

Grade: 1

Studying Our Urban Forest



An urban forest includes all plants and organisms in the schoolyard.

Teacher Background Reading

Trees are the world's most complex flowering plants. Roots reach deep into the soil to anchor a tree and to draw in soil nutrients and water. The roots of a tree are generally broader underground than the crown of a tree is in the air. A stem supports the plant and carries water and nutrients throughout the plant. On a tree, the stem is called a trunk. The hard outer layer of the tree trunk is called bark. It protects the tree from insects and diseases.

Insects are found in every habitat. In the larval phase, insects feed on leaves of trees, shrubs, and annual plants. Bees and other adult insects pollinate flowers. Many adult insects lay their eggs underneath the bark of trees. Sometimes insects are camouflaged with colors and patterns to blend in with the plants. They may look like leaves or sticks, or even other insects. This is called mimicry. In the schoolyard, you will most likely see insects on shrubs or on the ground.

Trees provide food, shelter, and nesting places for birds. Birds eat seeds, sap, leaves, twigs, and buds from trees, shrubs, and other plants. Some trees provide acorns, nuts and fruits to help birds build up fat reserves for winter or for their migration. Shrubs grow berries that birds love to eat, and they are great places for building nests and hiding from predators. Some birds prefer to live and nest on the ground. Often birds are heard and not seen, and there are many morning bird songs in neighborhoods with trees.

Within any habitat there are smaller microhabitats that can vary in temperature, moisture and light. For example, a tree can hold a variety of microhabitats. A microhabitat inside a decaying log might be just the right darkness and humidity for a salamander, while the top of the log, in the full sun, might be too bright and dry for such an animal. Mosses and fungi might be able to grow in the darker,





cooler microhabitat of the north side of a tree, while the south side of a tree could be too sunny.

Ecosystems are balanced systems of living and nonliving things interacting together in a particular place. An ecosystem includes the habitats for many organisms, or living things, in one area, and will include everything all the organisms need to survive in a cycle of birth and death. ■

Vocabulary

Bark: covers the tree trunk and protects the tree from insects and diseases

Branches: carry water and nutrients to the leaves, and food from the leaves to other parts of the tree

Ecosystem: a system of living things (plants and animals) and nonliving things (like air, water and soil)

Habitat: the area in which an animal lives, providing everything the animal needs to survive

Leaves: make food for the plant using energy from the sun

Microhabitat: an area that is small and different from surrounding areas

Roots: hold a plant in the soil and get water and nutrients from the soil

Seeds: grow into new plants

Trunk: provides support and protection for the tree

Find a spot in nature you can use for the lessons - either in the schoolyard or in a park nearby with trees or bushes. Check for any hazards. Describe the boundaries of the outdoor area that you will be using for the lessons and explain acceptable and unacceptable behaviors outdoors. Much of the class discussion, etc. can also be done outside.

Note: Worksheets are available for all lessons, though please save paper when possible by having students use journals, notebooks or scratch paper.

Grade 1/Lesson 1:

Examining Schoolyard Trees

Students will observe the structure and form of trees, and will understand the connection between structure and function in trees.

Learning Outcomes

Students will be able to draw and identify the structure and function of five main parts of a tree: roots, trunk, branches, leaves and seeds.

MATERIALS

- Magnifying Glasses – 1 per student
- Copies of the “Compare Trees” Worksheets - 1 per student
- Copies of “Growing Trees” Worksheet - 1 per student
- Pencils 1 per student
- Crayons
- Colored pencils and/or markers
- Clipboard or folder - 1 per student

Getting Ready

Review the Teacher Background reading.

Identify available trees for observation.

Make the necessary copies.

ENGAGE:

Write the vocabulary words from the teacher background on the board and go over the definitions of each word with the class. Revisit them as they come up in the lessons.

Ask students what they think of when they picture a tree; share ideas.

Pass out the “Compare trees” Worksheet and pencils. Give students 5 minutes to draw a quick sketch of a tree they have in their minds (on “A. Compare Trees”).

Share drawings by posting them around the room, or showing one by one on a document camera. What do we notice they all have in common? (Possible responses: color, trunk, leaves/needles, roots, branches.)

