PROJECT LEARNING TREE CANADA

An initiative of SFI

explore your ENVIRONMENT

K-8 ACTIVITY GUIDE

A FREE SAMPLE ACTIVITY FOR GRADES 3-5: CHARTING BIODIVERSITY

EXPLORE YOUR ENVIRONMENT

Project Learning Tree's *Explore Your Environment: K-8 Activity Guide* includes 50 hands-on, multidisciplinary activities to connect children to nature and increase young people's awareness and knowledge about their environment. Activities include detailed step-by-step instructions, time and material requirements, background information, academic correlations, assessments, and student worksheets with green career connections.

This supplementary curriculum is designed to develop students' critical thinking and problem-solving skills. The activities suggest ways to connect students to the outdoors, no matter if you live in a rural or urban area.

Charting Biodiversity is one example of a Grades 3-5 activity found in the guide that presents students with real-world opportunities to record their observations, learn about sustainability, and apply STEM skills. Students will learn how animals in different environments have adapted to where they live, why there are so many different species, and the value of biodiversity.

BE SURE TO VISIT PLTCANADA.ORG/EN/RESOURCE FOR MORE

ACCESS ONLINE RESOURCES

This guide is supported by a free online toolkit and resource hub. For each activity, you'll find links to curated resources, downloadable student pages, recommended reading, correlations to academic standards, suggested Units of Instruction, and much, much more!

Download these resources at plt.org/myk8guide

ATTEND A PROFESSIONAL DEVELOPMENT WORKSHOP

PLT offers online and in-person workshops tailored for specific grade levels, curriculum connections, environmental topics, and formal and nonformal teaching situations.

During PLT's hands-on training you will:

- Learn new teaching skills and become comfortable teaching outdoors.
- Receive PLT's instructional materials and supplements tailored to your provincial standards.
- Practice modeling PLT activities and get tips for lesson planning specific to your educational setting.
- Establish access to a professional network and support system.

Contact pltcanada@forests.org to find out about professional development near you.

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GRADES 3–5

Students explore the amazing diversity of life on Earth and discover how plants and animals are adapted for survival. This activity helps students understand why there are so many different species and teaches them the value of biodiversity.

CHARTING BIODIVERSITY

SUBJECTS
Science, English Language Arts

FOREST LITERACY CONCEPTS
1.D.4

STEM SKILLS
Cooperating, Investigating, Organizing

DIFFERENTIATED INSTRUCTION
Cooperative Learning, Higher-order Thinking, Literacy Skills, Student Voice

MATERIALS
Paper lunch bags or other containers (three per pair of students), resources on animals.

TIME CONSIDERATIONS
Preparation: 30 minutes

Activity: 50 minutes, plus time for research

OBJECTIVES

Students will

- **Organize different species of plants and animals according to their physical characteristics.**
- **Determine how certain characteristics help species adapt to environmental conditions.**

BACKGROUND

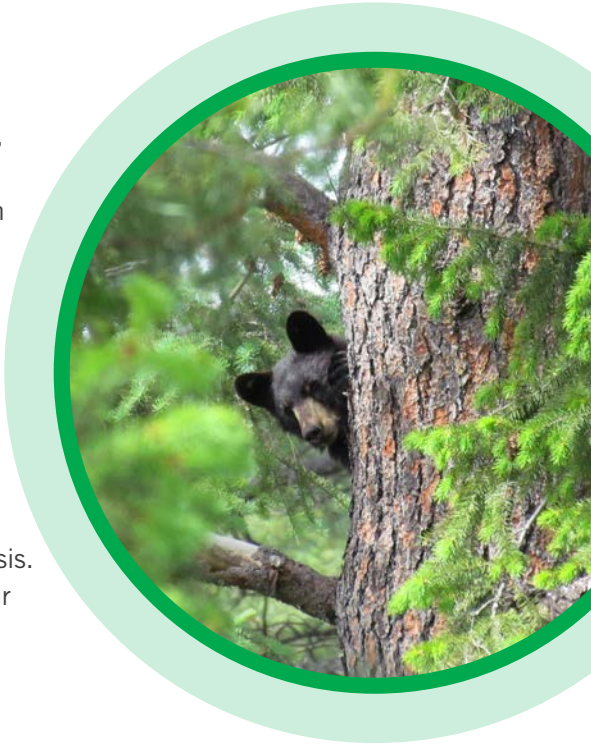
Living organisms can be found just about everywhere on Earth: from the equator to the poles, from dry deserts to freezing water, from undersea thermal vents to miles in the air, and from lush forests to city sidewalks. Anywhere you look, in almost any environment you can imagine, there are organisms that are adapted to living there.

