

# Bees' Needs:

## *Creating a Relationship-based Connection to Pollinators*

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### **Abstract**

The Bees' Needs Curriculum was created to help children build a personal relationship to nature while laying the groundwork for future conversations about climate change. Centered around time spent in an outdoor garden, the lessons invite students to see bees not as something to fear but as neighbors who share our same basic needs—food, water, shelter, and community. Using place-based and embodied learning, children learned through movement, play, and observation, discovering how their actions can help bees thrive. Guided by the philosophy that children must love the Earth before we ask them to save it, this approach shifts environmental education away from anxiety and toward empathy, care, and curiosity. Through inquiry and hands-on exploration, students developed both understanding and affection for the natural world, showing that even small, empathetic encounters with bees can inspire lasting environmental awareness and stewardship.

### **Keywords**

environmental education, place-based learning, provocative pedagogy, ecological handprint, pollinators

## Overview

When developing the Bees' Needs Curriculum, we asked ourselves: How do we get our kids to love nature and the world outside? How do we guide children's connection to nature as a way of laying foundations that can be later connected to larger global climate emergency conversations? Our answer was to bring learners to an outdoor garden, create a comfortable space for those with limited nature-based experiences, and strive to develop a sense of kinship with the creatures that share this same garden space.

We approached curriculum development by through the notion of the ecological handprint, which promotes positive impacts and agency people can have on the environment rather than the "negative impacts captured by environmental 'footprints'" (Guillame et al., 2020, p. 1). Likewise, environmental educator David Sobel ([1996](#)) reminds us that "if we want children to flourish, to become truly empowered, then let us allow them to love the Earth before we ask them to save it." (p. 39).

Bees may not be an obvious starting point for fostering this sense of love and connection. They are often perceived with fear or discomfort rather than affection. Yet, because children are likely to encounter them in their own backyards, bees offer a tangible, place-based connection to the natural world. This familiarity provides opportunities to model local advocacy within the broader context of the climate emergency. Moreover, bees are essential to both local and global food systems, making them an accessible and meaningful gateway into conversations about environmental stewardship.

The garden space was an ideal environment to foster empathy, care, and compassion toward our tiniest creatures, serving as a representative way to address the global climate crisis. The garden is a place where children can interact with the environment, observe bees as they eat, breathe, and fly, and begin to develop a sense of kinship with them. Our primary goal was to encourage learners to understand that our human needs are similar to those of our flying neighbors: we eat, we drink, and we feel the heat of the sun. This curriculum identifies this kinship; bees need nectar as food, safe water to drink, and the same ability to cool their homes when it's hot outside.

## Narrative Framing

These place-based, nature-based lessons were designed using a provocative pedagogy framework (see Figure 1; Hunter, 2024), which "evoke emotions, encourage the relationship between learner and nature, and validate personal experience" (Hunter, 2025, p. 2). Our goal was to provide an immersive, experiential, and provocative experience that connects children to larger global climate issues in developmentally

appropriate ways, fostering resilience and advocacy behaviors. Our lesson plans engaged with these principles by focusing on connection first, content second, as seen in the lessons on bees' needs for water and food. Having access to a curated learning garden, designed for intergenerational learning, provided a perfect backdrop for using a real-world context (gardens) that would be familiar to children.

Figure 1: Provocative Pedagogy framework

Hunter, C. (2024) Provocative Pedagogy: What Interpretive Methods Offer in Traditional Education Spaces. National Association of Interpretation, *Legacy Magazine* 35(4)



By focusing on bees, the lessons emphasize care and responsibility, prompting the question: What do bees need? What is our role in supporting them? How do we "feed" the bees and care for them as they visit our gardens, our flower beds, or our yards? These types of questions allowed us to begin our planning process from the provocative action we hope to instill. Our goal was for the children to walk away with the desire and knowledge of how to care for local bees, as well as a broader call to action for stewardship.

We begin each lesson plan by tying in the concept that bees have the same basic needs (food, shelter, water) as humans, while evoking memories and starting the

relationship-building process. In the lesson plan section “Bees’ Needs: Food,” we created a relay race in which children took on the roles of bees to explore how bees eat. The activity was rooted in principles of sensory learning, allowing students to use movement and physical engagement representative of abstract biological and social processes to cultivate a love for the natural world and a relationship to the more-than-human community. In the lesson plan section “Bees’ Needs: Water,” learners explore the ways bees cool off in the summer heat and relate it to their own experience with air conditioning. The instructor should lead the students in inquiry-based learning where the engagement and information come from the children themselves, balancing ecological understanding with emotional connection. Ultimately, both lessons were intentional in identifying commonalities between humans and their flying neighbors.

