National Wildlife Federation's

Trees for Wildlife

Exploring and Learning about Trees and Nature

Group Guide

GRADES 4-5
Innovative Ideas and Activities

Create an outdoor learning garden

Give back to the school or community by installing and using an outdoor learning garden. Gardens are designed to teach students about gardening, wildlife, eco-systems and provide physical activity. Adding a vegetable garden can also provide food and nutritional connections.

www.nwf.org/schoolyard

Need activities that get Scouts outside and active?

For 40 years, NWF has provided quality activities and lessons for youth from Elementary to High School in environment and nature skill exploration.

Be Out There online activity database provides a host of simple games, crafts and activities that can be done any time of the year.

www.beoutthere.org

Greening Your Community

Eco-Schools USA provide 8 different pathways to make a difference in your community. Create eco-action plans and devise a vision statement for what you can do to make a change for the better. Pathways include: Energy, Water, Transportation, Grounds, Green Hours, Climate Change and more.

www.eco-schoolsusa.org

Take the Next Step

Climate change is a pressing issue in the world today. Our world is in flux and we can help by reducing our impact. Climate Classroom provides age appropriate talking points to discuss climate change from what it is (science), what its impacts are, and what the solutions are. Included on the site are ideas for service projects for middle school and teenage students.

www.climateclassroom.org

Trees - more than shade

Trees for Wildlife teaches youth about trees, and their role in their community and how to plant and care for trees in their community. Step by step activities and instruction for groups and individuals walk you through the learning, planting and caring for trees. You can also potential receive free trees.

www.nwf.org/trees

Get Up, Get Active and Go Outside

National Wildlife Federation (home of Ranger Rick) provides an array of ideas and activities you can use to with your community.

Sign up to receive an update from National Wildlife Federation about these activities or other ways to get your communities outside.

FREE enrollment at educators@nwf.org
Special Acknowledgement to Contributors

National Wildlife Federation would like to thank the former staff, education advisory committee and contributors who worked to develop the Trees for Wildlife program and educational materials. Your dedication to building a lasting relationship between future generation of stewards and nature is inspiring.

National Wildlife Federation

OUR MISSION

National Wildlife Federation mission is to inspire Americans to protect wildlife for our children’s future. For 70 years, National Wildlife Federation has been a leader in conservation and environmental education shaping the future of stewardship for the earth in the United States. Through our educational programs, publications and multi-media outreach, NWF is dedicated to three objectives; connecting people with nature, safeguarding wildlife and wild places and providing solutions to climate change.

ERNXT merger with NWF in 2010 extends our programmatic connections for adults and youth by offering an opportunity to learn about the importance of trees to our planet’s health, the ability to tangible experience to make a difference by planting trees and dedication to pass on an appreciation for nature to future generations.

Trees for Wildlife program provides adult leaders with fun, hands-on science-based activities to help young people learn about the importance of trees and how to plant and take care of trees for the future. This initiative aims to educate and prepare a generation of environmental stewards, expand the world inventory of trees and to protect and improve natural resources.
Purpose and Organization of this Guide

Trees for Wildlife program is designed to helping young people learn about the importance of trees in the environment, how to plant and take care of trees, and share the information they have learned with others.

Each section of the guide provides information and activities for different age levels (grades k–1, 2–3, 4–5, 6–8, and 9–12) and tips for the adults who will encourage and guide participants in the Trees for Wildlife program.

Objectives will be outlined for each activity so that both adults and children can quickly understand some of the key learning points.

The time suggested to complete each activity is estimated. Some groups move quickly through an activity, while others might enjoy longer discussions, have more questions, or need more help following directions. The focus should be on learning, working with others, and having fun, rather than on the amount of time the activity takes.

Materials needed for each activity are provided in each lesson to help you prepare for a session. Whenever possible, let the participants take on the responsibility for gathering supplies. Building leadership and taking responsibility including planning, delegating, and work as a team are objectives of each activity.

The activities are preceded by background information, which will provide you with details that you might need to answer questions or guide a discussion. You will find extension activities for each grade level that are a great way to keep participants engaged if you have more time or find particular interest in a topic.

This guide includes a section on tree planting. Included are guidelines for identifying and assessing a planting site, organizing a planting day, and caring for trees after planting. Every participant will have at least one opportunity to plant or care for a tree. The glossary will assist with definitions of many relevant terms which are italicized throughout the activities.

The Trees for Wildlife program guiding principles include:

- Educate a generation of young people on the value of trees to the environment, built and natural;
- Plant trees to replace trees lost to deforestation, and
- Develop lifelong advocates for planting and caring for trees, and for nature and wildlife in general.
**Trees for Wildlife Patches and Pins**

Embroidered patches and lapel pins are available to purchase as a recognition for your students successful completion of the program. We suggest that participants complete two to three activities appropriate for their grade level to earn a patch and planting a tree can count as an activity. For all participants, the patch will be a proud reminder of what they have learned and what actions they have taken as advocates for trees and nature. (Order www.nwf.org/trees)

**Resources and Expansion Activities**

Additional resources and activities to continue students engagement with nature, wildlife and how they can make a difference in their community are available on the Trees for Wildlife website (www.nwf.org/trees)

**Using This Activity Guide**

Trees for Wildlife program activity guides provide information and age appropriate activities (grades k–1, 2–3, 4–5, 6–8, and 9–12) and tips for the adults who will encourage and guide participants through the program.

