Life Science - Ecosystems

Standards

- MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations or organisms in ecosystems.
- MS-LS2-3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- MS-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
- MS-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
- MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- MS-LS2-5: Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
- MS-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- MS-ETS1-2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- MS-ETS1-3: Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
- MS-ETS1-4: Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Vocabulary

- **Ecosystem** - All the living and nonliving things in an area and their interactions.
- **Biosphere** - The name which describes all of the biomes that make up the Earth.
- **Community** - Different populations in a certain area.
- **Organism** - An individual animal, plant, or single - celled life form.
- **Biotic** - All the living organisms in an ecosystem.
- **Abiotic** - The name given to non-living organisms.
- **Predator** - An animals that hurts and eats another animal for energy.
- **Prey** - An animal that is hunted by another animal for food.
- **Habitat** - A place that provides all the things an organism needs to live. These things include food, water, and shelter.
- **Population** - A group of organisms of one species that live in an area at the same time.
- **Food Chain** - A series of steps by which energy moves from one type of living thing to another.

- **Niche** - A role in an ecosystem, which includes what type of food the organism takes in, how it gets its food, and which of the other species use the organism as food.
- **Producer** - Plant and some other organisms that make their own food for energy.
- **Consumer** - Organisms that can't make their own food, but get their energy from producers or other consumers.
- **Decomposer** - Organisms that get their energy by breaking down wastes and dead organisms.
- **Carnivore** - Consumers that only eat animals.
- **Scavenger** - Carnivores that feed on dead animals.
- **Herbivore** - Consumers that only eat plants.
- **Omnivore** - Consumers that eat both plants and animals.
- **Competition** - The struggle of organisms for the same resources needed for survival.
- **Food Web** - A diagram that combines many food chains into one diagram. It's used to see how different food chains are connected in an ecosystem.
- **Photosynthesis** - The process by which plants and other organisms convert light energy into chemical energy.
- **Environment** - All of the conditions surrounding an organism. These conditions meet the needs of the organism.
- **Ecology** - The study of organisms and their interactions with one another and with the physical and chemical environment around them.
- **Symbiosis** - A long-term relationship between two different organisms.
- **Reproduce** - The ability to make offspring. This keeps the species in existence.
- **Biome** - Large ecosystems with the same climate and organisms.
- **Terrestrial Biome**- A type of biome that can be found on land.
- **Aquatic Biome** - A type of biome that can be found in a body of water.
- **Carrying Capacity** - The number of organisms that can live in a habitat.
- **Limiting Factors** - Factors that limit the carrying capacity of a habitat. These include the amount of food, water, space, and shelter that an area has.
- **Parasitism** - A relationship between two organisms where one organism benefits from the other by causing harm to it.
- **Parasite** - An organism that lives on or inside of another organism. They take nutrients away from that organism, which harms these organisms.
- **Mutualism** - A relationship between two organisms that are interdependent; meaning each receives benefits from the other.
- **Commensalism** - A relationship between two organisms when one receives benefits from the other without hurting or harming it.

Learning Objectives

1. Explain the difference between a producer, consumer, and decomposer.
2. What is the difference between a food chain and a food web?
3. Describe how energy is transferred from one organism to the next (energy pyramid).
4. Explain what makes up an ecosystem (organism, population, community, and ecosystem).
5. Describe the relationship between organisms (parasitism, commensalism, and mutualism).
6. Describe how changes in one population can affect an entire environment.
7. What is a biotic and abiotic factor?
8. What is a biome? Identify characteristics of each biome.