Tree Trekkers

A reading and science adventure for kids

Explore, read, play, create, and learn—all about trees and forests

Start with a Book
Read. Explore. Learn!

PARK FOUNDATION

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Welcome to Tree Trekkers

Introduction

Where would we be without trees? We need trees—and we need kids to see the trees in their communities as more than just something pretty to look at that offers shade or a challenge to climb. Kids may know trees clean our air and give us food, but what about their role in the water cycle, the habitat they provide for wildlife, the ways they connect communities, the products they provide, and how they keep us cool and stop erosion?

Understanding more about the practical benefits of trees and the awesome impact that trees—and the forests and parks they are found in—have on the environment is not just for kids interested in environmental stewardship. Kids are aware of threats to our planet and need to learn about and appreciate the critical role of trees in our lives and in nature. We cannot survive in a treeless world.

The best way to get kids learning is to build on their curiosity and interests. Tree Trekkers is kid-centered with an emphasis on inquiry and creativity and provides opportunities to ground children in science learning and action and the natural world around them. Activities have the overarching goals of raising awareness about and making connections to local trees.

We've designed the program to be user-friendly and adaptable. Choose from the topics and activities in any way you like to add hands-on learning to your summer, afterschool, classroom, or library programming.

How to Use this Toolkit

Getting yourself ready

- **Each topic features books and activities related to trees and forests.** Review all topics in advance and decide which books and activities you want to use. You'll find an introduction to the concepts covered and recommended books, as well as a list of questions to guide explorations and activities.
- **Start by gathering books from your library** using the booklists in this toolkit.
- **Choose both fiction and nonfiction books** from the lists provided.
- **Read the books you choose before you read them to kids.** That way you'll know what happens and can spot any unfamiliar words or concepts you'll need to explain. Also, look for places to ask questions while you're reading aloud to engage listeners.
- **Think about what you'd like to do after reading the books.** Select from the different activities or do them all, keeping in mind that **going outdoors is critical** in helping children connect ideas with their everyday environment, as well as providing them with opportunities for observation and reflection. You may also want to include opportunities for your Tree Trekkers to write, journal, and explore related websites, videos, and apps.
- **Familiarize yourself with places nearby to find trees.** These resources may be helpful:

- American Public Gardens Association: publicgardens.org/garden-finder
- Morton Register of Arboreta: arbnet.org/morton-register/state
- Discover the Forest: discovertheforest.org
- Locate a Park: stateparks.org/locate-a-park
- Your local nature center, community park, or your local Sierra Club chapter: sierraclub.org/chapters

- **Get connected to arborists, foresters, and others in your area:**
  - Find an arborist: treesaregood.org/findanarborist/findanarborist
  - Society of American Foresters by state: eforester.org/Main/Community/Find_a_State_Society/Main/Community/StateSocieties.aspx
  - Cooperative Extension agencies: landgrantimpacts.org/extension

- **Check too with your local college or university** to see if they have an arboretum or find out what tree- or forest- related exhibits a local science, natural history, or children's museum might have.

Learning with kids

- **Introduce topics and activate background knowledge** by asking kids what they know about trees, what trees they are familiar with, what experiences they have had with trees and forests, etc.
- **Review and teach new words.** Take time to talk about words kids might not know and tell them what they mean. Use images, video, and real objects to help them build an understanding of unfamiliar words before or while you read or do an activity. Tree Vocabulary on page 75 can help you define terms for kids.
- **Start with a book.** By reading aloud and asking questions, you'll get kids thinking about the topic and what they want to learn. You'll also increase their understanding and excitement. Read another book and repeat.
- **Choose a hands-on activity** to let kids explore a theme. By doing an activity, kids get to use the concepts and new words they have learned.
- **Look for a local connection.** How can you connect the ideas in the books or the activities with kids' personal experience? Think about walks outdoors, visiting a park or forested area, or checking on animal habitats in local trees or woodlands.
- **Keep asking questions** and listening carefully to children's answers.
- **Encourage kids to write** about what they are learning or are curious about by using one of the writing prompts in this toolkit, and by keeping a Tree Trekker Journal for observations, drawings, questions, and creative writing activities.
- **Provide access to books** about the topic for kids to look at on their own.
- **Share websites and videos** with kids that they can use to learn more. (See "Tree-sources" for each topic).

- **Step outside or take a field trip** to further explore your topic or related theme. Activities for each day will note an opportunity to **Branch Out!** on an outdoor adventure with special attention to connecting with nature and getting hands-on with trees.
- You can choose any of the activities in this toolkit, all of them, or just one or two, but we recommend that you **always Start with a Book.**

Branch Out!

When you see the **Branch Out!** symbol included in an activity, make a plan to head outdoors with your Tree Trekkers. You can visit a wide variety of locations and habitat types or visit the same spot each day. There are benefits to each approach. One will give kids the chance to observe and learn more about a specific habitat, which helps them to better be able to notice when something unusual comes along. Visiting a variety of green spaces opens more opportunities to see different species of trees and note their impact on a location.

You don't need to go far. Trees can be as close as your own backyard! You can find them on city and suburban streets as well as in parks, yards, forests, nature preserves, and arboretums.

What Tree Trekkers Need to Branch Out!:

- A place to safely walk and appropriate footwear
- Tree Trekker Journal or notebook and pencil
- Field guide to trees (optional)
- Water, sunscreen, and first-aid items (optional)

Before You Branch Out!

Set expectations. Talk about what an observation is and how to make them. Kids have sharp observation skills and natural abilities to use their senses. Model the behavior you expect to see as you encourage them to focus attention on their surroundings, slow down, and use their senses to be curious about what they see and hear.

Discuss etiquette. Kids get excited when they see something unusual. Recognizing a tree or flower or observing birds and animals is exciting and Tree Trekkers will want others to share in their excitement. Sharing their sightings quietly will increase the chance that others get to make observations too. Let kids know that loud noises are stressful to wildlife.

How to Use this Toolkit

Leave no trace. If you **Branch Out!** to a wildlife area, kids also need to know that it's important to stay on trails to avoid causing damage to the land, plants, and trees. Kids also need to leave rocks, plants, flowers, feathers, and other objects of interest as they find them to give others the chance to make the same exciting discoveries. Have kids make use of the Tree Trekker Journal or take a photograph to enjoy their finds. An adult can take the photographs if kids don't have access.

Prepare for all weather. We often avoid going outside when the weather isn't what we'd like it to be. Maybe it's raining, snowing, hot, or windy. Except for extreme situations, like heat advisories, lightning storms, or severe wind chill, most weather conditions, while maybe wet or messy, are safe. Make an effort to get kids outside in all kinds of weather. Experiencing the elements in person is a powerful experience, makes for interesting observations, and can dispel misconceptions about the great outdoors. The right clothing and gear make a big difference, so check to make sure Tree Trekkers have shoes and gear appropriate for the conditions before going out.

Forest Bathing

While you are outside, you can also invite your Tree Trekkers to take a **forest bath**. Find a place where everyone can sit or lie down quietly. Invite kids to close their eyes and listen to the sounds around them: What do they hear? Animals? Insects? Water or wind? Do they notice how the air feels on their skin? Is it warm or cold? Humid? Is there any wind? What do they feel when they touch the ground? What do they smell? Then have them open their eyes and look around carefully, including above them. What do they see?

Forest bathing is about slowing down and experiencing the outdoors with all your senses. It has been shown to reduce stress and help people feel better. The idea, known as *shinrin yoku,* comes from Japan.

Read more about the benefits of engaging with nature slowly and deliberately: natgeokids.com/uk/parents/forest-bathing-destresses-kids

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Tree Trekker toolkit creators

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Rachael has more than 30 years of experience developing partnerships with nonprofit organizations, corporations, and public agencies to benefit children and families. She launches national campaigns, coordinates special events, and develops original content for the National Education Association, Random House Children's Books, Hachette Book Group, PBS, and WETA's Learning Media initiatives (Reading Rockets, Colorín Colorado, and AdLit.org). Visit Rachael at Belle of the Book: belleofthebook.com and Book Life: readingrockets.org/blogs/book-life.

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Eileen has more than 30 years of experience designing reading curriculum for underserved kids and training for parents and social service providers about reading and child development. Her passion for children's books and hands-on learning has led her to learn, research, and write about literacy and child development, pedagogy, and the impact of toxic stress on learning. She created her own consulting company where she serves a variety of clients with their curriculum, training, children's book, and writing needs. She has developed curriculum for Random House, WETA, Reading Is Fundamental, the Girl Scouts of the USA, and Red Comet Press. Visit Eileen at Read Learn Reach: readlearnreach.com.

Dr. John R. Seiler (expert reviewer)

Dr. Seiler, Professor of Forestry in the College of Natural Resources and Environment at Virginia Tech, has been studying trees for more than 40 years. He is an expert in tree ecophysiology, focusing on the physiological processes that allow trees to manage environmental factors and stressors such as water and pollutants, and has authored more than 115 refereed research articles. In addition to his research activities, Dr. Seiler has taught a wide variety of undergraduate and graduate courses and also serves as a frequent mentor and advisor for graduate students. Known to students and to the public as "Dr. Dendro" (dendrology is the scientific study of trees), he personally answers hundreds of tree related questions submitted though **vTree**, the free tree identification app (IOS and Android).

Melina Cienski (expert reviewer)

Melina Cienski is the Urban & Community Forester for Prince William and Stafford counties at the Virginia Department of Forestry. She attended William & Mary, graduating with a degree in biology concentrating in botany. After working in the W&M Herbarium, her environmental career began with Virginia's State Parks as an interpretive ranger teaching all ages the value of natural resources. She continues to advise the public as a forester, wildland firefighter, forest warden, and Virginia master naturalist.

Tree ID and Anatomy

Tree ID and Anatomy

Introduction

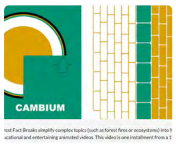
Trees are amazing plants. Tall and woody, they can live for hundreds—sometimes thousands—of years. Part of that is due to their unique way of growing and the ability to make new parts if they lose some. Trees also make use of their internal, dead framework which supports their large size, allowing them to grow big without using too much energy. Because each tree species has its own way of growing and thriving, there is great variation in species, and trees look different from each other.

Tree ID focuses on all the things that make a tree a tree, including its parts and their purposes and the characteristics that help trees survive in particular environments. Tree Trekkers can learn how to identify which trees live around them, which will help them to better understand their own environment and how to care for the planet.

Questions to guide explorations and experiments

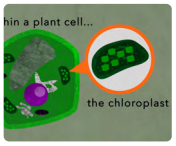
- What makes trees different from other plants?
- Are all trees the same?
- How do a tree's parts help it live and grow?
- Why are trees important?
- Why is it important to identify trees?
- How can we help others learn more about trees?

Helpful "tree-sources" for this topic



Tree Biology from Oregon Forest Resources Institute
Takes a look inside of a tree and the parts that help it grow
learnforests.org/all-resources/forest-fact-break-tree-biology

Nature Neighborhood: Trees to Meet You from North Carolina Museum of Natural Science
Points out characteristics of a tree that can help in identifying it
youtu.be/ygOEdkXxBsE



Photosynthesis video from PBS Learning Media
pbslearningmedia.org/resource/2bdaf922-572b-4f5c-a801-1eb2fb31b101/photosynthesis-unctv-science

Guess that Tree from SciShow for Kids
Emphasizes journaling to help identify evergreen trees
youtu.be/qFVh2fTR2XA

Children's Books

FICTION

- *Be a Tree* by Maria Gianferrari (ages 4-8)
- *Beatrice Was a Tree* by Joyce Hesselberth (ages 4-8)
- *The Cottonwood Sings* by Alfreda Beartrack-Algeo (ages 4-8)
- *If I Were a Tree* by Andrea Zimmerman (ages 4-8)
- *Looking for Peppermint, or, Life in the Forest* by Maxwell Eaton (ages 4-8)
- *The Nature Journal: A Backyard Adventure* by Savannah Allen (ages 4-8)
- *Only a Tree Knows How to Be a Tree* by Mary Murphy (ages 3-7)
- *There Was A Tree* by Rachel Isadora (ages 3-7)
- *The Tree That Bear Climbed / El árbol que trepó el oso* by Marianne Berkes (ages 4-8)
- *Trees* by Tony Johnston (ages 3-6)
- *Under My Tree* by Muriel Tallandier (ages 4-8)
- *What Do You See When You Look at a Tree?* by Emma Carlisle (ages 3-7)
- *Winter Trees* by Carole Gerber (ages 4-8)

Tree ID and Anatomy

POETRY

- *Sometimes I Feel Like an Oak* by Danielle Daniel (ages 3-6)
- *Trees* by Verlie Hutchens (ages 4-8)

NONFICTION

- *The Book of Amazing Trees* by Nathalie Tordjman (ages 8-12)
- *I Can Name 50 Trees Today!* by Bonnie Worth (ages 4-8)
- *I See Leaves* by Tim Mayerling (ages 4-6)
- *I See Trees* by Tim Mayerling (ages 4-6)
- *A Kid's Guide to Backyard Trees* by Felicia Brower (ages 7-10)
- *The Magic and Mystery of Trees* by Jen Green (ages 5-10)
- *Science Comics: Trees: Kings of the Forest* by Andy Hirsch (ages 9-12)
- *Tell Me, Tree: All About Trees for Kids* by Gail Gibbons (ages 4-8)
- *The Tree Book for Kids and Their Grown-Ups* by Gina Ingoglia (ages 6-10)
- *Trees* by Lisa Jane Gillespie (ages 4-7)
- *Trees* by Robin Twiddy (ages 4-8)
- *Trees, Leaves & Bark* by Diane Burns (ages 4-8)

Parts of a Tree

Introduction

Each part of a tree has a purpose. The **roots** anchor the tree and gather **nutrients** and water. The **trunk** supports the weight of the **boughs** and brings water to **branches**, **twigs**, and **leaves.** The **leaves** use sunlight to help make food for the tree.

Keeping a Tree Trekker Journal is a great way to get your Tree Trekkers outdoors to explore and keep track of what they're learning about trees. It's a place where they can note not only their observations, but things that might surprise them—such as most of a tree's trunk is dead tissue, but still supports the weight of the tree **crown**!

