



# What Makes a Habitat A Home?

## Noticing the Elements of Habitats

Day 4 of Cultivating Connections Spring Sequence

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### Target Grade Level

1<sup>st</sup> - 5<sup>th</sup> grades

### Essential Question

What are the essential things needed to make a place a suitable habitat?

### Objectives

By the end of this lesson, students will be able to:

- Name the 4 components of a habitat
- Identify 1-3 actions that students can do to improve habitats in the garden

### STE(A)M Integration

**Art:** Journals, singing

### Engineering:

Constructing mason bee shelters

**Science:** Observations & data tracking, habitat song

### NGSS Performance Expectation

Crosscutting concept(s):  
Stability and Change  
Systems and Systems  
Models

### Lesson Length

One 80-85 minute session

## Summary

This lesson introduces 1<sup>st</sup> - 5<sup>th</sup> grade students to the four key components of a habitat through inquiry and a song. Additionally, a mason bee shelter building activity will allow students to actively engage in the creation of bee habitat. This will also encourage students to be mindful of their behavior in the garden.

## Rationale

This lesson will raise awareness about the garden as a habitat and cultivate empathy for the species that live there. The activities in this lesson provide knowledge about what makes a place a good habitat and empower students to take responsibility for their garden habitat.

## Background

Essentially, a habitat is a scaled down ecosystem. It is a community in which organisms interact with their environment. A habitat has four essential elements: food, water, shelter, and space. Habitats come in many forms (swamp, forest, meadow, city, etc.). Gardens provide a habitat for many plants and animals, and are especially important in areas that have limited green space.

Gardens typically have enough food for the organisms to eat, but sometimes there is not enough water or shelter for organisms to stay and live there. Adding some of these elements can encourage organisms to make the garden their home. Creating a mason bee shelter is one example of how students can positively impact the availability of the four components of a habitat within the garden.

Mason bees are different from European honey bees. Instead of living in hives, they make homes in individual units within small groups, with no particular hierarchy. Because of this they are called *solitary* bees. Mason bees don't have stingers. This makes them a great pollinator to invite into a school garden. Mason bees are also very efficient pollinators!

Mason bees typically make their homes in naturally occurring gaps and crevices, such as cracks in stones, hollow stems (such as dead raspberry canes), or holes in wood made by wood-boring insects. Inside of these holes, mason bees fill the back with mud and create a bed of pollen and nectar, called the 'golden nugget', to lay their eggs on in the spring. The bees fill the front of the holes with more mud to protect the egg inside. When the egg hatches, the larvae eats the golden nugget for food. However, the bee can remain in hibernation until next spring!

Think about your garden space. These types of habitat may not be readily available, or maybe there is not enough of these types of spaces in close proximity to the garden. You might already have some mason bees in your garden, but we want to encourage even more to make their home there. The mason bee shelters you make today will help.

#### Materials

- Journals (from Day 1)
- Student measuring sticks (from Day 1)
- Rain gauge
- Thermometer
- Scissors (for teacher's prep)
- Non-toxic water based paint (for teacher can prep)
- Non-toxic water based paint pens

For every 4 students in your class, you will need:

- 1 large can (2-3 lb. size)
- 4 toilet paper rolls
- 16 cut pieces of newspaper (1/2 pages)
- 16 pieces of parchment paper (~8½ x 11" each)
- Dry moss
- Scotch tape

#### Preparation for Lesson

- Prepare a visual of the lyrics to the habitat song
- Pre-cut newspaper
- Paint and label each can

#### Key Vocabulary

- Habitat
- Food
- Water
- Shelter
- Space

#### Evidence of Learning

Construct a Mason Bee Home  
Journal Entries

## Procedure

### Introduction (5-10 minutes)

Ask if any of the students can define the word habitat. Can the students come up with some examples? What are characteristics that distinguish the different habitats? What organisms live there? For example, could a toucan live in a cold climate? Why not? Ask the students if the school is a habitat. Ask the students to identify the key elements of a habitat. What are some things that people, plants, or animals *need* to have in order to survive and thrive? Explain to the students that today's lesson will focus on the four *essential* elements of a habitat: food, water, shelter, space.

### Habitat Song (10 minutes)

*It is useful to have the lyrics to this song written where the students can see them: on a flip chart, projector, white board, or on a hand-out.*

*The song is meant to include ASL signs for the keywords: food, shelter, water, and space.*

As the facilitator, you can use the following link to learn the ASL signs:

<https://www.signingsavvy.com>

This website provides a search engine to look up the following signs, and provides a short video that shows how they are performed.

