Biodiversity

• Biodiversity: **variety (different kinds) of life**

• 3 Types of Diversity:
  • Genetic → “variety” in the DNA
  • Species → specific types, based in the DNA
  • Ecosystem → geographic level

• Threatened: **extinction not an immediate threat.**

• Endangered: **extinction is possible**

• Extirpated: **eliminated in some places.**
Biodiversity

• Main cause of biodiversity loss: habitat loss/change/fragmentation

• #2 Cause of biodiversity loss: Invasive species.

• Impact of Latitude:
  • ↑ means (farther from equator - 0°) → fewer species.

• Latitudinal gradient:
  closer to the equator = ↑ 0° = more species

• Closer to the equator: ↓
Biomes

- large, geographic area - similar ecosystems, and climate patterns

- Forest stratification:

- Layers of a Forest:
  - Emergent - "stick out" (white pine)
  - Canopy - top layer of branches
  - Understory - shorter trees "under" the canopy
  - Shrub - bushes
  - Forest floor
Biomes

Vocabulary

• **Deciduous** and **Evergreen**:  
  - Losing shed → stay green year round  
    - Leaves → winter, dry seasons

• **Coniferous** and **Broadleaf**:  
  - Needles → flat, wide leaves  
    - (Make cones)
Aquatic Systems

Characteristics Describing Aquatic Systems

- **Salinity:** amount of salt
- **Depth:** Photosynthesis occurs in the
  _photic zone_
- Flowing or Standing

  Types of **Wetlands**

  - bogs → thick layer of decaying vegetation
  - fens → , water source (like a spring)
  - swamp → trees
  - marsh → grasses (fresh + salt)
  - vernal (temporary) pools
Aquatic Environments

Freshwater and saltwater bodies can be understood horizontally and vertically. The intertidal, neritic, open ocean, photic and aphotic are used to describe the ocean zones. Limnetic, littoral, aphotic, and photic are used to describe freshwater zones.

Describe the zones for

**OCEAN**:

- Intertidal: shore, low/high tide
- Neritic: beyond the "wave" or the low tide line
- Open Ocean: beyond the "drop-off"
- Photic: light zone, phytoplankton→ photosynthesis
- Aphotic: "dark zone"

- Between

- Phytoplankton → primary producer (autotroph)
Objective: Aquatic Environments

Freshwater and saltwater bodies can be understood horizontally and vertically. The **intertidal, neritic, open ocean, photic** and **aphotic** are used to describe the ocean zones. **Limnetic, littoral, aphotic, and photic** are used to describe freshwater zones.

Describe the zones for **Freshwater**:  

- **Shoreline**  
  - Plants can **root**  
  - Bottom (also for ocean)

- **Open Water** (no rooted plants)  
  - Algae in the **photic zone**
Species Interactions

- **Partitioning**: Two Forms
  - **Resource**: how they obtain a similar food
  - **Niche**: separating in different areas of the
    - nesting areas of trees
    - long-term "relationship" or interaction

- **Symbiotic**:
  - **Parasitism**: parasite (+) feeds on (harms) the host (-)
  - **Mutualism**: both organisms benefit => bacteria/people or termite
    - sex anemone/clownfish
  - **Commensalism**: one benefits (+), other unaffected (0)
Species Interactions

Generalists and Specialists

- **Specialists** have a narrow range of **tolerance** for environmental conditions.

Predators and Herbivores

- **Predation**: the process when one species feeds on another
- **Herbivory**: process of an animal feeding on plants.
Ecological Energy Flow

Primary Producers

• Also known as **autotrophs**
• **1\textsuperscript{st} level** in food webs and energy pyramid.
• Use energy from the **sun** – process is known as **photosynthesis**.
• **Without** sunlight, carry out **chemosynthesis**.
• **Heterotrophs:**
  • Carnivores: **3\textsuperscript{rd} level** or higher.
  • Omnivores: **2\textsuperscript{nd} level** or higher.
  • Herbivores: **2\textsuperscript{nd} level** or higher.
Ecological Change

Succession

• Primary:
  - Starts on bare rock (volcanic eruptions)
  - Pioneer species → 1st to occupy
  - Glaciers

• Secondary:
  - Soil in place (not removed)
  - Fire, logging, high winds
  - Beavers
# Population Growth Curves

<table>
<thead>
<tr>
<th></th>
<th>Logistical Growth</th>
<th>Exponential Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Population Growth</strong></td>
<td>slow</td>
<td>slow</td>
</tr>
<tr>
<td>Later Phase(s) in population growth</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; phase-grows through rapid growth</td>
<td>Rapid increase in population size</td>
</tr>
<tr>
<td>Carrying Capacity</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; phase-growth levels off and follows “up and down pattern”</td>
<td>Until limiting factor(s) present – will continue to grow rapidly</td>
</tr>
<tr>
<td>Exponential Growth</td>
<td>Logistic Growth</td>
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<tr>
<td><img src="image" alt="Exponential Growth Graph" /></td>
<td><img src="image" alt="Logistic Growth Graph" /></td>
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</tbody>
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- **Exponential Growth**:
  - **J-shape**

- **Logistic Growth**:
  - **S-shape**
  - **Lag Phase**
  - **Exponential Phase**
  - **Deceleration Phase**
  - **Carrying Capacity**
Levels of Ecology

• **List and describe** in order from smallest to largest:
  
  • Organism (Individual)
  
  • Populations → all the same species
  
  • Communities → biotic (all the populations)
  
  • Ecosystems → biotic / abiotic
  
  • Biomes → large geographic / large scale environments
  
  • Biosphere → “living part” of the Earth
Limiting Factors

• Density- **Dependent**
  *Biotic* → greatest affect when pop. #’s are high

Examples: *disease, predators, food, comp.*

• Density- **Independent**
  *Abiotic* → not related to pop. #’s

Examples: *weather events|fires.*