

# Beehive Lesson 5: Life Cycle



*Students explore the life cycle of bees, learning what the bees need to thrive – and what can threaten survival – at each stage.*

## **Guiding Ideas**

This project was developed with the American Beekeeping Federation's Kids and Bees program. Explore a new Minecraft world, created by Lifeboat, and use new lessons to introduce students to bees' dynamic and fascinating roles in their own hives and in broader ecosystems. Life Cycle is Lesson 5 of 5 for the Beehive.

## **Learning Objectives**

- ⬡ NGSS Crosscutting Concepts: Patterns, Systems and System Models
- ⬡ NGSS Disciplinary Core Ideas: LS1.B: Growth and Development of Organisms
- ⬡ Recognize the stages of a honeybee's life cycle, and identify what can help or hurt a bee's chances of survival
- ⬡ Understand the importance of castes and jobs within a hive

## **Performance Expectations**

This lesson will enable students to:

- ⬡ List in order the four life stages of a honeybee, and identify what can help or hurt a bee during the different stages
- ⬡ Describe the castes and jobs within a honeybee hive

## **Skills**

Creativity, Critical Thinking

## **Total time needed**

45-70 minutes

## **Materials needed for classroom activities**

One printed copy for each student of the Honeybee Caste and Life Cycle Worksheet  
One set of headphones for each student, to watch videos while in Minecraft

## **Introductory questions**

- ⬡ Think about a familiar insect: butterflies. What do you know about a butterfly's life cycle? What are the stages a butterfly goes through? (egg, caterpillar/larva, chrysalis/pupa, adult)

- What life stages can we see in the bee video?
- Once an adult bee has emerged, what does it do? Does it do the same thing for its whole life?

## **Student Activities**

### Introduction (whole class) 5-10 minutes

As a class, watch [National Geographic's Amazing Time-Lapse: Bees Hatch Before Your Eyes](#) video. Ask students what they saw and noticed during the video, and what it made them wonder about. Invite curiosity without seeking specific answers. Then, using the first two questions above, guide a discussion that prepares students to identify the four stages of a bee's life cycle as they watch the video a second time. Write the names of the four stages on the board, in order, to help students remember what to look for and to use as a prompt during the game later in this lesson.

After watching the video a second time, explain to the students that in this lesson, they are going to be learning about the specifics of a bee's life cycle, which they just witnessed, and they'll also be learning about what honeybees do once they're fully grown. Using the third question above, prompt students to consider the many tasks a bee might take on during its life.

### Minecraft Beehive (explore as individuals) 20-30 minutes

Students will meet a scientist in a lab outside of the beehive. The scientist will instruct the students to gather a bee costume, a camera, and a quill and book from the chest. Students will transport to the hive and meet the NPC Bee Girl outside the hive to receive a welcome and introduction to the beehive.

After they enter the hive, students should find the "Nursery" section of the beehive. There, they will follow worker bee Lulu and Bella to learn about honey bee castes – including the different jobs that worker bees take on in the hive. Then, students put their newfound knowledge into action by becoming "nurse" bees to help Veronia raise new bees in the hive.

After the students feed the larva the bee bread, stand back and wait a few seconds, they will see a transformation! Then warm up the transitioning bee by jumping and wiggling around her, then watch for more life cycle transitions!

Note: The students must fill the combs with pollen, then nectar (in that order) to get their bee bread.

Encourage students to take notes and pictures to have information to complete the in-class worksheet.

Please note that other bee NPCs exist in Beehive 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. If the students are having difficulty finding the sections of the hive, they can just ask the queen to send them to where they need to go!

In-Class Exercise (individual) 10 minutes

Hand out one copy of the "[Honey Bee Caste Worksheet](#)" and "[Honey Bee Life Cycle Worksheet](#)" to each student. Ask students to work individually or in pairs to use the notes from their time in the Nursery to fill in the worksheet.

In-Class Exercise and Discussion (whole class) 10-30 minutes

Worker Bee Life Cycle Game: A variation on rock, paper, scissors

To play the game:

Each life stage is connected to a hand motion. Practice these motions with your students several times, until everyone knows them well.

