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TREE WALK THROUGH CHILDHOOD'S GATE



Introduction

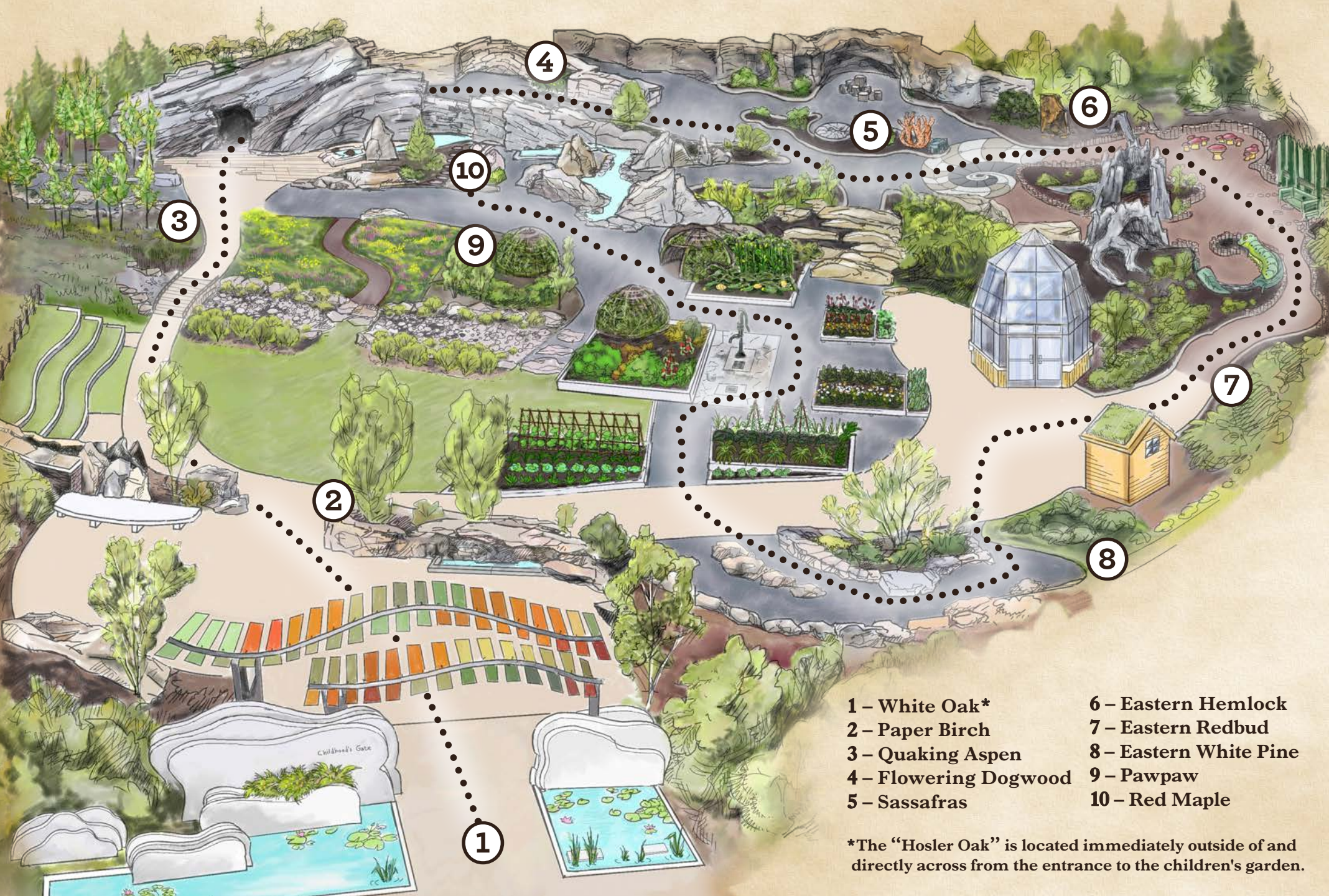
Welcome to The Arboretum at Penn State!

The H.O. Smith Botanic Gardens are made up of just under 10 acres of flowering shrubs, herbaceous plants, and trees. Because the human eye is attracted to things that are bright and colorful, and at eye level, we sometimes miss the majestic beauty of trees.