Get Tree Trekkers started on their journals with information that will help them identify trees and provide them with some of the words they'll need to record their observations. As they learn more about the parts of a tree, kids can develop an appreciation for the ways trees grow and thrive, make connections to how the existence of trees is vital to other living organisms, and record their responses to and reflections about the natural world.

Supplies

- Blank spiral notebooks or sketchbooks (or fold 10 sheets of paper in half and staple along the fold to create booklets)
- Copies of Tree Trekker Journal cover (optional)—find the printable on page 18
- Writing tools
- Drawing materials
- Copies of the Tree Parts Scavenger Hunt handout—see page 19

Get kids thinking

Trees are such a familiar part of our world that when you pass them by, you probably don't think too much about them or look carefully to notice the differences in trees. As with other living things, there is **biodiversity** among trees. There is wide variety in the size, shape, color, and **habitat** of trees. But trees basically all have parts that function in the same way.

Parts of a Tree

Ask: What makes a tree a tree? What characteristics do trees share? How would you describe a tree? Make a list together so that everyone can see and agree on what all trees have in common (trunk, roots, branches, leaves). While looking over the list, ask kids to think about other plants and consider how trees are different from other plants and what is unique about trees (one erect woody stem or trunk).

Let's get started!

Start with a book! Share features of trees from nonfiction titles such as *The Magic and Mystery of Trees* by Jen Green, *The Book of Amazing Trees* by Nathalie Tordjman, or *Tell Me, Tree: All About Trees for Kids* by Gail Gibbons. Talk about the characteristics all trees share and the similarities and differences among trees.

Give kids time to look at the parts of a tree in detail from one of the books or from the Tree Parts diagram on page 16. As you go over the parts, talk about the purpose and function of each:

Tree Parts

Roots and root hairs: tree root systems absorb water and other nutrients from the soil, store food for the tree, and anchor the tree in the ground. The types of roots a tree has and how they grow depend on the species of tree and what else is in the ground.

Root collar: where the below-ground roots meet the above-ground trunk. This part of the tree is important for the stability of the tree.

Trunk: provides support and carries water and nutrients to the leaves and branches and brings food down from the leaves to the roots.

Bark: covers the trunk (and branches) and protects the tree from weather, disease, and injury. Beneath the outer bark, inner layers include the **vascular cambium** which makes new **phloem** and **xylem** cells every year. Phloem moves food in any direction up or down—from leaves up to a fruit or from a leaf down to the roots. **Sapwood** is functioning xylem that moves water, while **heartwood** is xylem that is no longer moving water.

Branches and twigs: branches, which are connected to the trunk, enable the tree to spread out its leaves to get as much sunlight as possible. Twigs, which grow from branches, provide support for leaves, leaf buds, and flower buds.

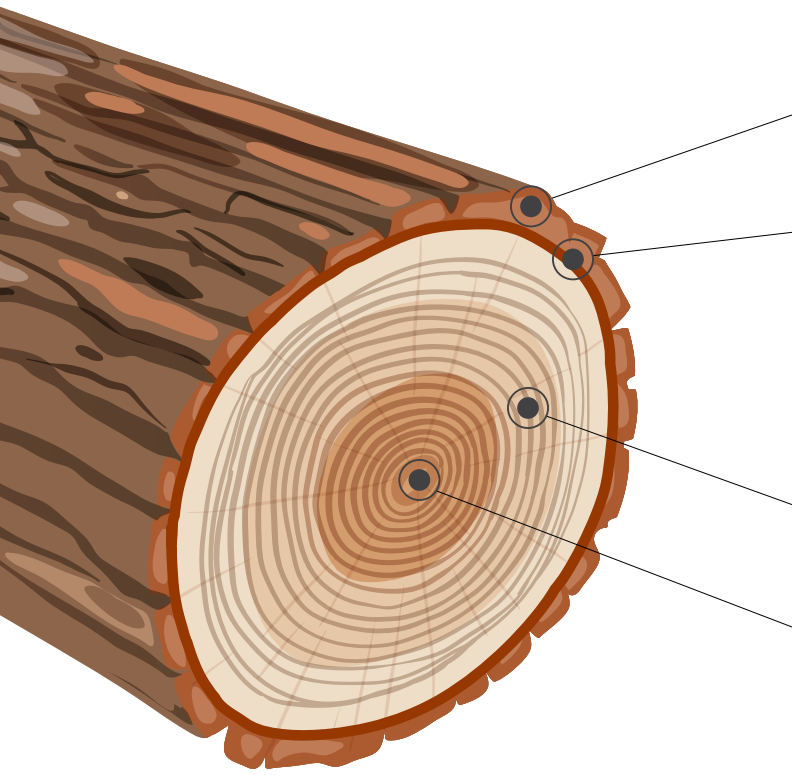
Parts of a Tree

Buds: store energy and contain new leaves and flowers for next year's growth.

Flowers and fruits: flowers are part of a tree's reproductive system and produce the seeds that can be used to produce new plants. Fruits are the mature and ripened ovaries of flowers and the seed-bearing structures.

Crown: contains the tree's leaves and branches. The crown is where **photosynthesis** takes place. It also filters dust from the air and protects the soil below from erosion from rainfall.

Leaves: make food for the tree and oxygen for the planet using **photosynthesis**. A leaf has two parts: the flat part crossed with **veins** is the **blade** (or **lamina**); the part that holds the blade to the twig is the **leafstalk** (or **petiole**). **Simple leaves** have an undivided blade, while **compound leaves** have blades divided into **leaflets** attached along the **main vein** or **midrib**. Leaves are shaped and arranged differently depending on whether the tree is **deciduous** or **coniferous**.



Inside the Tree

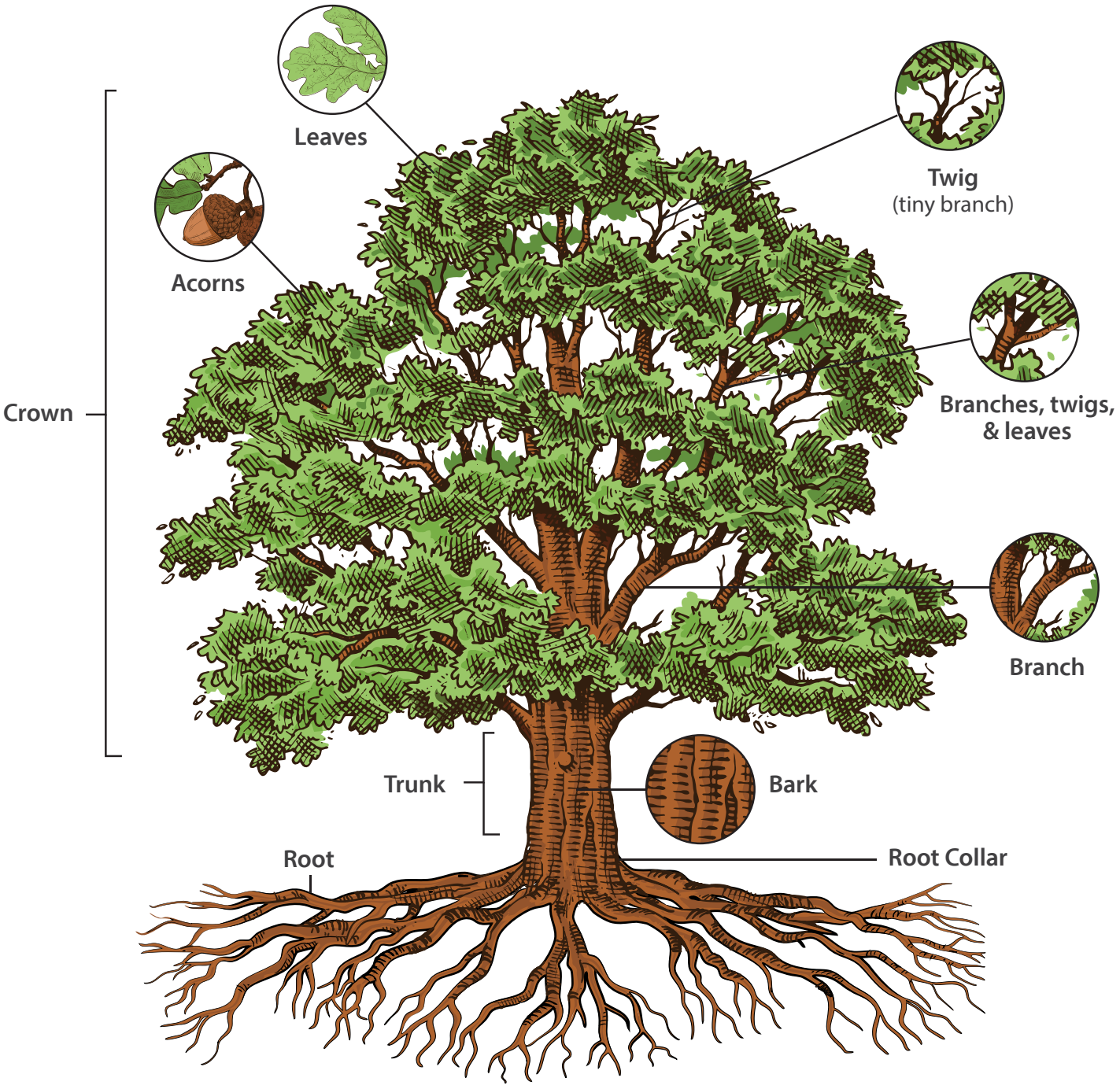
Phloem: the inner bark that transports food from the leaves to the rest of the tree.

Cambium: where cells grow outward to produce new phloem and inward to produce new wood, or xylem. The ages of some tree species can be determined by counting growth rings the layer of wood formed during one growing season.

Sapwood: dead xylem that transports water upward from the roots.

Heartwood: xylem that no longer transports water. It is resistant to decay, very strong, and helps support the tree's weight.

Diagram: Tree Parts



Parts of a Tree

Next, try another book such as *Looking for Peppermint, or, Life in the Forest* by Maxwell Eaton or *The Nature Journal: A Backyard Adventure* by Savannah Allen. Explain how journaling gave characters in these books their own opportunity to use drawing and writing together to show their observations, document their discoveries, pose questions, note their ideas, and learn to see and hear more. Talk about how all the different books you've shared use images and writing together to share observations, facts, ideas, and more about trees, forests, and nature.

Ask: What is a journal? Have you ever kept a journal? Who else might keep a journal? Why?

Talk about how scientists and naturalists keep field notes and journals of their observations and experiments. Writers keep journals of their observations and feelings about people and places. As Tree Trekkers, how do they think they could use a journal?

Pass out blank notebooks or staple folded sheets of paper with the Tree Trekker Journal cover (page 18) to make a booklet and make writing and drawing materials available. Let kids know that their journals can look however they want them to look!

Ask kids to draw a picture of a tree from memory in their journal. As kids sketch, help them understand that they don't ever have to draw beautiful "perfect" pictures—their journal's best use is to document their observations and draw what they think is important to remember.

After they've finished sketching, let kids pair up and compare their tree pictures. Have pairs share what the trees in their drawings have in common and what's different. Then, as a group, have kids explain those similarities and differences to you. Use the details they share to draw your own tree on poster board or a whiteboard. With their input, label your tree's key parts. Then have kids do the same for the tree they drew in their journal or draw another tree and label it.

BRANCH OUT!

With their new understanding of the parts of a tree, provide kids with the Tree Part Scavenger Hunt handout (on page 19) and Branch Out! to search outside for tree parts.

Date:

Tree Trekker Journal

FOLD ALONG DOTTED LINE

Tree Parts Scavenger Hunt

Time for an adventure! Look for the following tree parts and draw what you find.

Papery Bark

Rounded Crown

Toothed Leaf

Fruit

Buds

Smooth Bark

Lobed Leaf

Needle Leaves

Conical Crown

Scaly Bark

Field Guide Fun

Introduction

Knowing the names of the trees around them can be a powerful way for kids to build a connection to a place. Trying to identify trees makes us stop and take a closer look at the parts of a tree and their characteristics. Take Tree Trekkers outside to explore trees closely, then have them use their observations to create a product to share what they've learned—a field guide to the trees of your community.

Supplies

- Tree Trekker Journals (or notebooks)
- Writing tools and drawing materials
- Field guides
- Copies of the Field Guide template (page 23)

Get kids thinking

Ask kids: What different types of trees do they know? How did they learn the names of different trees? When we know the parts of a tree and the different characteristics they can have, what can we do with that information?

Let's get started!

Start with a book! Talk with kids about **field guides**—books that help identify things in nature, such as birds, insects, rocks, and trees! Talk about how field guides help everyone better understand how the world works and why the ability to identify and recognize species is important to the health of our ecosystems. To help them develop an understanding of what field guides are, how they are organized, and what they might find in an entry, have a variety of field guides for kids to look at (find them at the library or try online guides).

Field Guide Fun

FIELD GUIDES TO TREES

- *A Kid's Guide to Backyard Trees* by Felicia Brower
- *National Audubon Society First Field Guide: Trees* by Brian Cassie
- *National Geographic Kids Ultimate Explorer Field Guide: Trees* by Patricia Daniels
- *National Geographic Field Guide to the Trees of North America* by Keith Rushforth
- *National Wildlife Federation Field Guide to Trees of North America* by Bruce Kershner
- *Peterson First Guide to Trees* by George A. Petrides
- *The Sibley Guide to Trees* by David Sibley

DIGITAL GUIDES TO TREES

- Arbor Day Foundation (arborday.org/tree-identification)
- Leaf Snap (leafsnap.app)
- Seek by iNaturalist (inaturalist.org/pages/seek_app)
- vTree (dendro.cnre.vt.edu/dendrology/vtree.htm)

Ask kids: What is the purpose of a field guide? What would you expect to find in a field guide? How could you use the information in a field guide to identify particular trees? Show kids how to find common local trees in a field guide, reading through an entry together, connecting their knowledge of the parts of a tree to the identifying characteristics noted in the entry (crown shape, leaves, bark, twigs, cones, fruit). Then, have everyone head outdoors with Tree Trekker Journals and pencils in hand to look at trees.

When outdoors, have kids explore trees and record their observations, specifically looking for **crown** shape, **leaf** types, **bark** texture, **cones**, and **fruit**. Let kids know that writing and drawing about what they see and hear in their Tree Trekker Journal will help them observe more carefully. Encourage drawings and notes about the trees and tree parts they discover, making leaf and bark rubbings as part of their tree observations.

