

Species Survey

Key Topics: Habitat, Microhabitat, Species, Citizen Scientists, Endangered Species, Identification

Grade Levels: K-1, 3-5

Outside

Lesson Overview:

What makes a suitable habitat? What kinds of living beings are typically found in our schoolyard? Students will prepare for an adventure in their school grounds and go on a school safari! Tracking skills and understanding life cycles of local species will be the focus. Students will then turn their attention to a real life example of a declining species of ladybug, the C-9, and will serve as citizen scientists to survey their schoolyard to look for, identify, and photograph ladybug species they encounter.

Activities:

Option 1 - Habitat Discussion and Schoolyard Safari (25 minutes)

Option 2 - Citizen Scientists: Ladybug Survey (35 minutes)

Suggested Activities & Learning Objectives by

Grade:

- K: Habitat Discussion and Schoolyard Safari
 - K-LS1-1 What do plants and animals need to survive?
 - K-ESS3-2 How does a plant's or animal's needs determine where it lives?
- 1: Habitat Discussion and Schoolyard Safari
 - 1-LS1-1 How do plants and animals use their external parts to meet their needs, survive and grow?
 - 1-LS3-1 How are young plants and animals like, but not exactly like their parents?
- 2: Habitat Discussion and Schoolyard Safari
 - 2-LS4-1 Compare the life you find in each habitat you examine.
- 3: Habitat Discussion and Schoolyard Safari, Citizen Scientists: Ladybug Survey
 - 3-LS1-1 Compare and contrast the life cycles of different species--how are they different? How do they all have birth, growth, reproduction and death in common?
 - 3-LS2-1 What animals form groups that help members survive?
 - 3-LS3-1 What animals and plants do you find that are similar, but not identical to their parents?
 - 3-LS4-3 What habitats do you find and how are they supportive or not of different plants or animals?
- 4: Habitat Discussion and Schoolyard Safari, Citizen Scientists: Ladybug Survey
 - 4-LS1-1 What do plants and animals use to help them survive, grow, and reproduce?
- 5: Habitat Discussion and Schoolyard Safari, Citizen Scientists: Ladybug Survey



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- 5-ESS3-1 How can we gather information and determine the health of the ladybug population, and discuss ways to improve it using the data we've gathered?

Essential Question(s) that Connect CCCs and SEPs:

- Ask students to identify any patterns that appear from the three lists. How can this pattern support your explanation of what a habitat is? ([Patterns](#); [Construct Explanations and Design Solutions](#))
- How do habitats change at different scales? Can I look at habitats on a smaller scale? ([Scale](#); [Asking Questions and Defining Problems](#))
- How can we use the patterns of habitats to promote the populations of local endangered species? ([Patterns](#); [Asking Questions and Defining Problems](#))

Materials:

Part 1 - Habitat Discussion and Schoolyard Safari

- [Schoolyard Safari Survey for Students](#) - 1 per group of 3-4 students
- Clipboards - 1 per group of 3-4 students
- 3x5 note cards - 1 per group of 3-4 students
- Writing and drawing materials (pens, pencils)

Part 2 - Citizen Scientists: Ladybug Survey

- [Coccinella novemnotata](#) - laminate a copy to help with identification
- [Looking for Lost Ladybugs!](#) - 1 per group of 3-4 students
- Container with lid to gather ladybugs into (any recycled container will do, or 1 oz salad dressing containers) - 1 per group of 3-4 students
- 1 camera (could use a high quality cell phone camera)
- Ruler for size reference in photographs

EG Team Support Needed:

- None

Prep:

This activity is meant to be done 100% outside! In the case of rain the Habitat Discussion can be done inside. Alternative options for the Schoolyard Safari and Ladybug Survey: play an educational video looking at habitats. Have students pretend they are in that environment for their safari and instruct them to fill out their schoolyard safari sheet just the same, instead of doing a ladybug survey outside work on identifying ladybugs inside! You can make it a game by playing bingo, a matching game, etc.

- Make sure you have the [Coccinella novemnotata](#) laminated poster
- Ask classroom teacher to make photocopies of the [Schoolyard Safari Survey for Students](#) (1 per group of 3-4 students) and [Looking for Lost Ladybugs!](#) (1 per group of 3-4 students)
- If you will be writing the *Habitat Homes Chart* on a piece of butcher paper instead of a whiteboard, do this ahead of time.
- Walk school campus to observe places that will be beneficial for students to go on their schoolyard safari and ladybug survey. Make a mental note of the parameters for students to explore within.

