

Lesson: Honeybees and Trees

Topic/Essential Question: How do honeybees and trees help each other?

Unit: “Why Are Trees Terrific?” Kindergarten Environmental Literacy



Content Standards:

- NGSS K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.
- NGSS K-ESS3-1. Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.
- SL.K.1 Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.
- SL.K.6 Speak audibly and express thoughts, feelings, and ideas clearly.
- Foundation for EL Standards 2.0 Interaction of Earth’s Systems, 3.0 Flow of Matter and Energy, and 4.0 Populations, Communities, and Ecosystems.

Length of Lesson: 30 minutes *(This lesson is split into two 15-minute activities that are taught simultaneously. The group splits in half for the lesson and swaps after their first activity.)*

Student Outcome: The student will

- Describe how trees provide food and homes for honeybees.
- Explain how bees pollinate tree flowers to make fruit.

Knowledge of the Learner:

- Prerequisite Knowledge, skills and processes: trees and animals are living things with basic needs; listening, observing, following instructions.
- Students’ needs, interests, and previous learning will vary. It may be difficult for students to understand (without direct observation) how bees interact with trees.
- Pictures will be provided to help students understand this.
- Instructor may pace the lesson according to the responses and participation of the students.

Knowledge of Content:

- Content knowledge for instructor: Provided in the text of the lesson.
- Vocabulary: Hive, pollen, nectar, worker, queen, drone, pollinate, orchard
- Resources:

Honeybee posters
Section of hollow log

Observation Hive
Bee puppet

Display flowers
Pom-poms

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| Bowl | Honey | <i>Smoker</i> |
| Hand sanitizer | Honeybee book | <i>Hive tool</i> |
| Waxed paper | Bee Keeper tools: | <i>Bee brush</i> |
| Apples | <i>Veil</i> | <i>Decapping knife</i> |
| Apple corer | <i>Gloves</i> | <i>Extractor</i> |
| Knife for slicing apple | <i>Suit</i> | <i>Super w/ frames</i> |

Pre-Assessment: During the opening at the beginning of the field trip, Camp Woodlands staff will invite students to share what they have learned at school about trees including trees as living things, trees as plants, parts of a tree, and what is a forest.

Activity A: Hive Observation

Set Up Before Students Arrive:

1. Make sure covers are on observation hive.
2. Have pictures in order.

Motivation/Warm-Up:

1. Have students sit on the bee rug on the floor.
2. Introduce yourself and welcome students to the “Honeybees and Trees” activity.
3. Inform the students, “There are many kinds of bees, but today we are going to learn about honeybees.” Ask students, “What do you know about honeybees?”
4. Explain that first they will look at some pictures then they will look at real bees behind glass. *(Assure the students that they will be safe.)*

Procedure:

1. Use pictures and Hive Observation Text (Supplement A) to teach students about honeybees.
2. Remove cover of the observation hive and allow small groups of students to look at the hive and try to find workers, queen, drones, workers with pollen on their legs, workers fanning their wings, workers doing the bee dance (wagging their tails), capped honey, stored pollen, larvae and capped brood (nursery for baby bees).
3. Close hive panels as soon as group is done and prior to the arrival of the next group.

***Optional (Time permitting):**

4. Using Study Print 12 and the beekeeper’s equipment, explain and demonstrate how a beekeeper gets honey from a hive. Refer to Supplement B for text.

Assessment: Ask students how honeybees use trees. *Bees build their homes in trees. Bees get food (pollen and nectar) from trees that have flowers.*

Activity B: Honeybees Helping Trees

Set Up Before Students Arrive:

1. Check that the following supplies are available: apples, apple corer, knife, cutting board, bowl for scraps, hand sanitizer, wipes.
2. Place display flowers with pollen on the table.
3. Cut wax paper squares (*One for each student; Woodlands staff will let you know how many.*)

Motivation/Warm-up

1. Welcome students and introduce yourself. Have them sit around the table and clean their hands with hand sanitizer.
2. Show students an apple and ask them where apples come from? *Apples grow on apple trees.*
3. Ask students, “Did you know that a bee helped the apple tree make this apple? Do you want to find out how?”

