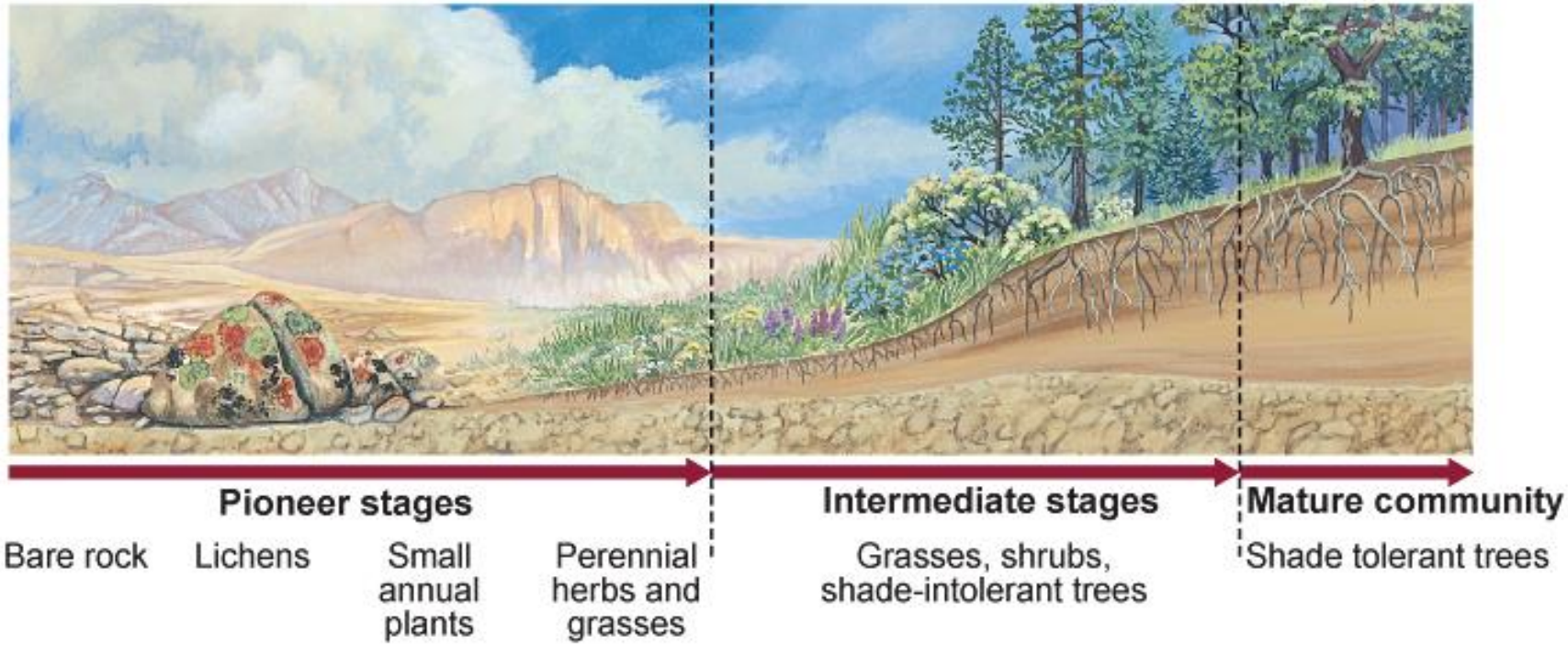
- Watch the Amoeba Sisters video: https://www.youtube.com/watch?v=uqEUzgVAF6g

- The change in an ecosystem that happens when one community replaces another as a result of changing abiotic and biotic factors is ecological succession.

- There are two types of ecological succession—primary succession and secondary succession.