1. Gather the students in a wide circle, with enough room to hold their hands out at their sides. This song will help students to remember what the four essential habitat elements are.
2. Teach the following hand movements:
  - a. “food” (fingers pinched together, bring to mouth)
  - b. “water” (fingers make a W and tap chin)
  - c. “shelter” (use the ASL sign for “home”: start with the sign for food and then move your hand, in the same position, to your cheek close to your ear)
  - d. “space” (right hand with fingers spread makes a horizontal circle out from chest)
3. Sing to the tune of “Twinkle Twinkle Little Star”:  
Food, water, shelter, space (Do each sign as you sing the word)  
Makes a happy living place.  
*I live in my habitat,*  
*Eating bits of this and that.* (Sign for food with both hands, bring each to your mouth in turn)  
Food, water, shelter, space  
Makes a happy living place.

To enhance the activity, this song can be repeated with different lines to tell about different species. A few examples below replace the italicized lines above:

I live on a silken bed,  
Eating insects in my web. (spider)

I live inside my shell,  
Leaves and grasses serve me well. (snail)

I live high up in a tree,  
Fruit and bugs can't hide from me. (bird)

### **Mason Bee Shelter Building Activity (45 minutes)**

*If it is nice weather outside, and not windy, this activity can take place in the garden. It is helpful to have a table, but a flat surface like a bench or sidewalk could work as well.*

Introduce mason bees to the students. Have visuals of a mason bee and a European honey bee (attached).

1. Discuss some of the similarities and differences between these two species. Some guiding topics for discussion could include:
  - a. Consider the differences in behavior between hive bees and solitary bees.
  - b. How is a mason bee habitat different from other bees? Consider the purpose the crevices serve for the mason bee.
  - c. Which is a more efficient pollinator, the European honey bee or the mason bee?
  - d. Discuss the life cycle of the mason bee, from egg to adult.
  - e. Only female mason bees have stingers. They will only sting if they are squeezed or trapped. Consider this compared to European honey bees.
  
2. When you are ready to get started, have one facilitator pass out materials. Alternatively, you can have a few students help you pass out materials, or line up the materials and have students collect what they need themselves.
  
3. As you build the shelter, keep the students engaged on the task at hand by asking inquisitive questions about what they are building. Keep in mind that younger students may not be able to focus on both the questions you have and the instructions. It might work best to ask these questions after the task is done, particularly with grades 1-3. Two critical thinking questions you can ask are:
  1. *“How do you think the bees use these tubes?”* Explain how mason bees use mud and the ‘golden nugget’ to fill the tubes and lay their eggs in the spring.
  2. *“Why do you think the mason bees might live in tubes like this instead of a hive? How is it different than living in a hive? What is similar?”* Tell the students that mason bees are solitary. They don’t have a hive they share with a colony, and they don’t have a queen. Instead, they lay eggs on their own. It is different than a hive because they don’t share the space with other bees. It also doesn’t involve making honey. It is similar to a hive in the way they protect their eggs in individual “nests”.

To make the mason bee shelters:

1. Take out pre-painted can(s) and permanent markers
2. Have the students decorate the can to personalize the nest and foster a connection with the bee home
3. Each student needs:
  - a. 1 toilet paper roll
  - b. 4 pieces of newspaper
  - c. 4 pieces of parchment paper
  - d. pencil
  - e. 8 pieces of tape
4. Have students lay one piece of newspaper on top of one piece of parchment paper so that the corners meet.
5. Next have students roll the newspaper and parchment paper tightly

- together to make a tube. (It might help to roll the newspaper around a wooden pencil. Just make sure that the end of the pencil sticks out from the roll of paper, so you can pull it out when you are done.)
6. Once the newspaper and parchment paper are rolled tightly, fold the tube in half. The two open ends will now be at the same end.
  7. Tape the tube together so that it stays in the bent position.
  8. Place the tube into one of the toilet paper rolls. It's okay if the ends stick out from the tube.
  9. Continue steps 4-8 until you have 4 bent tubes in each toilet paper roll. The tubes should fit in the toilet paper roll without falling out.
  10. Place a handful of moss in the bottom of the can. The moss must be dry. The moss will help insulate the bees, and will keep the toilet paper rolls from knocking around inside the can.
  11. Fill the can with your toilet paper rolls, with moss in between. The moss does not need to be stuffed tightly, but the tubes should stay in place.
  12. Clean up materials with your students and get ready to go into the garden (if you're not already there). You will need to also bring the students' journals from Day 1, for the next activity.

Now that your mason bee shelters are done, it's time for them to be placed in the garden! Have the students help you find a place to put them. The homes should be in a safe spot on the ground, where they are not likely to be stepped on, kicked, or removed. They can also be placed in trees, if it is sure that they will not be knocked down or blown out by the wind.