EXPLORE:

Go outside in the schoolyard and get an up-close experience of a tree. Allow students to feel the bark and pick up a leaf or seed they may find on the ground. Remind students not to pull pieces of the tree off. This is a great multi-sensory activity to really have the kids feel, touch explore with senses.” Choose a tree and have children sit in a wide circle near it. Students can place the seeds and leaves in a central place, so others can see them and draw the tree and its parts. Direct students to observe the bark, if roots are peeking out of the soil, branches, leaves, flowers, seeds and any animals or other organisms that might be on the tree. Ask them to draw the tree in detail and give them plenty of time to do a detailed drawing (on “B. Compare Trees”).

After drawing the tree:

Have students stand up and look at the tree and ask them what the tree needs in order to grow and survive. See vocabulary section in teacher Background Reading for examples to guide student answers. Ask the students each of the following questions.

- What do you think the function of the bark is? (protect the tree from injury, illness). Compare the bark to our skin as you are eliciting answers, if the students are having trouble with guesses. Ask for examples of how people make coverings to protect their skin like bark.
- What do you think the branches are used for? (carry water and nutrients). Compare the branches to our bodies, with veins that deliver blood and oxygen to other parts of our bodies. Are there any things that people have created that act like the branches of the tree? Example: food delivery services, oxygen tanks at hospitals and bottled water.
- Leaves? (collect sunlight and turn it into food for the plant). Have students hold hands up to the sun to feel heat. Are there any things that people have created that act like the leaves of the tree? Example: cooking appliances such as ovens, microwave or using a recipe to create a meal from different types of ingredients.

- Roots? (gather water and nutrients, send them to the branches and leaves). Are there any things that people have created that act like the roots of the tree? Example: food delivery services, food getting transported across the country/world, and farmers gathering food in the fields for people to eat.
- Seeds? (make new plants). Are there any things that people have created that act like the seeds of the tree? Example: using science to create new types of plants and foods.

EXPLAIN:

As you are discussing the tree, have students make believe they are trees, send roots into the ground, stand firm and ask them to hug themselves to protect the tree, as the bark does. Have students extend their arms and picture the water and nutrients traveling through the branches to the leaves. “Wiggle your fingers as the leaves swaying in the wind and receiving sunlight to create food. Feel the warmth of the sun.”

- Dangle some seeds and drop them to the ground so those seeds can start the cycle all over again!

Compare the class’s first pictures of trees with the second pictures of trees. How are they the same? How are they different? Discuss as a class why the trees are different and how much detail is in the second picture. Point out that even two trees of the same kind will have differences if they look at the details.

ELABORATE:

Pass out the “Growing Trees” worksheet. Have students (alone or in pairs) cut the four squares of the stages of growth of an oak tree.

Have them arrange the four squares in the order they think the oak tree grows. Walk around the room and give feedback about their choices. They should start with an acorn or an adult oak. Then move from acorn, to sprouting acorn, to sapling, to adult tree. Go over the correct order with the students as a class and if there’s time, have them glue them onto a separate paper. Have students label the trunk, branches, leaves, seeds, and soil. They can also add sun, rain, insects, birds and anything else they would like.

EVALUATE:

Have students spread out for this fun and very engaging activity. The first time you do this activity, model for your students what they should do.

“We are going to pretend we are each an oak tree growing from a little acorn seed to a beautiful, grand oak tree. Curl up on the floor and pretend that you are a little acorn in the soil lying very still.”

“Now here comes a winter rainstorm. (Make whooshing rain sounds or use a rain stick for rain noise.) Feel that rain. Push those feet down into the ground to get the water. Send your roots into the soil to absorb the rain. Keep spreading your roots out to find more water. Does your seed feel happy?”

Pause for a few moments:

“Now out comes the sun. The beautiful warm sun. See how good that feels for your seed to be absorbing the sun. Your seed can sprout now. Sit up and sprout your seed.” (Model squatting on your knees with your palms together in front of your face.)

“Here comes some more rain and some more sun. Now your tree is growing larger.” (Model slowly standing up and pushing your palms together, slowly spreading your arms.)

