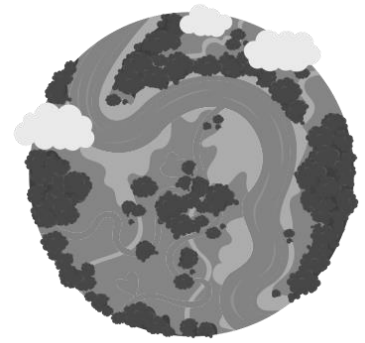


TOWER HILL

B O T A N I C G A R D E N



ECOSYSTEM EXPLORATIONS

Teacher Guide

OVERVIEW

Thank you for registering for the *Ecosystem Explorations* field trip. During this guided program your students will investigate how living and non-living things interact within different ecosystems. Students will observe and define these relationships in a forest, meadow, aquatic and cultivated garden habitat. We recommend you complete the pre- and post-visit activities on the following pages to enhance your visit and support the 2nd to 5th grade classroom integration of the concepts addressed during this program. Please note all programs are 90 minutes in length and will take place outdoors in rain or shine over areas of rough, uneven terrain. Please ensure students are dressed appropriately.

LEARNING OBJECTIVES

- Students will understand that plants and animals depend on abiotic factors and other living things to meet their needs for survival within their habitats.
- Students will understand that an ecosystem is an interconnected community of living and non-living things and the physical environment.
- Students will be skilled at making observations and be able to compare and contrast features in the natural world.

NARRATIVE

Animals, plants, and people require food, water, shelter, and space to survive. Plants and animals are able to meet these needs within their habitats, but not all species can survive in the same habitat. A habitat is an animal or plant's home. Many homes or habitats together make up an ecosystem. An ecosystem is an interconnected community of living (biotic) and non-living (abiotic) things and the physical environment.

During your trip Teacher Naturalists will guide small working groups of 10 to 15 students to four different habitats; cultivated garden, aquatic, forest, and meadow. Students will be encouraged to make observations, explore, investigate, and ask questions throughout. Each student will be provided with a hand lens, clipboard and habitat data sheet to use during their visit. Teacher Naturalists will challenge students to become scientists by using scientific instruments, collecting data, and exploring each habitat. During the field trip Teacher Naturalists will engage students in the following teaching points using a combination of stories, investigations, experiments, and games.

- A habitat is a plant or an animal's home. All living things need food, water, air, and space to survive in their habitats.
- An ecosystem is an interconnected community of living (biotic) and non-living (abiotic) things and their physical environment.
- All living things have different requirements for survival. Not all animals and plants persist in the same habitats and environmental conditions differ between habitats.

STANDARDS

All programs are designed to align with state and NGS standards. The *Ecosystem Explorations* field trip program addresses the following Massachusetts Science and Technology/Engineering Curriculum Standards.

Grade 2

- 2-LS2-3(MA). Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.
- 2-LS4-1. Use texts and local environments to observe and compare (a) different kinds of living things in an area, and (b) differences in the kinds of living things living in different types of areas.

Grade 3

- 3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well, some survive less well, and some cannot survive.
- 3-LS4-4. Analyze and interpret given data about changes in a habitat and describe how the changes may affect the ability of organisms that live in that habitat to survive and reproduce.

Grade 5

- 5-LS2-1. Develop a model to describe the movement of matter among producers, consumers, decomposers, and air, water, and soil in the environment to (a) show that plants produce sugars and plant materials, (b) show that animals eat plants and/or other animals for food, and (c) show that some organisms, including fungi and bacteria, break down dead organisms and recycle some materials back to the air and soil.
- 5-PS3-1. Use a model to describe that the food animals digest (a) contains energy that was once energy from the Sun, and (b) provides energy and nutrients for life processes, including body repair, growth, motion, body warmth, and reproduction.

VOCABULARY

Students will be introduced to the following vocabulary words during the program. Reviewing these terms beforehand will serve to enhance the group's experience during your visit.

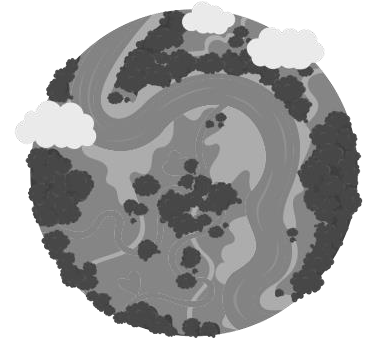
- **Habitat:** Where an animal or plant lives and is able to find food, water, shelter, and space
 - **Ecosystem:** A community or network of living and non-living things
 - **Abiotic:** Non-living
 - **Biotic:** Living
 - **Nutrients:** Something that provides food or vitamins to a living organism
 - **Aquatic:** Relating to water
 - **Cultivated garden:** An area with plants that are cared for by humans
 - **Survive:** To be alive and healthy
 - **Meadow:** A piece of grassland
 - **Forest:** A large area covered by trees
 - **Adaptation:** A physical feature or behavior that helps a plant or animal survive
 - **Relationship:** The way two or more living or non-living things are connected
 - **Depend:** To need something in order to live
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TOWER HILL

BOTANIC GARDEN

ECOSYSTEM EXPLORATIONS

Pre & Post Activity Guide



The following pre- and post-visit activity ideas and recommended resources are designed to support the 2nd to 5th grade classroom integration of the concepts addressed in the *Ecosystem Explorations* program. In order to complete the post-activities we recommend you collect students' Habitat Data Sheets upon departure from the site. We love to see your students' work and continued learning experiences. Please send any drawings, photos, poems and other examples of student work to the Manager of Youth Education at 11 French Drive, P.O. Box 598, Boylston MA, 01505.