### At a Glance

Title	Bees’ Needs: Food & Water
Unit Time	Approx. 1-2 hours for one lesson or 2-4 hours for both lessons
Grade Level(s)	K-5
Core Text	Provocative Pedagogy and Handprint Thinking
Supporting Texts	<a href="#">Begin with a Bee</a> - Nonfiction Picturebook <a href="#">If Bees Disappeared</a> - Nonfiction Picturebook <a href="#">Rooftop Garden</a> - Nonfiction Picturebook <a href="#">How Does My Fruit Grow?</a> - Nonfiction Picturebook <a href="#">How to Bee</a> - Coming-of-Age Novel
Climate Literacy Terms	Place-Based Pedagogy, Interconnectedness, Climate Change, Stewardship
Objectives	To engage emotionally and sensorially with bee behaviors Build personal relationships with bees through our shared needs, such as food and water Reflect on lived experiences and memories with bees or other insects Demonstrate understanding through actions of creating bee air conditioning and acting like a bee Connect local action to support bee populations
Materials and Resources	<a href="#">University of Minnesota: Plants and Landscapes to Support Pollinators</a>

	<a href="#">University of Arkansas: Help a Bee to Wet Her Whistle</a> <a href="#">USGS: The Buzz on Native Bees</a> <a href="#">The American Bee Journal</a> <a href="#">Xerces Society</a>
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## Going Forward

Children were actively engaged during the bee relay and air conditioning activities, which used representative materials (e.g., straws, spray bottles, cardboard boxes). When children were given natural materials (e.g., plants, soil, flower heads), we noticed that children were hesitant until given permission to tear flowers apart, examine the components, run pollen between their fingers, feel the viscosity of nectar, and taste leaves from edible plants. While we had originally expected learners to fully engage, given the immersive garden environment, it became clear that a hesitancy clouded their experience, rendering them more passive learners when given the actual materials. We believe this is indicative of a larger cultural norm of the ways that children are told to “look, but don’t touch” (Chawla, 2006) when experiencing the natural world.

We saw firsthand the need for a greater emphasis on free play in nature and the freedom to explore and touch wild natural spaces during childhood. By invoking both provocative pedagogy and ecological handprint thinking, learners were given actionable ways to have an impact on their own backyards going forward. We actively chose to provide ideas and examples of things they could easily find and use, while encouraging stewardship. Going forward, we believe these short lessons are small steps toward building a relationship with nature where learners are less fearful and more willing to provide for and protect our bees’ needs.

## References

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## **Appendix I: Provocative Pedagogy Lesson Plan: Bees' Needs: Food**

### **Grade Level / Audience**

- K-1: Students experience what a bee must do to get nectar from a flower.
- 2-3: Students experience how bees communicate.
- 4-5: Students experience challenges of native bees and non-native flowers.

### **Place / Location / Setting**

Outside in a natural space with trees, flowers, and grass. Ideally a garden setting.

### **Learning Objectives**

Students experience living like a bee to understand that we have a lot in common with bees and we can do a lot to help them. By the end of this lesson, learners will be able to:

- Engage emotionally and sensorially with bee behaviors
- Experience a personal relationship to bees through our shared needs, such as food
- Reflect on lived experiences and memories with bees or other insects
- Demonstrate understanding through actions of acting like a bee
- Connect local action, such as planting flowers, to support bee populations

### **Materials Needed**

- Multiple shirts in variety of colors (to represent flowers). For advanced learners determine two colors of flowers to be designated as native flowers. Place the names of these flowers on duct tape on the back side of the t-shirt. These should be specific to your geographic location.
- Multiple yellow shirts with black duct tape bands (to represent bees) and quart-sized ziplock bags taped to front of shirt. For advanced learners add an additional element to some of the shirts to represent a native bee species specific to your geographic location. For example, for rusty-patched bumble bees add an orange stripe. More information on rusty-patched bumble bees. This creates two groups (native and non-native) of bees.
- Cups that are the same colors as the colors chosen to represent the flowers shirts (holds water that represents the nectar in each flower). For advanced learners provide shorter and taller cups. The shorter cups will be easy for all types of bees

to drink, and the taller cups will be more difficult for native bees to use (when learners use the shorter straws).