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The activities are preceded by background information, which will provide you with details that you might need to answer questions or guide a discussion. You will find extension activities for each grade level that are a great way to keep participants engaged if you have more time or find particular interest in a topic.

You can also access additional resources online that can help you with the activities.

**Tree Planting Guide**

You can download the step by step tree planting and care guide. This guide will assist you for identifying and assessing a planting site, organizing a planting day, and caring for trees after planting. Every participant will have at least one opportunity to plant or care for a tree.
A critical starting point for the program and your journey with your students to learning about trees – is to understand the foundation building blocks: Trees themselves

- What is a tree and what are its parts
- What types of trees are there
- What is the lifecycle of a tree
- Why do trees play in the community

**What is a Tree?**

Trees, similar to all living things, grow, reproduce and respond to their environment. Trees like all plants manufacture their food through photosynthesis. Trees are in the family of woody plants which have cambium, a special layer of cells that allow the tree to increase in girth. Trees are self-supporting with a single stem.

The leaves of the tree produce sugar for the food through photosynthesis by combining carbon dioxide and sunlight. Through the process the resulting is the production of oxygen. The sugar is fed to the trunk and roots of the tree through the cambium.

The roots gather minerals and water which are needed in the process of photosynthesis and

Leaves prepare the food obtained from the air and soil and give off moisture by transpiration. Light and heat are necessary for these chemical changes.

Air supplies carbon to the tree, through the under-surface of leaves.

The breathing pores of the entire tree—located on the leaves, twigs, branches, trunk and roots—take in oxygen.

Events such as flooding, poisonous gases, or smoke may damage or even kill a tree.

Root tips or root hairs take up water containing small quantities of minerals in the solution.
for feeding the tree’s growth and development. The tree has one tap root and many lateral roots which help to keep it stable in wind and snow.

Learn more about trees at www.arboretum.harvard.edu/programs/tree_basics

Part of the trees

The **CROWN** of the tree is made up of the leaves and branches.

The **TRUNK** of the tree supports the crown and serves as a highway for food made in the leaves to travel to the roots and for water and nutrients from the roots to travel to the leaves.

The **HEARTWOOD** of the tree develops as the tree gets older. It is old sapwood that no longer carries sap, and gives the trunk support and stiffness. In many kinds of trees, the heartwood is a darker color than the sapwood, since its water carrying tubes get clogged up.

The **CAMBIUM** is a layer or zone of cells, one cell thick, inside the inner bark. The cambium produces both the xylem and phloem cells. This is where diameter growth occurs, and where rings and inner bark are formed. In the Xylem (sapwood) layer, tree sap (water plus nitrogen and mineral nutrients) is carried back up from the roots to the leaves. In the Phloem (inner bark) layer, sugar that is made in the leaves or needles, is carried down to the branches, trunks, and roots, where it is converted into the food (starch) the tree needs for growth.

The **BARK** layer protects the tree from insects and disease, excessive heat and cold, and other injuries.

The **ROOTS** of the tree support the trunk and crown, and also anchor the tree in the soil.

They serve as a storage facility during the winter for the food produced by the leaves during the growing season. The roots also absorb water and nutrients from the soil for use by the tree.

**Tree Lifecycle**

All living things have a life cycle – they are born, they grow, they produce, they die. A tree life cycle has four general steps. Along the cycle, each component has to build off the next and then re-start again.

**Seed**

Seed – whether it is an apple seed or pine cone or acorn – contains the foundation for what the tree will become (the type of tree, the size, what fruit it will produce). Seeds come in a wide variety of shapes, weights, colors, and sizes, depending on the species. All seeds develop from male and female parts of the trees producing fruits but not all of them are easily recognizable or edible. A seed need to germinate or sprout and begin to grow. Germination for different trees can take different amounts of time and waiting to see if the seed has successful germinated – till when you can see the first shoots – can be the longest aspect for tree growth.

**Sprout/Seedlings**

Favorable environmental conditions enable the seed to grow, expand, and break through the seed coat using the stored food supply of the seed for the necessary
energy to grow. The root grows downward to the soil to anchor the sprout and search for water and nutrients, while the sprout emerges from the ground seeking sunlight.

A sapling is a small tree usually between 1 and 4 inches in diameter at 4.5 feet. This is the standard height where a tree’s diameter is measured. In this juvenile state, the tree is not mature enough to reproduce. However, it is growing rapidly. The sapling encounters similar types of competition and threats to that of a seedling.

Mature

With favorable conditions, a sapling will continue to develop into a mature tree. During this stage in the cycle, each tree will grow as much as its species and site conditions will permit. In addition, flowers develop, reproduction ensues, fruits form, and seed dispersal can now occur.

The life span of a tree is as wide-ranging as the number of tree varieties, yet death is inevitable. Usually it is a combination of factors that finally overcome a tree and cause it to die. Injury, drought stress, followed by disease, rot, root dieback, coupled with a lightning strike and insect infestation is just one of many scenarios. However, sometimes it can be just one factor serious enough to cause mortality.

