



# What Tree Is That – and Why?

**TREE CITY USA®  
BULLETIN**

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*No matter where you live in the United States, trees are your neighbors. More than 747 million acres of forests grace our rural lands in the 48 contiguous states and there are another 70 million acres of trees within our urban areas. Even densely populated New York City has more than 5 million trees. Knowing the names of our green neighbors and the features that make each unique can be personally satisfying and can help build greater appreciation for the many benefits trees provide.*

With approximately 1,000 distinct species of trees in the U.S., only an expert can be expected to know them all. When it comes to cultivars, such as the 600-some crabapples extant, even the experts have to resort to chemical analysis or a review of records showing parentage. We'll leave that level of expertise to the professionals. This bulletin is about the common trees that are encountered in our communities, how they can be identified, and some of the interactions or ecology that make them a fascinating part of our environment.

There are many good reasons for identifying the trees in your area. First, it is essential to know the name of a tree to be able to plant the right species in the right place. Errors can be costly and disappointing if the tree turns out to be unsuited to its surroundings. Second, different species require different care and treatment. This knowledge can also serve as clues regarding the potential hazard of breakage or other problems like susceptibility to pests. Third, species give us important information about overplanting, recognizing that diversity of both species and genera are safeguards against widespread loss during storms or epidemics.

Just as important is the personal satisfaction that comes from knowing the names and characteristics of trees. Matt Harris, chief executive of the Arbor Day Foundation, sums it up. "It's just plain fun to be able to identify trees," he says. He also notes that it's a good first step toward helping young people get acquainted with trees and develop a love for nature.



Trees small or large, like this London planetree in Eagle, Idaho, are our neighbors. Knowing their names can be a guide to where and where not to plant them, how to provide care, and what dangers or benefits they may offer. Identification is also one more way to enjoy our interaction with trees.

*"It's just plain fun to be able to identify trees."*

Matt Harris, chief executive of the Arbor Day Foundation



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# A Helpful Key to Identification

*The Arbor Day Foundation's 159-page What Tree Is That? field guide may not be the only guide to identification, but it is one of the most colorfully illustrated and easiest to use.*

## STORY BEHIND THE PUBLICATION

Credit goes to Susie Wirth, a former Arbor Day Foundation outreach director, for seeing the need to create a simplified key to tree identification. "We needed something so easy that even children could use it to identify trees during school visits and summer camp at Arbor Day Farm," Susie said. After a lot of study and work and review by experts such as extension forester Mike Kuhns of Utah State University, a 70-page booklet was produced with black and white line drawings. It is still available today under the title, *What Tree Is That? A guide to the more common trees found in the Eastern and Central U.S.* It was eventually joined by a western version that also remains in print.

The booklets were popular but the need was felt for a single volume that covered the entire continent north of Mexico. "We also wanted to help people have a good experience with trees," said Woody Nelson, the Foundation's vice president of marketing communications. "We wanted to retain a friendly approach," he added. To add even more quality, talented scientific illustrator Karina I. Helm was selected to make detailed drawings of the features needed to separate the approximately 250 trees in the book. Karina carefully studied literature, online references, and live trees and then rendered nearly 250 5x7 watercolors for the publication.