- Straws. For advanced learners provide longer and shorter straws that represent the different lengths of bee tongues (or proboscis). More information on tongue length in bees.
- Fresh flowers

### **Lesson Components:**

Principles of Provocative Pedagogy are noted within the lesson (sensory engagement, evoking memory, lived-experience, relationship-building, place-based, call to action).

### **Priming Experience: (Sensory engagement, Relationship building)**

Provide every learner a fresh flower and ask these exploratory prompts without responding: What does this flower look like? What does it feel like? What does it smell like? Let's look closer (encourage learners to tear apart the flower and continue to describe with as much detail as possible). Do not follow up with "answers" – this is not time to "teach." This is time to listen to the learners. Draw attention to the base of the flower and specifically ask about what learners can feel, specifically drawing attention to noting wet or liquid responses.

### **Opening Inquiry Questions: (Evoking memory; Lived experience)**

- "I often notice bees around flowers. Have you ever seen a bee and what was it doing?" Instructor listens for responses such as flying, landing on flowers, collecting pollen, etc.. Instructor refrains from speaking or adding comments. Instructor ensures everyone has a chance to respond.
- "What do bees look like and sound like?" Instructor listens for responses and encourages students to make sounds or any actions that represent bees.
- Both questions should encourage movement and student expression.

### **Experience: "Let's be bees!" (Relationship building)**

- Instructor refrains from using any specific content-based language until after the experience portion). If students use specific language only correct any misuse, do not introduce concepts/definitions. Explanation only occurs during discussion component.
- Instructor divides learners into 3 groups.
- Give one group flower shirts. These are the different color shirts, and the wearer will represent a flower. Give other two groups bee shirts. These are the yellow

striped shirts. For more advanced students, divide the bee groups by native/non-native distinctions. The wearer will represent a bee.

### **Inquiry-based questions:**

- Ask, pointing to bee groups, "What do you think this group is?" Bees should be an obvious answer. Follow up with "why do you think that?"
- Next ask, pointing to flower group, "What do you think this group is?" If 'flowers' is not a response, prompt by asking: "these are things bees need." Allow students opportunity for diverse answers until 'flowers' are a response.
- Ask, "what do flowers have that bees need? (depending on level, responses may vary from 'food,' 'pollen,' 'nectar.')
- When food or nectar is provided, ask, "do you remember the wet/liquid feeling of our flowers? That is the food that bees get from flowers."
- Ask, "who can tell me what they love to eat?" Provide ample time for students to share some of their favorite foods.
- Ask, "Are any of you bees hungry?" Let's help these bees get food."
- Give each flower learner a cup and fill partially with water. As you put water into the cup remind learners this is the liquid that they remember feeling earlier when they were exploring the flowers. The term "nectar" may be used by learners and at this point, the word can be introduced if it hasn't been introduced by learners previously.
- Ask, "If this is the flower's nectar in the cup, and this is what bees eat, how do bees get it?" Allow learners to explain that bees fly to the flower and drink it.

### **Let's Get Moving: Bees Need Food**

- Explain that the goal is for the bees to go out as quickly as possible to collect nectar from the flowers.
- Ask: How will the bees do this? And how will they carry it back? Have students look at their shirts for ideas as to how they will carry the nectar back. Bees notice they have a pouch on their shirts. This is for carrying nectar.
- Ask: How will the bees get the nectar from the flowers? Notice it's a liquid! Prompt with "how" questions. "How would we get the nectar/water out of the flower and into our nectar bags?" Wait for a response that alludes to the use of tongues for drinking. Provide each bee a straw.

### **K-1 Learners: How Bees Get Food**

One adult takes the flowers away from the bees and spreads the flowers out. Explain to each bee that they fly away and must visit two flowers and then return. After all the bees have returned, note which bees have more nectar in their bags.