Field Guide Fun

Next, have kids use a field guide to trees to do some reading and research to clearly identify and learn more about the trees they observed. Talk with them about how to compile their observations and research into their very own field guide to trees. Kids can each make their own guides about the trees in their community or collaborate, with each Tree Trekker working on an entry for a different tree or trees that are added to a group-authored guide. Provide kids with copies of the Tree Field Guide template (on page 23) as needed where they can add descriptions and illustrations of their trees and the identifying characteristics.

Keep in mind that kids could add new entries as they further explore outdoors and revise and edit their field guides as they learn more. Whenever they consider their guides complete, have kids add page numbers and an index to help readers use the guide. Consider having them put their guide or guides into action by sharing them with a local nature center or library.

Name of Tree:

What it looks like

Notes:

Leaves

Notes:

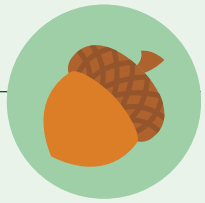
Bark

Notes:

Where it lives (habitat)

Interesting fact

Tree Biology



Tree Biology

Introduction

Just like all living things, a tree goes through different stages as it grows and changes. From a tiny seed to a towering tree, each step in a tree's life cycle is important for its own survival and plays a part in the health of the environment around it. Recognizing and understanding the life cycle of trees helps foster responsible environmental stewardship and appreciation for the processes that sustain life on Earth.

Tree Biology focuses on the stages of a tree's life cycle, the roles trees play in the ecosystem throughout their lives, the benefits and products trees provide, and how human activities impact a tree's life cycle.

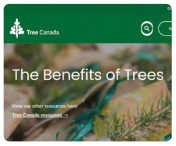
Questions to guide explorations and experiments

- How does a tree live and grow?
- What do trees need to grow and survive?
- What do you think might affect how a tree grows?
- How does a tree's life cycle compare to the life cycles of other living things?
- Why do we need trees?
- What impact do trees have on the environment?
- How are trees a renewable resource?
- How does the renewable nature of trees tie into their life cycle?

Helpful "tree-sources" for this topic

How Trees Grow from One Tree Planted
Shares the life cycle of trees
youtu.be/GtYCO0dHMfk

Working Trees: Reforestation and Responsible Forestry from the Nature Conservancy
Explores responsible forest management
youtu.be/b-j28Qd8WJ8



The Benefits of Trees from Tree Canada
A long list of all trees offer with links to more information
treecanada.ca/resources/benefits-of-trees

Children's Books

FICTION

- *Acorn Was a Little Wild* by Jen Arena (ages 4-7)
- *The Apple Pie Tree* by Zoe Hall (ages 4-7)
- *Avocado Magic / ¡Viva el aguacate!* by Taltal Levi (ages 4-8)
- *Big Tree Down* by Laurie Lawlor (ages 4-8)
- *Call Me Tree / Llámame árbol* by Maya Gonzalez (ages 4-7)
- *The Cottonwood Tree* by Serena Mangus (ages 7-10)
- *Have You Seen My Acorn?* by DK Ryland (ages 4-8)
- *Little Sap: The Magical Story of a Forest Family* by Jan Hughes (ages 4-8)
- *Log Life* by Amy Hevron (ages 4-8)
- *One Day This Tree Will Fall* by Leslie Barnard Booth (ages 4-8)
- *Red Leaf, Yellow Leaf* by Lois Ehlert (ages 4-7)
- *This Table* by Alex Killian (ages 3-7)
- *Tree Song* by Tiffany Stone (ages 3-7)
- *Treemendous: Diary of a Not Yet Mighty Oak* by Bridget Heos (ages 3-8)
- *Wake Up, Little Pin! The Story of a Sleepy Sapling* by Loretta Garbutt (ages 4-8)
- *Whirl* by Deborah Kerbel (ages 3-8)
- *The Wind and the Trees* by Todd Stewart (ages 4-8)

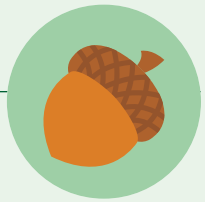
Tree Biology

POETRY

- *It Starts with a Seed* by Laura Knowles (ages 4-8)
- *Trees: Haiku from Roots to Leaves* by Sally M. Walker (ages 7-9)

NONFICTION

- *21 Things to Do with a Tree* by Jane Wilsher (ages 6-9)
- *Be Thankful for Trees* by Harriet Ziefert (ages 4-8)
- *Before We Stood Tall: From Small Seed to Mighty Tree* by Jessica Kulekjian (ages 3-7)
- *Branching Out: How Trees Are Part of Our World* by Joan Marie Galat (ages 8-12)
- *Fire! A Renewal of a Forest* by Celia Godkin (ages 6-9)
- *From Cone to Pine Tree* by Emma Carlson-Berne (ages 5-9)
- *From Tree to Paper / Del árbol al papel* by Avery Toolen (ages 5-9)
- *Forestry A-Z* by Ann Walsh and Kathleen Cook Waldron (ages 6-9)
- *The Gentle Genius of Trees* by Philip Bunting (ages 6-9)
- *How Do Maple Trees Grow? / Cómo crecen los arces?* by Kathleen Connors / and Diana Osorio (ages 4-7)
- *The Life Cycle of a Tree / El ciclo de vida del árbol* by Bobbie Kalman (ages 7-10)
- *Little Brown Nut* by Mary Auld & Dawn Cooper (ages 5-8)
- *One Small Place in a Tree* by Barbara Brenner (ages 6-10)
- *Rise to the Sky: How the World's Tallest Trees Grow Up* by Rebecca E. Hirsch (ages 4-9)
- *The Second Life of Trees* by Aimee M. Bissonette (ages 4-8)
- *The Sequoia Lives On* by Joanna Cooke (ages 4-8)
- *A Tree Is a Home* by Pamela Hickman (ages 4-8)
- *A Tree Is a Plant* by Clyde Robert Bulla (ages 4-8)
- *A Tree Grows Up* by Marfe Ferguson Delano (ages 4-6)



Life Cycle of a Tree

Introduction

All living things are born, grow, change, reproduce, and die over time. Together, these stages form a **life cycle**. Sometimes, a life cycle happens very quickly. For fruit flies, the life cycle is over in about two weeks, while Greenland sharks can live for hundreds of years.

Trees can also live for hundreds of years—or more. Kids are often interested in understanding beginnings and endings. Learning about the life cycle of trees can help Tree Trekkers understand the things all life cycles have in common, see patterns in nature, and connect with the world around them.

Supplies

- Collection (or pictures) of various tree seeds: acorns (oak), samaras (maple), spiny burs (sweetgum), cone (pine), etc.
- Copies of Life Cycle of a Tree handout (page 32)
- Tree Trekker Journals (or notebooks)
- Writing and drawing tools

Get kids thinking

Ask kids to think about life cycles they are familiar with. What living things do they notice growing and changing around them? How does that growth and development happen? How does their own growth and development compare to that of other living things?

Let's get started!

Start with a book! *Treemendous: Diary of a Not Yet Mighty Oak* by Bridget Heos, *Red Leaf, Yellow Leaf* by Lois Ehlert, or *A Tree Is a Plant* by Clyde Robert Bulla are fiction and nonfiction options for taking readers through the different stages of development and growth of trees.

Life Cycle of a Tree

After reading, talk with kids about how trees begin as seeds. Nearly every big, tall tree once started out as a small seed! Share your collection (or pictures) of tree seeds and see what kids can tell you about the stages those seeds have to go through to become mature trees.

In your discussion, reinforce that in the right conditions, seeds that get enough sunlight, water, and nutrients **germinate**, crack open, and **sprout**.

That small shoot that comes out of the seed breaks into the soil. Roots develop and a tiny stem appears, pushing through the ground. As the first leaves unfold, a **seedling** is born.

As the tree continues to grow, it develops into a **sapling**, a young tree that can't yet grow flowers and fruit.

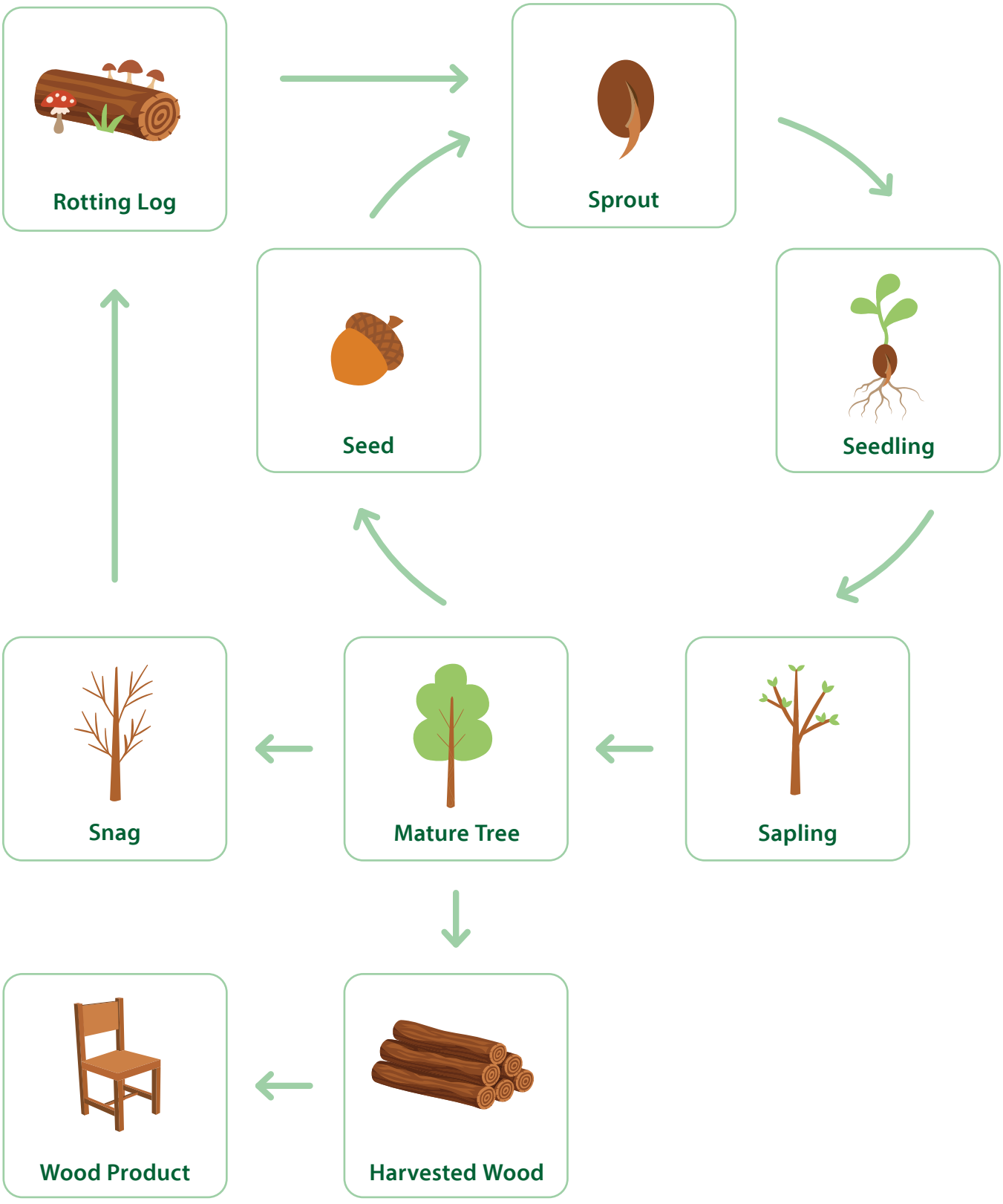
Once the tree develops a wide trunk and lots of branches that sprout leaves and can grow flowers and fruit, it is a **mature tree** that can reproduce and disperse seeds. A mature tree may continue to grow and live for hundreds of years.

But eventually, a tree reaches the end of its life due to circumstances such as damage or disease and begins to decay. Though no longer producing life, the upright dead tree, or **snag**, helps sustain other life, including insects, fungi, and other creatures.

A tree that has fallen and decayed may also help sustain life as a **nurse log**, providing nutrient-rich spaces for germinating seeds.

Ask kids: What could happen to interrupt the life cycle of a tree? Have them consider both natural and man-made possibilities, such as lightning strikes, fires, flooding, insects, disease, construction, or harvesting trees for wood products. Talk about how things that affect trees can impact the ecosystem. You might share another book such as *Big Tree Down* by Laurie Lawlor or *Fire! A Renewal of a Forest* by Celia Godkin to prompt your discussion.

Diagram: Life Cycle of a Tree



Life Cycle of a Tree

Now that kids are familiar with the life cycle of trees, share the Life Cycle of a Tree handout (on page 32) with them and have them complete the diagram by drawing the various stages. When finished, have them use their work to think about how they could interpret the life cycle using movement.

Start them with the example:
I'm a seed! [Curl your body up into a tight ball or curl your hand into a fist.]

Together, come up with movements and poses for:

1. I've sprouted!
2. I've grown roots!
3. I've grown a stem and leaves!
4. I've grown taller!
5. I've grown branches!
6. I've spread out my roots!
7. My crown is round and full! (or narrow and conical!)
8. I've grown flowers!
9. I've grown fruits!
10. I've been blown by the wind and spread my seeds!
11. I've been hit by lightning! (or attacked by insects!)
12. I've lost a branch!
13. Birds and animals are using me as a home!
14. I fall down in a storm!
15. I've become a nurse log.