Procedure:

1. Show the picture of honeybee hives in an orchard. Explain to students, “The white boxes you see were built by people, and they all have a bee hive in them. Farmers keep bees at their farms because bees help their crops grow, like apples! This is what we are going to talk about, how the honeybees help apples grow.”
2. Show the picture of a honeybee on an apple tree flower. This bee is visiting the flowers on an apple tree. Why do you think she is doing that? *To get food (pollen and nectar). Pollen is the powder on the flower. Nectar is the juice inside the flower.*
3. Show the picture of the bee covered in pollen. Tell students, “This is a close-up picture of a honeybee with pollen all over her.”
4. Go back to the picture of a honeybee on an apple tree flower. Explain to students that this honeybee is going to help turn each apple blossom into...(show the picture of the apple tree) *“Apples!”*
5. Tell students that this is because of *“pollination.”* Have students repeat this word.
6. Use the bee puppet and pom-poms to demonstrate and explain pollination. Tell them that as honeybees travel from flower to flower, they carry pollen from one flower to another flower. This is called *“pollination.”* Pollination helps each flower make fruit with seeds inside, just like apples.
7. Show students the picture of the other forest fruits and say, “Now that we know bees help fruits grow by what?” *Pollination.* “I want to show you some other fruits that honeybees help pollinate.” Tell them that all three of the fruits can be found right at Camp Woodlands.
8. Show students the apple again. Ask them, “What do you think is inside the apple?” *Seeds.*

9. Slice an apple in half crosswise to show the star pattern and seeds inside. Ask students, what is the purpose of seeds? *If planted in soil, they sprout/grow into new apple trees.*
10. Ask students if they know another food that bees help make? *Honey.* What do bees use to make honey? *Nectar, the juice from the flower.*
11. Invite students to eat the apples and taste honey. If students want to taste honey, put some on the wax paper for them to dip their apple slice in. *Have any adults help with this process.*
12. While students enjoy the apple and honey snack, read the book *Honeybee's Busy Day.*
13. **If requested**, wipes are available to clean sticky hands. Please use sparingly by tearing them in half.

Assessment:

- Ask students how bees help trees make fruit and seeds. *They carry pollen from flower to flower. This helps the trees make fruit and seeds. Seeds are needed to grow new trees.*
- Ask students where honey comes from. *Honeybees make honey from flower nectar.*
- Can you think of any other fruit that people can eat, which comes from a tree? *Oranges, peaches, cherries, etc.*

Supplement A**Hive Observation Text**

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| Three Members of the Honeybee Family | <p>There are three kinds of bees in the honeybee family:</p> <ul style="list-style-type: none"> • Workers • Queen • Drones |
| Print 10 Drone | <p>The drones are the brother bees. When they grow up, they will leave the hive and be the daddy bee in a different hive. The drones don't do any work in the hive. The drones don't have stingers.</p> |
| Print 5 Queen | <p>The queen is the mommy bee. There is only one queen in the hive. She has only one job: laying eggs. The worker bees feed her.</p> |
| Print 3 (Workers) Food Sharing | <p>These are two worker bees. One worker bee is feeding the other worker bee. They are called "worker" bees because they do all the work for the hive. They have many jobs such as</p> <ul style="list-style-type: none"> • gathering pollen, nectar and water (the nectar changes into honey) • building the hive, cleaning the hive, guarding the hive • feeding the queen and the other bees <p>The workers are all sisters.</p> |
| Print 1 Home of the Honeybee | <p>This is the home of the honeybee. It is called a hive. Sometimes honeybees build their hive inside of a hollow tree. They will be warm and dry inside of the hollow tree. (Show students hollow log in bee room)</p> |

Supplement B**Bee Keeper Text**

Print 12 this is a beekeeper. The beekeeper gives the bees a box to live in and takes care of them. He does this so he can get something from the bees. Do you know what it is? *Honey*. Remember, bees make honey from flower nectar.