- Egg: make a circle with your hands (touch your fingers and thumbs) above your head
- Larva: put your hands together over your head and arms bent into a "C" shape
- Pupa: arms crossed in front of you like a hug
- Adult: flap your hands and pretend to fly

To begin, every student starts out as an egg. Two eggs play "rock-paper-scissors" (with the normal motions) with each other; the winner becomes a larva while the loser remains an egg.

After each round of rock-paper-scissors, students put up their hand motions to indicate what life stage (egg, larva, pupa, or adult) they're in. Then, they find another student who is in their same life stage to play rock-paper-scissors against. For each round, the winner advances to the next life stage and the loser remains at their current life stage. The order of advancement always remains the same: winning eggs become larvae, winning larvae become pupae, winning pupae become adults.

This version of the game can end in a variety of ways. Choose ahead of time, or ask your class to make the choice as a group. Options include:

- The adult bee flies away to find a flower
- The adult bee goes to help (cheer on) eggs, larva and pupa (like a nurse bee would do)
- The adult bee guards the "hive" where the students are playing

Optional Continuation 1: After the students have played a round or two, introduce an addition to the game that reflects the jobs of an adult bee. This new version of the game works the same as the earlier version: students begin as eggs and play rock-paper-scissors against others in their same stage, advancing through the stages by winning rounds. Now, however, they continue into adulthood and move through the jobs a worker bee takes as an adult. Invite your class to choose, as a group, hand motions to reflect a worker bee's roles: nurse bee, house bee, guard bee, forager bee, and scout bee. Remember, when a bee first emerges, its first job is nurse, so instead of using the flapping wings from before, students should use a motion, such as wiggling, to keep the rest of the developing bees warm.

Optional Continuation 2: To deepen the discussion, play the game as described above (one or both versions), but only let it last for a few minutes, so that not every student reaches bee adulthood or completes all of the jobs. Ask students what they think might, in the real world, prevent bees from surviving. Guide the discussion toward weather/climate, lack of pollen and nectar, pesticide use, predators, and parasites. Then, ask students what they think people can do to help bees survive. [You may use this video](#) from the Beetopia world on the challenges out bees face. Guide the discussion toward avoiding pesticides, planting lots of different kinds of flowers, and supporting diverse farms.

### **External Resources**

[Minecraft Beehive File](#) - Download Beehive and open with Minecraft: Education Edition. You'll find this resource in your Templates, under Create New.

[Honey Bee Caste Worksheet](#) - Using this worksheet, students label pictures of the different bee castes.

[Honey Bee Life Cycle Worksheet](#) - Using this worksheet, students label pictures of the different bee life stages.

[National Geographic's Amazing Time-Lapse: Bees Hatch Before Your Eyes](#) - This 1-minute video shows a time lapse of a bee's life from egg to pupa to larva to adult.

[The Challenges Bees Face](#) - A Kids and Bees video briefly explaining the challenges bees face: pesticides, climate change, disease, and habitat loss.

### **Vocabulary**

Adult - a fully formed, mature honey bee

Bee bread - a combination of pollen, nectar and honey that nurse bees eat in order to produce food (worker jelly) for the young larvae, also balled up and fed to older larvae

Brood - immature honey bees: eggs, larva, pupa

Cell - the hexagonal compartment made of beeswax used to store honey, pollen, and nectar and to raise the brood

Colony - all the individual members of a beehive

Comb - a mass of cells, usually formed in two layers with the cells fusing at the bases

Drone - the male honey bee, usually hundreds per colony

Egg - laid by the queen bee, this is the first stage in the life of a honey bee

Larva (plural, larvae) - the second stage of bee brood development; a white, legless, grub-like insect

Nectar - a sugary liquid secreted by plants to attract pollinators

Pollen - the fine, powder-like vessel housing a plant's male gamete

Pupa - the third stage in the development of bee brood development where the larva metamorphosis into an adult bee

Queen - a female adult bee that is reproductive, usually one per colony

Royal jelly - a thick and nutritious mixture used to feed the developing queen

Worker bee - adult female bees who do not reproduce, usually over 99% of the colony's population

Worker jelly - a nutritious mixture used to feed the worker bee larvae

### **Further Study**

[Two Types of Reproduction](#)

[How honeybees get their jobs—explained | National Geographic](#)

[How Do Honeybees Get Their Jobs? | National Geographic](#)