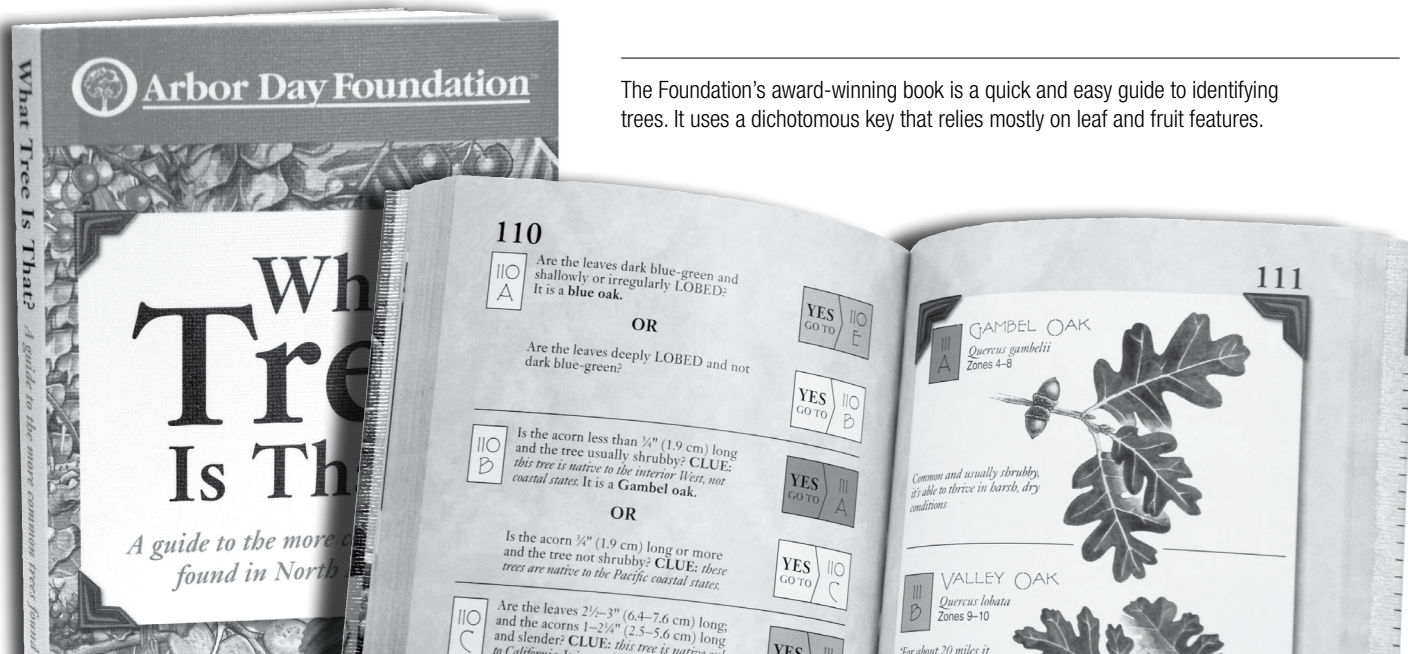
## AN AWARD WINNER

After more than a year of preparation and quality-controlled production, *What Tree Is That? A guide to the more common trees found in North America* was ready for the public. It is now available at [arborday.org](http://arborday.org) and several retail outlets. There is even a downloadable file for use on smartphones.

The hard work paid off, not only in a helpful product, but one that has gained wide acclaim from users. In 2010, it won a Mom's Choice Award honoring "excellence in family-friendly media, products, and services."

## FEATURES OF THE BOOK

- Pocket size on durable paper
- Water-resistant cover with place-holding folds
- A measuring scale
- Space for notes and field sketches
- Words to know (glossary)
- Hardiness zone map and explanation
- Icons to identify potentially invasive species
- Detailed index



The Foundation's award-winning book is a quick and easy guide to identifying trees. It uses a dichotomous key that relies mostly on leaf and fruit features.



## HOW TO USE A DICHOTOMOUS KEY

Whether it is the key in *What Tree Is That?* or another publication, a dichotomous key is built on somewhat the same principle that is behind binary calculators and computer technology. Basically, there are always just two choices, or 'on and off' in the bowels of a computer system. In the tree key, you are asked a question about the unknown specimen and given two choices (occasionally three or four). When you answer "yes" to one of the choices, it sends you to another page for another decision, or to a picture of the specimen in hand.

*Example for Keying Out an Eastern White Pine*

5

HOW TO USE THIS KEY:

- In each box there are two or more questions. Each yes answer is followed by a GO TO direction which indicates a page number and box identifier.
- Read each question in the box. Follow the directions by the question most correctly answered yes, moving to the page and box number indicated.
- By repeating this process and turning to the pages indicated, the yes answer will direct you to the box that names the tree. The color of the [ ] box will match the color of the tree's box identifier. Compare the leaf drawing with your leaf sample.

*If answer is YES, turn to this page and box.*

Box identifier	Questions to answer	If answer is YES, turn to this page and box.
10 A	Are the needles mostly 3-6" (7.6-15.2 cm) long?	YES 10 B GO TO
	OR	
	Are the needles mostly 1/4-4" (1.9-10.2 cm) long?	YES 10 C GO TO

*If you have some idea about the tree's name, you may also look it up in the index, which lists the page where each species is shown.*

START HERE

5 A	Do you live east of the Rocky Mountains or in the blue shaded area of Canada or Alaska?	YES 6 A GO TO
	OR	
	Do you live west of the Rocky Mountains or in the green shaded area of Canada or Alaska?	YES 6 B GO TO