### **2-3 Learners: How Bees Communicate to Get Food**

- One adult takes the flowers away from the bees and spreads the flowers out. Adult explains to flowers that only the certain colors (choose which colors) will allow the bees to get nectar.
- Divide bees into teams of 3-4 bees. Explain to each bee that they fly away and must get nectar from two flowers and then return. Bees will go out one at a time from the team. However, some flowers won't let you drink and others will. You will want to help your next teammate to only go to flowers that let you drink. Ask, "But how will you let your teammates know which flowers?" Let learners make suggestions and remind learners that bees can't talk if they suggest they "tell" their teammates. Explain that bees use their bodies to communicate, like talking through dancing. Decide on a "dance move" that suggests the flower will let you have nectar and another "dance move" that shows the flower won't let you have nectar. Practice these moves before letting teams begin.

### **Advanced Learners: How Native Flowers Support Native Bees Getting Food**

- One adult takes the flowers away from the bees and spreads the flowers out. Adult explains to flowers that are native- will have shorter cups. Use the same amount of water so shorter cups will be full, and taller cups will be only half full.
- Have bees draw new straws where some straws are longer or shorter.
- One bee from each hive will leave the hive. They can only visit three different color flowers before they must come back to the hive. Once they return the next bee can go.

### **Call to action**

- Regroup all learners for a concluding conversation. Begin with the question, "did all our bees get fed?" "Explain to me how bees eat?" "What did you learn about bees and their food?" "How would you help feed a bee?" With this last question, prepare to discuss concrete actions such as planting flowers (native flowers) or observing bees for scientists (citizen science) and provide either materials or a future experience that is a concrete action. For example, learners can support the rusty-patched bee by taking photos and share location on [www.bumblebeewatch.org](http://www.bumblebeewatch.org)

- Next give learners the opportunity to plant flowers that are native to your geographic location to demonstrate direct action. Provide seed packets so learners can plant additional plants in areas around where they live.

### **Connecting to Content Discussion**

Content- specific questions can be created that provide an opportunity to introduce content-specific concepts directly connected to what was experienced in the lesson. Concepts that were directly experienced (such as flower parts, bee anatomy, bee communication, social insects, native plants) should be introduced first before moving into conceptual ideas (such as conservation).

### **Back in the Classroom: Extending the Lesson**

Content- specific questions can be created that provide an opportunity to introduce content-specific concepts directly connected to what was experienced in this lesson. Concepts that were directly experienced (such as flower anatomy, bee anatomy, honey production, bee communication, social insects, native plants) should be introduced first before moving into conceptual ideas (such as conservation). Likewise, the instructor can draw attention to new information that is directly related to the experience, but not specifically experienced. For example, the instructor can provide bee and wasp photos to help students identify the differences between bees and wasps for safety purposes for future explorations.

### **Assessment / Reflection**

Learners can be assessed through journal prompts: How are you like a bee? What do you both need to live? Why are flowers important for bees? Advanced learners: How is bees' communication similar to ours? Why are native flowers important for native bees?

## **Appendix II: Provocative Pedagogy Lesson Plan: Bees' Needs: Water**

### **Grade Level / Audience**

K-5: Students experience changes in temperatures in a beehive and create watering holes that are safe for bees to use.

### **Place / Location / Setting**

Outdoor classroom, school garden, or a warm sunny spot with access to water and shade

### **Learning Objectives**

Students experience Beehive Cooling and relate it to their own experience with air conditioning. Students understand that we have a lot in common with bees and can do a lot to help them. By the end of this lesson, learners will be able to:

- Engage emotionally and sensorially with bee behaviors
- Build personal relationships with bees through our shared needs, such as water
- Reflect on lived experiences and memories with bees or other insects
- Demonstrate understanding through actions of creating bee air conditioning
- Connect local action, such as planting flowers, to support bee populations

### **Materials Needed**

- Cardboard boxes ("beehives") (set out in sun to ensure they are warm for activity)
- Spray bottle with water (set to "mist" setting)
- Old folders/flattened cardboard boxes to use as bee wings
- Digital waterproof thermometer
- Shallow dishes (such as water trays)
- Marbles, rocks, floating debris

### **Lesson Components**

Principles of Provocative Pedagogy are noted within the lesson (sensory engagement, evoking memory, lived-experience, relationship building, place-based, call to action).

### **Opening Inquiry questions: (Evoking memory; Lived experience; Relationship Building)**

- Instructor asks: "does anyone get too hot when they're outside? What do you do to cool down?" Learners share memories and explain their favorite ways to cool off. Instructor allows students to respond, listen for responses involving water (jump in lake, use a fan, etc.). Allow students to share stories in a story circle or through personal journal writing if appropriate.