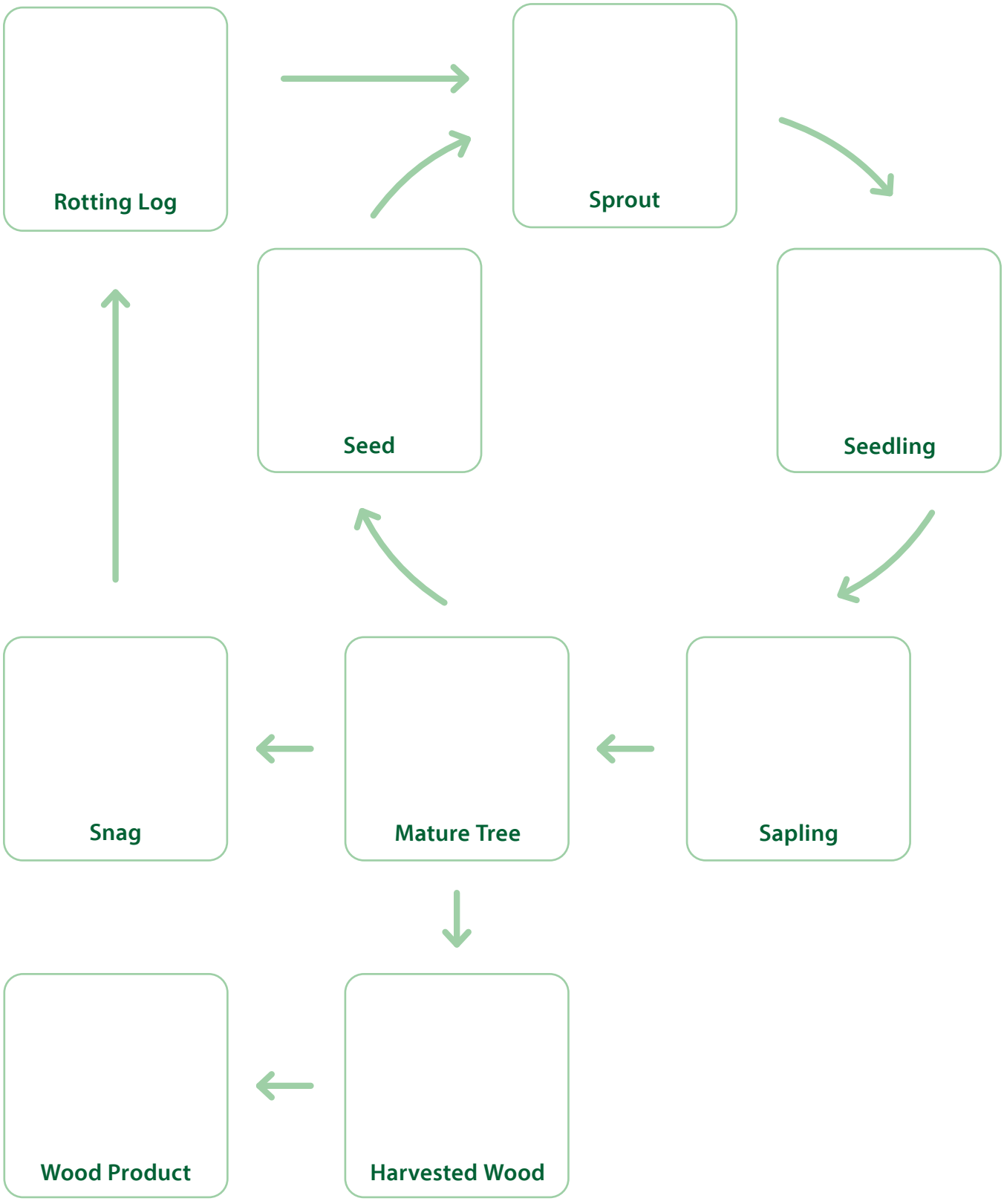
For younger children, you may want to develop the movements yourself then call out instructions for them to imitate you.

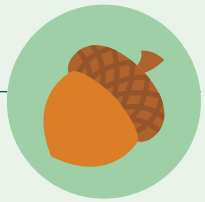
BRANCH OUT!

With everyone energized by their pantomime, **Branch Out!** and take a walk to look for trees in the different stages of their life cycle and note them in the Tree Trekker Journals.

Life Cycle of a Tree

Draw the stages of the life cycle of a tree in the spaces below.





What Wood We Do Without Trees

Introduction

Trees play important roles in the lives of other living organisms—including people—throughout every stage of their lives.

One important thing trees do is to provide food for people, animals, and insects. They also improve our air quality when producing their own food through **photosynthesis**. Trees absorb carbon dioxide through their leaves, where **chlorophyll**, or green color in leaves, uses sunlight, air, and water to create food. The process not only removes **carbon dioxide** from the **atmosphere**, it also releases **oxygen**. As trees' root systems spread and grow, they secure and protect the soil and help prevent **erosion**. In various life cycle stages, they offer protection and homes for many animals.

And they provide an incredible number of foods and products we use every day. Tree Trekkers can explore the uses for living and harvested trees, gain appreciation for the valuable resources trees provide, and create their own products from trees.

Supplies

- Writing materials
- Tree Trekker Journals (or notebooks)
- Yarn or string in many lengths and colors
- Twigs (collected from the ground)
- Foods from trees (optional)

Get kids thinking

Have kids look around the room and collect or make note of things that are made from or come from trees. How many things did they gather? Make a list together and add other things that were made from or came from trees that kids have used today.

Point out some of the less obvious products they may have missed such as those derived from chemicals in trees, like the sweetener in their toothpaste (turpentine-derived trans-anethole), flavorings for lots of different soft drinks (cola nut, sassafras oil, glycerol ester of wood rosin), and something to thicken their yogurt (gum arabic).

Are they surprised at how many things come from trees? How many things do they think we use everyday that come from trees? Did they know there are thousands of products that come from trees?

Let's get started!

Start with a book! Read *Be Thankful for Trees* by Harriet Ziefert or selections from *Branching Out: How Trees Are Part of Our World* by Joan Marie Galat. Give kids a chance to share specific reasons they appreciate trees.

Ask kids: Which benefits from trees do they think are most important: the food they provide for animals and people, the products people make from them, soil protection, the air we breathe, or something else?

Given what kids know about the importance and benefits of trees, how do they feel about trees being cut down? How does harvesting trees fit into their life cycle?

Explain that trees are considered a **renewable resource**, a natural element that can renew itself in some way in a short time or never run out. But for trees to truly be a renewable resource, forested areas where trees are cut down or removed have to be adequately replanted or given the conditions to naturally replenish.

Sustainable forestry means managing trees in a way that meets our needs for forest products, recreation, clean water, and plentiful wildlife, while ensuring healthy forests grow back for future generations. What if trees are cut down faster than we grow them back? Forests shrink, and trees become a diminished resource. Forest managers use numerous practices called **silviculture** to ensure that forests remain healthy and are growing well. **Deforestation** is when trees are cut down permanently to clear land and make room for something other than forests, like farmland for animals or crops, mining, roads, or construction. This can alter weather patterns, destroy habitats, and accelerate climate change.

What Wood We Do Without Trees

Ask kids to think about what they can do to **conserve** trees or products from them carefully, avoiding waste or overuse. Brainstorm together and have kids make a list of ideas in their Tree Trekker Journals.

BRANCH OUT!

People have built products from wood throughout history because it's a renewable resource that is strong, lightweight, and easy to work with. Talk with Tree Trekkers about things they could make with wood on a smaller scale with string or yarn and twigs they find on the ground. **Branch Out!** on a twig search so kids can gather twigs, then return to have them work individually or in pairs to build their wooden item—a picture frame, mobile, instrument, or a tiny den or raft. (Remember to only take twigs from the ground—and not too many! Birds need them for nests.)

Have them come up with their own designs or offer some examples and instructions:

Twig picture frame
aldoleopoldnaturecenter.org/wp-content/uploads/Twig-Picture-Frame-Craft.pdf

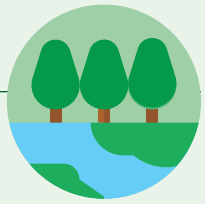
Twirling twig mobile
babbledabbledo.com/engineering-for-kids-twirling-twig-mobile

How to make a percussion stick musical instrument
nurturestore.co.uk/how-to-make-a-percussion-stick-musical-instrument

Craft a craft
startwithabook.org/content/pdfs/swab-craftacraft.pdf

Showcase their efforts with a celebration that includes a food bar where "tastetree" treats from trees such as apples, cherries, oranges, peaches, pears, chocolate, maple syrup, walnuts, and almonds are offered for kids to try! (Be aware of any food allergies when planning what to serve.)

Green Shield:
The Forest Ecosystem



Green Shield: The Forest Ecosystem

Introduction

Trees cover almost one-third of the land on Earth. A tree can be a home, or **habitat**, for many kinds of animals and insects. Because it can provide several habitats at once, a single tree can also be an **ecosystem**—a community of living things in a shared environment. An ecosystem is like a neighborhood. Plants and animals in an ecosystem provide food for each other in **food chains** and **webs**.

A forest creates a bigger kind of ecosystem. A **forest** is a group of trees growing close together covering a large area, with smaller trees, plants, and animals living under them. A **biome** is an even bigger region of the Earth with a certain climate, landscape, and certain living things. Forests are a kind of biome (along with deserts, grasslands, and tundra).

The three general types of forests are **boreal**, **tropical**, and **temperate**. The evergreen trees of a boreal forest, also known as **taiga**, are found across Siberia, Scandinavia, Alaska, and Canada. Broad-leaved **deciduous** trees (trees that lose their leaves) are found in temperate forests, mostly in the Northern Hemisphere in regions with changing seasons. Tropical forests are found near the equator, and are full of **biodiversity**. The Amazon Rainforest is the largest forest in the world and is home to more living things than any other place on Earth.

In forests, **mycorrhizal networks** help trees find and absorb nutrients and water. These networks are made up of **fungi** that form a relationship with plant roots that benefit both the plant and the fungi. This **symbiosis** significantly expands the root system's surface area so that vast amounts of soil can be explored for water and nutrients. This allows trees far, far greater access to resources that just their root systems alone could reach. In return, the fungi get **photosynthate**, or the sugar that plants make, from the root tissue.

Forests are complex natural systems where different species work together. In doing so, the forest and trees provide a variety of benefits that help keep the Earth healthy, too. Tree Trekkers learn more about what these benefits mean as they explore the important role trees and forests play in providing homes for other plants and animals and protecting our planet.

Questions to guide explorations and experiments

- What is a forest?
- What is an ecosystem?
- What role do trees play in forest ecosystems?
- How do trees help each other? How do they help others in the forest ecosystem?
- How can change in one part of an ecosystem affect change in other parts of the ecosystem?
- How do the things trees do for their own growth (photosynthesis) and survival of trees affect the planet?

Helpful "tree-sources" for this topic

Explore different tree-based ecosystems in your neighborhood and around the world:

Forest Ecosystem Guide: Boreal vs Deciduous vs Coniferous vs Temperate
8billiontrees.com/trees/forest-ecosystem

The State of the World's Forests
fao.org/state-of-forests/en

Biomes
kids.britannica.com/kids/article/biome/403913

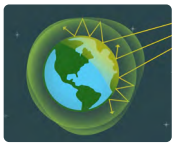
Understanding Habitats, Ecosystems and Biomes
wildernessclassroom.org/understanding-habitats-ecosystems-biomes

Biomes, Ecosystems, and Habitats
education.nationalgeographic.org/resource/biomes-ecosystems-and-habitats

Helpful "tree-sources" for this topic (cont.)

We Depend on Trees Song
Celebrate the benefits of trees with song
youtu.be/TB6ycNTZwzw

Heat Islands from NASA
Learn why cities may experience much warmer temperatures than nearby rural areas
climatekids.nasa.gov/heat-islands



Climate Heroes: The Power of Trees from the Nature Conservancy
Illustrates the role of trees in the quest to tackle climate change
youtu.be/ilXeGlybjJQ

Children's Books

FICTION

- *Everyone Starts Small* by Liz Garton Scanlon (ages 4-8)
- *The Great Kapok Tree* by Lynne Cherry (ages 4-8)
- *Little Sap: The Magical Story of a Forest Family* by Jan Hughes (ages 4-8)
- *Little Tree and the Wood Wide Web* by Lucy Brownridge (ages 4-7)
- *The Lumberjack's Beard* by Duncan Beedie (ages 4-8)
- *My Dad Is a Tree* by Jon Agee (ages 3-6)
- *Redwoods* by Jason Chin (ages 6-9)
- *Slowly Slowly* by Toni Yuly (ages 3-6)
- *Slowly, Slowly, Slowly Said the Sloth* by Eric Carle (ages 4-8)
- *Walking Trees* by Marie-Louise Gay (ages 4-8)

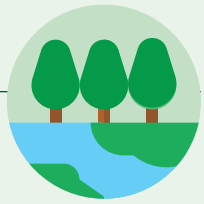
POETRY

- *A Forest Song* by Kirsten Hall (ages 4-8)
- *The Wisdom of Trees: How Trees Work Together To Form a Natural Kingdom* by Lita Judge (ages 7-10)

Green Shield: The Forest Ecosystem

NONFICTION

- *Be Thankful for Trees*
  by Harriet Ziefert (ages 4-8)
- *The Boreal Forest: A Year in the World's Largest Land Biome*
  by L. E. Carmichael (ages 8-12)
- *Branching Out: How Trees are Part of Our World* by Joan Marie Galat (ages 8-12)
- *Deep Roots: How Trees Sustain Our Planet*
  by Nikki Tate (ages 8-12)
- *DKFindOut! Forest*
  by Cat Hickey (ages 6-9)
- *Footsteps in the Forest*
  by Laura Perdew (ages 5-8)
- *The Forest in the Trees*
  by Connie McLennan (ages 4-8)
- *The Gentle Genius of Trees*
  by Philip Bunting (ages 4-8)
- *Incredible Stars of the Plant World*
  by Benjamin Flouw (ages 5-10)
- *Let's Save Our Planet: Forests*
  by Jess French (ages 8-10)
- *Listen to the Language of the Trees: A Story of How Forests Communicate Underground*
  by Tera Kelley (ages 6-10)
- *Look What I Found in the Woods*
  by Moira Butterfield (ages 5-10)
- *The Magic and Mystery of Trees*
  by Jen Green (ages 4-10)
- *The Magic of Forests: A Fascinating Guide to Forests Around the World*
  by Vicky Woodgate (ages 6-10)
- *The Story of an Oak Tree Ecosystem*
  by Henry Cole (ages 4-9)
- *Tell Me, Tree: All About Trees for Kids*
  by Gail Gibbons (ages 4-8)
- *A Tree Is a Community*
  by David L. Harrison (ages 4-8)
- *A Tree Is a Home*
  by Pamela Hickman (ages 4-8)
- *A Walk in the Deciduous Forest*
  by Rebecca L. Johnson (ages 8-12)
- *Welcome to the Tree Stump*
  by Alix Wood (ages 5-9)



At Home in the Ecosystem

Introduction

Trees provide habitats for many animals, plants, and insects. A tree can be both a **habitat** and a small **ecosystem**. Forests are ecosystems with many different kinds of habitats. There are even habitats in each layer of a forest. And under the forest floor, plants and trees, with the help of **fungi**, gain greater access to water and nutrients.

