Ecology

- An ecosystem is all the organisms that live in an area together with the nonliving factors of the environment
  - Ex. Pond or pine forest

- Ecology is the study of how organisms interact with each other & the physical environment

Populations are all the organisms in an ecosystem that belong to the same species

Ex. Mice living in a meadow or pine trees in a forest

Species are a group of organisms that can mate to produce offspring that can produce more offspring

Ex. Brown pelican or human

Communities are all the populations of different species that live in an ecosystem & share resources

Ex. Pine tree forest forms a community with populations of deer, mice, raccoons, bacteria, mushrooms, & ferns

Habitat- The natural environment where an organism lives that provides food, shelter, moisture, & temperature needed for survival the physical environment

- Ex. *The polar bears main habitat is on offshore pack ice, and along coasts and island of the Arctic region.*

Niche - The unique ways an organism survives, obtains food & shelter, reproduces, cares for its young, and avoids danger (how it has adapted)

- Ex. Polar Bear Niche: Polar bears depend on sea ice as a platform for hunting seals.

Interactions Within Communities

All organisms need ENERGY to survive.
The sun is the source of energy that fuels most life on Earth

Feeding Relationships

Two categories of organisms

Autotrophs are organisms that can make their own food for energy by capturing sunlight or other chemicals

Heterotrophs can not make their own food for energy & must obtain it by feeding on another organism

3 main types

Producers (Autotrophs) Consumers & Decomposers (both heterotrophs)

Producers: Organisms that make their own food using energy from the sun & raw materials from the environment

Most producers are plants that use the process of photosynthesis to make food

Photosynthesis

Plants use carbon dioxide and water with light-energy in the presence of chlorophyll in the chloroplast of the cells to make glucose and oxygen

- Directly or indirectly produces food for almost all organisms
- Phytoplankton & algae also play a huge role as producers in the environment

carbon dioxide + water + sunlight → oxygen + glucose

(CO_2) (H_2O) (energy) → (O_2) ($C_6H_{12}0_6$)

Consumers

Organisms that cannot make their own food & Obtain energy by eating other organisms & cellular respiration

Three Types:

Herbivores: eat only plants/producers

Carnivores: eat only animals

Omnivores: eat both plant & animals

Decomposers

Organisms that feed on the dead remains or waste products of other organisms to obtain energy

Ex. Bacteria, earthworms, & fungi

Cellular Respiration

The purpose of cellular respiration is to release energy that can be used by cells to perform their specialized function

- Cellular respiration occurs in the mitochondria of cells.
- The mitochondria uses glucose & oxygen and converts it in a chemical reaction to produce carbon dioxide, water, and energy

oxygen + sugar → carbon dioxide + water + energy

$6O_2$ $C_6H_{12}0_6$ → $6CO_2$ + $6H_2O$

Food Chains
A model that shows the flow of energy through feeding relationships among organisms in a particular ecosystems

Food Webs
A model that links the organisms within an ecosystem by how they depend on each other for food.
The lines drawn represent the flow of energy through the ecosystem & show a variety of food chains

Energy Pyramid

- An energy pyramid shows the amount of energy available at each level of a food chain.
- Only about 10% of energy is passed to next level.
- The rest is lost as heat.

Producers- bottom level- have the most energy
Primary consumers- eat producers
Secondary consumers- eat primary consumers
Tertiary consumers- eat secondary consumers

Relationships Between Populations
Competition: Occurs when more than one individual or population tries to make use of the same limited resources
Ex. Food, water, or space

Predation: Type of feeding relationship in which one animal captures & eats another animal for food
Animal being eaten is the prey
Animal doing the eating is the predator
Predator/prey relationships help keep an ecosystem in balance by preventing any one population from growing too large