GENERATIONGENIUS
ALWAYS QUESTION. ALWAYS WONDER.

TEACHER GUIDE

BIODIVERSITY

GRADES 6–8

COMMON MISCONCEPTIONS

- **All organisms have the same impact on an ecosystem.**
  When it comes to maintaining ecosystem health, not all organisms are created equal. Biodiversity within an ecosystem is very important. However, some species are essential, and these are called *keystone species*. In an ecosystem, if a keystone species were to die out or move, the ecosystem would collapse. Keystone species are not the same in every ecosystem.

- **Plants can pollinate themselves, so we don't need bees.**
  Without bees, the food chain as we know it would collapse. Bees, especially honeybees, are essential to pollination and are considered a keystone species. Although many plants produce flowers that have both male and female organs, they are not always able to self-pollinate. Other plants, like pumpkins, have male and female flowers and depend on a third party for pollination.

- **Ecosystems don't change.**
  Ecosystem health depends on both living and nonliving factors. Maintaining biodiversity in an ecosystem keeps the system in balance and healthy. If there is a minor shift in the ecosystem, it will usually adjust and continue. However, environmental factors such as fires, droughts, or floods can sometimes change an ecosystem very quickly. If a disruption causes a keystone species to leave the ecosystem, that ecosystem will eventually change and become a new ecosystem.

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 it and the environment. For an ecosystem to be healthy, it must maintain its biodiversity to keep its populations in balance. Many things can affect an ecosystem and the living and nonliving things within it. When an ecosystem is healthy, it can maintain itself for hundreds of years.

INTERDEPENDENT RELATIONSHIPS

Ecosystem dynamics depend on the interactions among living and nonliving things to maintain its health. The biodiversity found in an ecosystem depends on the organisms' access to necessary resources, including food, shelter,

air, water, and sunlight. Ecosystems are resilient and tend to “bounce back” after change because of the interdependent relationships. However, a very drastic change can change an entire ecosystem to the point where it cannot bounce back. Thus it becomes a new ecosystem with a different set of interdependent relationships.

HUMAN RESOURCES

Humans depend on ecosystems for resources such as food, energy, and medicine. Changes in biodiversity can influence an ecosystem and cause it to change in a way that it no longer produces the resources we rely on. For example, a drought can cause fertile, nutrient-rich soil to dry up, making the area unable to grow the plants we eat for food.

TEACHER TIPS

When teaching about biodiversity in ecosystems, having students make local connections is essential. Many students are familiar with the living and nonliving things around them, so use those community connections to build a deeper understanding about ecosystems that might be less familiar. Getting students outside to make observations of the biodiversity within 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.