“Now, hug yourself and make some good strong bark to protect your tree. Is your bark hard and strong? Sprout some branches so your branches can send the water and food to the leaves. Spread your arms wide. Send that food to the leaves of your tree. Wiggle your fingers so your leaves are swaying in the wind and receiving sunlight to create nutrients.”

“Dangle some seeds and drop them to the ground so those seeds can start the cycle all over again!”

After doing this activity all together with you modeling the first time, then play some soft instrumental music in the background and have your students repeat this activity.

EXTENSION:

Have students write a story about how their tree grew from a seed, following the stages of growth worksheet that they started with. Remind to include details about the importance of each stage of growth and what happens at each stage.

NOTE: This activity can be done in the classroom any time. Students really enjoy the movement, it is very calming and can help the students refocus. It makes a nice transition when students come in from outside and will be moving into an activity that requires group focus. They can be any kind of tree or plant they would like!

References

American Forest Foundation (2012). The Closer You Look. *In Project learning tree: Pre K-6 environmental education activity guide (6th ed., pp. 263-264)*. Washington, DC: Author.

American Forest Foundation (2012). Tree Factory. *In Project learning tree: Pre K-2 environmental education activity guide (6th ed., pp. 271-272)*. Washington, DC: Author.

Grade 1/Lesson 2:

Schoolyard Bird Safari

Students will look for and identify signs of birds living in the schoolyard, and describe how the schoolyard provides habitat for birds.

Learning Outcomes

Students will understand that anywhere can be a habitat, as long as it provides an organism with food, water, shelter, space and conditions necessary for reproduction.

MATERIALS

- Copies of “Schoolyard Birds” Worksheet - 1 per pair
- Clipboards - 1 per pair
- Materials for constructing a diorama (optional activity)
- Toilet paper roll for “scopes” – 1 per pair

Getting Ready

Review the Teacher Background reading

Make copies of Schoolyard Birds worksheet.

ENGAGE:

Ask students to name the requirements for an animal to survive (food, water, shelter, reproduction). Ask students how a bird might use a tree or shrub. Record the students’ ideas on the board. Have them come up with as many as they can. (Nesting material, place to build nest, protection from predators, and shelter from weather) What evidence, or signs, of birds is likely to be found in the schoolyard?

The students will be taking a Schoolyard Safari, focused on birds. Ask students what a bird's habitat must include (food, water, shelter, space, and to be able to reproduce and raise their young). Ask students to look for any signs of birds in the schoolyard and what do these signs tell us about the birds? If a bird is spotted in a tree look for nests and other signs of the habitat or baby birds.

EXPLORE:

Organize the students into pairs. Pass out "Schoolyard Birds" worksheet, toilet paper rolls and a clipboard - one for each pair.

Focus the students' attention on the tops of trees by having them use a toilet paper tube as a telescope or bird spotting scope.

Take the students outside and ask them to hunt for signs of birds using all their senses to find them. Ask them to both look and listen for birds, watching for signs such as nests, homes, holes, insects, other food, droppings, territory or feathers. Look for signs of the animal's habitat, everything it needs to survive (food, water, shelter, and places to build a nest). Ask students to think about how birds depend on the trees or shrubs in your habitat.

Give students time to make in-depth observations in the schoolyard and record them on the Schoolyard Birds worksheet. Have students share observations with you as you walk around between the groups.

EXPLAIN:

Bring students back together to share what they found.

Write the following questions on the board and have each group share what they found focusing on these questions.

Visual evidence of birds. What birds did you see?

Evidence of birds in sounds. What birds did you hear?

Evidence of food. What could birds eat?

Evidence of water for birds

Evidence of shelter for birds. Where can they hide from predators? What places are dry? What places are in the shade?

Evidence of nesting places. Where can birds build nests?

What surprised you the most?

What questions do you have about the birds you saw or heard?

ELABORATE:

Ask students what they know about how adult birds take care of their young, or how baby birds are able to get what they need to survive. Examples: chicks chirp to alert of danger, parents chase off predators or chicks chirping for food and parents bringing food back to the nests. Write down initial ideas from the class and allow students to use computers and texts to find the answers.

