Bug Hotel

LESSON

GRADE LEVEL:

Pre-K to grade 4

CATEGORY:

Naturescape: Plants, Animals and Habitats

TOPIC:

Discovering insect life in tree canopies and creating an insect shelter at school

LENGTH:

- Part 1: 30-40 min, plus longer for inquiry
- Part 2: 30 min+ pending buddy class help

SETTING:

- Part 1: Outdoors
- Part 2: Outdoors with some assembly indoors

GROUP SIZE:

- Part 1: Whole class or split in two with helper
- Part 2: In pairs

SUBJECT AREAS:

Science

SKILLS:

Observing, predicting, comparing, drawing, creating, questioning, communicating.

KEYWORDS:

Living/alive, bug, insect, bark, leaves, tree, habitat and components (food, water, shelter, space).

Overview

Trees provide shelter for many living things, like insects. This activity helps students realize how important shelter is to small animals and all living things. Students also get a chance to create habitat for insects on the schoolgrounds and consider the consequences of their actions on living things.

Objectives

Students will be able to:

- Experience, communicate, and appreciate the many roles trees play in a place
- Learn about the places where insects live and what trees provide for them
- Consider the needs of other living things and how they provide for them
- Apply their observations by creating a shelter for insects
- Appreciate the diversity of insects and some of the important roles they play in nature

Materials

Part 1

- White sheet
- Magnifying loops (optional)
- Insect collecting tools, such as pooters: *https://www.hctfeducation.ca/wp-content/uploads/2015/10/HowToMakeAPooter_Print-1.pdf* (optional)
- Paper and pencil to record and draw observations in journals (optional)

Part 2

- Loose natural parts such as cones, small bamboo with holes, bark pieces, sticks, wood with holes drilled in them about 5 inches deep, dry fallen leaves.
- String or thin jute for tying things together
- Metal cans or paper rolls (towel or toilet paper) to use as rooms
- Hotel structure (old small shelves, metal wine racks) or materials to make frame and roof

Method

Students use their senses to observe and appreciate trees as shelter for animals such as insects. Based on their observations, students build a 'bug hotel'. Shelters can be taken home and hung up/placed outside at school near the school grounds or school garden. Students monitor the hotel for use and consider the usefulness of providing shelter.

Background

In order to survive, all living things need a habitat- a home- where they obtain food, water, shelter, and space. Trees are a habitat for all kinds of living things. The many parts of a healthy, growing tree—including its roots, branches, leaves, bark, flowers or cones, and seeds—may be eaten, used as a nest site, be a place to grow, or a place to shelter from the weather or predators. For example, big leaf maple trees in coastal B.C. are easily identified by the thick layer of mosses, lichens, and ferns that grow upon them. Squirrels and birds make nests in tree branches high above the ground. Insects munch on tree leaves, which attracts birds who munch on the insects. Deep grooves in bark, such as that on old Douglas fir trees, shelters insects, spiders, and even larger animals such as amphibians and bats. Some types of insects lay their eggs in plant stems or leaves, causing the plant to create a swelling or "gall", which provides both food and shelter for the developing insect through the winter until it emerges the following spring. The trees that grow in the riparian area alongside a creek or stream support life. The overhanging tree branches provide shade keeping the water temperature down, and the leaves provide a shelter for insects, which, as they drop onto the water, in turn become an important source of food for fish. This can be seen in the way freshwater fly-fishing lures (flies) are designed to look like insects and the associated casting techniques simulate the way in which insects drop onto the water surface.