6



EASTERN


6 A	Does the tree bear cones and have leaves that are needle-like? <b>CLUE:</b> These trees are called CONIFERS (cone-bearing) and most are EVERGREEN (tree with needles or leaves that remain alive and on the tree through the winter and into the next growing season).	YES 7 D GO TO
	OR	
	Does the tree sometimes bear berry-like and have leaves that hug the twig and are scale-like or awl-shaped? <b>CLUE:</b> These trees are called GINKGOES (cone-bearing) and most are EVERGREEN.	YES 16 B GO TO
	OR	
	Does the tree have leaves that are flat and thin? <b>CLUE:</b> These trees are called BROADLEAF (a tree with leaves that are flat and thin) and bear a variety of fruit and flowers. Most are DECIDUOUS (shedding all leaves annually).	YES 7 A GO TO

7

7 A	Are the leaves SIMPLE (one BLADE attached to a stalk or PETIOLE)?	YES 7 B GO TO
	OR	
	Are the leaves COMPOUND (more than one BLADE attached to a single stalk or PETIOLE)?	YES 7 C GO TO
	OR	
	Are the uniquely fan-shaped leaves mostly attached, in clusters, to short, SPUR-like branches? It is a ginkgo.	YES 25 B GO TO
7 B	Are the SIMPLE leaves OPPOSITE (2 leaves that are directly across from each other on the same twig)?	YES 18 A GO TO
	OR	
	Are the SIMPLE leaves ALTERNATE (leaves that are staggered, not opposite each other on the twigs)?	YES 24 B GO TO
7 C	Are the COMPOUND leaves OPPOSITE?	YES 20 D GO TO
	OR	
7 D	Are the trees EVERGREEN with needles arranged in clusters of 2-5? These are pine trees.	YES 8 A GO TO
	OR	
	Are the trees DECIDUOUS.	YES 14 D GO TO
	OR	
	Are the trees EVERGREEN with needles arranged singly?	YES 12 B GO TO
	OR	
	Are the trees DECIDUOUS with singly attached needles of uneven length flattened along the twig, the cone a 1" (2.5 cm) diameter green or brown wrinkled ball? It is a baldcypress.	YES 14 D GO TO

8

8 A	Are the needles clustered in groups of 5 and the cones long with thin scales? It is an eastern white pine.	YES 9 A GO TO
	OR	
	Are the needles clustered in groups of 2, 3, and 4 and the cones short and tipped with spines?	YES 8 B GO TO
8 B	Are the needles clustered in groups of 3?	YES 8 C GO TO
	OR	
	Are the needles clustered in groups of 2?	YES 10 A GO TO
	OR	
	Are the needles clustered in groups of 2 and 3 on the same tree?	YES 10 D GO TO
8 C	Are the needles 3-5" (7.6-12.7 cm) long, somewhat twisted, often sprouting in tufts from the trunk, cones 2-3" (5.1-8.9 cm) long? It is a pitch pine.	YES 9 B GO TO
	OR	
	Are the needles 8-18" (20.3-45.7 cm) long, cones 6-10" (15.2-25.4 cm) long? It is a longleaf pine.	YES 9 C GO TO
	OR	
	Are the needles 6-9" (15.2-22.9 cm) long, cones 3-6" (7.6-15.2 cm) long? It is a loblolly pine.	YES 9 D GO TO




9

EASTERN WHITE PINE

*Pinus strobus*  
Zones 3-8

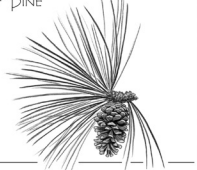
*The fabled tree eagerly sought by the first wave of loggers in America. The provincial tree of Ontario.*



LONGLEAF PINE

*Pinus palustris*  
Zones 7-10


*A tall, stately pine of the South long sought by loggers.*



LOBLOLLY PINE

*Pinus taeda*  
Zones 8-9

*Our most important and widely distributed timber species in the southern United States.*