Trees come in diverse shapes and sizes. They can tower hundreds of feet into the air or grow just a few inches tall, stand straight or twist into fascinating shapes, and bear branches that thrust upwards and outwards or “weep” towards the ground. Contrast the ground-sweeping branches of the red elm behind the Overlook Pavilion with the straight and youthful limbs of the Hosler Oak, and it becomes clear that trees gain character with time. The Hosler Oak is the Arboretum’s “witness tree,” planted in 2005 to “witness” the growth of the gardens, and is the first tree you will encounter during your walk. Imagine how this young white oak will change over its 200- to 400-year lifespan!

Trees, both male (♂) and female (♀) may produce a wide variety of structures, including cones, leaves, seeds, fruits, and flowers. The flowers may be large, showy, and fragrant, and designed to attract pollinators, or small and drab, designed to exchange pollen on the wind. When you visit the botanic gardens in any season of the year, there will be something interesting to see growing on a tree!

Presently, The Arboretum at Penn State hosts nearly 200 varieties of trees, ten of which we have chosen to illustrate in this book. They include our state tree (eastern hemlock), the most common tree encountered in Pennsylvania’s forests (red maple), our most abundant conifer (eastern white pine), and one of the state’s most picturesque species (white oak). Each page explores how the different parts of each tree contribute to its environmental importance, historic and modern value, and aesthetic appeal. We hope that by exploring some of these treasures in the botanic gardens, you will discover that the true beauty and character of trees is often only revealed through closer inspection.



- | | |
|-----------------------|------------------------|
| 1 – White Oak* | 6 – Eastern Hemlock |
| 2 – Paper Birch | 7 – Eastern Redbud |
| 3 – Quaking Aspen | 8 – Eastern White Pine |
| 4 – Flowering Dogwood | 9 – Pawpaw |
| 5 – Sassafras | 10 – Red Maple |

*The “Hosler Oak” is located immediately outside of and directly across from the entrance to the children's garden.

1 WHITE OAK

Quercus alba



Flower: Male yellow-green catkins measure 4–7 inches; tiny and inconspicuous red-green female flowers grow in pairs. Once their pollen is released, male catkins are shed from the tree.

Bark: Bark is pale or ashy gray with scaly ridges. Some claim that oak bark has medicinal properties, including treatment for indigestion.



Leaf: Each leaf displays six to ten deeply rounded lobes and may remain attached to the tree through the winter. Fall colors can vary from shades of red to burgundy.

Fruit: Mature trees bear 1-inch oblong acorns with warty caps covering $\frac{1}{4}$ of each nut. The sweet inner flesh is often consumed by wild birds and animals.



FAMILY: Oak & Beech

DID YOU KNOW?

- Acorns can be ground into flour for cakes, bread, and porridge.
- The *USS Constitution*, famous ship of the Revolutionary War, was built from white oak timber.
- The white oak was named for the appearance of its newly cut wood, which appears light in color.
- Blue Jays bury (cache) acorns across their territory but often forget the location, earning them the nickname of “forest planters.”



Catkin: a long cluster of tiny flowers that hangs from some trees.

2 PAPER BIRCH

Betula papyrifera

♂



Flower: Male yellow-brown catkins droop in clusters; smaller green female catkins stand upright. Each catkin produces dozens of tiny seeds (nutlets) which are a source of winter food for many forest animals.



Bark: Peeling bark may appear light gray or white, with black lenticels. Abenaki, Malecite, and Algonquin peoples used this pliable, water-resistant bark to build canoes.

Lenticel: a raised pore that provides oxygen to woody plants.



Leaf: Each ragged-edge, semi-glossy leaf measures 2–4 inches, changing from dark green to yellow in the fall. White-tailed deer may consume birch leaves in autumn.



Fruit: Female catkins release tiny brown nutlets that disperse via the wind over winter. Trees only begin to produce seeds around the age of ten.

FAMILY: Birch

DID YOU KNOW?

- This tree received its name from the nature of its bark, which resembles sheets of paper.
- The leaves, buds, and twigs from paper birch trees provide food for animals such as snowshoe hare, moose, porcupine, beaver, and many bird species.
- Birch wood is used to make materials such as toothpicks, popsicle sticks, and clothespins.



3 QUAKING ASPEN

Populus tremuloides

♀

Flower: Unlike birch, male and female catkins of aspen are produced on separate trees. Only the male catkin contains pollen, which is carried to the female tree by the wind.