Activity Procedure:**Engage:**

Begin with a classroom discussion in the seating area in your garden or in the classroom.



Write the following chart on the whiteboard or butcher paper, record answers, and discuss with the class:

Label the chart: Habitat Homes. Make three columns and label them with the headings “People”, “Other Animals” and “Plants”. Tape up the chart. On the second sheet of paper write the heading “A Habitat is Where...” Introduce the activity by asking students what they think people need in order to live. Accept all ideas, writing them in the “People” chart. *How do you meet your survival needs? Could you live anywhere? Do you think other animals and plants have similar needs? What do the plants in our garden need for survival? What do the animals need? How does our garden help them to survive? What resources do the plants provide for the animals? (food, shelter) What resources do the animals provide for the plants? (pollination, beneficial predation, seed dispersal).*

Option 1 - Habitat Discussion & Schoolyard Safari

1. Divide the class into groups of four students. Assign half of the groups to brainstorm things animals need in order to live and the other half to brainstorm things plants need in order to live. Encourage groups to think of as many things as they can, listing ideas on a piece of paper. Have each group choose a reporter.
2. Ask the reporter from one group to read aloud from the group’s list while you record ideas on the chart in the appropriate column. Ask other groups’ reporters to share any ideas they have on their lists, and add these to the chart.
3. Ask students to identify any **patterns** that appear from the three lists. Circle them. How can this **pattern** support your explanation of what a habitat is? (**Patterns; Construct Explanations and Design Solutions**) The most basic needs should be the same for all three groups. Then finish the statement “A Habitat is Where...” (*an organism lives. It’s habitat provides an organism with everything it needs to survive, including its specific needs for food, water, shelter, space, and reproduction.*)

Every living thing needs a home – not just a shelter but a resource base that provides food, water, safety and space to live and produce young. Just as we look for homes near jobs, schools, transportation, shops, parks and services, each animal needs a habitat where it can obtain the things it needs for survival. Plants also require certain soil types, light, nutrients, water and temperature ranges.

Explore:**Action**

1. Ask students whether they have ever heard the word “safari,” and ask what kinds of things they might see on a safari. Point out that a safari doesn’t have to be to a faraway place, and that they can even take a safari in their own backyard. Ask, “What might you see on a backyard safari?”
2. Tell students that they are going on a safari of the school grounds! They will look and listen for signs of animals living or visiting there. Tell students that they will need to search carefully to

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find animals, and that they will be more likely to find an animal if they are quiet. Ask students for ideas about where they might look. Their suggestions might include on the bark and leaves of the trees, on shrubs, in the cracks of sidewalks, among blades of grass, on utility wires, in the soil around plants, along the edges of buildings, under leaves, and on walls and fences. List their suggestions on the board.

**Note:* While most students will be excited to look for animals, some may be nervous about encountering animals like spiders or bees. You might help by briefing students in advance on the kinds of animals they are likely to see, and by assuring them that most animals will be scared of them. However, tell them it is smart to be cautious and warn them about animals they should not touch or pick up.

3. You might stimulate their imagination by having them pretend that buildings are mountains and cliffs, that the lawn is a jungle, or that the sewer is an underground river outside and allow a few minutes for them to find two animals or signs of animals. Set boundaries so that students don't roam too far.
4. Remind students what the callback will be for this project (give me 5, silent coyote, chime, etc) and stick with it! Break children into small groups of 3-4. Distribute clipboards, drawing materials, and the Schoolyard Safari Surveys for Students. Ask students to sketch the animals or signs they find. Instruct students to draw the structures of animals they find as accurately as possible. How many wingtips did the bee have? How many dots did the ladybug have? You might also give students hand lenses to increase their powers of observation.
5. Provide a blank table to each group and have students record the number of each animals they find. This table can be made by students out of a simple 3x5 notecard. Later, they can draw a graph using these numbers.

Explain:

Bring the group together in a toe-to-toe circle. Ask students where they had success finding animals or signs of animals. Do all animals live in the same place? Did we observe any habitats on a smaller **scale**? Even within our schoolyard there are **microhabitats** that supply the unique needs of different animals. How does the habitat of a worm differ from the habitat of a bird? Microhabitats support a diversity of plant and animal populations! (**Scale**; **Asking Questions and Defining Problems**)



Comprehension Check

Have students share their experiences and compare their findings. Use the Think-Pair-Share recommendations to have kids partner up with classmates outside of their groups to share their findings. Have them change partners for each new question. Focus them on the following questions:

3rd-5th grade:

What animals did you observe living in our schoolyard?