Snag (Decline)

A standing dead tree, also called a snag, still plays a vital role in the life cycle. A snag slowly breaks down and returns nutrients to the soil as small limbs, bark, and branches fall to the ground. The snag also provides habitat, cover, and food for wildlife and insects. In turn, animals, insects, and fungi help break down the tree.

Fallen Trees (Decomposition)

Trees will fall to the ground and gradually return nutrients to the soil where they are taken up again by other trees by providing for their growth.

Deciduous Trees are also known as broadleaf trees because the leaves are generally larger and wider than those of conifers. The larger leaf size means a greater surface area for photosynthesis, but it also mean the leaf is too fragile to withstand winter conditions. Therefore, most deciduous trees drop their leaves in autumn.

Coniferous Trees keep their leaves throughout the year, shedding only the oldest leaves. Usually these leaves are lower down on the tree and do not receive as much sunlight as newly developed leaves higher up. Some of the best-known members of the conifer family are pines, spruces, firs, and hemlocks. The cones of the conifers are its flowers.
The Value of Trees!

Trees are a truly beautiful part of the natural environment, but they are also amazingly efficient machines—constant working to make Earth a healthier planet. The Trees for the 21st Century program is designed to help you guide children and teens through activities that will deepen their understanding of how trees make a difference in their lives and in the world.

Here are 10 proven ways that trees make a big difference:

1. **Trees improve air quality.**
   Trees are sometimes called the lungs of the Earth because they absorb pollutants through their leaves, trapping (or “sequestering”), and filtering contaminants in the air. Like all green plants, trees also produce oxygen through photosynthesis.

2. **Trees improve water quality, reduce flooding and erosion.**
   A tree’s leafy canopy catches precipitation before it reaches the ground, allowing some of it to gently drip and the rest to evaporate. Tree roots hold soil in place, reducing erosion. In these ways, trees lessen the force of storms and reduce the amount of runoff into sewers, streams and rivers, improving water quality. One hundred mature trees can intercept about 100,000 gallons of rainfall per year.

3. **Trees temper climate.**
   Trees lower air temperatures and humidity; they can also influence wind speed. Evaporation of water from trees, or transpiration, has a cooling effect. Cities develop “heat islands” because dark roofs and pavement absorb solar energy and radiate it back. Trees in parking lots have been shown to reduce asphalt temperatures by 36 degrees and car interiors by up to 47 degrees Fahrenheit.

4. **Trees conserve energy.**
   Three or more large trees strategically placed on sunny sides of a house shade it from the hot summer sun, reducing air-conditioning costs by as much as 30 percent. Deciduous trees are best for this use because they lose their leaves in winter, exposing the house to the warming winter sun, which lowers the energy needed to heat the house. Coniferous trees, because they retain their needles year-round, serve to reduce wind when placed on the north and northwest sides of a building, resulting in significantly lower winter heating costs.

5. **Trees are good for the economy.**
   Economic analyses have found that the value of homes near trees is 9 to 15 percent higher than homes without. Research shows that shoppers linger longer along a shaded avenue than one barren of trees and are even willing to pay more for goods and services.

6. **Trees create habitat for plants and animals.**
   Wherever trees are established, wildlife and other plants are sure to follow, ensuring a healthier ecosystem. Trees provide shelter and food for a variety of birds and small animals.

7. **Trees improve health.**
   Research demonstrates that exposure to trees has a relaxing effect on humans, reducing stress and imparting a sense of well-being. Hospital patients with a window view of trees recover faster than those without. Children with Attention Deficit Disorder are better able to concentrate after time spent in outdoor green settings.
8. Trees reduce crime.

Data show that apartment buildings with high levels of greenery had significantly fewer crimes than those without any trees.

9. Trees reduce noise pollution and can serve as screens.

A belt of trees 100 feet wide and 50 feet tall can reduce highway noise by up to 10 decibels, reducing the sound volume by half. Densely planted trees can also block unsightly views.

10. Trees promote community.

Trees can enhance a community’s sense of pride, and ownership. Active involvement in tree planting programs leads to a stronger sense of community and the promotion of environmental responsibility and ethics. Planting programs also project a visible sign of change and provide the impetus for other community renewal and action programs.

It takes many years for a tree to grow large enough to give back many of these benefits. Existing trees are living things that will not last forever, so it is critical that we continue to replenish the forests and plant new ones in our communities. Young trees need our care and stewardship to grow strong—ensuring a healthy future for our planet and all its inhabitants.

REFERENCES


Activities for Grades 4-5

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OBJECTIVES

- Understand how invasive species endanger native plants
- Identify community needs by researching where in the park the invasive plants need to be removed
- Improve an area by removing unwanted species
- Transform invasive plants into useful and attractive products

TIME

Between 1-4 hours. If all parts of the activity are done at one time, a full morning or afternoon is needed. But you and your group might decide to break up the activity into two sessions—one for preparation and one for pulling up invasive plants and transforming them. Because pulling invasive plants is hard work, include time for a break with refreshments.

MATERIALS

- Gloves
- “Pullers,” also known as “weed wrenches,” clamp-like tools that pull up plants by the roots (optional)
- Paint
- Brushes

BACKGROUND

Invasive species take over many areas and crowd out indigenous or native plants, which are trying to grow. Often these invasive trees and plants are not “bad” in their own right but are merely ill-placed and create problems by spreading aggressively.