One of Earth's most valuable resources is its biodiversity, the variety of species that live there. Biodiversity is reflected in the wide range of ecosystems and species on Earth and in the genetic diversity within and among species. A species is a group of organisms classified together on the basis of genetic structure, that typically have a similar appearance and characteristic behaviours. To be considered the same species, organisms that reproduce sexually must be able to interbreed and produce fertile offspring.

Biologists estimate that Earth's current biodiversity is somewhere between 10 million and 1 trillion different species, living in a variety of ecological communities. We can't know for sure how many species there are because many live in inaccessible habitats, are too small to see, are hard to find, or live inside other living things. So far, biologists have classified about 1.7 million species and only have detailed knowledge of about one-third of those. We have not yet studied the roles and interactions of many millions of species.

FOREST FACT

In Canada, many of the at-risk and endangered species rely on crown lands owned by the public. Foresters managing these lands employ sustainable practices to maintain or increase forest biodiversity by reforesting areas, restoring threatened species and habitats, and controlling invasive species. Indigenous peoples have been instrumental in supporting foresters to help preserve our natural environments in Canada.



Humans, like other organisms, depend on this biological richness to live. Diversity within and among species provides us with a variety of food, wood, fibres, energy, raw materials, chemicals, and medicines and contributes hundreds of billions of dollars yearly to the world economy. Every species on Earth today represents stored genetic information that allows the species to adapt to certain changes in environmental conditions. We can think of biodiversity as nature's "insurance policy" against disasters, such as volcanic eruptions, floods, invasive species, or changing climate. A disaster might destroy wildlife species living in a particular area, but other individual species will survive and eventually repopulate that area.

In any ecosystem, living (biotic) and nonliving (abiotic) elements constantly interact. For example, most plant species depend on soil for water and nutrients, and they need sunlight to manufacture food through photosynthesis. Some plants also depend on animals to pollinate their flowers, disperse their seeds, and fertilise the soil in which they live. Animals, in turn, depend on plants for food and shelter. Some animal species also depend on other animals for food and protection.

By looking at a real ecosystem in action, students will begin to understand how the intricate parts of that system work together to support the plant and animal species living there and help to maintain biodiversity.

GETTING READY

- Make one copy of the *Match-up Cards* and *Biodiversity Match-up* Student Pages for each pair of students.
- Find resources that students can use to research local wildlife, including websites, field guides, or other books.
- See the "Spice of Life" game in the Enrichment section for an adapted activity that doesn't involve student research.

DOING THE ACTIVITY

1. Ask students to name a wild animal that lives near them, such as a squirrel, a robin, or a spider. Encourage them to think about what characteristics—or adaptations—the animal possesses that might help it live where it does. For example, squirrels can climb trees, which enables them to gather acorns and other seeds for food. Point out another type of environment (such as forest, ocean, or desert) and ask what different kinds of characteristics animals living there might need.

2. Explain that students will learn how animals in different environments are adapted to their environments. Divide the students into pairs. Give each pair copies of the Student Pages and three lunch bags (or other containers). Have the students label the bags as follows:

   - Where I Live
   - How I Move
   - What I 'Wear'

   LITERACY SKILLS Make sure that students understand all the words on the Student Page.

3. Have students cut out the individual squares in the first column of the *Match-Up Cards* Student Page and put them into the bag labeled "Where I Live." Then have them cut out the squares from the second column and place them in the "How I Move" bag. The squares from the third column, which include different types of animal coverings, go into the "What I 'Wear'" bag. Have them shake the bags to mix up the squares.

4. To start, have one member of each pair take a square from each bag. Have students write the words in the top row of the *Biodiversity Match-Up* Student Page. They should take turns doing this until all the bags are empty.

5 **COOPERATIVE LEARNING** Explain to the students that they will complete the last columns of their charts by filling in the name of an animal species that has all three of the characteristics listed in a row. For example, if a row lists *forest, the ability to fly*, and *exoskeleton*, the students should do research to find one or more examples of an animal living in the forest that has these two adaptations. (A good example would be a forest-dwelling insect such as a spruce beetle.) For each animal, they should also identify how that species is especially suited, or adapted, for the environment in which it lives.

6 Give the students time to research animals and fill in their charts. If they are not able to find an animal that fits a particular combination (for example, if the chart requires them to find an animal with fur that flies and lives in the water), allow them to pick a different characteristic for one of the columns.

7 **HIGHER-ORDER THINKING** After they've finished their research, have the students present their findings to the rest of the group. For each species, students should be prepared to say how that species is especially suited, or adapted, for the environment in which it lives.