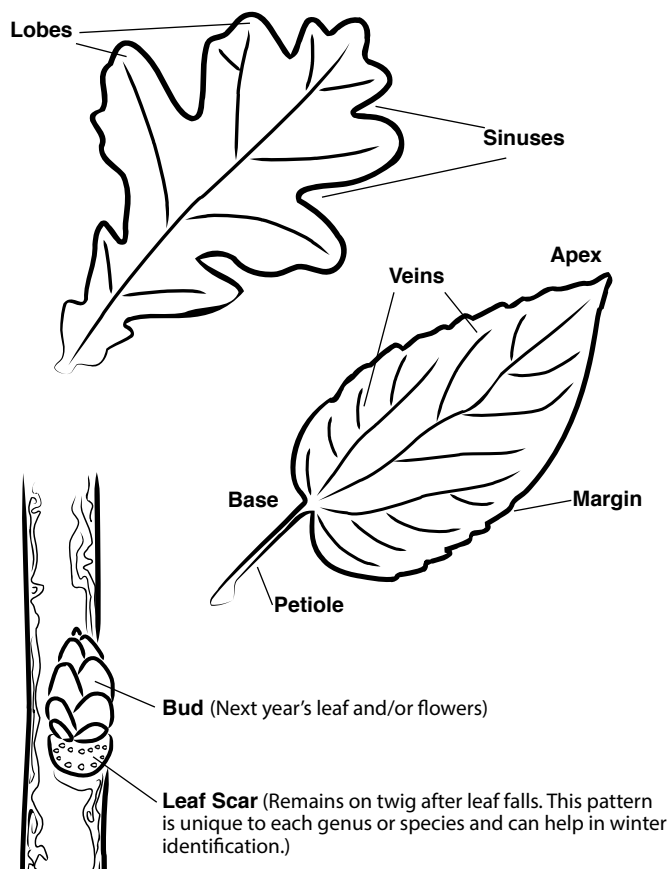
# Knowing Your Tree

**I**n a woodland, a tree's natural habitat is important for determining species and understanding the tree. In nature, trees are limited to geographic locations (their "range") by climatic factors such as temperature extremes and length of seasons. Site factors are also important. Moisture-loving species will be in coves, stream sides, and other damp areas; others tolerate dry, rocky, or sandy sites. Soil pH, elevation, and "aspect" (direction the land slopes) also make a difference in what trees will be found. These all provide clues to the identity of a tree found in the woods. In cities and other built environments, these factors will help determine the success of planted trees but do little in helping with identification. Humans have scrambled the natural order of plant growth so drastically that morphological features become almost the sole way of determining the identity of a tree.

## LEAVES

Leaves are usually the best or easiest clue to tree identification. Shapes, colors, size, and feel provide endless opportunities for collecting, sorting, doing art projects and studying nature. Thanks to their ability to absorb CO<sub>2</sub> and release O<sub>2</sub> into the air, leaves also provide an excellent

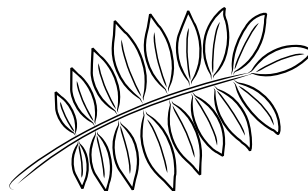
introduction into the many important, practical roles that trees play in our environment. It is also fun to speculate about the relationship of leaves' characteristics to helping the tree survive.



**Simple:** Eastern redbud



**Palmately Compound:**  
Ohio buckeye



**Pinnately Compound:**  
Butternut



**Bipinnately Compound:**  
Kentucky coffeetree



**Needles:** Pine



**Scale or Awl-like:**  
Western redcedar

Leaf shapes add fascinating variety to the world around us – and often provide the best clues to the tree's name. In winter, look on the ground for fallen leaves for identification clues.

## WHAT IS A TREE?

Is a lilac a tree or a shrub? What about the hazelnut or smokebush? Or a saguaro cactus? Scientists generally agree that a tree is "a woody plant, usually with *one main stem*, at least 12 feet tall, and having a *distinct crown* in most cases." "Woody" would rule out the succulent cactuses, but the other examples can be considered either a shrub or a

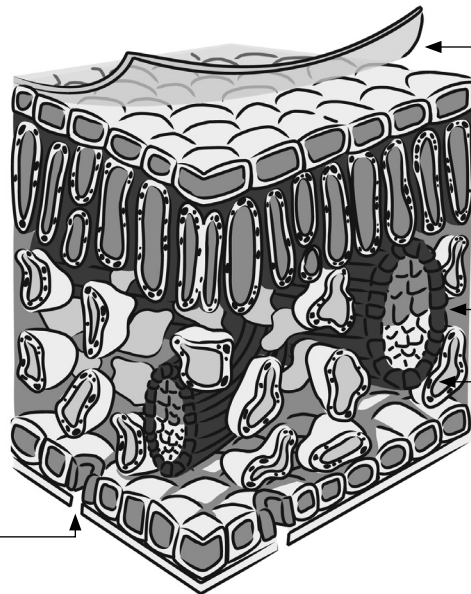
tree depending on how they are growing. Lilacs and many other bushy or multi-stem trees can be pruned into a single stem and become more like the plants we call trees. The saguaro, by the way, despite not being a real tree, is included anyway in *What Tree Is That?* Lilacs and hazelnuts are not.