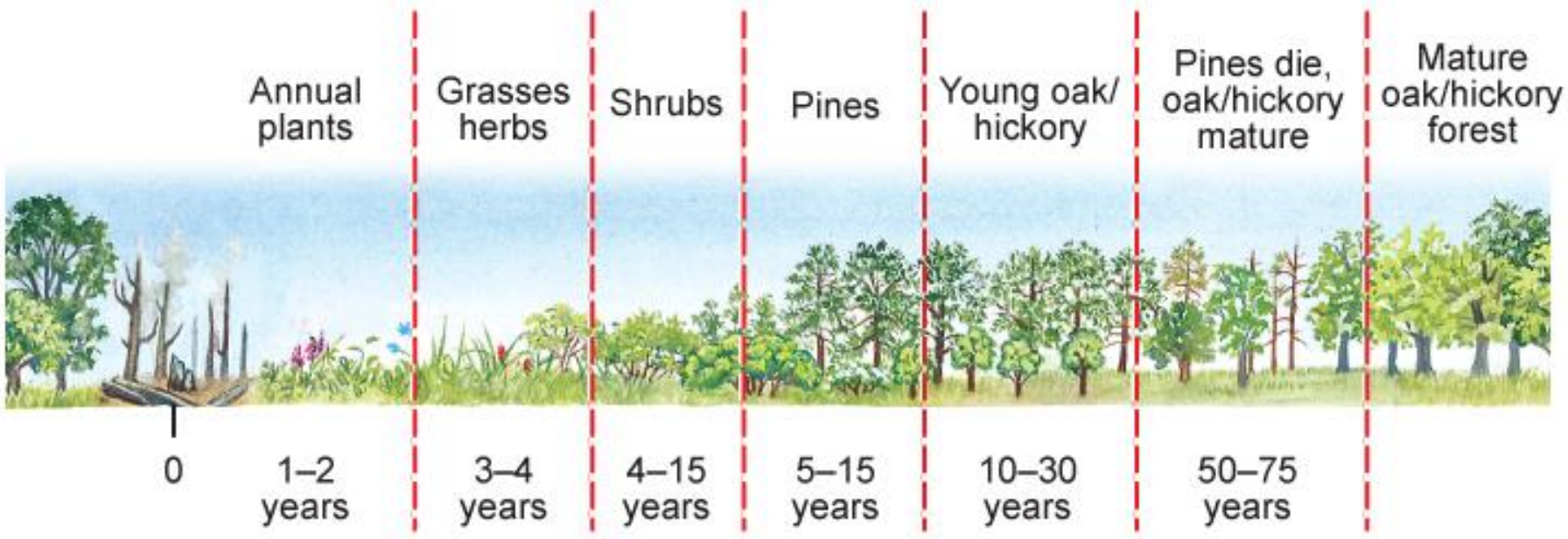
Community Ecology

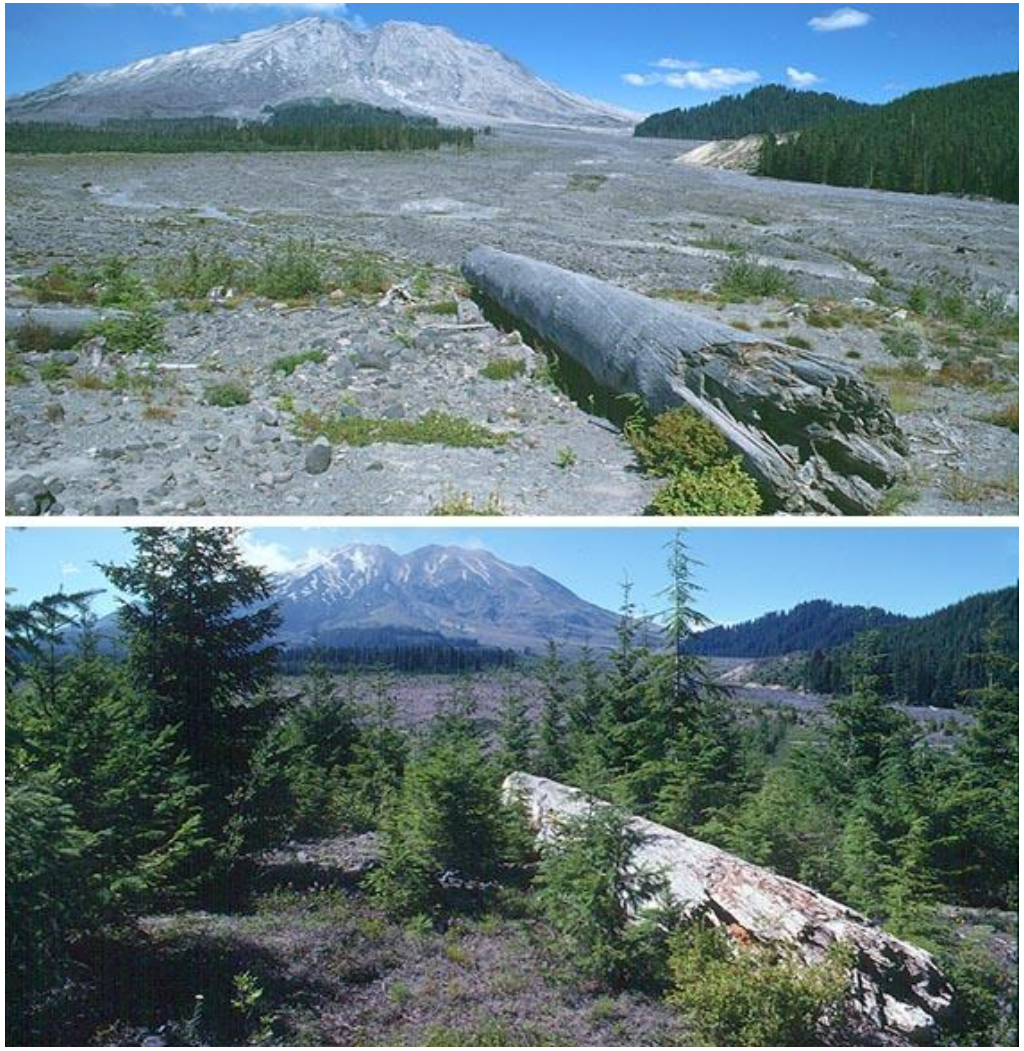
- The establishment of a community in an area of exposed rock that does not have any topsoil is primary succession.



Community Ecology

- The orderly and predictable change that takes place after a community of organisms has been removed but the soil has remained intact is secondary succession.





Example of
Primary Succession
Mount St. Helens
Eruption 1980

Summary

Primary Succession	Secondary Succession
Begins with no life	Follows removal of existing biota
No soil present	Soil already present
New area (e.g. volcanic island)	Old area (e.g. following a bush fire)
Lichen and moss come first	Seeds and roots already present
Biomass is low	Biomass is higher

Ecological Succession

Cut out the pictures of the stages of succession.

Determine the order for primary succession and glue those pictures into your EOC notebook-make sure that you cut out the labels as well. Add color to your pictures.

Do the same procedure for secondary succession

Section 3: Biodiversity-key ideas

What is biodiversity?

Types and descriptions:

Why is biodiversity important?

Biodiversity

What is biodiversity?

- Biodiversity is the variety of life in an area that is determined by the number of different species in that area.
- Biodiversity increases the stability of an ecosystem and contributes to the health of the biosphere.

Section 3: Biodiversity

What is biodiversity?

-variety of life in an area-number of different species

3 Types and descriptions:

-**Genetic**-variety of genes in a population, ex) different colors of frogs

-**Species**-number of different species and abundance in a community, ex) deer, snakes, insects

-**Ecosystem**-variety of ecosystems in the biosphere ex) rainforest, temperate forests, etc

Why is biodiversity important?

-species might be useful as a food source, economically, possible medicines

Types of Biodiversity

In your EOC notebook, draw a picture to represent each type of biodiversity:

-genetic

-species

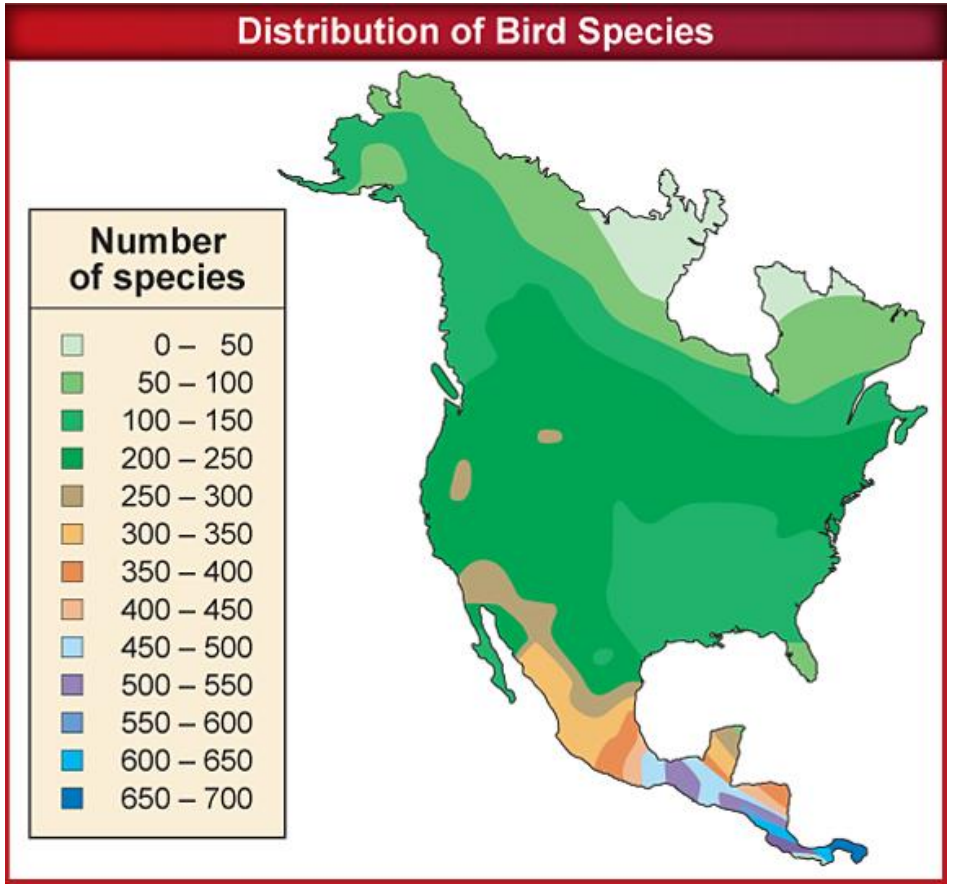
-ecosystem

Biodiversity

- The variety of genes or inheritable characteristics that are present in a population comprises its genetic diversity.
- Genetic diversity increases the chances that some species will survive during changing environmental conditions or during the outbreak of disease.

Biodiversity

- The number of different species and the relative abundance of each species in a biological community is called species diversity.



Biodiversity

- The variety of ecosystems that are present in the biosphere is called ecosystem diversity. 
- An ecosystem is made up of interacting populations and the abiotic factors that support them.

Why is biodiversity so important? (TED video)

Importance of Biodiversity

- Economic Reasons-direct and indirect
- Aesthetic Reasons-preserve species for later generations
- Scientific Reasons-provide substances for medical use, improve agriculture, improve ecosystem resilience

Biodiversity

The Importance of Biodiversity

- Most of the world's food crops come from just a few species.
- Wild species serve as reservoirs of desirable genetic traits that might be needed to improve commercial crop species.
- Scientists continue to find new extracts from plants and other organisms that help in the treatment of human diseases.

Biodiversity

- A healthy biosphere provides many services to humans and other organisms that live on Earth.
- Green plants provide oxygen to the atmosphere and remove carbon dioxide

- Natural processes provide drinking water that is safe for human use.

Section 2: Threats to Biodiversity

1. Overexploitation-
2. Destruction of habitat-
3. Disruption of habitat-
4. Fragmentation of habitat-
5. Pollution of habitat-
6. Acid Precipitation-
7. Eutrophication-
8. Introduced Species-

Section 2: Threats to Biodiversity

1. Overexploitation-excessive use of resources, ex)overhunting of bison
2. Destruction of habitat-human interference of habitat, ex) clearing the rainforests
3. Disruption/Pollution of habitat-something that changes the habitat
4. Fragmentation of habitat-breaking up areas of habitat, reduces range
5. Acid Precipitation-pollutants carried in rain harm organisms
6. Eutrophication-excess nutrients cause overgrowth of plants in bodies of water-less oxygen
7. Introduced/Invasive Species-use resources of natural organisms