The black swallow-wort, for example, an invasive perennial vine native to Europe, has been introduced into the United States and is now found in California, New York, Wisconsin, and other states. Black swallow-wort crowds out and replaces goldenrod and grasses, decreasing grassland bird populations in some areas. Lack of predators allows invasive plants to multiply, which also creates problems for animals that are dependent on food sources from native plants. The monarch butterfly is threatened by black swallow-wort because when it lays its eggs in this non-native milkweed the larvae do not survive.

A list of invasive species for your state through the US Department of Agriculture website (http://plants.usda.gov/java/noxiousDriver) or by contacting your local cooperative extension office.
Prior to conducting this activity, you will need to:

- Contact your local park authority or cooperative extension service to learn about invasive plants and how to properly identify and remove plant. They will be able to also connect you with a local group of “weed warriors” to work with.
- Identify a location where you would like to conduct a “weed warrior project”
- Confirm a date when a chosen local park, state forest, cemetery, community garden, etc.
- Obtain the support of a conservation professional at your local nature center, museum, community group, park, or conservation district, who can teach the participants about invasive plants and guide them in pulling up these unwanted species.
- Research how to transform invasive plants into baskets and other art objects or obtain the participation of an artist or art teacher who can work with the participants immediately following the invasive “pull.”

**DISCUSSION**

Start the session by asking the children to brainstorm what “throw-away” products they have in their home that could become useful items. Discuss with the students that plants also can be good or bad and that the US Department of Agriculture has a list of good and bad plants. (This is a great opportunity to have your local nature center or native plant society come to talk with the students.) Discuss why a plant may be good (native) and why a plant can be bad (invasive) but depending on where you are… a plant is not always bad.

Then tell them that after they have spent time in the park pulling out invasive plants, they will have an opportunity to make something useful and/or attractive out of those plants. Show them some examples of invasive plants and ask them to brainstorm what they might want to make.

**ACTIVITY**

1. The first part of this activity can take place indoors or at the park where the group will be working. A conservation professional will discuss the difference between invasive and native plant species, describe how animals, native plants, and trees can be harmed by the presence of invasive plants, and teach the group how to recognize poison ivy and other poisonous plants in the area. Allow time for all questions and concerns to be answered.

2. Once the group is in the park, the conservation professional will help the group identify the various types of invasive plants in the area and show them how to pull them out using their gloved hands or a small pulling or weeding tool. The children should be asked to stack up all invasive plants of the same type together.

3. The group can stay outdoors or continue the art workshop part of the session indoors. Remind the children of the ideas they had come up with
displays to raise awareness of the damaging effects of invasive plants. Children could make hang tags that include the price of the item as well as information about the invasive plant that was used to make it.

- Prepare and host a presentation and demonstration with younger students in school or after-school programs about invasive and native plants.

- Plan and install a wildlife garden using native species of plants, trees and shrubs. Observe the wildlife that visit and live in the wildlife garden over a few seasons and track your observations. Get started by downloading a starter kit at www.nwf.org/schoolyardhabitat.

for transforming the invasive plants into works of art. You or the artist will now guide the participants as they take pieces of grapevine, bamboo, English ivy, or other invasive species to create something new out of it. They might want to paint their new objects or decorate them in some other way.

**EXTENSION ACTIVITIES**

- Organize a crafts fair where they can sell some of their invasive plant art and donate some or all of the proceeds to a group that educates the public about the environment or to some other charitable organization.

In addition to the crafts that are offered for sale, the children might want to make informational posters and
Sensing a tree

ACTIVITY GRADES 4-5

OBJECTIVES
- Learn about the characteristics of different kinds of trees
- Understand how trees live and why they are so important to people
- Understand that each person has choices to make in how to use natural resources smartly
- Identify interrelationships among forest citizens

TIME
About 1 1/2 hours including discussion, online and print research, the activity outside, and follow-up. More time is needed if the wooded area is some distance from your meeting place.

MATERIALS
- Tree guidebook
- Blindfolds, enough for half of the participants
- Sound recorders (digital camera, cassette recorder, camera cell phone)—one for each group of three or four participants

BACKGROUND
Using a variety of senses, participants can learn more about the differences among trees than they can if they just look at them.

In one part of this session, participants will be blindfolded. Children who are very fearful about being blindfolded can just shut their eyes.

DISCUSSION
Before the participants go to a park or other wooded area where different kinds of trees are found, give them an opportunity to learn more about trees by holding a discussion with the following questions:
- What kind of tree drops its leaves in the fall?
- What kind of tree appears to be dead and then looks alive again in the spring?
- What kind of tree looks alive all year long?
- What kind of tree has needles instead of leaves?

The participants can use a tree guidebook, the glossary in this guide, and the Internet as they try to find answers to questions they don’t know.

ACTIVITY
1. Once the group is in the wooded area, divide the children into pairs. Have one person in each pair put on a blindfold. The partner should carefully lead the blindfolded child to different trees, guiding the exploration of the textures of the leaves, needles and bark of each tree. Once the blindfolded children remove their blindfolds, ask them if they can identify the trees, needles and leaves that they felt while blindfolded. Then ask the
children to switch places and repeat the exercise.