# What's Inside a Leaf?

**PALISADE MESOPHYLL** – This is the “engine” of the entire tree! This layer of cells contains chlorophyll that uses energy from sunlight and converts CO<sub>2</sub> and H<sub>2</sub>O into sugars. Life-giving oxygen is emitted from the leaf as a byproduct. The sugars are transported throughout the living portions of the tree and are eventually used to fuel growth of the tree and provide defense mechanisms against pathogens.

**GUARD CELL AND STOMA** – Pores (stomata) in the cuticle expand or contract through action by guard cells. This mechanism closes the opening to retain moisture during dry periods and opens it when there is excess moisture to vent. This is also how CO<sub>2</sub> and O<sub>2</sub> enter and exit the leaf.



**CUTICLE** – An outer waxy layer that helps retain the leaf’s moisture and keep out pathogens.

**EPIDERMIS** – A protective layer at the upper and lower surfaces of a leaf; it secretes the cuticle.

**VEIN** – This bundle of cells provides transportation of water up from the roots (xylem) and sugars down through the tree and to the roots (phloem). These cells connect through the petiole to the xylem and phloem under the bark of the tree’s branches and trunk.

**SPONGY MESOPHYLL** – Cells and air spaces that fill in the rest of the leaf and communicate internal conditions to the guard cells.

The benefits of leaves range from cleaning our air to building moisture-retaining soil after they fall.

## LEAVES KEEP ON WORKING

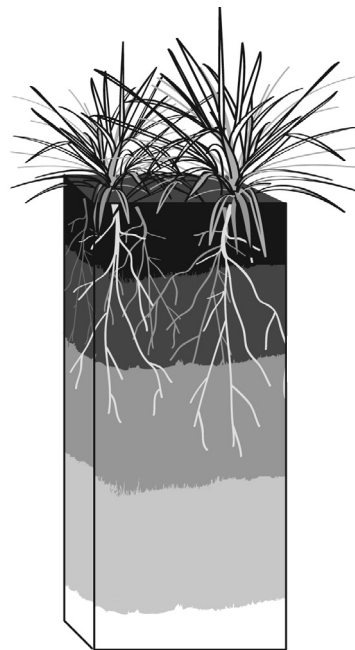
Sometimes leaves are thought of as a nuisance. However, fallen leaves play an essential role in forest ecology. They can provide similar benefits in urban settings.

Decomposing leaves, including shredded leaves on lawn grass, contribute organic materials that build good topsoil. Benefits include:

- Less time and energy costs spent removing leaves; less air pollution or landfill use.
- Soil is protected from rain impact.
- Moisture is retained in the soil.
- Habitat is provided for beneficial microorganisms: worms that aerate and improve the soil, butterfly young to beautify the earth, and homes to “unseen” wildlife such as salamanders and toads.
- Soil structure is improved.
- Soil is enriched without artificial fertilizers.
- Softens the ground and helps protect against compaction from foot traffic.

When used as mulch around the base of a tree, leaves can provide the added benefit of suppressing weeds. As with any mulch, keep the leaves from touching trunks or other plant stems. This allows air flow and helps prevent fungal growth.

**Note:** Exceptions to retaining leaves include under fruit trees, near diseased plants, or around disease-prone plants such as roses, peonies, irises and hollyhocks.



## SOIL PROFILE

The layers of healthy soil. Leaves contribute to fertility and moisture-retaining texture that in turn benefit soil organisms and root growth.

**O - ORGANIC MATERIALS**  
(including decomposing leaves)

**A - TOPSOIL**

**B - SUBSOIL**

**C - WEATHERED OR DECOMPOSED ROCK**

**R - SOLID ROCK**



Fallen leaves play an essential role in forest ecology. Imitating this role in urban settings can provide environmental benefits.

# More Clues to Identification

## FLOWERS AND FRUIT

Flowers are a great way to identify trees, but these clues don't last very long. The resulting fruits, on the other hand, are more often used in dichotomous keys for trying to find the name of a tree. The "fruit" may be

cones, acorns, nuts and seed pods, as well as what we more commonly refer to as "fruit," such as apples, pears and berries. Terms for the various kinds of fruit as used in tree keys are shown in the illustration.