Bark: This tree's smooth, green-to-white bark does not peel but turns dark gray and develops warty patches with age. Its wood is used to make paper pulp and animal bedding.

Pollen: powder which fertilizes female flowers to produce seeds.

Leaf: Glossy, dark green leaves turn golden yellow in the fall, in shapes ranging from hearts to triangles. Quaking aspen is named for the way its leaves shake in the breeze.

Fruit: After fertilization, female flowers develop into small, light green capsules containing many tiny seeds dispersed in late spring.

FAMILY: Willow

DID YOU KNOW?

- Each year, quaking aspen provides one of the main sources of fall color in the Rocky Mountains.
- The Onondaga peoples are said to have called quaking aspen *nut-kie-e*, meaning "noisy leaf."
- Quaking aspen is a pioneer plant: one of the first species to become established after a fire, flood, or earthquake.



4 FLOWERING DOGWOOD

Cornus florida



Flower: Trees bear small, yellow-green “perfect” (bisexual) flowers surrounded by four white or pink petal-like leaves. These flowers can attract pollinators such as the azure butterfly, Baltimore Oriole, and many bee species.



Bark: Gray-brown bark forms broken rectangular blocks which resemble the bumpy texture of alligator skin. During the Civil War, dogwood bark was sometimes used as a substitute for quinine.

Drupe: a fleshy fruit with thin skin and a single seed.



Leaf: This 3- to 5-inch, ovate leaf features arching veins and a slightly wavy edge, changing from dark green to different shades of red and purple in the fall.



Fruit: Trees produce glossy red drupes in clusters; though the bitter fruit is inedible to humans, it is commonly enjoyed by birds and other wild animals in the fall.

FAMILY: Dogwood

DID YOU KNOW?

- The extremely hard wood of this tree was used in the past for the construction of textile machines, wooden wheel hubs, and mallets.
- The name *dogwood* likely refers to the historic practice of harvesting twigs for wooden daggers, known at the time as “dags” or “dogs.”
- Unfortunately, dogwood anthracnose disease has killed many of the state's wild and ornamental dogwood trees since the 1980s.



5 SASSAFRAS

Sassafras albidum



Flower: Male and female trees bear green-yellow flower clusters at the ends of branches. A sticky substance on each flower's stem deters ground-dwelling insects from pilfering nectar and pollen.

Bark: Soft and corky bark is ridged and furrowed with inner cinnamon-brown color, releasing a spicy aroma when cut. Although historically used to make homemade tea, sassafras bark contains a known carcinogen and is not recommended for consumption.



Ovate: a leaf two to three times as long as it is broad.



Leaf: Leaves may be ovate (no lobes), two-lobed (mitten-shaped), or three-lobed. This leaf's bright green color changes to scarlet in the fall and is fragrant when crushed.

Fruit: Female trees display shiny, ½-inch, blue-black drupes with scarlet stalks in late summer, providing a feast for many species of birds.



FAMILY: Laurel

DID YOU KNOW?

- Native peoples once relied on sassafras for its medicinal uses, including mouthwash, cough syrup, and treatment of fever.
- The spice *filé* is made from dried sassafras leaves, and is a key thickening ingredient in Cajun gumbo.
- European settlers were so impressed by the supposed healing powers of sassafras oil that sassafras roots were exported from early American colonies back to Europe in great quantities.



6 EASTERN HEMLOCK

Tsuga canadensis



Flower: Though technically not flowers, male “cones” are small, rounded, berry-like pollen-bearing structures, while female “cones” are elongated and yellow-green. Both are a source of food for the state bird of Pennsylvania, the Ruffed Grouse.

Bark: Young bark is flaky and scaly, forming deeply furrowed, flat ridges with age.

The hemlock woolly adelgid, a sap-sucking insect, poses a serious threat to the survival of wild hemlocks in the eastern region of the United States.



Leaf: Flat clusters of short, tapered evergreen needles adorn the branches of the eastern hemlock, providing important shade along streams for aquatic life.



Fruit: Though technically not fruit, trees produce small, light brown, bell-shaped cones in early fall.

FAMILY: Pine

DID YOU KNOW?

- The eastern hemlock was named the state tree of Pennsylvania due to its historically economic importance as a source of timber and bark for tanning.
- The common name “hemlock” was given because the crushed foliage smells like that of the poisonous hemlock herb, which is native to Europe.
- The winged seeds of hemlock cones are consumed by many native bird species.