VARIATION: PLANT ADAPTATIONS

1 **STUDENT VOICE** Have students do the activity using plants instead of animals. The group should decide on three categories for identifying plants, such as "Where It Lives," "How It Reproduces," "How It Depends on People and Other Animals," or "How It Protects Itself." Pairs should label their three bags with the categories they choose.

2 Students then should make four cards for each category. For example, if they choose the category "How It Reproduces," they could make cards for "Has Tasty Fruit" (for spreading seeds), "Has Bright Flowers" (for attracting pollinators), "Has Seeds That Float" (and can be carried by the wind or water), or "Grows New Plants from Roots" (for plants like ivy). They should put these cards in the appropriate bags.

3 Each pair should make a blank chart similar to the *Biodiversity Match-up* Student Page, with plant categories instead of the animal ones. Each partner takes a turn picking a set of three cards from the bags, while the other partner fills in the appropriate words on the chart. Together, they should think of or research a plant that has those three characteristics.

TAKE IT OUTSIDE

Invite students to bring magnifying lenses and journals outside to record their observations of an animal. Encourage them to locate one, observe it up close, and draw a picture of it. They should also note other observations, such as the animal's behaviour. (Depending on your site, students are most likely to find insects or small invertebrates like ants, pill bugs, or worms, but they may also find birds, mammals, or other animals.) Challenge students to determine which of the animal's characteristics or adaptations might help it to survive, grow, and reproduce. You may have students observe plants as a different option.

INTEGRATED LEARNING

UN SUSTAINABLE DEVELOPMENT GOAL CONNECTIONS

Goal 11: Sustainable Cities and Communities

- Make cities and human settlements inclusive, safe, resilient, and sustainable.

Goal 15: Life on Land

- Protect, restore, and promote sustainable use of terrestrial ecosystems, manage forests, combat desertification and biodiversity loss, and halt and reverse land degradation.

CMEC GLOBAL COMPETENCIES CONNECTION

Collaboration

- Participates in teams, establishes positive and respectful relationships, develops trust, acts cooperatively and with integrity
- Learns from, and contributes to, the learning of others

ASSESSMENT

Ask students to

- Look at the list of animals presented by the entire group and sort them into categories according to where those animals live and how they move.
- Choose three organisms and explain how they are suited to their environment.

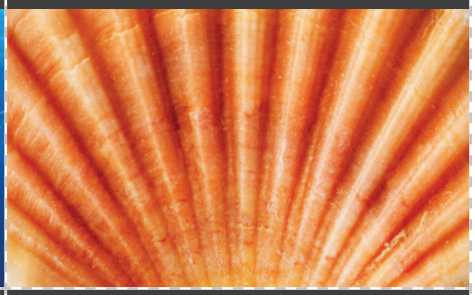
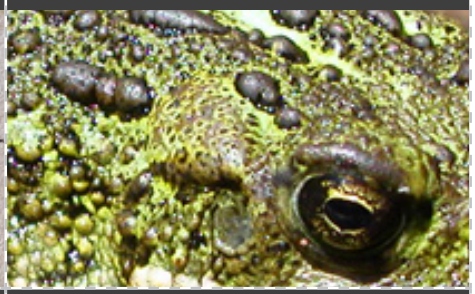
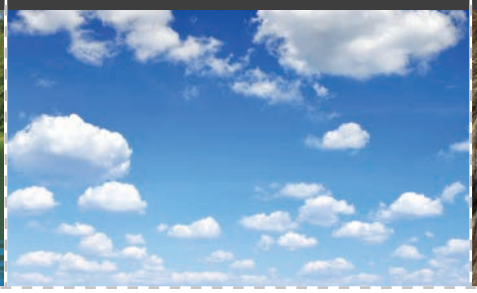
ENRICHMENT

- Have the students use the cards to play a "Spice of Life" game.
  - » Teams of two play against one another. Put the cards (plant or animal) into the appropriate bags from the activity.
  - » Have students create six additional cards that say "Wild Card" and add two to each bag.
  - » To play, each team should draw a card from each bag. The opposing team must try to think of an animal or plant that has all the characteristics printed on the cards. If a team pulls a wild card, they can pick any characteristic they want, provided it fits the category of the bag it came from.
  - » Younger students can pick just one card per play and think of a plant or animal with that trait. They can alternate the bag from which they pick on each turn.