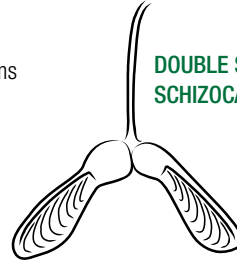
**ACORNS:** Oaks



**SAMARA:** Ashes



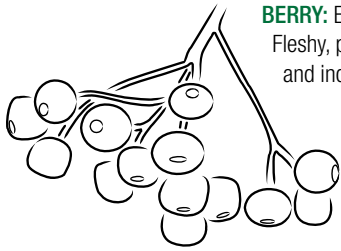
**SAMARA:** Elms



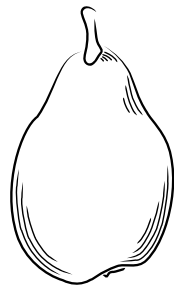
**DOUBLE SAMARA OR SCHIZOCARP:** Maples



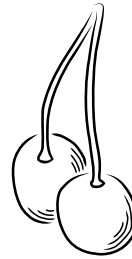
**PODS:** Locusts, redbuds



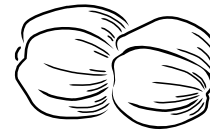
**BERRY:** Elderberries, Oregon grapes.  
Fleshy, pulpy multi-seeded fruit resulting from a single ovary, and indehiscent, meaning it does not split open at maturity.



**POME:** Apples, pears, hawthorns.  
Fleshy and resulting from a compound ovary.



**DRUPE:** Cherries, peaches.  
Fleshy, indehiscent fruit with its seeds enclosed in a stony covering, or endocarp.



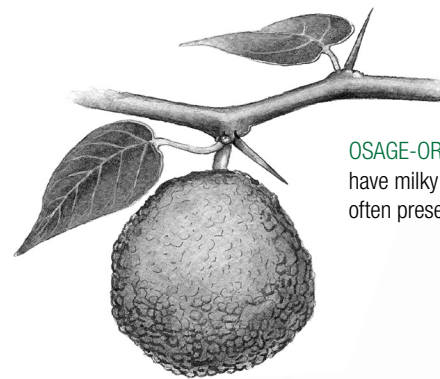
**NUT:** Walnuts, hickories

## TWIGS AND BUDS

Twigs are the narrowing terminals of branches and sometimes have characteristics that help identify the tree. Here are some examples from *What Tree Is That?*

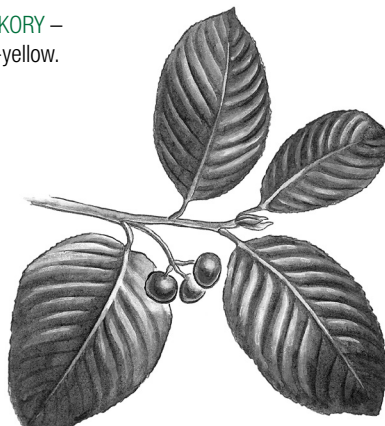


**BITTERNUT HICKORY –**  
Buds are sulfur-yellow.

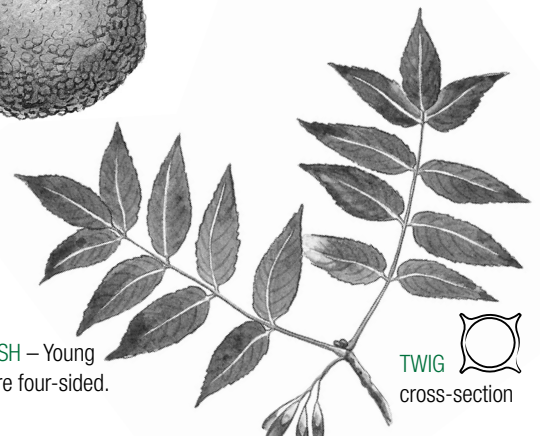


**OSAGE-ORANGE –** Twigs and leaves have milky sap, with spines or thorns often present on twigs.

**CASCARA BUCKTHORN –**  
Twigs have buds that are hairy and without scales.



**BLUE ASH –** Young twigs are four-sided.



**TWIG** cross-section

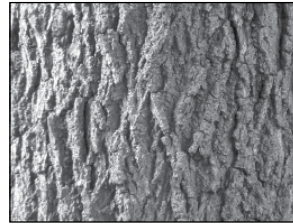


# Bark – Functional and Identifying

In some ways, bark is the tree’s “skin.” It is the outer boundary of the organism, keeping life-sustaining moisture inside and protecting the tree from outside invaders such as fungal spores. Scientists divide bark into various layers with technical names, but inner and outer bark are the two features most of us recognize. The inner bark, or phloem, is the wet, slippery layer made up of vascular cells that conduct sugars from the leaves to the roots and other living cells throughout the tree. That layer is protected by the mostly dead, lignified outer bark. It is the outer bark that serves so well in helping to identify trees, especially those that are larger or mature.