Evergreen: a plant that retains green foliage throughout the year.

7 EASTERN REDBUD

Cercis canadensis



Flower: Trees bear small, lavender-to-pink “perfect” (bisexual) flowers, which occur in pea-like clusters before summer foliage appears. Despite their slightly sour taste, they are rich in vitamin C and can be used as garnish on foods like breads, salads, and pancakes.

Bark: Young bark is smooth and brown, later changing to brown with orange inner bark and scaly ridges. When boiled in water, twigs produce yellow dye.



“Perfect” Flower: having both male and female parts.



Leaf: These smooth, heart-shaped leaves are dull blue-green in color, turning yellow in the fall. Beneficial leafcutter bees will often line their nests with redbud foliage.



Fruit: Trees produce flat seed pods measuring 2–4 inches and containing six to twelve seeds, which are consumed by native birds including the Northern Bobwhite and Black-capped Chickadee.

FAMILY: Legume

DID YOU KNOW?

- George Washington wrote often about the beauty of the eastern redbud, and was reported to have spent many hours transplanting seedlings obtained from a nearby forest.
- Early blossoms will attract songbirds and many nectar-seeking pollinators (including butterflies), who enjoy this tree's flowers as a source of food.
- Redbud is one of few native Pennsylvania trees with non-white spring flowers.



8 EASTERN WHITE PINE

Pinus strobus



Flower: Though technically not flowers, pollen-bearing, light yellow male cones are borne at the base of new growth, while pink-yellow female cones are borne near the ends of twigs.

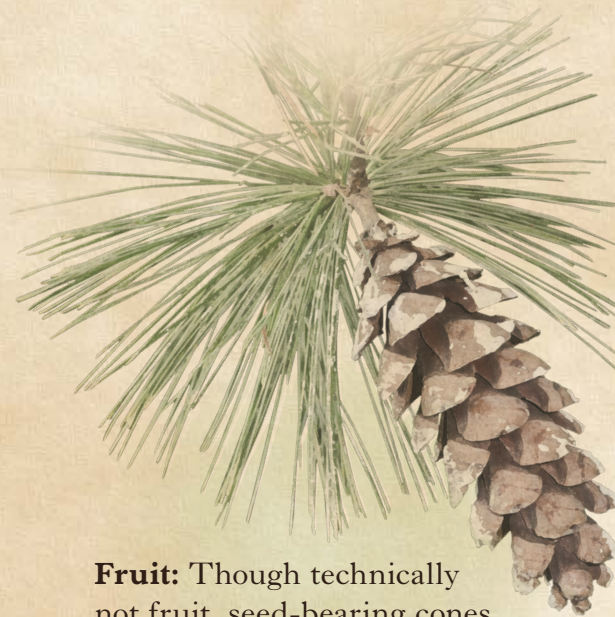
Bark: Young bark is green-brown, changing to dark gray-brown and developing deep, scaly ridges with age. In the wild, the eastern white pine can grow to heights of up to 100 feet, though some have been documented at over 200 feet.



Resin: a thick, sticky substance produced by some trees to deter pests.



Leaf: Evergreen boughs produce 5-needle clusters of smooth, 4- to 5-inch, blue-green needles that are soft to the touch.



Fruit: Though technically not fruit, seed-bearing cones are light brown, 4–7 inches long, resinous, and curved.

FAMILY: Pine

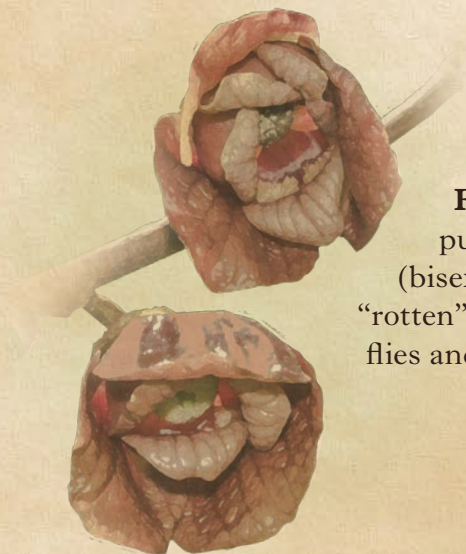
DID YOU KNOW?