Describe a beekeeper's hat for me. It is called a "veil." Why do beekeepers wear this? *So they don't get stung.*

Let me show you how a beekeeper gets honey from a hive.

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| Man-made hive | This is a man-made hive and this is the door for the bees to come and go. |
| Smoker | When the beekeeper wants to open the hive to get honey, he uses the smoker to make the bees safer to handle. He puts leaves or cloth and a lighted match in the smoker to start a fire. He then squeezes puffs of smoke into the door of the hive. This fools the bees and makes them think their house is in danger from fire. The worker bees fill their stomachs with honey just in case they have to fly to a new home and take food with them. When their stomachs are full of honey, they move more slowly and they are easier and safer to handle. |
| Hive Tool | The beekeeper then opens the hive and takes out the frames using the hive tool. He needs this tool because the bees seal the hive with propolis (PRO-pah-lis), a sticky substance from trees. |
| Bee Brush | The beekeeper brushes the bees off of the frame and back into the hive. |
| Decapping Knife | He then uses the hot decapping knife to remove the wax that covers the stored honey. |
| Extractor | The beekeeper then puts the frames in the extractor and turns the handle to spin the frames. The honey spins out and gathers in the bottom. The beekeeper can then drain the honey into jars from the spout. When the beekeeper is finished, he puts the frame back into the hive, and the bees can reuse it. |

Supplement C**Volunteer Background Information
Honeybee Fact Sheet**

- Honeybees have a very important job of pollinating flowers so that we can have the fruits and vegetables that we eat.
- There are three types of bees in the hive:
 - **Queen:** Her job is to lay eggs to make more bees. The hive senses her, and if she were not present, the hive would not survive. She can live 2-3 years.
 - **Worker:** All the females. They do all the work of collecting nectar, pollen, and water, making honey, cleaning the hive, feeding and caring for baby bees. Once they sting, they die. They can live up to 45 days.
 - **Drone:** All the male bees in the hive. They have no stingers. They fly out and mate with a queen of another hive. They can live up to 45 days but are not around during the winter months.
- Honeybees collect nectar from flowers using their long straw-like tongue called a **proboscis**. As honeybees visit flowers, some pollen sticks to their bodies. Some of this pollen rubs off onto other flowers and pollinates them. The bees comb some of the pollen off of their bodies into their “pollen baskets” on their back legs. They take this pollen back to the hive as a food source.
- Honeybees use non-verbal communication. They use a “Bee Dance” to communicate the location of the nectar and pollen to the other bees. A circle means that it is **near** and a figure 8 means that it is **far**.
- As temperatures fall below 57° F, the workers hunker down near their cache of honey. The queen stops laying eggs in late fall and early winter, since food stores are limited and the workers must focus on insulating the colony.
- Bees are cold-blooded animals. Their temperature changes with their surroundings.
- We are warm-blooded, which means we stay the same temperature inside no matter the outside temperature is.
- At 50°F the honeybee’s muscles do not function, the heart stops beating and the bee dies.
- Nectar and pollen are brought back to the hive and stored in the cells. This can be seen in the observations hives. Nectar is shiny and pollen is yellowish. The reason bees make honey is so that they have something to eat in the winter.
- Baby bees are called **brood**. They go through metamorphosis. They start as eggs, then develop into larva (looks like a worm), next the pupa stage when their cells are sealed, then they emerge as baby bees.
- **Division of Labor:**
 - Young bees help clean up around the hive
 - Slightly older bees help take care of the larva, feeding them
 - More mature bees go out and collect nectar and pollen to bring back to the hive
 - Mature bees guard the hive and protect it from predators or honey robbers