Populations and Communities

Living Things and the Environment
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Living Things and the Environment

- An organism obtains food, water, shelter, and other things it needs to live, grow, and reproduce from its environment.
  - Organism: a living thing
  - Habitat: An environment that provides the things an organism needs to live, grow, and reproduce

Living Things and the Environment

- An organism interacts with both the living and nonliving parts of its habitat.

Living Things and the Environment

- The smallest unit of organizations is a single organism, which belongs to a population that includes other members of its species. The population belongs to a community of different species. The community and abiotic factors together form an ecosystem.
  - Biotic factor: a living part of an organism's habitat
  - Abiotic factor: a nonliving part of an organism's habitat
  - Photosynthesis: the process by which organisms use water along with sunlight and carbon dioxide to make their own food
  - Species: a group of organisms that are physically similar and can mate with each other and produce offspring that can also mate and reproduce
  - Population: all the members of one species in a particular area
  - Community: all the different populations that live together in an area
  - Ecosystem: the community of organisms that live in a particular area, along with their nonliving surroundings
  - Ecology: the study of how living things interact with each other and their environment

Studying Populations

- Some methods of determining the size of a population are direct and indirect observations, sampling, and mark-and-recapture studies.
    - Estimate: an approximation of a number, based on reasonable assumptions

Studying Populations

- Populations can change in size when new members join the population or when members leave the population.
- Population density can be determined using the following equation:
  - Population density = Number of individuals / Unit area
  - Birth rate: the number of births in a population in a certain amount of time
  - Death rate: the number of deaths in a population in a certain amount of time
  - If birth rate > death rate, population size increases.
  - If death rate > birth rate, population size decreases.
  - Immigration: moving into a population
  - Emigration: leaving a population
  - Population density: the number of individuals in an area of a specific size

Studying Populations

- Some limiting factors for populations are food and water, space, and weather conditions.
  - Limiting factor: an environmental factor that causes a population to decrease
  - Carrying capacity: the largest population that an area can support

Interactions Among Living Things

- Every organism has a variety of adaptations that are suited to its specific living conditions.
  - Natural selection: a process by which characteristics that make an individual better suited to its environment become more common in a species
  - Adaptations:a behavior or physical characteristic that allows an organism to live successfully in its environment
  - Niche: the role of an organism in its habitat, or how it makes its living

Interactions Among Living Things

- There are three major types of interactions among organisms: competition, predation, and symbiosis.
  - Competition: the struggle between organisms to survive as they attempt to use the same limited resource
  - Predation: an interaction in which one organism kills another for food
  - Predator: the organism that does the killing in a predation interaction
  - Prey: an organism that is killed and eaten by another organism
  - Symbiosis: a close relationship between two species that benefits at least one of the species

Interactions Among Living Things

- The three types of symbiotic relationships are mutualism, commensalism, and parasitism.
  - Mutualism: a relationship between two species in which both species benefit
  - Commensalism: a relationship between two species in which one species benefits and the other is neither helped nor harmed
  - Parasitism: a relationship between two species in which one organism lives on or in a host harms it
  - Parasite: the organism that benefits by living on or in a host in a parasitism interaction
  - Host: the organism that a parasite lives in or on in a parasitism interaction

Changes in Communities

- Unlike primary succession, secondary succession occurs in a place where an ecosystem currently exists.
  - Succession: the series of predictable changes that occur in a community over time
  - Primary succession: the series of changes that occur in an area where no soil or organisms exist
  - Pioneer species: the first species to populate an area
  - Secondary succession: the series of changes that occur in an area where the ecosystem has been disturbed, but where soil and organisms still exist