- This tree was once harvested so heavily that conservation laws were enacted for its protection.
- The eastern white pine was featured on the first flag of the American Revolution.
- As the largest pine species found in the eastern United States, and valued highly for its lumber, this tree's straight, long trunk was once used to make masts on colonial ships.



9 PAWPAW

Asimina triloba



Flower: Trees produce red-purple, bell-shaped “perfect” (bisexual) flowers with a slightly “rotten” smell that attracts pollinating flies and beetles.

Bark: Bark is smooth and gray, becoming slightly scaly with age. Pawpaw wood is naturally insecticidal, making the tree essentially free from pests.



Berry: a fleshy fruit containing many seeds.



Leaf: The tropical-looking, 5- to 11-inch leaves are arranged alternately on branches. They become clear yellow in the fall and release a peppery aroma when crushed.



Fruit: This tree's large fruit is an edible berry and has a custard-like consistency, often described as tasting like a blend of banana, mango, and pineapple.

FAMILY: Custard-Apple

DID YOU KNOW?

- Often described as “America’s forgotten fruit,” pawpaw fruit is full of antioxidants and Vitamin C. Just one pawpaw fruit has two times as much Vitamin C as an apple.
- Frozen pawpaw fruit was reportedly the favorite dessert of George Washington.
- Pawpaw trees are bisexual, but they still require cross-pollination from an unrelated pawpaw tree to produce new seeds and fruits.

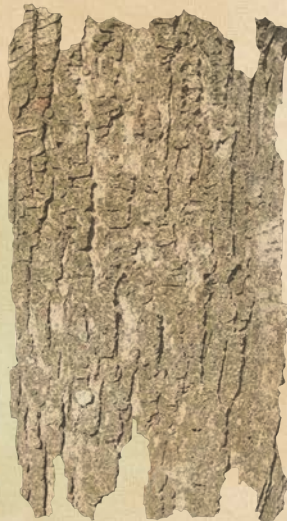


10 RED MAPLE

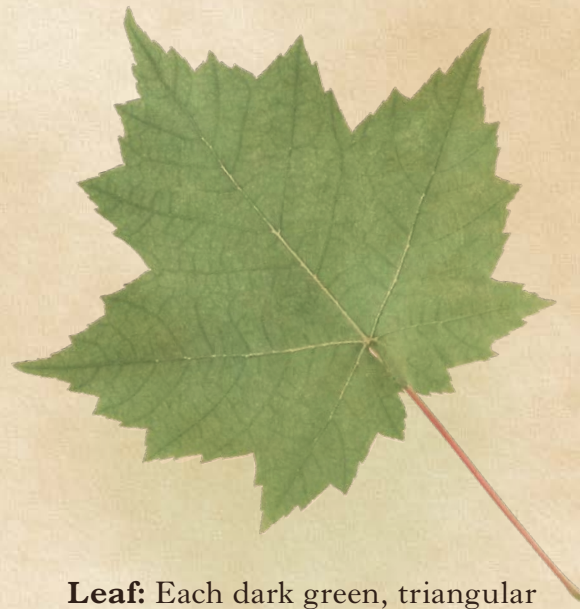
Acer rubrum



Flower: While most trees bear either unisexual or bisexual flowers, red maple produces both. Red maple trees develop reddish, rounded buds and showy clusters of droopy red flowers.



Bark: Young bark is smooth and gray, eventually turning dark and developing rough, scaly ridges with age. Early American pioneers sometimes used maple bark to make black and dark brown-colored ink and dyes.



Leaf: Each dark green, triangular leaf features three to five lobes and irregular texture, transforming into its namesake—brilliant red—in fall.



Fruit: Clusters of ¾-inch to 1-inch samaras are produced in early June (unlike sugar maple, which produces its samaras in the fall).

FAMILY: Maple

DID YOU KNOW?

- The red maple is one of many maple trees that can be tapped for maple syrup. Although its cousin, the sugar maple, is more widely known, the red maple is the most abundant of any tree species in the state of Pennsylvania, accounting for 23% of all trees over five inches in diameter.
- The red maple is one of the most commonly planted ornamental trees in North America.



Samara: a fruit with a dry, papery wing.

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EASTERN HEMLOCK

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FLOWERING DOGWOOD

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EASTERN REDBUD

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EASTERN WHITE PINE

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