2. Ask what they learned by doing this exercise. What senses did they use?

3. Take the group on a nature walk. Each group of three or four children should take along a sound recorder for this part of the activity. Each group tries to find sounds that they like as well as sounds that they don’t like. The groups should be encouraged to try to find “tree sounds” of rustling leaves, wind in trees, storm sounds, water, wildlife sounds, etc. remind the children not to speak as they record themselves walking on different surfaces such as leaves, crunching branches, gravel, etc.

4. When the group goes back inside, play the recordings and ask the children to identify the sounds. They might try to imitate the forest sounds using body percussion and objects. For example, they could rub their hands together to imitate the sound of rustling leaves, or pat their legs softly for the sound of a light rain, harder for a heavier rain.

EXTENSION ACTIVITY

• Create a play using sound effects of sounds that you might hear during a dark and stormy night. Once the children have learned the routine well enough, they can teach it to a group of younger children and then the groups can perform together.

• Become a tree detective by using National Wildlife Federation lesson plans at www.nwf.org/schoolyardhabitat
Incredible Wood In Our World

ACTIVITY GRADES 4-5

1. Ask students to brainstorm products made from trees, listing these on the board as mentioned.

2. Share information about wood products to the list.
   - rayon
   - cellophane
   - photographic film
   - newspaper
   - alcohol
   - space craft reentry shields
   - book paper
   - telephone casings
   - football helmets
   - roofs
   - ping pong balls
   - fishing floats and tackle
   - flashlight cases
   - camera cases
   - artificial snow
   - toilet seats
   - artificial vanilla flavoring
   - vinegar
   - cosmetics
   - fertilizer
   - ceramics
   - sausage casings
   - diapers
   - clock cases
   - rubber tires
   - foam rubber
   - bread wrapping
   - diplomas
   - hand cleaners
   - lubricants
   - tax forms
   - highway surface
   - oil and gas wells
   - liquid soap
   - radio and television panels
   - shelf paper
   - vacuum cleaner bags
   - flypaper
   - glasses frames
   - corks
   - guitars
   - name tags
   - gift boxes
   - movies
   - decoys
   - snowshoes
   - fence posts and fencing
   - heels for shoes
   - facial and bath tissues
• paper towels
• hair spray
• nail polish
• laxatives
• linoleum
• tires
• paint
• telephone books
• yeast
• award certificates
• masking tape
• varnish
• atlases and maps
• popsicle sticks
• umbrella handles
• flooring
• kitchen cabinets
• knife handles
• grocery bags
• milk cartons
• egg cartons
• buttons
• magazines
• photographic slides
• automobile instrument
• panels
• draperies and bedspreads
• stadium seats
• trailers and mobile homes
• puzzles

3. Ask participants to imagine what life would be like without wood products, starting with getting up in the morning until they go to bed at night. List these on the board. For example: no toilet paper, no chair to sit on, no books made of paper, etc.

4. Explain that some paper is made from woodpulp obtained from trees, but other paper is recycled. Emphasize that not enough paper can be made from recycled materials, so it’s important to plant quick growing trees that can be made into paper. In this way trees are a renewable resource.

5. Have the participants work in small teams to create a TV informational that highlights how trees and forest are a vital part of our every day and get individuals to purchase or adopt a tree in their local forest to care for.

6. Have them share their informational with each other.

EXTENSION ACTIVITY
• Catalogs and “junk mail” one way that tree come into our homes everyday. Catalog Choice (https://www.catalogchoice.org/) and other campaigns provides opportunities to “get off the list” for mail. Organize a campaign to get individuals in your participant family neighborhood and community to reduce unwanted mail.
• Identify ways ways to reduce, reuse and recycle through the consumption pathway through Eco-schools USA by conducting an audit of your home, school or meeting place. (www.ecoschools-usa.org)
Tree Detective

ACTIVITY GRADES 4-5

OBJECTIVES:
- Demonstrate basic observation and identification skills
- Describe different characteristics of two or more different tree species
- Associate particular characteristics with different tree species

TIME
45 minutes

MATERIALS NEEDED
- Pencil
- Paper
- Field Guide
- Computer

BACKGROUND
A good rule of thumb when working to identify trees, or most other life forms, is to observe three or more characteristics about the organism before heading for a field guide or making a final decision. At least two of these characteristics should not be related to the size of the specimen. Relying too heavily on one type of clue can lead to incorrect identification.

Examining details, such as the bark of the tree, the leaf shape, and its habitat would make correct identification much more likely.

The following are things to consider when identifying trees:
- Does it have needles or leaves?
- Does it lose its leaves in the winter (deciduous), or not (evergreen)?
- What is the size, shape, color and general appearance of the leaves or needles?
- Look closely at the color, texture (scaly, smooth, ridged, fissured, etc.), thickness, and anything unusual about the bark.
- How are the leaves attached to the stem (facing opposite each other, alternating, etc.)?
- Look closely at the flower, fruit (including nuts and acorns), or cone of the tree.
- Estimate the size (in height and diameter) and general shape of the tree.
- What does the crown, or top area of the tree, look like?
- Look closely at its habitat. What is growing around the tree? What is the area like (swampy, mountainous, near a lake, desert-like, in the tundra, etc.)?
- Consider its geographic region. Some trees, like the live oak (found almost exclusively along Southeastern U.S. coastlines), are confined to certain regions.
- Consider any unusual characteristics, such as the great height and width of the California Redwoods.
ACTIVITY

1. Find a wooded area that has at least five different types of trees, preferably native trees, to conduct the activity. If no such stand exists near the place your group meets, consider planning a field trip to a nearby park. Have volunteers help as needed.