Bark also has great aesthetic appeal. Its appearance is often considered by landscape architects as they plan for the year-round effect of the trees and other vegetation to be planted.

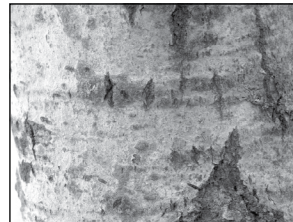
Here are some examples of distinctive bark and the terms used to describe them for identification:



**BLACK WALNUT**  
Deep, narrow furrows with thin ridges.



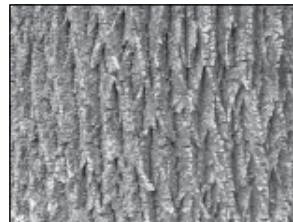
**RIVER BIRCH**  
Dark reddish to gray-brown, breaking into irregular, curly scales.



**QUAKING ASPEN**  
Until very old, smooth cream-colored or greenish-white with corky patches and faint, horizontal striations.



**AMERICAN SYCAMORE**  
Generally smooth, exfoliating (flaking off) in large, irregular, thin pieces providing a mottled appearance.



**WHITE ASH**  
Furrowed with flat ridges that form into identifying diamond shapes.

## HOW TO USE TREE IDENTIFICATION TO SUPPORT A TREE CITY USA GROWTH AWARD

The Growth Award is received by communities that have been a Tree City USA for at least one year and go beyond the four standards to earn 10 points from a list of potential activities. The activities are listed under four categories and can be viewed by navigating to Growth Awards from [arborday.org/programs](http://arborday.org/programs).

Getting to know trees can be a central feature under several activities in Category A: Education and Public Relations. These would include:

- Interpretive Programs (Walks, an arboretum, heritage trees, etc.)
- Youth Education
- Continuing Education for Tree Workers
- Continuing Education for Tree Board Members
- Publicity Events

Tree identification is also basic to a number of activities that earn Growth Award points in Categories B, C and D, respectively: Partnerships, Planning and Management, and Tree Planting and Maintenance. For example:

- Tree Care Workshops
- Tree Inventory and Analysis
- Street Tree Pruning
- Management Planning
- Street Tree Planting
- Ecosystem Service Analysis



**TREE CITY USA®**

# Remarkable Relationships



Knowing the names of trees is important, but trees can also be an excellent springboard into understanding ecological relationships and the importance of trees for environmental health.

“No man is an island...” and neither is a tree. All species are hosts to other plants. In many cases, they are also essential as part of the pyramid of life for animals.

Look at the bark of most older trees and you will find colorful splotches. Some people mistake these as signs of a disease but they are lichens. Lichens are two interdependent (symbiotic) organisms — a fungus and algae. There are hundreds of species of lichens and they commonly use tree bark for support. They do no harm to the tree and often add color and interest to the landscape. Similarly, bark in moist climates often supports mosses, ferns, or even orchids or other plants.

In the higher order of life, virtually all trees provide preferred food and nesting or cover for specific insects, birds, or mammals. For example, eastern cottonwoods are superb habitat for tiger swallowtail butterfly larvae. Huge grizzly bears rely heavily on the small but energy-rich seeds of whitebark pines. In some cases, the very existence of wildlife depends on specific species of trees. Kirtland’s warblers are the classic example. They will nest only under the branches of jack pine trees between the ages of about 5 to 20 years.

When studying trees or teaching others, go beyond naming names. Seek out the species relationships with other life forms — including ours. Most tree species make practical contributions ranging from erosion control or historic uses for medicinal purposes to the low tech solutions of high tech problems such as air pollution and energy consumption. Trees are fascinating, but trees can also be excellent springboards to discussions about much broader environmental issues.

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### For More Information

For additional sources of information about the value of trees, please visit [arborday.org/bulletins](http://arborday.org/bulletins).

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