EVALUATE:

Have students write a story of the life of a bird in the schoolyard. Make sure they include the information that they collected in the “Engage” section of the lesson. Next to their story, have them draw the bird and its habitat.

EXTENSION:

- 1. Use school computers, media and books to try to identify what birds were observed.*
- 2. Invite a parent or local birder (birdwatcher) to visit the classroom. Ask them to share with the class how to identify birds and where to look for them in the schoolyard.*
- 3. Have each pair of students recreate the habitat for a bird they observed, in a shoebox diorama. Create the bird, its food, water sources and shelter, labeling each to show information about where the bird lives, how it survives, and what its habits are. Circulate around the room as they are being created to evaluate understanding and correct misconceptions. Have student pairs share their diorama with the class.*

References

American Forest Foundation (2012). Schoolyard Safari. *In Project learning tree: Pre K-8 environmental education activity guide (6th ed., pp. 197-199)*. Washington, DC: Author.

Grade 1/Lesson 3:

In the Microhabitat of Miss I.M. Ant

Students will understand the interdependence of organisms and their surroundings by examining microhabitats within their schoolyard.

Learning Outcomes

Students will investigate microhabitats and the animals and plants in those habitats to create a story and drawing to explain what they learned.

MATERIALS

- Plastic containers to collect and observe insects (can be re-purposed plastic basket containers from berries, tomatoes, etc. and glass jars with holes punched in the lids, or bug boxes can be purchased from acornnaturals.com)
- Pencil and clipboard – 1 per student
- Magnifying glasses – 1 per pair
- Colored pencils and markers
- Paper – several sets paper for class
- 1 Large piece of wood, carpet square, or old non-rubber-lined bath mat – to create “bug rug”

Getting Ready

Review the Teacher Background reading

Identify possible microhabitats to use for a study in the schoolyard. These include shrubs, bare soil, and the “bug rug” area (directions below).

Place a board, carpet square, or rubber-lined bath mat on an area of soil, to serve as an artificial soil matrix or “bug rug”. Pour water on the “bug rug” as needed to

keep it moist for at least 2-3 weeks. You can continue to keep it moist throughout the school year if you want to continue to study the area. Ask the maintenance staff or groundskeepers not to move it. Gather materials.

You may want to give students the option to each have their own copy of the story to read along and/or take home with them.

ENGAGE:

Read the story: In the Schoolyard of Miss I.M. Ant to the class.

Explain that within any habitat there are many smaller microhabitats that vary by temperature, amount of water, light and other factors. Think about the habitat of the school yard. What are some microhabitats you may have encountered within the schoolyard and some animals that might be a part of one?

EXPLORE:

Divide the students into pairs and give each pair a magnifying glass and a plastic container. Explain that they will be exploring the schoolyard for microhabitats.

Students can turn the board or mat over and look at the insects and other animals that live in the soil and are drawn to the dark, moist area under the board or mat.

These animals are decomposers, recycling nutrients from dead plants and animals into the soil, so that plants can reuse the nutrients.

Have each pair pick a section of the schoolyard and sit down to explore it looking for a microhabitat. They can pick up insects and put them in their container to look at them, but must put them back carefully before leaving that area.

Have students think about where one tiny animal lives, finds its food, shelter, and water. Where would it hide, what does it eat and what danger there is and where it could raise its young.

EXPLAIN:

Back in the classroom, make a list of what students found in their microhabitat. Are there animals that eat other animals? (predator/prey) Are there animals that eat only plants (herbivores), or animals that eat only meat (carnivores), or animals that eat both (omnivore), or only insects (insectivore)?

Two commonly observed animals on the board or mat are centipedes (with one pair of feet on each body segment, two legs) and millipedes (with two pair of feet on each body segment, four legs). The pill bug (which can roll into a ball) and the sow bug (which cannot roll into a ball) are both centipedes, and they are crustaceans not insects.

ELABORATE:

Write a story like the story of I.M.Ant. Use the story of I.M. Ant to describe the microhabitat and the characters that live within it and their quest for food, water and safe shelter, and the relationships of predators and prey. Create an illustration showing the story from the point of view of the smallest inhabitant of the microhabitat.

