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TEACHER GUIDE

ECOSYSTEMS
GRADES 3-5

COMMON MISCONCEPTIONS

- **The more of one type of animal, the better.**
  Although diversity and many types of animals is a good thing for an ecosystem, too many of one particular animal may create an imbalance in a habitat.

ECOSYSTEMS

An ecosystem is a community of interacting organisms and their environment. It refers to an area (of any size) where living things interact with each other as well as non-living things like soil, water, and air. Organisms can only survive in an ecosystem when their specific needs are met. If an organism's needs are not met, one of three things happens: (1) it adapts over many generations, (2) it moves to a different ecosystem, or (3) it does not survive. An ecosystem is in balance when all needs are met for all components. If something changes, the ecosystem may become unbalanced.

BIODIVERSITY

A healthy ecosystem has many different kinds of organisms living in balance. Diversity means different organisms play different roles. However, newly introduced organisms can throw off the balance of an ecosystem. Invasive species are living things not naturally found in a particular ecosystem. They may or may not be able to survive in a new environment, but if they do they can introduce a change that impacts the ecosystem. Often, invasive species are better at surviving in that ecosystem than the organisms that were naturally there.

HUMAN IMPACTS

Humans are part of many ecosystems. Human impacts to ecosystems can be both positive and negative, and we can affect ecosystems that are thousands of miles away from us through things like surface runoff.

LIMITING FACTORS

Every ecosystem is constrained by limiting factors. These limiting factors maintain numbers of organisms within populations. Anything that affects an organisms population can be a limiting factor. A limiting factor on foxes in an ecosystem might be the amount of mice for them to prey on. Likewise a limiting factor for mice is the number of foxes hunting them. Limiting factors can be available grazing land, access to water, shelters, and even humans. Climate and soil composition are examples of limiting factors for plant life.

CONTEXT AT THE ELEMENTARY LEVEL

Although the ecosystem subject matter addressed by this lesson makes no direct mention of biological evolution, it is important to note that student learning here builds a foundation for later understanding of evolutionary processes. The concept that "for any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all" (NGSS Disciplinary Core Idea LS4.C Adaptation, 3-LS4-3) is a key to students' later comprehension of ecological niches and natural selection. The idea that "when the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die" also addresses dynamics related to natural selection and adaptation (NGSS Disciplinary Core Idea, LS2.C: Ecosystem Dynamics, Functioning, and Resilience, 3-LS4-4).

RESPONDING TO CHANGING SEASONS

Many organisms have unique survival responses to the change in seasons. Some animals migrate, or travel to other locations, in order to avoid hot summers or cold winters. Other animals use hibernation, a process by which they store food and put their bodies into a dormant state. Some organisms, like trees, preserve energy by stopping the growth of their leaves and conserving water for cold winter months.