Ecosystems can occur on their own. But what happens when people build a park or garden? Those places create habitats for plants, animals, insects, and fungi, too. Central Park, in New York City, is 2.5 miles long and half a mile wide, and is home to more than 500 plants and animals. Forest and park rangers and arborists care for naturally occurring and man-made ecosystems and protect the things that live there.

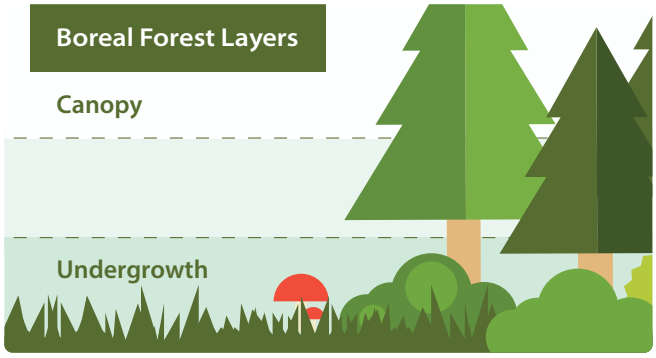
Kids can learn more about habitats, ecosystems, and the crucial role trees play in both by creating their own forest ecosystem in a diorama that shows others what they look like and how they work.

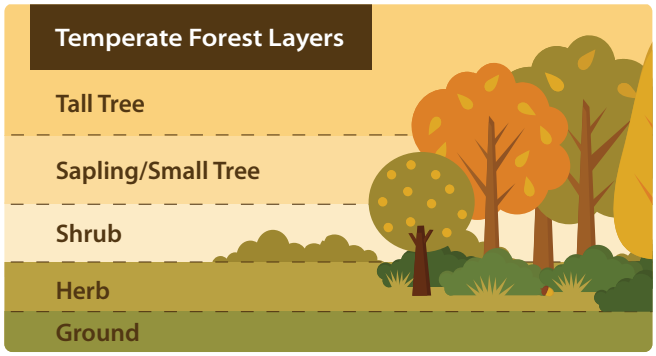
Supplies

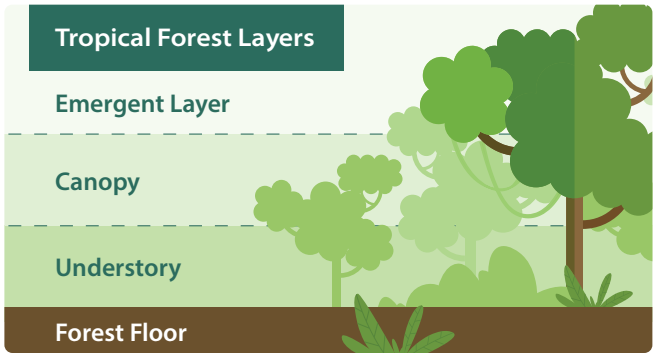
- Tree Trekker Journals (or notebooks)
- Writing tools
- Books about trees
- Computer and printer (optional)
- Internet access to research kid-friendly sites (optional)
- Drawing tools, painting materials, clay
- Colored construction and/or tissue paper
- Shoe boxes (one per kid or team of kids), scrap cardstock, paperboard (cereal boxes, paper towel tubes), cardboard, and other materials from the recycling bin
- Scissors, glue, and tape

Get kids thinking

Talk with kids about what an ecosystem is. If you think about an ecosystem as a neighborhood, you see how the different plants and animals in it work together to live and grow. If you drew a picture of your neighborhood, it might show where you and your friends live, where you buy food and go to school, where you like to play, who you play with, and how you help each other.







A picture of a forest ecosystem would show the same things. It would show who lives there and where, where they get their food, and how the things that live there interact. Ask Tree Trekkers to think about ecosystems they are familiar with including woods, forests, or parks they know about or have visited. What plants, animals, or insects lived there?

To help kids understand the complexity of ecosystems, help them visualize the different layers of forests. Using the Layers of the Forest graphic (page 45) as a guide, have kids interpret and act out the layers of different types of forest.

Kids can stand on risers, benches, or rocks to create the top layers and crouch, kneel or even lie on the ground to create the lower levels. Take a picture of the kids acting out each kind of forest and then show them the photos so they can compare and discuss:

- **Boreal:** canopy and undergrowth
- **Temperate:** tall tree, sapling or small tree, shrub, herb, ground
- **Tropical:** emergent layer, canopy, understory, forest floor

A Home in the Ecosystem

Ask kids what they know about the habitat and homes of plants and animals that live in these types of forest ecosystems. Can they describe a food chain in one of the levels?

Now have Tree Trekkers brainstorm what lives in the different layers of a forest. Remind them that some animals can move from layer to layer, but some stay in the same layer for their whole lives. And plants can live in different layers. You can suggest some different organisms to get them going, such as tree sloths, koalas, owls, orchids, fungi, etc. Take some time to talk about how the climate in each forest ecosystem impacts the things that live there.

Let's get started!

Start with a book! Share books about tree habitats and forest ecosystems such as *A Tree Is a Community* by David L. Harrison, *The Forest in the Trees* by Connie McLennan, *The Lumberjack's Beard* by Duncan Beedie, *Redwoods* by Jason Chin, or *The Great Kapok Tree* by Lynne Cherry.

Ask kids to point out ways plants and animals use trees as their homes or food sources and how the trees and other living things depend on each other. Challenge them to identify what kind of tree or forest is depicted in the book and which levels of the forest they see.

Repeat this exercise a couple of times with books, or sections of books, that explore different kinds of forests. Encourage kids to compare and contrast the different kinds of forests and write down their findings in their Tree Trekker Journals. Then invite your Tree Trekkers to choose a forest or tree ecosystem to further research and create a diorama that brings it to life.

Working on their own or in pairs, invite kids to choose a kind of tree or forest ecosystem to research in depth. Using books and information they've collected in their Tree Trekker Journals, have Tree Trekkers gather information about their ecosystem to inform the diorama they will make.

A Home in the Ecosystem

They'll need to know:

- what kind of tree or forest (boreal, temperate, or tropical) it is
- where it can be found on Earth
- what levels it has
- what seasons it experiences
- the kinds of trees, plants, animals, and insects that live there

Provide a shoebox and a variety of art supplies. Kids could also use natural materials such as twigs and rocks that they find on the ground to create a more realistic effect. Encourage adding 3D elements using scrap paperboard or other materials to build out the tree trunk and branches or plants and animals. Have them add labels that identify the different trees, plants, animals, and insects in their ecosystem diorama.

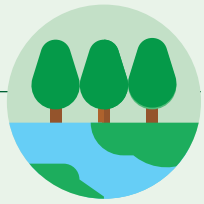
When the Tree Trekkers have completed their tree or forest ecosystem, ask them to share their creations with others. Have those who chose similar ecosystems talk with each other about the choices they made about what to include and how their unique pieces of art emphasize different aspects of the same ecosystem.

BRANCH OUT!

Explore ecosystems in your neighborhood. Branch Out! and have Tree Trekkers look for evidence of animals and plants using trees as their homes.

This "Who has been in the forest?" handout from Green Schoolyards America can help frame and guide searches: greenschoolyards.org/s/08_10-Who_s-Been-in-the-Forest.pdf

Diagram: Layers of the Forest



Ecosystem Services of Trees: Carbon Capture Superheroes

Introduction

Forests act as huge air filters and coolers for the Earth. To the benefit of our ecosystem, when a tree makes its own food through **photosynthesis**, it takes **carbon dioxide** out of the **atmosphere**, trapping it inside the tree, and releases **oxygen** and water into the atmosphere. Carbon dioxide, a **greenhouse gas**, traps heat from the sun and makes the planet warm up. But when a tree turns carbon dioxide into oxygen and glucose, it acts as a **carbon sink**, trapping the carbon inside and removing it from the atmosphere. That's called **sequestration** and helps keep our planet cooler. The more wood in a tree (trunk, roots, and branches), the more carbon it can trap. Older trees can even trap carbon in their leaves.

This significantly impacts the ecosystem and the living conditions for all plants and animals. Kids can explore connections between forests and climate and learn more about how the benefits trees provide are the foundation for a cooler planet and healthy environment.

Supplies

- Outdoor thermometer
- An empty paper towel tube
- A straw, cut in half
- Masking tape
- Sand (enough to fill the paper towel tube and the straw)
- A rimmed baking sheet or tray
- Tree Trekker Journals (or notebooks)
- Writing and drawing materials

Get kids thinking

Talk about **climate** and the climate where you live. Climate, or the average weather patterns over the years, is different from **weather**, which is the state or condition of the atmosphere. Spark discussion about weather and climate by heading outside and having kids place a thermometer in a sunny location.

While waiting to register the temperature, have kids stand in the sun and notice how it feels. Note the temperature, then move to a shady spot to take another temperature and notice how it feels. Have them record temperatures and their observations in their Tree Trekker Journals. Compare temperatures in other locations such as spots with plentiful trees, plants, or grass and in areas with concrete, bricks, or asphalt. Invite kids to share their findings and discuss.

Ask kids: Do you think trees can impact the weather or climate? If you do, how? What else can impact climate? How do human activities that release billions of tons of carbon dioxide into the atmosphere every year impact climate? What do trees take in from the atmosphere and what do they release during photosynthesis? Have kids share their ideas for combating climate change, especially the roles that trees can play.

Let's get started!

Start with a book! The seventh, and last, section of *Be Thankful for Trees* by Harriet Ziefert, explores how trees are needed to clean the air and cool the Earth.

Share how trees impact our environment and climate with *Walking Trees* by Marie-Louise Gay, *Deep Roots: How Trees Sustain our Planet* by Nikki Tate (especially chapter 2), *Branching Out: How Trees are Part of Our World* or *The Magic of Forests* by Vicky Woodgate (especially pages 36-37). Explore reasons why some trees are extra good at taking carbon out of the atmosphere: because they grow quickly when they are young (like maple trees), are in rainforests (like pau brasil trees), or are very old and big.

Talk about what kids discovered in taking outdoor temperatures in sunny and shady places. Explain that different situations can cause "islands" of heat or cool in cities and towns. **Heat islands** are places that are hotter than other places because they have fewer trees and plants to keep things cool and more concrete or asphalt. Heat islands are found in urban or city areas that lack trees and parks. A park or tree-lined street can create a cool island in an otherwise hot city.

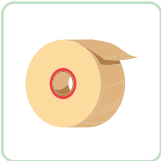
Ecosystem Services of Trees: Carbon Capture Superheroes

Connect how trees can store **carbon dioxide** to reduce **greenhouse gases** and prevent temperature rise, produce **oxygen**, and filter dust. They can also produce water that cools the surrounding area when it **evaporates**. Ask kids which is a better strategy for combating **climate change:** planting more trees or saving and protecting the trees and forests we already have? Have them share their ideas and write them in their Tree Trekker Journals. Then demonstrate:

Step 1: Show them the paper towel tube and the two pieces of a straw. Explain that these represent three tree trunks. One (the paper towel tube) is an old tree with a big trunk. The straws are new **saplings** with smaller trunks.

Step 2: Invite them to draw the three tree trunks in their journals. Then have them imagine the **branches**, the **crown** or top of the trees, the **leaves**, and the **roots**, and draw them, too.

Ask them to use what they know about these trunks to predict how much **carbon dioxide** they could trap or **sequester**. Can the saplings trap as much as the old tree? Have them write their predictions in their journals.



Step 3: Cover the bottoms of the paper towel tube and straws with masking tape. Fill each of the "trunks" with sand, explaining that the sand represents carbon dioxide that the tree can take out of the atmosphere. Once you've filled them, give your Tree Trekkers a chance to take a look at the trunks.

Step 4: Pour out the sand from each "trunk" into separate piles on the baking tray and ask kids what they see. Which held more "carbon dioxide" sand? Did they predict that the old tree trunk could hold more carbon dioxide than two (or even more) saplings? Remind kids that roots, branches, and leaves can trap carbon, too. Invite them to write about their observations and draw pictures in their journal.

Step 5: Now, revisit the question: which is a better strategy for combating **climate change:** planting more trees or saving and protecting the trees and forests we already have?

Ecosystem Services of Trees: Carbon Capture Superheroes

Talk with kids about why it doesn't have to be either/or. New trees are always needed, as old trees die, some trees are lost to fires or natural disasters, and some are harvested for wood. But it is especially important to protect forests—especially old-growth forests—from destruction. When forests are destroyed, the Earth loses its air-cleaning and cooling power, and the carbon stored in the trees gets released back into the atmosphere.

BRANCH OUT!

Scientists have figured out equations that allow us to know, based on a tree's species and age, how much carbon is stored in its trunk, branches, crown, and roots. They've also found that because young trees grow quickly, they capture carbon faster than old trees. But old trees can still capture more carbon than young ones. If you want to dig deeper, you and your Tree Trekkers can calculate how much carbon a tree can sequester.

Branch Out! to a park or arboretum to identify old, big trees and young trees growing fast in the sun or slower in the shade.

i-Tree

iTree has easy-to-use online tools that can guide you through the carbon capture calculation process: itreetools.org

Creative Roots: Connecting Trees to Art and History

Creative Roots: Connecting Trees to Art and History

Introduction

Trees provide us with fresh air, food, and materials to make things. They also help protect our environment from erosion, heat, and wind, and are home to many animals, plants, and insects. But that's not all. Trees are important members of our communities and can inspire people to create art. Whether it's showing a tree's beauty, strength, or role in a community, art can capture the personalities of trees. Trees are a common subject of **poetry**, paintings, drawings, and photography. They've even inspired sculpture and music.

Some trees that inspire are very old, and have been present for important historical events. Others have been planted to remember or celebrate special events. Artists, musicians, architects, engineers, inventors, and authors from around the world have been inspired by trees.

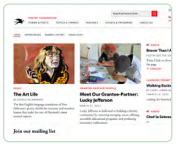
People all over the world make art about trees. Kids can use the things they've learned about trees, or the questions they still have about them, to make art too.