EVALUATE:

Lead the class in a guided discussion to identify materials created by people that mimic things in nature. Examples: protective coverings that mimic bark on trees or shells on animals, wings of a plane designed like birds wings, or solar panels designed to capture energy like the leaves on trees.

Ask the students to think about other places in the school building or at home, where they have seen insects. Write the places they mention on the board. If they are having a hard time, ask them where they have heard bees buzzing or seen ants marching.

Ask students the following questions and write their answers on the board. What are the different behaviors that individual insects do? What behaviors do they do in a group? How do you think they know to do the same things at the same time? (they communicate with each other) What human behaviors are similar?

EXTENSION:

Read **Miss Spider's Tea Party**. Book by David Kirk

REFERENCES:

American Forest Foundation (2012). The Forest of S.T. Shrew. In *Project learning tree: Grades 1-6 environmental education activity guide* (6th ed., pp. 40-44). Washington, DC: Author.

Grade 1/Lessons 1 & 2: Student Reading

Growing Trees & Habitats

Trees are plants. All plants have parts that help them grow. Roots hold a plant in the soil. Water and nutrients enter the tree through the roots. A stem helps a plant stand up tall. In a tree, the stem is called a trunk. The trunk is covered with bark. The bark protects the tree from insects and diseases. Branches reach for the sun. They carry water and nutrients to the leaves. Leaves use the sun's energy to make food. Then branches carry food to other parts of the tree. Most plants make flowers and seeds. Seeds grow into new plants. Their shape helps them travel to a new place to grow.

A habitat is a place an animal lives where it has everything it needs to survive. A habitat must have the right food, water, and shelter. There also needs to be a safe place for the animal to care for their babies.

A habitat for one animal may be very different from the habitat for another animal. A single tree could be a habitat for a small animal like a bark beetle. Many birds build nests in trees, fly to shrubs and other trees for food. Mountain lions need a very large habitat like an entire mountain range. ■

Grade 1/Lesson 1: Student Worksheet

A. Compare Trees

Draw the tree you are picturing

Grade 1/Lesson 1: Student Worksheet

B. Compare Trees

Draw the tree you are sitting in front of

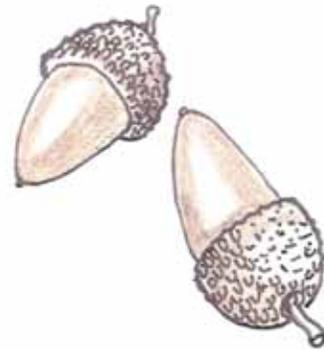
Grade 1/Lesson 1: Student Worksheet

Growing Trees

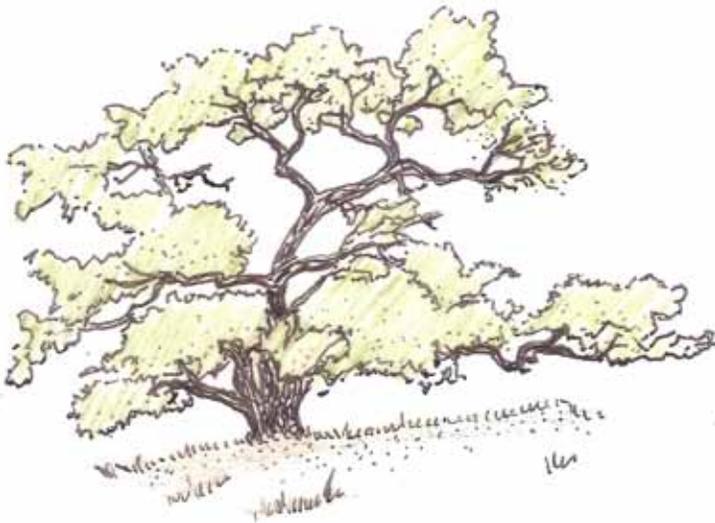
Cut into Four sections



Acorn seed sprouting



Acorn



Adult Oak Tree



Baby Oak Tree

Grade 1/Lesson 2: Student Worksheet

Schoolyard Birds

Visual evidence of birds. What did you see?

