

Farm World Lesson 2: Bee Friendly Farming



Students explore dynamic, multi-faceted solutions to the difficult and complicated issue of bee death, using sustainable agriculture as a guide.

Guiding Ideas

This project was developed with the American Beekeeping Federation's Kids and Bees program. Explore three new Minecraft worlds, created by Lifeboat, and use new lessons to introduce students to bees' dynamic and fascinating roles in their own hives and in broader ecosystems. Bee Friendly Farming is Lesson 2 of 3 for Farm World.

Learning Objectives

- NGSS Crosscutting Concepts: Cause and Effect
- NGSS Science and Engineering Practices: Defining Problems; Developing Solutions
- NGSS Disciplinary Core Ideas: LS4.D: Biodiversity and Humans; ESS3.C: Human Impacts on Earth Systems
- Students recognize that sustainable food production and bee decline are interrelated and complicated topics

Performance Expectations

This lesson will enable students to:

- Describe the relationship between bee health and food production practices
- List human and natural actions that help and harm bee health

Skills

Character, Citizenship

Total time needed

60-100 minutes

Materials needed for classroom activities

One chair for each student
One habitat resource sign for each student (using the list below)
Tape

Introductory questions

- What do honey bees do, besides make honey?
- Why did bees begin to decline after World War II?
- How can agriculture practices support rather than diminish bee populations?

Student Activities

Introduction (whole class) 25-40 minutes

Draw a T-chart on the board, titling the left column “Disappearing Bees” and the right column “Regenerative Agriculture”. Explain to the group that although bees dying is a big and complicated problem, scientists and farmers have some great ideas about how to help the bees survive. Tell them that you’ll watch two videos to explore how farming can help save bees.

As a class, watch [Dr. Marla Spivak’s TED Talk, Why Bees Are Disappearing](#) (15 minutes). After the video, ask the students to list some of the reasons why bees are dying, and write those answers in the left column of the T-chart. Reiterate that this is a big and complicated problem, but that, as you saw in the video, there are small and big actions everyone can take to help the bees.

Next, watch [What is Regenerative Agriculture?](#) (4 minutes). This video moves quickly, so you might want to watch it twice. After the video, ask students to list some of the ways that farmers can practice regenerative agriculture. Write their answers on the right column of the T-chart.

Now ask students to compare the two lists to identify solutions from the “regenerative agriculture” column that might help solve problems in the “disappearing bees” column. Draw lines to connect problems with solutions. For example, “monocultures” or “food deserts” on the left could connect to “plant lots of different kinds of flowers” on the right. Using the introductory questions above, guide a discussion around the role of bees in food production historically, now, and in the future, highlighting the idea that bee health and agricultural sustainability are very closely related.

Minecraft Farm World (explore as individuals or in groups) 20-30 minutes

Direct students to travel to the Farm World. Once they are there, ask them to go meet Poppy for a demonstration of a bee friendly farm. While they are there, ask them to read the blackboards near the demo farm. When they feel like they understand what makes a farm “bee friendly” and “regenerative”, they can walk over to the empty farm field.

There, students can talk to Caesar and Thurgood about farming, read all of the black boards for more information, and then get busy making their own bee-friendly farms! This activity can be completed individually or collaboratively.

Please note that other bee NPCs exist in Farm World; students will interact with them in other lessons. Also note that many of the NPCs have videos to share, so make sure students have headphones.

In-Class Activity (whole class) 15-30 minutes

Bee Habitat Musical Chairs

Ahead of time, print out or write signs, each with one of the following items; repeat items as many times as necessary to ensure you have one sign for each student:

- Dandelions
- Clover, alfalfa, and buckwheat cover crop
- Front yard covered in clover

- Roadside with milkweed
- Hedgerow with flowering bushes
- Oak tree
- Apple orchard
- Beehive
- Pond

Ask each student to bring their chair to an open area, and direct them to place their chairs in a circle with the seats facing out. Hand out one sign and a piece of tape to each student, and direct them to tape their sign to their chair.

Ask students what bees need to survive (food, water, and shelter) and what negatively disturbs their habitat (pesticides, climate change, pests/disease, and habitat loss); further exploration of these topics can be found in Beetopia Lessons 2 & 3. Explain to the students that they are now bees, and they currently have a healthy habitat, represented by the food sources, shelter, and water listed on their chairs. Although there are plenty of resources to go around right now (because there is one chair per student), after each round, something will change in the habitat that will either add or remove chairs (resources). For each round, while the music plays, the students are to circulate around the chairs in one direction. As soon as the music stops, each student has to get to a chair (resource) to survive. If they can't find an open chair, they're a dead bee! If your class is too large to play this game all together, split the class into two or three groups and have them take turns.

Play one practice round using music such as [Flight of the Bumblebee](#). After ensuring all students understand the process, introduce a disturbance event that will change the resources available in the habitat. For example:

- A homeowner sprays herbicide on all the dandelions along their sidewalk – remove all “dandelion” chairs
- A farmer tills in their cover crop to plant soybeans – remove all “cover crop” chairs
- The department of transportation sprayed herbicide on all the milkweed along the country roads – remove all “milkweed” chairs
- Due to a terrible drought, the hedgerows died – remove all “hedgerow” chairs
- A fire sweeps through during a five year drought, and kills all the oak trees – remove all “oak” chairs
- A farmer sprays their whole apple orchard with an insecticide during bloom – remove all “apple” chairs
- A farmer drains the ponds for irrigation – remove all “pond” chairs
- The last place to live is the clover in a lawn, but then someone mows it all down – remove all “clover” chairs
- Strong winds in a storm knock over a farmer's bee hives – remove all “bee hive” chairs

You can choose to continue play until two bees are competing for a final chair, or you can include some scenarios that are beneficial to bees to extend play:

- A farmer puts a protective fence around their beehives – add “bee hive” chairs back into play
- A landowner leaves oak trees rather than harvesting them for timber – add “oak” chairs

- Late spring rains refill a pond – add “pond” chairs
- A kid convinces their parent to leave the dandelions in the front yard – add “dandelion” chairs

To engage students further in the game, model the scenarios for a few rounds and then turn it over to the students to identify disturbances and the resulting habitat losses, and beneficial actions and the resulting habitat gains. Challenge them to come up with scenarios that involve more than one habitat resource, or scenarios that might add some resources and remove others at the same time.

Wrap up the game by reiterating the complex relationship between bee health and agricultural practices, emphasize that most land is disturbed or developed so that means how it is managed will make a huge difference in regional biodiversity (see the biodiversity article in the “further study” section). Ask a few students to share examples of specific things they can do to help support bees.

External Resources

[Dr. Marla Spivak’s TED Talk, Why Bees Are Disappearing](#) - This 15-minute video offers an overview of the many complex and interrelated factors affecting bee health, along with a simple action everyone can take to help bees thrive.

[What is Regenerative Agriculture](#) - This 4-minute video highlights three food production practices that improve soil health and support biodiversity in agricultural settings.

[Flight of the Bumblebee](#) - This video shows a live performance of Rimsky-Korsakov’s famous, fast-paced “Flight of the Bumblebee”.

Vocabulary

Monoculture - the farming practice of planting a single crop over a large area

Pesticide - a chemical used to kill insects

Herbicide - a chemical used to kill weeds

Tilling - the practice of plowing or turning the soil frequently throughout the year

Cover crop - a living mulch

Further Study

[How forest loss has changed biodiversity across the globe over the last 150 years](#)

[THE SOIL STORY: The Road to Regenerative Agriculture, Teaching Curriculum](#)