What evidence did you find of other animals?

Choose one animal you found. What was unique about that microhabitat? How does that habitat provide shelter, food, water for its inhabitants?

Are the plants in our schoolyard habitat getting what they need to grow well? How can you tell?

What kinds of food might animals find on the school grounds?

Where do these animals get water?

What kind of shelter might animals find on the school grounds?

Did you see any damage to habitats or unhealthy conditions for plants, animals, or people? Were those conditions natural?

K-2nd Grade:

What were the largest and smallest animals you found?

What surprised you the most?

How are those animals harmful or helpful to you?

What kinds of food might animals find on the school grounds?

Where do these animals get water?

What kind of shelter might animals find on the school grounds?

Elaborate:

We are now going to turn our attention to a real life example of a declining species of ladybug. The nine-spotted ladybug, *Coccinella novemnotata* or C-9 for short, was once so common and so respected for the great job it did controlling pests that, in 1985, it was proposed as the New York state insect by a fourth grade student. Unfortunately, by the time C-9 was honored in 1989 a population decline had already begun. There had been no confirmed collections of this ladybug in the eastern US since 1992 until one was found by Jilene (age 11) and Jonathon (age 10) in 2006. More recently, *C. novemnotata* has only been collected sporadically in the Midwest and west coast of the United States. There may be a rare ladybug in our schoolyard right now!

Scientists need detailed information on which species are still out there and how many individuals can be found. They need us to be their legs, hands and eyes! When citizens gather scientific information to provide to scientists, they are called citizen scientists. We are going to be collectors and photographers today to share valuable information with The Lost Ladybug Project, a group of scientists researching ladybugs, to help them survey population numbers and begin to understand reasons for their decline.

Option 2 - Citizen Scientists: Ladybug Survey

1. Review how students can identify the 9 spotted ladybug by displaying this large laminated photo: [Coccinella novemnotata](#). The nine-spotted ladybug can be identified by the presence of four black spots on each of its elytra, a single spot split between the elytra, and a black suture between the elytra. Its pronotum is black, with two connected white marks at the front of its head.
2. Have children stay in their same small groups of 3-4. Explain protocol for what to do when they find a ladybug by reading from the [Looking for Lost Ladybugs!](#).
3. Provide each group with 1 [Looking for Lost Ladybugs!](#) Sheet and 1 container to hold their ladybugs inside of until they make it to a freezer.
4. Again, set parameters for how far they can explore. Allow them to search and collect for 5-10 minutes.
5. Call students back to the group and proceed with the steps of chilling out, photographing, and identifying.
6. Save photographs and send to Cornell following the instructions given on the Looking for Lost Ladybugs! Sheet.

Evaluation:**Comprehension
Check**

Ask students to raise their hands to share:

How will the loss of native predators, such as the 9 spotted ladybug, affect the control of agricultural pests? How can we use the **patterns of habitats** to **promote the populations of local endangered species?** (*habitat protection and restoration*) ([Patterns](#); [Asking Questions and Defining Problems](#)).

Also, refer back to the Learning Objectives for your grade level and ensure that they have been met by asking the given learning objective question.

Extension Activities:

- Help students learn more about the animals they found in the schoolyard. For example, they could research different animals found and create a class chart showing a picture of each animal and information about what it needs to survive. They might also go on a schoolyard safari at different times of the year to see whether they notice any changes.
- Ask students what kinds of animals they would like to have (or have more of) on their school grounds (birds, bees, butterflies, squirrels, rabbits). Have them do some research to find out what could be done to the schoolyard habitat to attract those animals. (Provide bird feeders or baths, shelters for mammals, or plants as food for wildlife.) They can find information in the library or on the internet, or get advice from experts such as the state wildlife agency.
- Play [Living Dangerously](#), an active game where students discover how the availability of habitat resources affects populations of living things.
- Students write and draw enticing travel ads for a garden animal's habitat. Follow this activity guide: [Homing In](#).

Tips and Caveats:

- Ladybug populations are greatest from May-October, so conducting this lesson at the beginning or end of the year is best!

Adaptations for K-2

For kindergarten students, have them draw the animals they find on their schoolyard safari as accurately as possible on a blank piece of paper rather than the **Schoolyard Safari Survey for Students Sheet**.

For K-2, follow the discussion questions outlined for the schoolyard safari think-pair-share.

Cited Curriculum:

- American Forest Foundation - [Schoolyard Safari](#)
- LifeLab - [Garden Habitats](#)