Evidence of birds in sounds. What did you hear?

Evidence of food. What could birds eat?

Evidence of water for birds.

Evidence of shelter for birds. Where can they hide from predators?
What places are dry? What places are in the shade?

Evidence of nesting places. Where can birds build nests?

Grade 1/Lesson 3: Story

In the Schoolyard of Miss I.M.Ant

Luis sat down with a humpf and leaned against the fence of his schoolyard.

“This is crazy,” he said. “Nothing lives in this schoolyard but dead weeds and germs. I’ve been walking around forever and I haven’t seen anything at all.”

He pulled out his assignment and read the directions again.

“Find a place in our schoolyard and check out what lives there. Write a report about all the interesting living things you found.”

Luis shrugged. “I guess I can’t do it. There’s nothing alive here at all.”

“Excuse me?”

“Huh?” Luis looked around. Then he heard it again.

“Excuse me?” A tiny voice was floating up from down by his shoe. Luis looked down, squinted, and leaned in closer. He saw a tiny ant waving its front leg at him. “I’m alive, and I don’t appreciate it when you say there’s nothing alive around here!” said the ant in an angry, if squeaky, voice.

Luis looked around. Was anyone watching him? This was crazy, but... He put his face right down next to the ant. “Are you really talking to me?” he asked.

“Yes,” said the ant. “And as you can see, I am very much alive. That’s my nest, right over there.” She pointed with a tiny foot over at a small mound of sand. “I’m a harvester ant. Those are my sisters.”

“How do you do?” said Luis. “No offense meant, Miss Ant. It’s just that our schoolyard doesn’t look like it is much of a habitat for animals. I mean, where are the predators and prey? I don’t see any animals eating each other. For that kind of thing, you need to go to Africa, on a real safari.”

“Not true!” said Miss Ant. “It just depends on your point of view. Let me help you see things more clearly.” She scurried up to Luis and put a tiny foot on his sneaker. With a whoosh and a poof, Luis suddenly found himself looking Miss Ant right in the eye. He was a half-centimeter tall!

“Whoa!” said Luis.

“Welcome to my microhabitat,” said Miss Ant. Let’s go!”

“I won’t take you in the ant nest just yet,” she said. “First I want you to see our aphid farm. It’s right over – .”

Suddenly Luis ran right into a mass of sticky string. The more he struggled, the more he was tangled up. “Help me get out of this stuff, Miss Ant,” he cried. Then he felt the sticky string shift and move. He looked up. There, looming over his head was a brown and gold spider.

“Welcome to the neighborhood,” said the spider. “I’m the friendly, neighborhood predator. And you, my friend, are the prey.”

“Ahhh!” Luis yelled, and struggled. He closed his eyes and struggled with his arms.

“Luis?” a soft voice was whispering in his year.

Luis opened his eyes. He was leaning against the fence. His jacket had become entangled around his arms. He sat up and blinked. His teacher was leaning over him.

“Are you O.K., Luis?” she asked. “It looks like you might have fallen asleep.”

Luis stood up. “No – I was with this ant in a microhabitat. And then I ran into a spider web and...” his voice trailed off. “That sounds like I made it up, doesn’t it?” he said.

“Well,” his teacher shrugged. “It does sound rather odd. But I’m glad you’ve been learning about microhabitats.” ■

Standards Grade 1:

Next Generation Science Standards

1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

California Science Standards

Life Science

2. Plants and animals meet their needs in different ways. As a basis for understanding this concept:

- a. Students know different plants and animal inhabit different kinds of environments and have external features that help them thrive in different kinds of places.
- b. Students know both plants and animals need water, animals need food, and plants need light.
- c. Students know animals eat plants and other animals for food and may also use plants or even other animals for shelter and nesting.

Common Core Standards

Literacy - Writing

W.1.5 With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers, and add details to strengthen writing as needed.

Literacy – Speaking and Listening

SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.

SL.1.5 Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.

Literacy – Language

L.1.6 Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships (e.g., because).

Collaboration of



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Program



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Additional resources for educators available at
www.sdchildrenandnature.org