   Note: A local arborist, either from a private tree care company or a county/municipal government office, can serve as an excellent resource for information on local tree species and identification.

   Consider contacting an arborist from the community to help with this activity.

2. Ask participants, Do you know how to tell one kind of tree from another? Have them name different characteristics that can help them to identify trees. Brainstorm a list. What do trees need to survive? What kinds of things do they need in their habitat?

   Discuss with participants the idea that, like animals, trees have different habitats and need varying levels and/or types of sunlight, water, soil, and space.

3. Tell participants that they are all going to become “tree detectives” and will have the opportunity to study different trees in detail. Each participant should have at least one partner with whom he or she will work. Make sure that at least one of the partners has a clipboard or other hard surface, copies of both the Leaf and The Whole Tree Clue sheets, and a pencil. Tell participants that these worksheets are a part of their field notebook, in which they will carefully describe different tree characteristics.

4. Begin by exploring leaves. Ask the teams or small groups to find at least three leaves on the ground, and on the leaf worksheets, to write their best description of the color(s), shape, texture, and size of each of the leaves. If participants can see how the leaves are arranged on a twig (i.e., alternating, opposing, etc.; see Leaf and Bark Clues, below), have them note that as well. They can also draw the leaves in a notebook. Once they have done this, ask all the participants to throw their leaves in a large pile and mix them up. Then, ask them to look at their notes and try to locate their own leaves. Often, participants will have studied their leaves well enough that they will be able to find the leaf without their notes; encourage them to cite evidence in their notes, too.

5. Once all participants have located their leaves, have them use field guides to try to find out what kind of tree the leaves came from. Encourage them to use several characteristics of the leaves to find their tree. Assist where necessary.

6. After they have completed their leaf hunt, have partner groups find a single tree to study. Using the Whole Tree Clue worksheet, have them take notes on every detail of the
tree they can find, including the appearance of the leaves, flowers, fruits (including nuts and acorns), or needles and cones. They should also consider the color, texture, and patterns in the bark, and the general size and shape of the tree. Also ask them to consider the area in which the tree is growing. Participants can also draw a picture of their trees in their field notebook.

7. When they have finished taking notes on their tree, have them investigate what kind of tree they have found using field guides. Ask each pair or small group to make a short presentation to the whole group about their tree and any interesting information the field guides may have told them about this species.

In particular, encourage small groups to discuss what wildlife might depend on the tree they have studied, and what kinds of native plants might grow nearby. Ask participants if they can find other trees of the same kind at their study site.

8. Ask participants, Why do you think tree identification can be useful? (Helps to evaluate the health of the forest, the kind of habitat available, the amount of biodiversity present, the kinds of trees certain animals use, etc.) Ask them what interesting things they learned about the process.

Note: The leaf hunt portion can also be done with nuts, seed pods, other fruits, or pine cones. Consider doing a nut/fruit/cone hunt in addition to the leaf hunt if the items are available.
**LEAF CLUE SHEET**

**DIRECTIONS:**

Draw a picture of your leaf in the middle, where it says “Leaf,” and briefly describe or draw each characteristic of the leaf (e.g., color, shape, size, etc.) in the space provided.

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<tr>
<th>Color</th>
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<th>Pattern on Twig</th>
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<thead>
<tr>
<th>Whole tree clue sheet</th>
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**DIRECTIONS:**

Draw a picture of your tree in the middle and briefly describe or draw each characteristic of the tree.

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<th>Tree</th>
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<th>Fruits, nuts, cones</th>
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<th>Tree shape</th>
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OBJECTIVES

• Learn how to reuse household items
• Practice using resources wisely while celebrating creativity

TIME

Total = 2 days; About a half-hour hour to assemble the screened frame and organize materials. The pulp will need to be soaked overnight. It will take about a half-hour to make the paper and about three hours for the paper to dry. Participants will need time to prepare for this session by collecting various items from home (see list below).

MATERIALS

• Section of window screen or wire mesh (Metal is best and should be about an inch larger on each side than the size of paper participants want to make and should be free of rust and dents)
• Large bowl
• Tub—wide enough to accommodate the screen horizontally and room on the sides for fingers
• Old newspapers and other scrap paper loosely packed (1 cup of scraps is needed for each sheet of paper)
• Dish towels
• Rolling pin
• Scissors
• Small dried flowers, leaves, feathers, colored thread, metallic foil, and similar items (Remind the participants that if the items are dark, the paper will be dark)
• Water

Note: The screen & tub can be shared as each participant takes a turn during steps 5–8.

BACKGROUND

The word paper comes from papyrus, a plant with long, coarse grass that grows along the Nile River in Egypt. In ancient times, Egyptians used papyrus as a writing surface. At that time, the best papers in Europe were made from processed sheep, calf, or goat skin. The art of papermaking began early in the second century in China using mulberry, fish nets, rags and other fibers and traveled slowly across Asia and on to Europe. China and Japan became known for making very fine papers from rice leaves and shoots. The invention of the printing press in the mid-fifteenth century increased the demand for paper, which continued to be made largely of rags and recycled clothing. Today, most paper products, from packing boxes to newspapers, are made from wood pulp. However, when greater paper strength and durability are required, paper is still produced using some rag content.