Questions to guide explorations and experiments

- How can trees bring people together?
- What is inspiring or interesting about trees?
- How can a tree be famous?
- Why do people create art?
- How do songs, poems, books, or works of art that feature trees make you feel about trees?
- How do you think trees should be represented in art?

Helpful "tree-sources" for this topic

Poetry4Kids
Includes descriptions of different forms of poetry
poetry4kids.com



The Poetry Foundation
Includes a digital archive of poems and a dictionary of poetry terms
poetryfoundation.org

Andy Goldsworthy - Earth Artist and his Process
Learn about sculptor Andy Goldsworthy who creates sculptures and land art situated in natural or urban settings
youtu.be/sngXz55b4bc

Children's Books

FICTION

- *All Kinds of Special*
  by Tammi Sauer (ages 4-8)
- *I Hear You, Forest*
  by Kallie George (ages 3-7)
- *Maple and Rosemary*
  by Alison James (ages 4-8)
- *My Towering Tree*
  by Janna Matthies (ages 5-9)
- *Not a Stick*
  by Antoinette Portis (ages 2-6)
- *The Paper-Flower Tree*
  by Jacqueline Ayer (ages 4-8)
- *Picture a Tree*
  by Barbara Reid (ages 4-8)
- *Poetree*
  by Shauna LaVoy Reynolds (ages 4-8)
- *The Tree in the Courtyard: Looking Through Anne Frank's Window*
  by Jeff Gottesfeld (ages 8-12)
- *The Tree Told Me*
  by Sophie Lescaut (ages 5-7)

Creative Roots: Connecting Trees to Art and History

POETRY

- *Poetree* by Caroline Pignat (ages 7-10)
- *Poetrees* by Douglas Florian (ages 6-10)
- *Poetry for Kids: Robert Frost* edited by Jay Parini (ages 8-12)
- *Tree Whispers* by Mandy Ross (ages 4-8)
- *Trees* by Verlie Hutchens (ages 4-8)
- *Trees: Haiku from Roots to Leaves* by Sally M. Walker (ages 7-9)

NONFICTION

- *111 Trees: How One Village Celebrates the Birth of Every Girl* by Rina Singh (ages 5-8)
- *Be Thankful for Trees* by Harriet Ziefert (ages 4-8)
- *Celebritrees: Historic and Famous Trees of the World* by Margi Preus (ages 6-10)
- *Cool Green: Amazing, Remarkable Trees* by Lulu Delacre (ages 7-10)
- *The Gravity Tree: The True Story of a Tree That Inspired the World* by Anna Crowley Redding (ages 5-9)
- *Incredible Stars of the Plant World* by Benjamin Flouw (ages 5-10)
- *Johnny Appleseed* by Steven Kellogg (ages 4-8)
- *The Magic and Mystery of Trees* by Jen Green (ages 5-10)
- *Paul Bunyon* by Steven Kellogg (ages 3-9)
- *The Secret Life of Trees (DK Super Readers Level 2)* by DK (ages 7-9)
- *The Tree of Life: How a Holocaust Sapling Inspired the World* by Elisa Boxer (ages 5-9)
- *This Very Tree* by Sean Rubin (ages 5-8)
- *Under the Freedom Tree* by Susan VanHecke (ages 6-9)
- *The Witness Trees: Historic Moments and the Trees Who Watched Them Happen* by Ryan G. Van Cleave (ages 7-10)

Poetree: Tree-Inspired Writing

Introduction

Because trees are beautiful and full of life, people are often inspired to write **poetry** about them. Trees give us shade, clean air, and are home to animals, but they can also tell stories—some trees have been around for many, many years, and they've seen lots of things happen. As symbols of life, growth, resilience, and interconnectedness, the topic of trees lends itself to many poetic forms.

In reading poems about trees and learning about different types of poetry, kids can express their own ideas and feelings about trees in poems they write and display on a Poetree.

Supplies

- Tree Trekker Journals (or notebooks)
- Writing and drawing materials
- Scissors
- Poetic Leaf handout (pages 57-58)
- Hole punch
- String or stapler
- Clear packing tape
- A tree (real or artificial) or bulletin board

Get kids thinking

Ask kids: How do trees inspire you or make you feel? If you wanted to share something you like about trees but didn't want to talk about it, how could you express yourself? Would you write a poem or a story? Make a drawing or sculpture? How could you use different kinds of art to share your ideas or feelings about a tree?

Let's get started!

Start with a book! Share a book such as *Be Thankful for Trees* by Harriet Ziefert and discuss how trees can help us make art and music. Then share another book such as *Poetrees* by Douglass Florian or *Tree Whispers* by Mandy Ross. Talk about the different poems in the book (most are **odes** or **concrete poems**) and what they think Florian's illustrations for each one add. Florian uses **visual poetry**, where the position, size, and shape of words and lines in his poems also add meaning.

Poetree by Caroline Pignat explores trees through the seasons with **acrostic** poems, and *Trees: Haiku from Roots to Leaves* by Sally M. Walker explores trees with **haiku**, a Japanese poetry form that often uses nature as its subject.

Talk about why people write poetry—to express their feelings, ideas, or tell stories in a creative way! Poetry can be fun because it uses words in a special way—sometimes with rhymes, rhythm, or interesting descriptions. It helps people share things they care about or imagine. Some people write poetry to make others think or laugh, while others do it to share something personal. It's like making a picture with words and there are lots of different ways to write poetry.

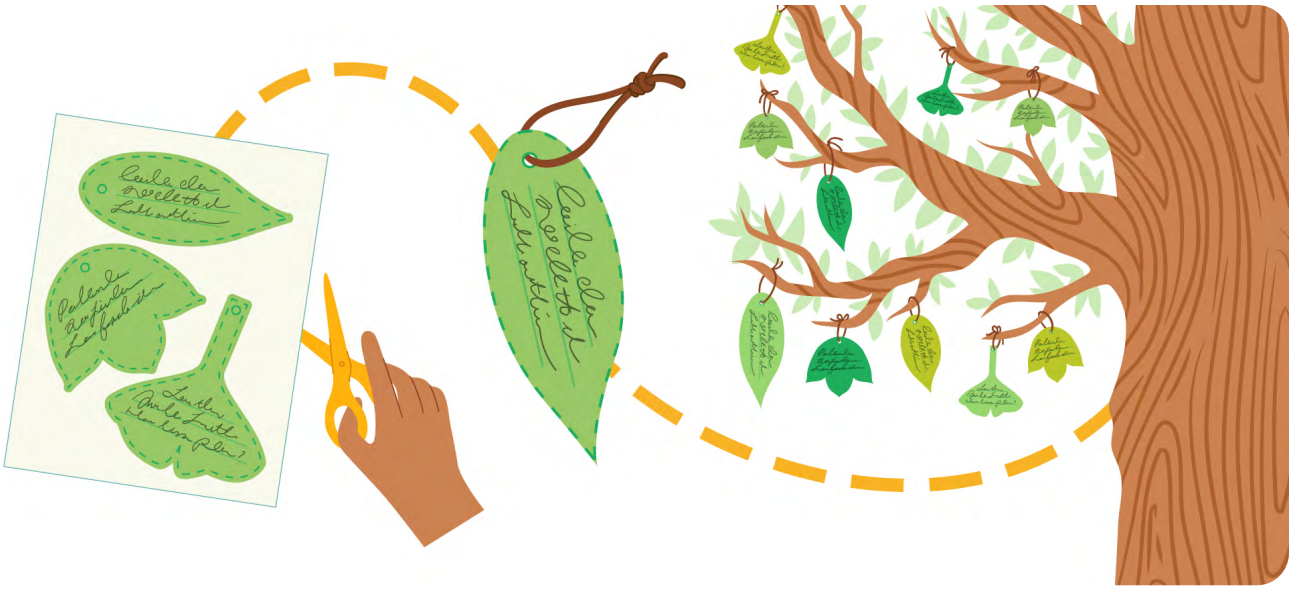
Some forms of poetry that would work well with trees as a topic:

- **Haiku:** A Japanese poetry form with three unrhyming lines of five, seven, and five syllables
- **Concrete:** A poem in written in the shape of its subject, such as a tree or leaf
- **Acrostic:** A poem where the first letter of each line spells out a word, name, or phrase when read vertically
- **Ode:** A poem expressing praise for or celebrating something
- **Diamante:** A diamond-shaped poem that compares and contrasts two different things such as tree roots and crown

Explore some famous tree poems before inviting kids to brainstorm about types of poems they'd like to try and things about trees or forests they'd like to write poems about. Have them write their ideas in their Tree Trekker Journals. Encourage them to draw any ideas they have, too.

- "Birches" by Robert Frost poetryfoundation.org/poems/44260/birches
- "Stopping by Woods on a Snowy Evening" by Robert Frost poetryfoundation.org/poems/42891/stopping-by-woods-on-a-snowy-evening
- "Loveliest of Trees" by A.E. Houseman poetryfoundation.org/poems/44411/a-shropshire-lad-2-loveliest-of-trees-the-cherry-now
- "The Poet Tree" by Shel Silverstein shelsilverstein.com/goodies/the-poet-tree

Poetree: Tree-Inspired Writing



Next, invite kids to choose a tree or something about a tree to be the topic of a poem. Have them use the same topic to try two or more of the poetry forms you've discussed. Ask them to write their poems in their Tree Trekker Journals then share their poems with the group if they want to.

Provide the Poetic Leaf handout on pages 57-58 and have kids write their poems on the leaf templates and cut them out. Cover each Poetic Leaf with clear packing tape to protect it. Punch a hole, make a loop with string for hanging the leaves.

BRANCH OUT!

Branch Out! to scout for a small accessible tree with low branches. That's perfect for a Poetree! If you don't have a "just right" tree nearby, find out about adopting a tree in your neighborhood or park. Hang the Poetic Leaves on the tree branch so that people can see and read them. You might also want to have a large paper leaf or sign that talks about the Poetree and your Tree Trekker poets. Stage a poetry reading at your Poetree and invite other kids or friends and family to attend.

If you can't access an outdoor tree to create a place for hanging poems, bring a fallen branch inside, use an artificial tree, or create a tree trunk and branches on a bulletin board.

Artis-tree: Celebrating Community Trees

Introduction

Trees are important members of our communities. We use them to help us build homes, furniture, and other useful items. They provide us with food, fresh air, and shade. They protect us from the wind. They should be valued and celebrated!

Some people celebrate the kinds of trees that grow near them. There are festivals or special days for trees that produce cherry blossoms, maple syrup, apples, and peaches. Arbor Day is a day to celebrate all trees, plant new ones, and recognize the importance of trees to our environment.

Other trees that get celebrated are Witness Trees—trees that have been alive for a long time and witnessed important events in history or have become landmarks.

As kids explore the ways trees bring people together, they can uncover the stories and histories of trees in their community and commemorate them with a work of art.

Supplies

- Materials for sculpture: paper bags, cardboard, wire, rocks, colored paper, cloth, other decorative items, gloves, wire cutters, and pliers
- Scissors
- Glue
- Tree Trekker Journal (or notebooks)
- Writing and drawing materials

Get kids thinking

Ask kids: What kinds of trees grow in our community? Do you know of any special days or events that celebrate trees or their products like fruits, nuts, or things made of wood? Do you know of any old trees that might have been present at an important event, like when someone was born or during a big storm? Do you know of any special trees in our community?

Let's get started!

Start with a book! Share a book such as *Celebritrees: Historic and Famous Trees of the World* by Margi Preus, *The Witness Trees: Historic Moments and the Trees Who Watched Them Happen* by Ryan G. Van Cleave, *The Tree in the Courtyard: Looking Through Anne Frank's Window* by Jeff Gottesfeld, or *A Family Tree* by Staci Lola Drouillard. Talk about how some trees were present for important historical events, like wars or peace celebrations, or meeting or hiding places for important or famous people.

Other trees are special to communities because they are very old, very tall, have survived destructive storms, were central meeting places, or were planted to mark a special occasion. *All Kinds of Special* by Tammi Sauer explores how a mango tree helps a little girl and her mom get to know their new neighbors.

Encourage your Tree Trekkers to imagine what a tree in their schoolyard, local park, or backyard might have witnessed over the years and write about it in their journals. Next, have kids research trees from their community or even from around the world that have been around for significant events or activities. Have them choose one tree to focus on and find out the type of tree, its age, and the historical events it may have witnessed—whether it's a notable date in history, a local parade or festival, or even the birthday of someone special. They should take detailed notes about the tree, the event it was part of, and how people feel about the tree.

Then invite kids to create a tree sculpture of their tree for a Witness Tree Museum. Start by leading a discussion about how sculpture is a three-dimensional form. So are trees! They are sculptures made by nature.

People make sculptures out of trees, living and dead. **Bonsai trees** and **topiary** are examples of people cutting and shaping living trees to change their appearance in an artistic way. People use wood and dead trees to make sculptures, too. Talk with kids about sculptures they have seen and what about them helps show people the importance of a person, object, or event.

Artis-tree: Celebrating Community Trees

Your Tree Trekkers can create their own tree sculpture out of available materials. Some materials may be better for creating sculptures of certain species of trees than others. Have them come up with their own designs or offer some examples and instructions:

Kids Art Workshop: Wire Tree Sculpture
youtu.be/s8FwqjqrFXc

Make Colorful Cardboard Sculptures
artfulparent.com/how-to-make-colorful-cardboard-sculptures

How to Make a Paper Bag Tree
youtu.be/O_a3RBPjlY0

Adapt holiday tree crafts to do a project about coniferous trees
artycraftykids.com/art/tree-art-and-craft-ideas-for-kids

Before they start, kids may want to sketch their sculpture and talk through their plan for creating. Offer help cutting materials as needed.

After Tree Trekkers have completed their sculptures, have them write a placard for their historic or community tree with the name of the tree and its location, species, and age if known. It should also include a short description of why the tree is special—what has it witnessed, what it commemorates, or how the community uses the tree.

BRANCH OUT!

Display all the sculptures in a Witness Tree, Communi-tree, or Celebri-tree Exhibit. Invite friends and family to come learn about important trees. Your Tree Trekkers can **Branch Out!** into the community to share their works of art at nature centers, community centers, or retirement homes. You can also **Branch Out!** to look for tree-inspired art in your neighborhood!

Tree Stewardship

Tree Stewardship

Introduction

A survey commissioned by the Arbor Day Foundation found that 94% of Americans say trees are good for the planet, yet most people don't spend a lot of time focused on trees. Involving kids in environmental advocacy and caring for trees builds their confidence and fosters a sense of attachment, connection, and responsibility—especially as they spend time getting to know the trees around them.