- Instructor asks learners to imagine being a bee inside a hot hive. Ask, “what would you feel? What would you do?” Instructor listens for responses describing sensations of heat, water, and airflow.
- Questions should encourage movement and student expression.

### **Priming Experience (Sensory Engagement; Action-Oriented Learning)**

- Engage learners in hands-on activities that model or contribute to solutions.
- Invite learners to stand in the sun, then step into the shade. Ask, “what do you feel on your skin?” Spray a little mist of water on their hands. Ask, “what happens when the water dries?” Instructor listens for responses related to cooling, temperature, etc. Instructor refrains from speaking or adding comments and ensures everyone has a chance to respond.
- Instructor can also prompt older learners: what happens in an area like a car or small room where there are a lot of people and no air flow? (it gets too hot!)

### **Place-Based Exploration**

- Instructor asks, “where do we see water helping to cool things around us?” Allow learners to ample time to think and respond. Instructor connects to the local environment: sprinklers, shade trees, ponds, fans at home, etc. Instructor ensures that each student has time to respond before volunteering examples.

### **Experience: How do bees cool their hive? (Sensory Engagement; Relationship Building)**

- Instructor refrains from using any specific content-based language until after the experience portion. If students use specific language instructor only corrects any misuse, do not introduce concepts/definitions. Explanation only occurs during discussion component.
- Instructor divides learners into groups of 3-4 (number of groups depends on how many students/“hives” are available).
- Instructor explains how bees cool their hives. Bee A/C! Bees gather water from sources such as ponds, pools, and other places where water gathers. Those bees bring the water back to their hive and spread tiny droplets all over the hive. Then, all those bees line up near the exits of the hives and fan their wings very quickly, the moving air evaporates the water and carries heat away with it. Additional info on “bee A/C” here.
- Give each group a dry “hive” with a thermometer inside. Instruct learners to insert their hands into the hive and ask, “what do you feel?” and “is the air inside the hive different from the air outside?” Listen for responses regarding temperature.

Instructor ensures each learner gets a turn to feel the inside of the hive and express their thoughts. Instructor asks, “what does the thermometer say inside the hive?” Note the temperature of each hive.

- Give each group a spray bottle of water and a couple of different types of “bee wings”. Instruct one learner in each group to spray five squirts of water in the hive. After, another learner fans the hive with their bee wings. Instruct learners to then feel the inside of the hive once more. Ask, “what does the hive feel like now? Do you notice a change?” allow each group to respond and note if there is a change in temperature.
- Learners rotate jobs. Repeat the above steps 5 more times. Note and discuss changes in temperature each time.

### K-3 Learners

Instructor focuses on temperature change.

### Advanced Learners

Instructor focuses on concept of evaporation. Instructor asks: where did the water go once the bees fanned their wings?

### Call to Action

- Regroup all learners for a concluding conversation. Begin with the questions, “did all of our hives change in temperature?” “Did the temperature go up or down?” “Explain to me how bees cool their hives down” “what did you learn about bees and water?”
- Next give learners the opportunity to create bee watering holes around the area. Provide shallow dishes and materials for bees to land on while gathering or drinking water. Remind learners that they just experienced how bees need water to live just like we do (relationship building). A shallow water source is needed to ensure safety, just like shallow water is safer for people that can’t swim.
- Instructor asks, “how does providing water for bees make a difference?” “how might it connect to bigger changes?”

### Connecting to content discussion and extending the lesson

- Content-specific questions can be created that provide an opportunity to introduce to the learner specific concepts directly connected to what was experienced in the lesson. Concepts that were directly experienced (such as how bees use their bodies to cool down the hive) should be introduced first before

moving into conceptual ideas (such as evaporation cycle, conservation, and climate change).

- The instructor can draw attention to new information that is directly related to the experience, but not specifically experiences. For example, the instructor can provide different types of dishes for bee watering holes, and have students identify which ones would be good to use and which ones would be bad to use.

### **Assessment / Reflection**

- Learners can be assessed through journal prompts and/or oral discussion: How are you like a bee? What do you both need to live? Why is water important for bees?
- Advanced learners: Why is the water cycle important to a bee? How do they use the water cycle to cool down their hives?