PRE-VISIT ACTIVITIES

Home Sweet Habitat

Students will identify the basic needs of all living things and recognize the similarities and differences between habitats.

Materials:

- Paper
- Magazines
- Markers
- Glue

Begin by brainstorming as a class the things that animals, people, and plants need to survive. Write down student's responses and narrow the list down to four basic survival needs; food, water, shelter, and space. Introduce the word *habitat* and explain that a habitat is a home where living things are able to find the things they require for survival. Though our homes or habitats may be very different, we all need the same things to survive.

To begin thinking about different habitats, have students create a drawing or collage with magazine clippings. Provide each student with a blank sheet of paper and instruct students to fold it in half. Ask students to write the word *habitat* on the top of each half. On one side they should create a floor plan of their home. On the second half students should create the habitat of an animal of their choosing. Students should include where they and where their animal

finds food, water, shelter, and space. Hang artwork up around the room, creating a gallery walk.

Wrap up by leading a class discussion, small group discussion, or independent journaling activity. Discuss the differences and similarities among the different human and animal habitats. Choose a few volunteers to present their work or ask students to imagine different animal habitats around the world.

Habitrek

Students will practice collecting data and making observations and will understand that habitats exist in all shapes and sizes.

Materials:

- Hand lens
- Spoons
- Data sheets
- Pencils

Review the basic needs of all living things; food, water, shelter, and space. Define *habitat* as a class and ask students if they think their schoolyard or backyard is a habitat; why or why not?

Explain that wildlife includes even the smallest organisms and many animals and plants find the things they need to survive in places we may not even think of. Head out to the schoolyard and provide students with a list of items to search for or allow for free exploration. Encourage students to roll over rocks, use hand lenses to observe areas up close, and

use spoons to dig in the dirt. Remind students that even if they do not see any living things, there are still signs they can search for that might tell us what lives here (i.e. tracks, leftover food, nests, etc.).

Allow the class to explore for an allotted period of time while recording their findings then regroup and ask students to report on what they observed. Ask students to list the most interesting things they found; what animals or plants could *not* live in this habitat; could these animals or plants live in any other habitats; how are these plants or animals meeting their needs in our schoolyard?

Extensions:

1. Classify and tally plants and animals found and create a bar graph to show results
2. Journal about the results
3. Discuss other habitats and create a Venn diagram to compare and contrast findings

EDUCATOR RESOURCES

- *Project Wild* by The Council for Environmental Education
- *The Curious Naturalist* by John Mitchell & The Massachusetts Audubon Society
- *The Big Book of Nature Activities* by Drew Monkman & Jacob Rodenburg

RECOMMENDED BOOKS

- *The Magic Schoolbus Hops Home: A Book About Animal Habitats* by Pat Relf & Nancy Stevenson
- *I See a Kookaburra!* By Steve Jenkins
- *Habitats Infographics* by Harriet Brundle
- *The Wondrous Workings of Planet Earth: Understanding Our World and its Ecosystems* by Rachel Ignotofsky
- *Eyewitness Living World* by Dorling Kindersley
- *Firefly Wildlife Atlas: A Comprehensive Guide to Animal Habitats* by John Farndon

POST-VISIT ACTIVITIES

Habitat Grid

Students will use data collected during their trip to create an ecosystem connections mural.

Materials:

- Crayons
- Pencils
- Chart paper
- Habitat data sheets

Split the class into small groups and provide each group with a piece of chart paper. Split the paper into four equal sections and draw a circle in the middle. Redistribute students' habitat data sheets from the trip and assign each group a different habitat to report on. Have groups spend 10 minutes organizing their data and reviewing. Each student should transfer their information to one corner of the group's chart paper. At the end of the allotted time period instruct groups to organize the data they agree on into the center circle. Once complete provide each group with a second piece of chart paper. Students should spend their remaining time creating a mural with the data they compiled. Hang all four murals together to create a larger class ecosystem mural. Discuss and review each habitat, challenging students to point out similarities and differences. Discuss how living and non-living things interact in and between each habitat and how these connections create an ecosystem.

Habitat Haiku

Students will use data collected during the trip to share their experiences and practice language and writing skills.

Materials:

- Habitat data sheets
- Pencils

Redistribute students' habitat data sheets from the field trip. Have students turn and talk to their neighbor and share some of the experiences they had or some of the data they collected. Explain that they will use this data to create a poem, haiku, short story or comic strip about their experiences. Challenge students to practice the vocabulary they learned by requiring the inclusion of a set amount of words in their work.

For more information, contact the Youth Education Manager at 508.869.6111 or youtheducation@towerhillbg.org