DISCUSSION

Before the children start the activity, spend a few minutes discussing the history of paper making. Then, ask them the following kinds of questions:

• What would the world be like if we made our own paper? (for example, fewer trees destroyed...
and more personal and creative products)

- What items from nature did you bring with you for this papermaking project?

**ACTIVITY**

1. Fill a bowl with water (about half-way to the top).

2. Have participants tear newspaper and other scrap paper into small pieces until they have about 1 cup’s worth (lightly packed) and put them into the water-filled bowl. Leave the mixture (pulp) soaking for several hours or overnight.

3. Ask the children to cut the decorative items, such as feathers and thread, into small pieces of various sizes and set them aside.

4. After the pulp is thoroughly soaked, have the participants add some of the tiny pieces of leaves, thread, and other materials they had set aside earlier and mix it in with the pulp.

5. Put the screen into the tub. Add just enough water in the tub to cover the screen. With your hands, transfer the wet pulp on top of the screen, trying to keep it away from the edges but not in a mound. Carefully lift the screen out of the tub so it lifts the pulp with it but allows the water to drip into the tub.

6. Place the screen on a flattened dish towel or layers of newspaper.

7. Lay a dish towel on top of the pulp. The children then use a rolling pin to squeeze out the extra water and flatten the pulp. (If you don’t have a rolling pin, just press using even pressure.)

8. Carefully remove the dish towel from the flattened pulp, and spread another dry dish towel on a flat surface. Guide the participants as they lift the screen and flip it over onto the dry towel. Slowly and carefully remove the screen from the flattened pulp.

9. Thorough drying will take about three hours or overnight. You might want to flip the paper over again to speed up the drying.

10. If you notice holes in your paper or it is too thick or thin, the activity is easy to repeat and refine your technique.

**EXTENSION ACTIVITY**

- Create your own brand and style of stationery. They might want to name their card “brand,” write a note explaining how the paper was created and then hand deliver it to a friend or family member.

- Plan a monthly outdoor adventure or activity for your students by using the Green Hour Activity Idea Center. Explore the wildlife that live in the trees and forest, take a nature hike or create crafts from natural objects. Visit www.nwf.org/greenhour for monthly ideas.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>Camouflage</td>
<td>A way of hiding by blending in with the surrounding environment.</td>
</tr>
<tr>
<td>Carbon cycle</td>
<td>A series of chemical reactions beginning with the production of carbohydrates by plants during photosynthesis, proceeding through animal consumption, and ending in the exhalation of carbon dioxide by animals and the decomposition of animal or plant matter, which start the cycle again.</td>
</tr>
<tr>
<td>Carbon dioxide</td>
<td>A heavy colorless gas (CO₂) that is non-flammable, is formed especially in animal respiration and in the decay or combustion of animal and vegetable matter, is absorbed from the air by plants in photosynthesis, and is used in the carbonation of beverages.</td>
</tr>
<tr>
<td>Carbon footprint</td>
<td>A representation of the effect human activities has on the climate in terms of the amount of greenhouse gases produced. A carbon footprint is often expressed as tons of carbon dioxide or tons of carbon emitted, usually on a yearly basis.</td>
</tr>
<tr>
<td>Circumference</td>
<td>The distance all around a tree trunk, taken from 4.5 feet above the ground.</td>
</tr>
<tr>
<td>Community</td>
<td>A group of organisms inhabiting the same area and interacting with each other.</td>
</tr>
<tr>
<td>Compound leaves</td>
<td>A leaf composed of a group of smaller leaflets like a locust tree or ash.</td>
</tr>
<tr>
<td>Crown spread</td>
<td>The distance tree branches spread away from its trunk. The crown spread is calculated by measuring the distance of the widest spread and the distance of the narrowest spread. These two figures are then added together and divided by two to get an average.</td>
</tr>
<tr>
<td>Deciduous</td>
<td>A tree that drops its leaves at the end of the growing season; non-evergreen.</td>
</tr>
<tr>
<td>Drought</td>
<td>A prolonged period of dryness that can cause damage to plants.</td>
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<tr>
<td>Ecosystem</td>
<td>An environmental system made up of a community of animals, plants, and bacteria and their interrelationships.</td>
</tr>
<tr>
<td>Fossil fuel</td>
<td>A fuel, such as coal, oil, or natural gas, formed in the earth from plant or animal remains.</td>
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<tr>
<td>Fruit</td>
<td>The ripened seed-bearing part of a plant, such as a cherry or apple.</td>
</tr>
<tr>
<td>Germination</td>
<td>The sprouting of a plant seed.</td>
</tr>
<tr>
<td>Global warming</td>
<td>An increase in the Earth’s atmospheric and oceanic temperatures widely predicted to occur due to an increase in the greenhouse effect resulting especially from pollution.</td>
</tr>
<tr>
<td>Habitat</td>
<td>A place where an animal or plant lives; the type of environment where a particular species is likely to be found.</td>
</tr>
<tr>
<td>Indigenous</td>
<td>Native and original to the region.</td>
</tr>
<tr>
<td>Invasive species</td>
<td>A species, not native to an area that spreads aggressively from the original site of planting.</td>
</tr>
<tr>
<td>Native Species</td>
<td>A species occurring naturally in an area and not introduced by humans; they are also know as indigenous species.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Nobel Peace Prize</td>
<td>Any of the prizes (five in number until 1969, when a sixth was added) that are awarded annually from a fund bequeathed for that purpose by the Swedish inventor and industrialist Alfred Bernhard Nobel. The Nobel Prizes are widely regarded as the most prestigious awards given for intellectual achievement in the world.</td>
</tr>
<tr>
<td>Nonrenewable resource</td>
<td>A natural resource that can’t be remade, regrown, or regenerated on a time frame similar to its consumption. (e.g., coal, oil, natural gas)</td>
</tr>
<tr>
<td>Photosynthesis</td>
<td>The manufacturing of sugar through the action of sunlight.</td>
</tr>
<tr>
<td>Pollution</td>
<td>The addition of any substance or form of energy (e.g., heat, sound, radioactivity) to the environment at a rate faster than the environment can accommodate it by dispersion, breakdown, recycling, or storage in some harmless form.</td>
</tr>
<tr>
<td>Renewable resource</td>
<td>Any natural resource that can be replenished naturally with the passage of time (e.g., timber, solar energy).</td>
</tr>
<tr>
<td>Riparian</td>
<td>Of, or relating to, rivers or streams.</td>
</tr>
<tr>
<td>Role model</td>
<td>A person whose behavior in a particular role is imitated by others.</td>
</tr>
<tr>
<td>Sap</td>
<td>The fluid that circulates through a plant, carrying food and other substances to different parts of the plant.</td>
</tr>
<tr>
<td>Sapling</td>
<td>A young tree.</td>
</tr>
<tr>
<td>Seed</td>
<td>The part of a plant produced by the flower that may grow into a new plant.</td>
</tr>
<tr>
<td>Seedling</td>
<td>A young (embryonic or baby) plant in a covering.</td>
</tr>
<tr>
<td>Shrub</td>
<td>A woody perennial, smaller than a tree, usually with several stems.</td>
</tr>
<tr>
<td>Species</td>
<td>A group of organisms having many characteristics in common and are able to reproduce.</td>
</tr>
<tr>
<td>Stewardship</td>
<td>The careful and responsible management of something entrusted to one’s care.</td>
</tr>
<tr>
<td>Team</td>
<td>A number of persons working together.</td>
</tr>
<tr>
<td>Terrarium</td>
<td>A small artificial environment for a specified habitat. A terrarium generally has a woodland setting, with the emphasis on plants rather than animals.</td>
</tr>
<tr>
<td>Trunk (tree)</td>
<td>The main stem of a tree.</td>
</tr>
</tbody>
</table>
Order your trees (minimum order of three trees) and download your planting and care guide by visiting www.nwf.org/trees.

