GENERATIONGENIUS
ALWAYS QUESTION. ALWAYS WONDER.

TEACHER GUIDE

COMPETITION IN ECOSYSTEMS
GRADES 6-8

COMMON MISCONCEPTIONS

- **Populations of organisms continue to grow, survive, and reproduce in an ecosystem no matter what the condition.**
  Populations of organisms depend on their environment for survival, growth, and reproduction of their species. Changing environmental factors can affect populations in different ways, including affecting access to necessary resources.

- **Plants can grow anywhere.**
  Plants also depend on resources to survive. To survive, grow, and reproduce, plants depend on water, sunlight, temperature, and space. Many plants also depend on pollinators for survival, and certain plants will not reproduce successfully if they are not pollinated.

- **Ecosystems do not change.**
  Ecosystems depend on both living and nonliving factors. If something changes in an ecosystem, the ecosystem will usually adjust and continue. However, sometimes environmental factors such as fires, droughts, and floods can change an ecosystem very quickly. Invasive species (either plant or animal) can also cause an ecosystem to change over time.

INTERDEPENDENT RELATIONSHIPS

Ecosystem dynamics depend on the interactions between living and nonliving things in order to maintain stability. Plants and animals depend on each other and on nonliving things such as air, water, and sunlight to help their populations continue generation after generation. Ecosystems are resilient and tend to “bounce back” after change because of interdependent relationships. However, a drastic change can change the entire ecosystem to the point where it cannot bounce back and becomes a new ecosystem with a different set of interdependent relationships.

ECOSYSTEMS

Ecosystems range in size from very small (like the ecosystem within a drop of pond water) to very large (like a tropical rainforest). No matter how big or how small, all ecosystems depend on the interactions of the populations within them and the environment. For an ecosystem to continue, it must maintain a balance between its plant and/or animal populations. Many things can affect an ecosystem and the living and nonliving things within that ecosystem. When an ecosystem is in balance, it can maintain itself for hundreds of years.

FACTORS

Two main factors affect ecosystems: environmental factors and genetic factors. Environmental factors are things that affect the environment where plants and animals live. Environmental factors can be natural like precipitation, temperature, or a lightning strike. They can also be human-made like pollution, destruction of habitat, or construction of buildings. Genetic factors affect living things. A plant or animal's genetic factors are inherited from its parents and are responsible for some of its traits.

TEACHER TIPS

When teaching about ecosystems, having students make local connections is essential. Many students are familiar with the living and nonliving things around them. Use those community connections to build a deeper understanding about ecosystems that might be less familiar. Taking students outside to make observations of their ecosystem is also a great way to allow students to make deeper connections to this content.

ABOUT THIS LESSON

This lesson was created by the National Science Teaching Association (NSTA) to pair with the Generation Genius video and support *NGSS*.

They have requested we provide the following background with this lesson:

The Next Generation Science Standards (NGSS) are the national standards on how students learn science, and they are based on contemporary research presented in *A Framework for K–12 Science Education (the Framework).* The shift in science teaching and learning required by the Framework is summarized in this infographic: A New Vision for Science Education.

At the start of each Generation Genius lesson, students are presented with a phenomenon, then they try to explain it. Students will notice they have gaps in their knowledge and ask questions, which motivates them to build ownership of science ideas they need in order to explain how or why the phenomenon occurred. The way students build ownership of science and engineering ideas is through active engagement in the science and engineering practices (SEPs). This process of sensemaking, or doing science to figure out how the world works, is one of the major shifts the *Framework* encourages.

To engage in the SEPs, students should be part of a learning community that allows them to share their ideas, evaluate competing ideas, give and receive critiques, and reach consensus. Students can start by sharing ideas with a partner, then with a small group, and finally, with the whole class. This strategy creates opportunities for all students to be heard, build confidence, and have something to contribute to whole-class discussions. Each Generation Genius lesson provides conversational supports to facilitate such productive student discussions to contribute to sensemaking.

Excited to continue your shift toward the new vision for science education? Check out the Generation Genius Teacher Guide page on the NSTA website for resources and strategies to engage every student in your classroom in **doing** science.