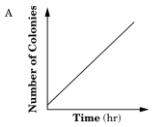
EVERYTHING YOU NEED TO KNOW ABOUT: **ECOSYSTEMS**

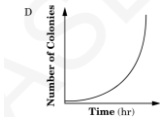
Population Growth

Ecosystems: All the biotic and abiotic factors in an area and how they interact.
- Abiotic: non-living
- Biotic: living

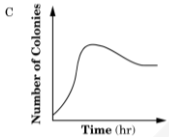
Growth Curves:
- Linear



- Exponential



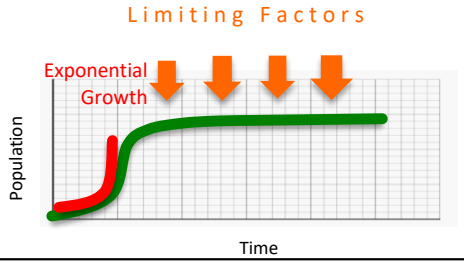
- Logistic



Populations Grow with a *logistic* growth curve due to limiting factors

Limiting Factors: biotic and abiotic factors that limit growth and reproduction
Examples:
sunlight, climate, temperature, water, food, space, competition with other organisms

Carrying Capacity: The largest population that an environment can support over a long period of time.
- When a population grows larger than its carrying capacity, limiting factors cause the population to become smaller.



Interaction Among Organisms

Ecologists have described four main ways that species and individuals affect each other:

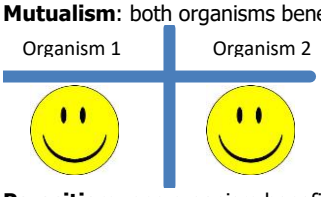
1. Competition: the relationship that occurs when two or more organisms need the same resource at the same time

2. Coexistence and Cooperation:
   - Coexist: Occurs when organisms live in the same habitat but rely on different resources.
   - Cooperation: is a helpful interaction among organisms living in a limited area

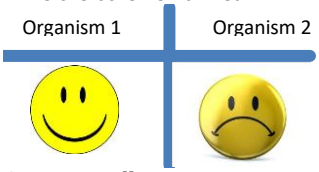
3. Predators and prey: Many interactions among species occur because **one organism eats another**.
   - Prey: The organism that is eaten.
   - Predator: The organism that kills and eats the prey.

4. Certain symbiotic relationships: how organisms affect each other

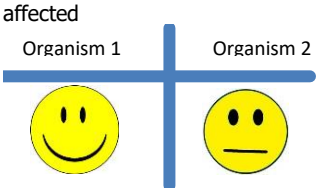
   - **Mutualism**: both organisms benefit



   - **Parasitism:** one organism benefits while the other is harmed



   - **Commensalism:** one organism benefits while the other is not affected

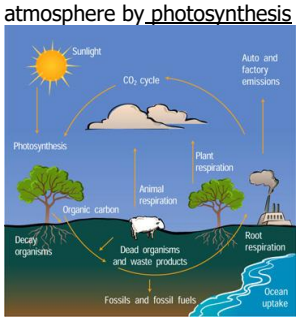


Cycling of Matter

Cycles in Ecosystems:
- Water Cycle
- Carbon Cycle
- Nitrogen Cycle

The Carbon Cycle
Carbon can be in two different forms:
- In the atmosphere (sky), carbon is carbon dioxide (CO_2)
- In the bodies of plants and animals, carbon is sugar (AKA glucose)

How carbon enters and exits the atmosphere:
- Carbon is ADDED to the atmosphere by respiration
- Carbon is REMOVED from the atmosphere by photosynthesis



The Nitrogen Cycle
- Bacteria convert nitrogen from the atmosphere into a usable form for living things. This process is called Nitrogen Fixation.
- Bacteria makes nitrogen available to the roots of plants and animals can then get nitrogen by eating plants.
- Nitrogen is returned to the soil in **animal waste** and through the human use of **fertilizers**.
- Animals and plants need nitrogen to make **proteins**

Energy Flow

- **Producers** organisms that make their own food, using energy from the **sun** (plants)
- **Primary Consumers**: organisms that cannot make their own food and get energy by feeding on plants.
- **Secondary Consumers**: organisms that cannot make their own food and get energy by feeding on primary consumers.
- **Decomposers:** organisms that cannot make their own food and get energy by breaking down the organic material of dead animals

Energy Pyramids:
- The flow of energy in an ecosystem can be represented by an energy pyramid.
- Only about 10% of the energy at one trophic level is passed onto the next higher trophic level.