



LESSON PLAN

BIODIVERSITY GRADES 6-8

SUMMARY

Students engage in an activity during which they research data to create a solution to a problem concerning biodiversity and ecosystem health.



MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

Science & Engineering Practices	Connections to Classroom Activity
<p>Engaging in Argument From Evidence</p>	<ul style="list-style-type: none"> • Students watch the Generation Genius video to learn about ecosystems and biodiversity. • Students design a pollinator garden to attract more pollinators to the area, help reduce pollinator population decline, and increase biodiversity.
Disciplinary Core Ideas	Connections to Classroom Activity
<p>LS2.C: Ecosystem Dynamics, Functioning, and Resilience Biodiversity describes the variety of species found in Earth’s terrestrial and oceanic ecosystems. The completeness of integrity of an ecosystem’s biodiversity is often used as a measure of its health.</p> <p>LS4.D: Biodiversity and Humans Changes in biodiversity can influence humans’ resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling.</p>	<ul style="list-style-type: none"> • Students figure out how pollinators help maintain biodiversity and healthy ecosystems. They also learn that humans depend on pollinators for crop generation. • Humans affect biodiversity in many ways. Students learn about different ways humans impact biodiversity by watching the Generation Genius video and researching pollinators to design a pollinator garden.

ETS1.B: Developing Possible Solutions

There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.

- Students engage in designing solutions to help mitigate the decline of pollinator populations.

Cross Cutting Concepts

Connections to Classroom Activity

Stability and Change

- Students learn about stability and change by watching the Generation Genius video.
- Students engage in an activity to mitigate change in pollinator populations by designing a pollinator garden.

DURATION

120 minutes



ENGAGE

Ask students to think about where fruits and vegetables come from and how they grow. Have students discuss their ideas in small groups. After a few minutes say, “Many of you have mentioned plants need to be pollinated. Talk about what that means in your groups.”

Have a brief whole-group discussion to allow the groups to share their ideas about their questions. Tell students that many different organisms pollinate plants, including people. Ask them if they think there is one pollinator that is more important than all other pollinators, and have them record their ideas. Next, have students watch the video [DC Honeybees TV](#) from 0:00 to 2:30 and record any questions they have.

Have each student write a question on a sticky note. Have students share their questions aloud with the class, then post them together somewhere in the room to create a question board. Common questions include the following:

- Why do they use the smoke?
- Why do they have to bring in bees on a truck?
- Don't bees just live there?

In their small groups, have students brainstorm ideas about why farmers would need to bring in bees on a truck. Prompt students to think about the reasons bees would be so important. Have small groups share their ideas with the whole group.

MATERIALS

- Graph paper
- Colored pencils
- Compass
- Rulers
- Angle
- Other measuring tools as determined



EXPLORE

Ask students if they think other organisms pollinate plants in the way that bees do. Agree that many other animals such as birds, bats, other insects, and rodents also pollinate plants. Tell students that bees and other pollinator populations are declining, according to research done by the U.S. Department of Agriculture (USDA). The online article "[Insects and Pollinators](#)" summarizes the USDA's research.

Prompt students to share what they remember about ecosystems and ecosystem interactions from previous grades. Students may share information about living and nonliving things, food chains or food webs, and human impacts.

Ask students to work individually to create an initial model to predict what might happen to their ecosystem if pollinator populations continue to decline. Have students share their models with at least two other classmates to compare similarities and differences. Students may revise their models after they have shared. Have a few students share their initial models.



EXPLAIN

Tell students that you have a video that will explain more about ecosystem interactions. Remind them to pay attention because they will need to use this information later in the lesson.



WATCH THE GENERATION GENIUS BIODIVERSITY VIDEO AS A GROUP

Refocus students back on the pollinators by asking them what they learned about pollinators from the video. Prompt them to remember that much of our food depends on pollinators. Now ask them, "Why do you think bees are so important that farmers need to bring them in on trucks?"

Facilitate a group discussion, guiding students to the idea that bees are a keystone species in many different environments. If students do not get to this idea right away, use prompts such as the following:

- How do you think bees affect biodiversity?
- How would that idea relate to bees?
- What do you predict would happen if ...

Once bees are identified as a keystone species, tell students that bees are critical in crop pollination and many farmers need to bring in bees to pollinate because without bees, the crops would not produce any food.

Have students revisit their models and revise them based on the new information they have about bees, pollinators, interactions, and biodiversity. Remind students that their models need to include all the components and explain the components' interactions.



ELABORATE

Ask students, "Do you think there is anything we can do to help solve the problem of declining pollinator populations?" Give students time to think, then have them share their solution ideas. Through discussion, lead students to the idea of designing a pollinator garden or waystation that could be used somewhere in the community (school, home, rooftop, community center, park).

To design their solution, students will need to engage in research to figure out what pollinators live in their ecosystem and what plants attract them. Students should also figure out other ecosystem interactions, so they are able to explain how organisms depend on each other for survival. Have students draw their gardens using graph paper and draw them to scale (depending on grade). Students may work individually or in groups and should consider the following criteria: space of garden, size of plants, cost of plants, bloom season, and pollinator attraction.

Tell students to include reasoning for why they should build a pollinator garden and how it would affect biodiversity. Have them explain why they chose the plants they did and how those plants will help maintain the pollinator population and biodiversity. Have students display their gardens and do a gallery walk to share garden ideas.



EVALUATE

There are multiple ways to assess your students' understanding of this topic. The exit ticket is an opportunity for students to use the science ideas they built in the lesson in a new context. Alternatively, you can use the Kahoot! quiz (which provides downloadable scores at the end of the game) and/or the paper quiz. All these resources are located right below the video in the assessment section.



EXTENSION

Consider starting a pollinator garden in seed pots in the classroom. You can use the plants later in container gardens or to create a pollinator garden on school grounds.

Another extension to consider is to engage students in pollinator citizen science opportunities that track pollinator populations such as monarch butterflies, hummingbirds, and bees.