  - » Develop rules for dealing with disputes. For example, if one team disagrees with another team's answer, they can look up the plant or animal in question to determine who is right.
  - » Have the students keep track of their scores. A good answer wins one point, and a poor answer or no answer gets no points.
  - » When the bags are empty, the game is over. Have the students add up their points to see which team is the winner.
- Invite students to "engineer an animal" for a specific environment. First, have them identify the environment and think of characteristics that might help an animal survive there. For example, forest animals might have physical structures that help them climb trees, like sharp claws or long limbs, or abilities to make use of limbs, branches or leaves, like prehensile tails or stomachs that can digest leaves. Challenge students to design and create a model of an animal characteristic that has at least one moving part, and to explain how that structure would increase the animal's chance of survival. Provide materials for students to use, such as egg cartons, paper clips, chenille sticks, scratch paper, etc.
- Explore cultural diversity by finding different common names (based on region or language) for the plants and animals that students researched in the activity. For example, depending on where you live, a pill bug may be called roly poly or tater bug. And a yellow poplar may be called tulip tree or tulip poplar.
- Explore adaptations of tree species that live in different environments. For example, Jack pine trees that live in fire prone areas have branches that stay on the trunk all the way to the ground so that when there is a fire they are more likely to burn and their cones that need fire to open up have a better chance to spread seeds for new trees to grow.

STUDENT PAGE Match-Up Cards

NAME _____ DATE _____

Where I Live	How I Move	What I 'Wear'
GRASSLAND	SWIM	EXOSKELETON
		
DESERT	BURROW	FEATHERS
		
FOREST	CRAWL, HOP, WALK, OR RUN	SCALES OR MOIST SKIN
		
WATER	FLY OR GLIDE	FUR
		

I LOVE MY GREEN JOB!

CAREER CORNER

NATURE PHOTOGRAPHERS help to document elements of our natural world with photos and video. They sometimes travel to remote areas, where they patiently wait to capture the perfect moment depicting wildlife and nature.

NAME _____ DATE _____

Where I Live	How I Move	What I 'Wear"	Who Am I?	How I Am Suited to Where I Live

CAREER CORNER

WILDLIFE BIOLOGISTS study wildlife and their habitats to understand what animals need to thrive. They help manage wildlife habitats for the benefit of all and increase our knowledge about wild animals.

I LOVE MY GREEN JOB!

SUSTAINABLE FORESTRY INITIATIVE SFI-00001 | PROJECT LEARNING TREE CANADA

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FOREST LITERACY FRAMEWORK

To translate the complex language of forests, trees, forest practices, and sustainable forest management into concepts that are appropriate for K–12 learners, PLT has developed the Forest Literacy Framework. This document presents a learning pathway for educating K–12 students about forests, with the goal of a forest-literate future.

PLT's Forest Literacy Framework promotes education that empowers learners to apply critical thinking and innovation to make decisions about forests and forest resources, understand the role forests play in addressing local and global environmental challenges, and grow up to be stewards of the forest.

It has applications for K–12 youth, teachers, and nonformal educators across the United States and Canada. It also incorporates diverse voices and perspectives, which enhance our collective ability to understand the forest and each other.

The Forest Literacy Framework offers 100 forest concepts organized into four themes, each with topics and concepts that address its central question:

THEME 1: What is a forest?

THEME 2: Why do forests matter?

THEME 3: How do we sustain our forests?

THEME 4: What is our responsibility to forests?

Explore the Forest Literacy Framework at pltcanada.org/en/forest-literacy.

ABOUT THIS SERIES

PLT Canada's Activity Collections provide content to support an identified theme for a particular grade level. Each collection offers hands-on activities for teachers and nonformal educators, youth group leaders and home schoolers to connect youth to nature and the outdoors.

COMING SOON 2023

For Grades K-2

SENSATIONAL TREES: Uses sensory exploration to help students understand objects, spaces, people, and interactions.

For Grades 3-5

BIODIVERSITY BLITZ: Invites learners to investigate variability among species in an ecosystem, and how this variability—or biodiversity—helps sustain life on Earth.

TRILLIONS OF TREES: Introduces students to the identifying features that distinguish different trees and explores how to care for trees in our communities.

For Grades 6-8

DISCOVER YOUR URBAN FOREST: Invites learners to explore their urban environment and investigate environmental issues that affect their urban community.

NATURE OF FIRE: Examines the role of fire and other disturbances in forest ecosystems, including the relationship between climate change and fire.

Find PLT Canada's newest resources at pltcanada.org/en/shop/

ABOUT PROJECT LEARNING TREE CANADA

Project Learning Tree Canada is committed to advancing environmental education, forest literacy, and green career pathways, using trees and forests as windows on the world. Our award-winning resources offer a lifetime of learning from early childhood through adulthood, and our wide and diverse network provides professional development for educators and opportunities for young adults to explore forests and green careers. Together, we are growing future forest and conservation leaders. PLT is an initiative of the Sustainable Forestry Initiative®, a non-profit charitable organization with the mission of advancing sustainability through forest-focused collaboration.

Sign up for our education newsletter at https://pltcanada.org/en/environmental-education/#teachers and visit us on social media