Tree Stewardship reminds kids that protecting trees protects all these benefits and more: oxygen to breathe, cleaner air, carbon dioxide absorption, animal habitats, delicious foods, shade, and improved physical and mental health for humans. The topic gets them thinking about how and why we all need to take care of trees and treat them like celebrities, how we can educate others about tree benefits, and ways they can protect and save trees.

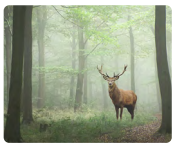
Questions to guide explorations and experiments

- How and why are trees important to us and our communities?
- What effects do trees have on people?
- How can people help trees?
- Where are trees most needed and why?
- How can we inspire others to appreciate and enjoy trees?

Helpful "tree-sources" for this topic

People of Forestry Activity Book from Texas A&M Forest Service
Learn all about the jobs that help keep our forests healthy every day.
texasforestinfo.tamu.edu/arborday/People_Of_Forestry_Activity_Book_Texas_web.pdf

Find Your Path: Field Forester from Oregon Forest Resources Institute
Shows a typical day in the life of a field forester
learnforests.org/all-resources/find-your-path-field-forester



Forests are Big Ecosystems from Earth Rangers Homeroom
Listen to an interview with a forestry expert to discover how forests are being managed to provide both resources for consumers and lasting benefits to the environment.
homeroom.earthrangers.com/podcast-listen-and-learn/forests-are-big-ecosystems

Children's Books

FICTION

- *Apple and Magnolia* by Laura Gehl (ages 4-8)
- *Bear Helps the Forest* by Karen Lynn Williams (ages 4-8)
- *The City Tree* by Shira Boss (ages 5-9)
- *Happy Birthday, Tree! A Tu B'Shevat Story* by Madelyn Rosenberg (ages 4-8)
- *Hello, Tree* by Ana Crespo (ages 4-8)
- *Kate, Who Tamed the Wind* by Liz Garton Scanlon (ages 4-8)
- *My Tree* by Hope Lim (ages 4-8)
- *Nell Plants a Tree* by Anne Wynter (ages 6-9)
- *Saving Delicia* by Laura Gehl and Patricia Metola (ages 4-8)
- *The Shade Tree* by Suzy Lee (ages 4-9)
- *The Strange Wonders of Roots* by Evan Griffith (ages 8-12)
- *This Is the Tree We Planted* by Kate McMullan (ages 3-6)
- *This Very Tree: A Story of 9/11, Resilience, and Regrowth* by Sean Rubin (ages 6-9)
- *The Tree and Me (Bea Garcia series)* by Deborah Zemke (ages 6-9)

FICTION (CONT.)

- *The Tree and the River* by Aaron Becker (ages 4-7)
- *The Tree of Hope: The Miraculous Rescue of Puerto Rico's Beloved Banyan* by Ana Orenstein-Cardona (ages 7-10)
- *Trees Make Perfect Pets* by Paul Czajak (ages 4-8)
- *Trillions of Trees: A Counting and Planting Book* by Kurt Cyrus (ages 3-6)
- *Under the Baobab Tree* by Julie Stiegemeyer (ages 4-8)
- *Zonia's Rain Forest* by Juana Martinez-Neal (ages 4-8)

POETRY

- *Maybe You Might* by Imogen Foxell (ages 4-8)

NONFICTION

- *Be a Friend to Trees* by Patricia Lauber (ages 4-8)
- *Cool Green: Amazing, Remarkable Trees* by Lulu Delacre (ages 7-10)
- *Deep Roots: How Trees Sustain Our Planet* by Nikki Tate (ages 8-12)
- *A Forest in the City* by Andrea Curtis (ages 8-12)
- *Forest Fighter: The Story of Chico Mendes* by Anita Ganeri (ages 7-11)
- *If a Tree Falls: The Global Impact of Deforestation* by Nikki Tate (ages 8-12)
- *Johnny Appleseed* by Steven Kellogg (ages 4-8)
- *The Leaf Detective: How Margaret Lowman Uncovered Secrets in the Rainforest* by Heather Lang (ages 7-10)
- *Let's Save Our Planet: Forests* by Jess French (ages 8-10)
- *Luna & Me: The True Story of a Girl Who Lived in a Tree to Save a Forest* by Jenny Sue Kostecki-Shaw (age 5-9)
- *The Magic of Forests: A Fascinating Guide to Forests Around the World* by Vicky Woodgate (ages 6-10)
- *One Million Trees: A True Story* by Kristen Balouch (ages 8-12)
- *Planting Peace: The Story of Wangari Maathai* by Gwendolyn Hooks (ages 8-12)
- *Stand as Tall as the Trees: How an Amazonian Community Protected the Rain Forest* by Patricia Gualinga and Laura Resau (ages 6-9)
- *A Voice for the Spirit Bears: How One Boy Inspired Millions to Save a Rare Animal* by Carmen Oliver (ages 6-9)

Tree Inventory

Introduction

It may seem like a complex challenge for kids, but young people throughout history have helped to care for and protect the environment and successfully helped their communities by taking action. As kids today learn to navigate the challenges our planet faces, engaging them in environmental **stewardship** nurtures the critical thinking and problem-solving skills they need and helps equip them with the tools to be a part of creating a healthier, more sustainable future.

When they take an inventory of neighborhood trees, Tree Trekkers will get to know their community, learn about stewardship, and the important role people play in taking care of trees, forests, and the land around us. They'll also look at what foresters and others do to care for trees and help protect forests and wildlife, and consider and plan what they can do themselves.

Supplies

- Copies of Tree Inventory handout (page 69)
- Tree Trekker Journals (or notebooks)
- Writing and drawing tools

Get kids thinking

Share the definition of **stewardship** with kids and get them to think about their own careful and responsible management of something that has been entrusted to their care. It might be caring for a garden or pet, keeping their bicycle in good condition, or organizing and maintaining the books in their home library. Have kids share how they practice stewardship, giving examples of the actions they take—watering a garden, cleaning up after a pet, etc.

Ask kids: What other things in our community could you help take care of? What role can you play in taking care of trees? Who else takes care of trees and forests?

Let's get started!

Start with a book! Share titles that give kids more ideas about what tree stewardship could look like, such as *The City Tree* by Shira Boss, *Happy Birthday, Tree! A Tu B'Shevat Story* by Madelyn Rosenberg, or *Nell Plants a Tree* by Anne Wynter. Also share "Fabulous Forest Folk" in *The Magic of Forests* by Vicky Woodgate to learn about people who have dedicated themselves to the care of forests. Talk about ways the characters in the stories practice stewardship.

Ask kids and discuss: Why do these characters take responsibility for trees? Who takes care of trees in your neighborhood? Do you have responsibility to care for the trees around you?

A forest is able to be healthy and thrive when a forester—someone whose job it is to plan, manage, and take care of forests as they grow—knows how many trees there are in the forest, what kind of trees there are, and how they are growing. Talk with kids about how knowledge of the trees around them is an important first step toward being a good steward of trees.

Making a list or doing an inventory of neighborhood trees brings attention to trees, identifies trees that might need help, and spots locations where new trees could be planted. Together, decide on a location to explore, provide copies of the Tree Inventory handout on page 69, and head outside so kids can count and observe trees. (Younger kids should tally the number of trees/spaces for trees that they see in their Tree Trekker Journal instead of completing the Tree Inventory or draw a map of the location that shows all the trees/spaces they see.)

After the inventory, prompt Tree Trekkers to discuss their observations: Did everyone notice the same things or were there differences in their inventories? Did trees seem healthy or did some have problems? What could be done to make sure trees stay healthy or to help trees in need? Is there room for more trees in this area? What benefits could more trees bring? What steps could they take to support the trees in this area?

Tree Inventory

In their Tree Trekker Journal, have kids reflect on their observations and what they've learned about stewardship. Have them write three ways they could be a steward of trees, why they think tree stewardship is important, and how they will put their stewardship into action. Ask kids to share their ideas! Some examples might include:

- Picking up trash and disposing of it properly
- Walking on sidewalks or trails instead of compacting soil around tree roots
- Not disturbing birds or other wildlife
- Leaving natural objects (like pinecones or flowers) in nature for others to enjoy
- Caring for trees by not damaging the bark or leaves
- Planting new trees

Compile ideas along with data Tree Trekkers gathered in their inventories. Have them use the information to create a flyer about being a good steward to the trees in this neighborhood and share it with community members, along with an invitation to join kids in planting trees, pulling up harmful **invasive species** such as kudzu or English ivy, or picking up trash.

Tree Inventory for _____ Date: _____

Location Type (street, park, common area, house, wooded area)	**Description** (mature tree, full canopy, sapling, dead tree, space for new tree)	**Identification** (type of tree or species of tree if known)	**Problems** (yellowing leaves, invasive vines, broken branches, disease or insect damage)	**Benefits** (shade, wind break, community gathering place, animal habitat)

Talking Up Trees

Introduction

Trees often get taken for granted, but we'd be in trouble without them there to improve our air, give us food, and slow the impact of climate change. Without trees, life on Earth would be much harder, if not impossible!

Trees have played important roles throughout history, inspiring art, architecture, literature, and serving as the main fuel and building material of every society until the middle of the 19th century. Trees are also important cultural and religious symbols: the olive branch has symbolized peace since ancient Greece.

Tree Trekkers can learn more about the many benefits of trees, then create something—like a poster, handout, coloring sheet, video, slideshow, song, game, skit, or signs—to educate others, raise awareness about how trees help us all, and issue a call to action to help trees.

Supplies

- Books about trees
- Writing and drawing materials
- Materials to make their chosen project
- Computer and printer (optional)
- Internet access to research kid-friendly sites (optional)
- Tools to make a video or digital slideshow (optional)

Get Kids Thinking

Take a moment to share with kids an encounter that you've had with a tree that gave you a feeling of awe. Talk about what was special to you about this particular tree and why you remember it.

Ask kids: How much do they think about or notice trees? How much do they think that other people think about or notice trees? We've never known life without trees. Is that a reason to assume trees will always be there? Talk with kids about what the world would be like if we didn't have trees. What would we do?

Let's Get Started!

Start with a book such as *Be a Friend to Trees* by Patricia Lauber, *The Magic and Mystery of Trees* by Jen Green, or other titles that share the many benefits of trees. Ask kids why they think people often overlook trees despite the vital role they play in maintaining life on Earth. What information or ideas do kids think they should share to help change how people see trees and make sure we take care of them?

Step 1: Get kids to research the benefits of trees in one or more of the below categories, then brainstorm ways they can use the information to educate others about trees. Encourage them to take notes about what they learn.

- **Social benefits:** Trees provide inviting spaces to gather, play, and connect, reduce stress levels, and influence community health
- **Cultural benefits:** Trees contribute to heritage and identity, offer beauty, provide outdoor recreation, and inspire art, literature, and music
- **Environmental benefits:** Trees support wildlife and biodiversity, prevent soil erosion, improve air quality, reduce carbon dioxide in the atmosphere, and lessen effects of urban heat islands
- **Economic benefits:** Trees provide food, fuel, and fiber, wood, sap, rubber, or resins for people to make things

Whichever category they choose, Tree Trekkers should also think about specific ways trees benefit them and their family at home and in their community. For example, there may be economic benefits of lower energy bills thanks to shade trees near their home.

Step 2: Have kids decide what they want to do to teach others about the importance of trees. They could all work on the same project, work in groups, or each do their own thing. They could teach about every benefit category, or each group could focus on one specific type of tree benefit. As kids consider ideas, share books that offer examples of kids supporting trees in their community, such as *A Voice for the Spirit Bears: How One Boy Inspired Millions to Save a Rare Animal* by Carmen Oliver, *Kate, Who Tamed the Wind* by Liz Garton Scanlon, or *The Tree and Me* by Deborah Zemke.

Some Tree Trekkers may want to research how to protect trees from threats like deforestation or climate change. Or they might want to investigate the impact of construction projects to the trees in their community, learn how to plant new trees or save existing ones from invasive plants, or discover ways they can to support policies and programs that protect forests and trees.

Talking Up Trees

Step 3: Support kids as they create their tree-focused projects. Remind them to think about their target audience (younger kids, family members, folks in the community) and what might appeal to them. Give kids enough time to make a rough draft and a final product or to practice and revise songs or skits.

Step 4: Share the knowledge and tree love! Have Tree Trekkers share their projects with each other and then with others. Help them find audiences for their projects, whether it's by displaying posters around a school or library or sharing their video online.

BRANCH OUT!

You can also **Branch Out!** to a local park and hold a tree appreciation event where kids get to present their work to families and the community. By teaching others about how trees are essential to our survival, kids can make a difference in the way people think about and care for the trees around them and around the world.