Trees continue to be an important home to other life even as they decay and die. Mushrooms growing on a tree may be harmless or depending on the type, may indicate that the tree has a disease that causes it to rot. Wood-boring insects, such as ants and beetles, make tunnels and lay their eggs in wood, causing decay. Woodpeckers use their strong beak to seek out a meal of these insects that live below the bark. Woodpeckers are also the great architects and builders of the forest, excavating large holes each year as nest sites to raise their young. Once the woodpeckers leave, the cavities become prime shelter and nest sites used by many other animals, including raccoons, squirrels, bats, and cavity-nesting birds, such as owls, chickadees, and wood ducks. Dead or decaying trees are so important as animal homes that they are called 'wildlife trees'. Over 90 different kinds of animals in B.C. rely on wildlife trees for food, shelter, and a place to raise their young. As a tree decays, its nutrients are recycled back into the soil by decomposers including slugs, fungi, bacteria, and insects. A decaying tree stump is often called a 'nurse log', because it gently provides everything that a young seedling needs to gain a foothold and thrive in the forest: a place to grow that is high in nutrients, sunlight, and moisture. Most western hemlocks and red huckleberry plants started their lives as young seedlings on nurse logs in West Coast forests.

The small creatures that are collectively and informally called 'bugs' are all around us and we could not live without them. This group of animals may include spiders, millipedes, centipedes, millipedes, woodbugs, and the most numerous and diverse group of animals on the planet, insects. Insects and other 'bugs' are often thought of as pests. When we see holes in leaves, we may be concerned and not realize that the one that is feeding on the plant might soon grace us with its presence as a butterfly. Insects play important roles as pollinators, in pest control (as predators of harmful insects or other 'bugs'), as food for other animals, and in nutrient cycling as decomposers. Many of the foods we eat we wouldn't

have without insect pollinators, including not only the honeybee (which was introduced from Europe), but also some types of flies, beetles, butterflies and moths. British Columbia has more than 450 species of native bees—more than half of all of Canada's bees—all of which are pollinators, and a third of which live in holes in trees. Trees are important as shelter and food for insects. Studies have shown that over 800 species of insects and mites are associated with the Garry oak tree. The majority were there for shelter or to feed on other organisms found there. 140 species feed on the Garry oak and almost a third of those are specialists, meaning that they eat nothing else and rely on the Garry oak for their survival.

Schoolyard trees and garden plants also have insects living in and on them. The manicured spaces of a typical schoolyard may not support an abundance or diversity of insects that rely on leaf litter, decaying wood, freshwater, specific plants, or other habitat features for their life cycles. Depending on the type of schoolyard you have or are envisioning (native plant gardens, food garden, trees), creating shelters for bugs from natural materials can be a useful activity to add into schoolyard greening projects. Insects and other 'bugs' are easy to observe and study because they are everywhere. They have fascinating life cycles, interesting forms and patterns, and play important ecological roles. We can discover the importance of a shelter by making a 'bug hotel' to attract them to our natural places.

Part 1 – Shake a Tree

Procedure

1. Visit the school grounds or on a field trip to a park, select a tree where students can reach the branches and put a white sheet under the tree/branch.

2. Select a few students to help gently shake the branch over the white sheet.

3. Arrange everyone around the edge of the sheet but not on it so they can look. Invite the students to make observations about what they see then record and draw two or three different living things without harming them. Use the magnifying loops to get a closer look and take pictures to record what is seen/drawn. You may wish to roll up the edges of the sheet to allow the students to get closer to the insects and to help the insects stay on the sheet until you are done. You also may wish to temporarily gather items with "pooters" or other collection tools to transfer into magnifying boxes or other clear collection jars. to allow for closer observation.

4. After you have made your observations, ask the students to help you hold up the sheet and if needed carry it closer to the tree trunk. Gently shake the sheet towards the trunk so the insects can find their way back up the tree or shelter until they can fly/crawl off. Leave the area so the insects, spiders, and other 'bugs' are not trampled.

Options:

- If time or on another day, repeat under a different kind of tree. Ask students to make hypotheses about what they might find under a different tree.

Discussion:

1. Using the students' observations discuss the different kinds of items the students observed on the sheet. Are the items living? Or once part of something living? Explore the students' conceptions of life and what is alive. Western scientific and Indigenous ways of knowing will differ.