Planting trees is a great activity for people to do together or with others, organize a tree planting day.

Tree Kits Details
All trees are shipped in bare root form. Shipping and handling costs are included. You will receive an email with a link to download your age appropriate activity guide within one week of placing your order.

Notes for Tree Shipments:
- Tree species are native to your area.
- You can select from list of native plants for your state.
- Please note: we recommend all locations within northern U.S. (hardiness zones 1–4) plant trees ONLY during Spring.
- Trees are shipped 4-5 days prior to your specified planting day.

Order your Trees at www.nwf.org/trees
- Spring Planting—Place your tree orders between January through May.
- Fall planting—Place orders between September through December.
- Trees should not be planted in winter or summer months to ensure tree survival.
Continue Your Exploration of Nature

Plan a weekly or monthly activity outdoor by getting activity ideas for a Green Hour. NWF’s Green Hour activity database has over 300 activity ideas for you and your “Little” to find fun ways to get outside, get active and learn about nature. Activities are added monthly and you can sign up to receive an email about new activities by visiting www.beoutthere.org.

Create a home for wildlife in your own backyard with your “Little.” NWF has certified the yards of some 120,000 U.S. homeowners as “backyard wildlife habitats” – these micro habitats provide adults and children a place to observe wildlife and enjoy the outdoors in a safe setting. You can create a habitat by offering food, water and shelter for local birds and wildlife. www.nwf.org/gardenforwildlife/

Join your family, and friends by participating in one of NWF’s signature outdoor events – starting with the Great American Backyard Campout (an annual outdoor camping experience) and extending to other events such as outdoor hikes and walks, conservation fairs and more. www.nwf.org/BackyardCampout/

Need supplies for your outdoor adventures? NWF’s nature catalog offers a variety of suggestions and materials for you to use in your adventures. Log on to www.nwf.org/shop.

Take a walk outdoors and help us by watching and recording the wildlife in your community. Start today by downloading your own wildlife watch list. Be sure to get one for each season. Just log on to www.nwf.org/watch.

Read about nature and wildlife through NWF children’s nature magazines. NWF publishes a series of popular, award-winning magazines that introduce children, ages 2 to 12, to wildlife and nature. These magazines are a great opportunity to teach reading as well. Order a subscription at www.nwf.org/magazines/ or copies may also be available in many local libraries.