This is a good opportunity to ask your students where a good place for the habitats are and why. *"Should they go up high in a tree?"* That *might* work! Mason bees make their homes in any space available, in walls, trees, or near the ground. (Depending on what is available at your site, you could choose to put the habitat in a tree. However, your mason bee home may be safer on the ground.) *"Should they go in the middle of the path?"* No, because they might get stepped on. Ask: *"What do the mason bees need for their habitat?"* The answer should be flowers for food (pollen and nectar), and mud to provide protection in their nests.

You should also ask the students: *When we come back to visit the mason bee habitats, how should we treat them? Should we pick them up, shake them, or move them?* No, because that would make the bees that use the habitat unhappy. The baby bees nesting inside might get hurt if we move their home. Instead, we can look inside carefully, to see if there are nests.

Once you have found a good place for your mason bee shelters, circle up and transition into the journal activity.

### Journal Activity (15 minutes)

Inform students we will be measuring plant growth, rainfall, and temperature for the day. We will rotate between measuring stations, then come together to discuss our findings.

1. Have students open their journals to page 1.
2. Help students write in today's date.
3. Ask students if they have any questions.
4. Split the students into 4 groups, one group for each measuring station (2 groups can work as well, do what seems intuitive for the size of the class).
5. Give each group 2 rulers and assign each group to a station.
6. Have students document their findings at each station.
7. Once the groups have rotated through all of the stations, have students come back to the circle to discuss the data.
8. Ask for a volunteer with a quiet hand to share the data they got and open the discussion to the group.
9. Take a rough group average and either assign a role or ask for a volunteer to help graph the data on the flip-chart. Do this for all four graphs.

### To Simplify:

For younger age groups, consider making the measurements and recording results as a whole group, taking volunteers to perform each task.

### To Add Complexity:

Provide the following prompt for students to answer in a blank page in their journals: *Pick a species in the garden (plant or animal). Draw a picture of it. Find the four elements of habitat it relies on, then draw and label them in your picture.*

### Wrap-up (5 minutes)

- Circle up and ask the students to name the four components of a habitat. Can they remember the ASL signs for each? Sing the song again if there is good energy for it.
- Congratulate the students on doing something helpful to make the garden a better habitat for bees! Ask what other things they can do to improve habitat conditions in the garden.
- Ask if they can name any other species that we would like to have in the garden. What can they do to help those species make their homes here?
- Suggest that the students can come back next class time to see if any mason bees have "moved in".

If you are evaluating this lesson and whether students have achieved the learning outcomes, take notes on the responses to each of the first three prompts. Keep track of how many students can answer each of your questions accurately. For more rigorous evaluation, consider printing a "quiz" with these questions that each student can complete individually, or ask them to write the answers on a blank page of their journals. (This will increase the time needed for the Wrap to 10-15 minutes.)



**Adapted From:**

‘Ōhi‘a Project. (1989). A happy place to live. An environmental education guidebook for Hawai‘i (pp. 48-51). Honolulu, HI: Bernice Pauahi Bishop Museum and Moanalua Gardens Foundation.

Goward, E. (Ed.). (n.d.). Habitats and Ecosystems. Retrieved February 12, 2017, from <https://www.schoolgardenproject.org/download/habitats-and-ecosystems/>

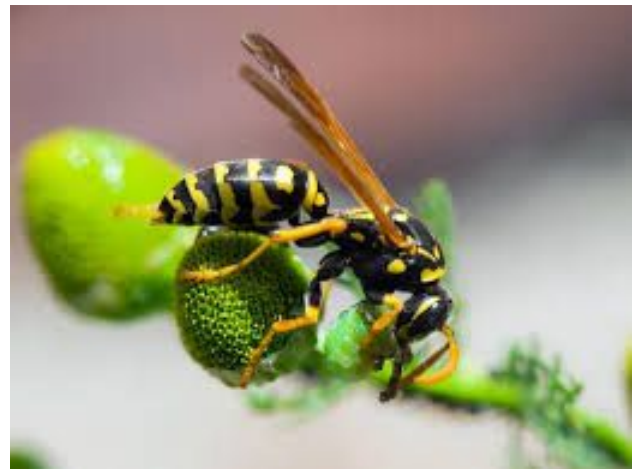
"Mason Bees: How to Build a Bee Nest Using Recycled Materials."

Bukisa. [http://www.bukisa.com/articles/474795\\_mason-bees-how-to-build-a-bee-nest-using-recycled-items](http://www.bukisa.com/articles/474795_mason-bees-how-to-build-a-bee-nest-using-recycled-items).



**Mason Bee (*Osmia lignaria*)**

<https://www.parentmap.com/article/keeping-mason-bees-10-expert-tips-for-families>



**Wasp (*Hymenoptera*)**

<http://animals.nationalgeographic.com/animals/bugs/wasp/>



**European honey bee (*Apis mellifera*)**

<http://rvcoutdoors.com/10-things-didnt-know-honey-bees/>