Appendix

Trees That Are Tops

General Sherman: Giant Sequoia in Sequoia National Park, California

2,100 to 2,200 years old. It's the biggest living thing on Earth by volume. Its trunk measures 26 feet across (diameter).

nps.gov/places/000/general-sherman-tree.htm

Hyperion: Coastal Redwood in California

700-800 years old. It is the world's tallest tree at 380 feet.

onetreeplanted.org/blogs/stories/oldest-tallest-biggest-trees

Jackfruit Trees: Evergreens in tropical regions and rainforests

The fruit, which grows on the trunk and branches, is the largest fruit from a tree. It can be two feet long and weigh 40 pounds.

fairchildgarden.org/visit/jackfruit-the-largest-fruit-in-the-world

The Major Oak: English Oak Tree in Sherwood Forest, England

800-1,000 years old. Robin Hood is said to have met with his Merry Men beneath this tree.

visitsherwood.co.uk/explore-the-forest/the-major-oak

Methuselah: Bristlecone Pine in Inyo National Forest, California

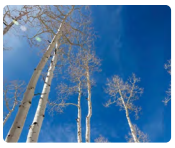
Around 4,800 years old. It's the oldest known single living organism on Earth.

onetreeplanted.org/blogs/stories/oldest-tallest-biggest-trees

NASA Moon Trees: Different species living all over the world

Less than 50 years old. Astronaut Stuart Roosa took tree seeds to space to see if that would affect how they grew. When he returned, the seeds were germinated and some grew into saplings that were planted all over the world.

nasa.gov/history/moon-trees-stand-as-living-testaments-to-first-voyages-to-moon



Pando: A colony of Quaking Aspen trees in Fishlake National Forest in Utah

80,000 years old. The colony is made up of more than 40,000 stems that look like individual trees, but they are all connected to the same root system, making it one organism. Together, the group is the heaviest living thing on Earth, weighing as much as 33 blue whales.

onetreeplanted.org/blogs/stories/oldest-tallest-biggest-trees

Tree of Life: Persian Mesquite in the Arabian Desert in Bahrain

Around 400 years old, this tree is only 32 feet tall but survives in an area with barely any rainfall and no fresh water. Its roots are thought to be 164 feet deep.

youtu.be/9PZzDgt79Kg

Tule Tree: Montezuma Bald Cypress in Tule, Mexico

1,400 years old. It is the world's widest tree measuring more than 31 feet in diameter.

onetreeplanted.org/blogs/stories/oldest-tallest-biggest-trees

Tree Vocabulary

Atmosphere: A mix of gases held in place around the planet by gravity

Bark: The outer covering of a tree's trunk and branches that helps protect the tree

Biodiversity: The variety of animal and plant life in any environment

Biome: A large region of Earth that has a certain climate and certain types of living things

Bough: A large, main branch of a tree

Branch: A part of a tree that grows out from the trunk and holds twigs, leaves, flowers, or fruit

Bonsai tree: A small tree or shrub that has been trained to grow in a container

Bud: A small, undeveloped part of a tree or plant that stores energy which the tree uses to create new branches, leaves, and flowers

Carbon dioxide: A molecule found in our atmosphere with two atoms of oxygen and one of carbon; a greenhouse gas. Carbon is a chemical element found in all living things

Carbon sequestration: Removing carbon dioxide from the air and storing it somewhere

Carbon sink: Anything that absorbs more carbon dioxide from the atmosphere than it releases

Chlorophyll: A green pigment found in plants that helps them make their own food using sunlight, air, and water through a process called photosynthesis

Climate: The average weather conditions in a place over a long period of time, such as 30 years

Climate change: When the typical weather in a region changes over a long period of time

Compound leaves: Leaves made up of several smaller leaflets attached to a central stem

Cone: The part of some trees, like pine trees, that holds seeds

Coniferous: A kind of evergreen tree with needle-shaped or scalelike leaves and sometimes pinecones

Conserve: Keep and protect something from damage, change, or waste

Crown: Part of the tree that contains the tree's leaves and branches and where photosynthesis takes place

Deciduous: A kind of tree with leaves that fall off seasonally

Deforestation: When trees are cut down permanently to clear land and make room for something other than forests, like farmland for animals or crops, mining, roads, or construction

Tree Vocabulary

Ecosystem: A community of living things in a shared environment

Erosion: When wind, water, or ice breaks down and moves or wears away materials like soil and rocks

Evaporation: When a liquid, like water, turns into a gas, called water vapor, usually because of heat from the sun

Evergreen: Having leaves that remain green year-round

Field guide: A small book with words and pictures for identifying plants, animals, or natural objects that are found in nature

Flowers: Part of a tree's reproductive system that produce the seeds that can be used to produce new plants

Food chain: A series of living things that are linked to each other because each thing feeds on the one next to it in the series

Food web: The interlocking food chains within a community

Forest: A group of trees growing close together covering a large area, and the smaller trees and plants under them. Kinds of forests include:

- **Boreal (or taiga):** A northern region on Earth with mostly coniferous trees
- **Temperate:** A type of forest that tends to be in the northern hemisphere where the weather isn't too hot or too cold, with four distinct seasons, and deciduous trees
- **Tropical:** A hot, wet, and dense forest located around the equator that receives lots of rain and is home to many animals and plants

Forest bath: The Japanese practice of spending time in nature with a focused awareness of your senses

Fruit: The fleshy or dry ripened ovary of a flowering plant, enclosing the seed or seeds

Fungus: An organism that helps plant and animal remains decompose. Plural is fungi

Germination: The process when a seed starts to grow and develop into a new plant

Greenhouse effect: The warming of the Earth's surface that takes place when heat from the sun is held in by the Earth's atmosphere

Greenhouse gases: Gases in Earth's atmosphere that trap heat and contribute to the greenhouse effect. Carbon dioxide is a greenhouse gas

Heartwood: Xylem that no longer transports water. It is resistant to decay, very strong, and helps support the tree's weight

Invasive species: Plants or animals that are not originally from an area and can harm the local ecosystem by spreading quickly and taking over

Lamina (or Blade): The broad, flat part of a leaf where most photosynthesis happens

Layers of Forests

- **Emergent layer:** Tallest layer, where trees get constant sunlight and their branches poke out above the canopy
- **Canopy:** Uppermost branchy layer of a forest (and home to most of the species in a rainforest) that forms a roof that blocks most light from reaching below

Tree Vocabulary

- **Understory or Undergrowth:** Lower-light layer below the canopy with shorter plants that have broad leaves and habitat for frogs, snakes, butterflies, and birds
- **Forest floor or ground:** Lowest layer where decaying matter from the other layers feed the roots of trees and habitat for large animals and fungi

Leaf: Leaves are the part of the plant that makes food for the tree and oxygen for the planet using photosynthesis. A leaf has two parts: the flat part crossed with veins is the blade (or lamina); the part that holds the blade to the twig is the leafstalk (or petiole).

Leaflet: The leaflike structures that together make up a compound leaf

Life cycle: The stages that an organism goes through from birth to adulthood, reproduction, and eventually death

Main vein: The largest vein in a leaf that carries water and nutrients throughout the leaf

Mature trees: Fully grown trees that have the ability to reproduce

Midrib: The main vein running down the center of a leaf

Mycorrhizal network: A symbiotic relationship of plant roots and fungal mycelium that provides a dramatically larger root system for the plant to obtain water and nutrients and hospitable sites for fungi to anchor and receive sugar

Nurse log: A fallen tree that provides nutrients and a safe space for new plants to grow

Nutrient: Something in a food that is needed for growth or health. Minerals are nutrients that plants need to grow

Oxygen: A colorless, odorless gas that we breathe from the air

Petiole: The stalk that attaches the leaf blade to the stem

Phloem: Vascular tissue which carries nutrients to all parts of the plant

Photosynthate: The sugar that plants make

Photosynthesis: The process by which plants use sunlight, water, and carbon dioxide to make their own food

Poetry: A type of creative writing that uses words and structure to share a feeling, experience, or idea that can take many forms:

- **Acrostic:** A poem where the first letter of each line spells out a word, name, or phrase when read vertically
- **Concrete:** A poem in written in the shape of its subject, such as a tree or leaf
- **Diamante:** A diamond-shaped poem that compares and contrasts two different things such as tree roots and crown
- **Haiku:** A Japanese poetry form with three unrhyming lines of five, seven, and five syllables
- **Ode:** A poem expressing praise for or celebrating something
- **Visual poetry:** A poem where the position, size, and shape of words and lines add meaning, such as concrete, acrostic, and diamante poems

Tree Vocabulary

Renewable resource: A natural resource, like sunlight, water, or trees, that can be replenished quickly over time

Roots: The part of a plant that grows underground and takes in water and nutrients from the soil

Root hairs: Small, hair-like structures on roots that help the plant take in water and nutrients

Root collar: Where the below-ground roots meet the above-ground trunk

Sap: The watery fluid in trees that carries nutrients from the roots to the rest of the plant

Sapling: A young tree that is still growing but has already begun to develop a trunk and branches

Sapwood: Dead xylem that transports water upward from the roots

Seed: The small part of a plant that can grow into a new plant

Seedling: A small, young plant that has just started to grow from a seed

Silviculture: The practice of controlling forest establishment, growth, composition, health, and quality to meet various needs, including timber production, wildlife habitat, and water resources

Simple leaves: Leaves that are one single, undivided piece

Snag: A dead tree that is still standing

Sprout: A small new growth that pushes out of a seed

Stewardship: Careful and responsible management of something that has been entrusted to someone's care

Sustainable forestry: The practice of managing forests so that trees are harvested in a way that doesn't harm the environment and allows the forest to grow back for future generations

Symbiosis: A close relationship between two different living things that typically benefits both

Topiary: The art of creating sculptures by clipping trees and bushes

Trunk: The main stem of a tree that holds it up and supports branches and leaves

Twig: Grow from branches, providing support for leaves, leaf buds, and flower buds

Vein: Provides support to the leaf and carries water and food

Vascular cambium: A layer of cells in a plant that form phloem and xylem

Weather: The state or condition of the atmosphere

Wood: The hard fibrous substance in trees consisting mostly of xylem that provides structural support and is involved in the transport of water and nutrients

Xylem: Vascular tissue responsible for water movement throughout the plant

Story Seeds

Share these writing prompts with your Tree Trekkers to encourage thinking, reflecting, and engaging in fun and meaningful writing.

- Don't know a tree name? Make one up! Is there a tree where you like to sit and read? Call it a "Reading Tree!" Is there a tree that you use to see how tall you are growing? That might be a "Growth Chart Tree." Give a meaningful name to a tree you've encountered and write about why you've given it that name.
- Live here! Trees and forests are home to many plants and animals. Imagine you are a newly mature tree and want to attract plants and animals to live in or on you. Create an advertisement with your special features and what you can offer in terms of a view, food, shelter, protection from weather events and predators, and access to other resources.
- Share what you've learned about superlative or extra-special Trees That Are Tops (page 74) with an acrostic poem.
- Head outside and listen to the sounds of the trees. Put them on paper in your own words as a poem, song, or piece of descriptive writing.
- Think about books you may have read that feature trees, like the treehouse tree in the *Magic Tree House* series by Mary Pope Osborne or the Truffula trees in Dr. Seuss' *The Lorax*. Imagine and write what these trees would say about the stories going on around them if they could talk.
- Speak for the trees! If you've discovered that some trees in your community need protecting, or if a planned construction project will require tree removal, write a letter to a public official, such as a mayor, city council member, state representative, or land manager asking for protection of trees or parks. Include any historical or community importance the tree or trees have and the important role trees play in our climate and providing habitats for other living things.
- Imagine that you have an encounter with a tree that leaves you with an unusual tree-related superpower. Write about your new superpower and what you would do with it.
- If someone says "you are barking up the wrong tree," or "the apple doesn't fall far from the tree," what do they mean? Write your own explanation for how this saying came into being.

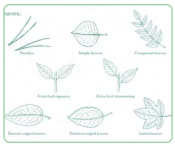
More "Tree-sources" and Activities

Use these links to activities, lesson plans, and videos about trees to help Tree Trekkers build and expand their knowledge about trees.

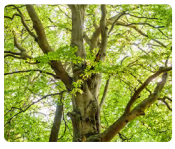
Activities and lesson plans

Be a Tree! Classroom & Outdoor Story Time Activities from Curious City
Art, STEM, and mindfulness activities for engaging with *Be a Tree!*
by Maria Gianferrari
curiouscitydpw.com/2021/04/22/be-a-tree-activites

Project Learning Tree
Educator and parent resources from the award-winning environmental education program
plt.org and plt.org/activities-for-families



Tree Detectives from the National Wildlife Federation
Activities (with adaptations) to help all kids identify trees by studying their different parts
nwf.org/~/media/PDFs/Be%20Out%20There/Schoolyard%20Habitats/tree_detectives.ashx



Tree Hugger Challenge! from Earth Rangers Homeroom
Lesson plan for K-3 that challenges kids to identify habits and changes they can make to better take care of trees
homeroom.earthrangers.com/k-3-classroom-activities/tree-hugger-challenge

Virtual Field Trip from The Nature Conservancy
Virtual field trips for students to travel the world and explore natural environments
nature.org/en-us/about-us/who-we-are/how-we-work/youth-engagement/nature-lab/virtual-field-trips

More "Tree-sources" and Activities

GLOBE Trees Family Guide from NASA's Globe Observer Program
A tree science journey for family and friends to learn all about trees
observer.globe.gov/do-globe-observer/trees/family-guide

How Do You Make Paper From a Tree? from Wonderopolis
Multidisciplinary content for exploring how paper is made
wonderopolis.org/wonder/how-do-you-make-paper-from-a-tree

Engineers Speak for the Trees from Teach Engineering
Hands-on activity to explore how engineers protect the environment through reducing pollution, protecting natural resources, and creative city planning
teachengineering.org/activities/view/cub_lorax_activity1

Timber! from Population Connection
Instructions for a simulation model to explore what happens to a forest when trees are cut down faster than they are planted
populationeducation.org/wp-content/uploads/2017/10/timber.pdf

Bimaadiziwin Mitigoog - Trees of Life from the Million Tree Project
Read the story of the Cosmic Tree and Sky Woman from the Anishinaabe People and find links to additional resources for Giizhik, an Anishinaabe term for cedar; Wáhta, sugar maple to the Mohawk People; and the Azaadi, Ojibwe for the trembling aspen tree
sciencerendezvous.ca/million-tree-project/en/resource_type/bimaadiziwin-mitigoog-trees-of-life

Videos

Cyberchase: "Buzz and the Tree": Acts 1, 2, & 3 and "Hacker Hugs a Tree": Acts 1, 2, & 3 from PBS KIDS
pbskids.org/videos/cyberchase

Plum Landing: A Forest in the City from PBS KIDS
pbskids.org/plumlanding/educators/context/140_a_forest_in_the_city.html

More “Tree-sources” and Activities

Indigenous STEM Resources: Wáhta (Sugar Maple) Stories
youtube.com/playlist?list=PLu0DYWDGMD6GeYDwwSyJefBc4q7HebWkk

Storytime & Art-Making Activity: The Great Kapok Tree from the Newark Museum of Art
youtu.be/HPqo1f6a0xg

Explore U.S. National Parks to Learn About Trees from Nat Geo Kids
kids.nationalgeographic.com/videos/topic/nature-boom-time and
youtu.be/e3XiEGwQxNU

6 of the World’s Weirdest Trees
youtu.be/Quimx461phY

The World’s Tallest Tree! from SciShow for Kids
youtu.be/UErOeqyJxFo

Tree Trekkers Name Badges

Make copies of these name badges, cut out, and distribute to your Tree Trekkers to wear when you Branch Out!

Tree Trekkers

This certificate is presented to:

To celebrate your participation in
the Tree Trekkers program!

Date

Signature