2. Collect the students' questions and wonderings about the activity. If needed ask questions like: Of the things that were seen, how many of them were insects? How would we know? Where do these insects live / what does the tree provide for them? What role do they play in the ecosystem? What makes them important? Explore insect lifecycles and habitats using these questions once back in the classroom. Use the questions to help the students design an inquiry such as how they might build a shelter for insects - see part 2.

Part 2 – Build a Bug Hotel

Procedure

1. Use the findings from the student inquiries to list the different things that an insect might use to shelter in such as bark, wood pieces with holes drilled in them, cones, small bamboo sections, pieces of leaf stems, sticks, small piles of leaves. Note that all the suggestions are natural objects. If appropriate discuss human-made and natural. Plastic straws might get mentioned but are not ideal because they do not break down and mold can build up in these items creating a toxic environment for insects.

2. Consider if you will be creating separate hotels or making one large one. Each student can make one room in the hotel from metal cans to take home and hang outside. Or metal cans and paper rolls to hold the individual items can be tied together or put in a structure to make a hotel. Individual items could also be tied together with string without a cover, if the hotel structure provides a space.

   Options:
   - Work with a buddy class to help students create one or two frames (2-3 hotels are better) to hold the 'rooms' . Consider where you will be placing the hotels and if they will need a roof to keep rain from soaking the inhabitants.

3. Either provide items or if possible, have students collect fallen items no bigger than their thumbs that they think an insect or other small 'bug' might like to live in. There should be enough different materials so that each student could have one handful of items. If taking the shelters home, you may need more materials.

4. In pairs, students work to fill the paper roll or metal can rooms (one per pair) by each collecting one handful of items or have a buddy class help the younger students tie them together with string or jute. Fill up the room, so that it is full, but not packed, you want the insects/ bugs to have room to find a place to live.

5. Ask the children about places where they might put the hotels, such as on the ground or hung up off the ground. Discuss and consider:
   - Where would be a good spot for the hotel and why?
   - How will the bugs/insects find the hotel? What would attract them to the hotel? Will they just come?
   - What do insects do in the winter, how cold will it be over the winter, and does the shelter provide enough protection?

6. Discuss the need to communicate with the rest of the school what they are doing, where they are putting the hotel, and why.

7. Students should monitor their hotels and make observations throughout the school year or in the different seasons.

   Options:
   - Depending on where students live, they may take individual rooms home as single room hotels and hang them where they can be observed. Make parents aware if this is the case.
   - Work with the municipal park staff, organizations, or community garden committee to find out if a bug hotel can be put up in a public area where students can visit. Consider what might happen to something that is put up in a public area.

Assessment

1. Depending on the inquiry, students can be assessed based on the quality and thoughtfulness of their questions, how they carry out the activity and the conclusions they draw.

2. You may wish to assess students on their ability to communicate what they learned about trees and insects and the place they studied. If appropriate for the grade, recommendations for improvements to the design of the bug hotel can also be used to measure comprehension.

3. Appreciation for insects and trees can also be measured as might be demonstrated when insects are found in places they do not belong, such as inside the classroom or at home.

Extensions

1. Explore any differences in insect life outside and inside schools.

2. Make similar observations in soil try the Eco-Enrichers activity in the Project Wild resource.

3. If you have a school garden, have students research what types of plants attract specific bugs/insects that you want in your garden such as pollinators, like mason bees and butterflies; or pest control such as ladybugs and non-aggressive wasps, like parasitic or mud wasps. Create a detailed list of the relationships between insects and plants including what plants are used during different life cycle stages. Consider growing or purchasing plants that would help support some of these beneficial insects for your school garden.

4. Maintain mason bees or grow native butterflies and release them in areas where food sources are available.

5. Take part in a citizen science project on insects and/or pollinators such as ebutterfly.org, bumblebeewatch.org or on pollinators: *https://www.naturekidsbc.ca/be-a-naturekid/stewardship-citizen-science/pollinators/*