

TREE DETECTIVE

Materials: Tree key, journal, pencil, magnifying glass, smart phone for apps (*optional*)

Background: Trees create important habitat in West Virginia and provide many ecosystem services for people. There are many species of trees that grow in West Virginia including conifers (evergreen) and deciduous trees (which lose leaves in the fall). Tree experts, called arborists, use clues to find out which species of trees are growing in the forests of West Virginia. These clues also help tree growers and planters put the right type of trees in new places to grow. These clues include the bark, seeds, flowers, tree shape, habitat, but especially the leaves. Simple clues like conifers have needles and deciduous trees have flat, wide leaves can help arborists know which type of tree is in an area to help make decisions about the forest. Visit <https://www.plt.org/> for more tree information.

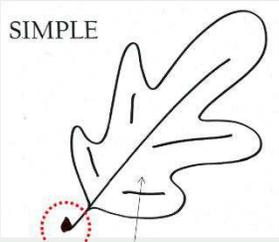
Directions: Arborists investigate tree species using a special tool called a key. Keys ask questions about a tree that you are looking at in real life. By following along with the directions in a key, it will lead you towards the name of the tree type. **Remember to be safe around trees and have permission from an adult to explore forests.**

When using a key, always start at number one. By answering this question, the key will point you towards another number. Go to that number, answer that question, and the key will point you towards another number. Follow these directions until the key sends you to a **bold** species name; this is the type of tree you are looking at. Remember that there are hundreds of types of trees in West Virginia and the key in your Tree Packet only has fifteen types of trees. You may follow the directions and not get a correct answer because this key only includes some types of trees. After some practice, you can find keys with more types of West Virginia trees online or at bookstores. You can also use the phone app iNaturalist, if available, to help.

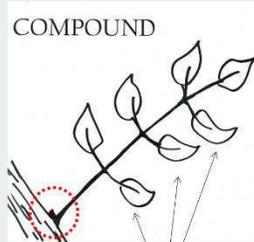
WHY IS THIS IMPORTANT?

Trees are an important part of the ecosystem in West Virginia and help people every day. Trees produce fruit, nuts, seeds, and maple syrup for people and animals. On a hot day, trees provide shade to cool down communities. Through photosynthesis, trees make oxygen and the leaves can capture air pollution, making cleaner air. Tree roots can prevent erosion and capture extra water to keep rivers and streams clean. Tree experts want to plant more trees in communities in West Virginia, but different types of trees will survive better in different places. In order to put the right type of tree in the right place, tree experts have to know which species of tree they are planting or growing using tree identification.

In order to use a key, you'll have to learn some new vocabulary. Review the images below to make sure that you understand the difference between the types of leaves:



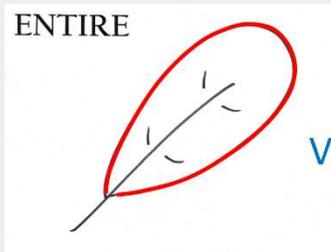
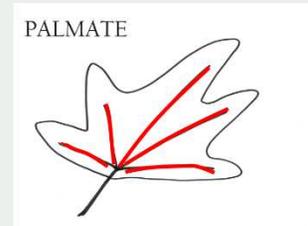
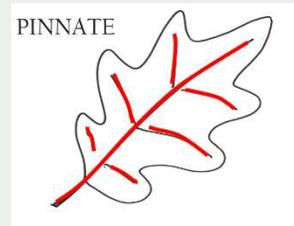
Leaf



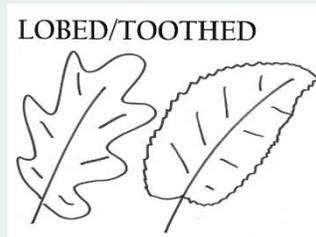
Leaflets

Look at where the leaf attaches to a branch. If one big leaf is attached to the branch, the leaf is **simple**. If there many small leaflets but only one place to connect to a branch, the whole leaf is made up of these small leaflets, but it is still one leaf. That leaf is **compound**.

Look at one leaf on the tree and look for the veins inside. If the pattern looks like a feather with a long center vein and veins coming out to the sides from the center vein, the leaf is **pinnate**. If the leaf has veins coming from one point at the bottom like fingers, the leaf is **palmate**.

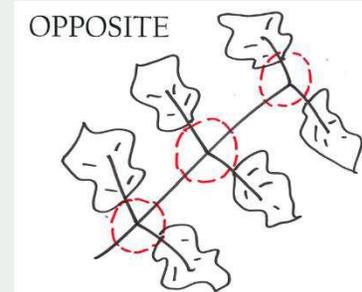
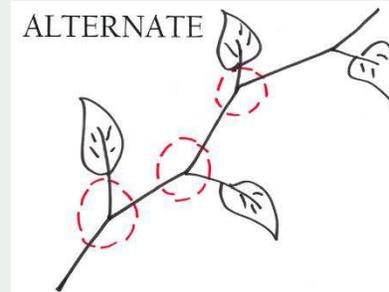


VS



Look at the outside shape of one leaf. If the overall shape is a smooth oval, the leaf is **entire**. If the outside is smooth but with wavy curves, like earlobes, the leaf shape is **lobed**. If the outside shape is jagged, and looks like a shark bite took out pieces, the shape is **toothed**.

Look at the branch of a tree to see where the leaves connect; you CANNOT look at a single leaf. Looking at all the leaves, look for the pattern of where the leaves connect. If all the leaves connect directly across from another leaf, like a twin sprouting from the same spot, the pattern is **opposite**. If the leaves are missing their twin and alternate in their pattern, meaning there is a leaf on the left but there is a blank spot on the right until further up the branch, the pattern is **alternate** on the branch.

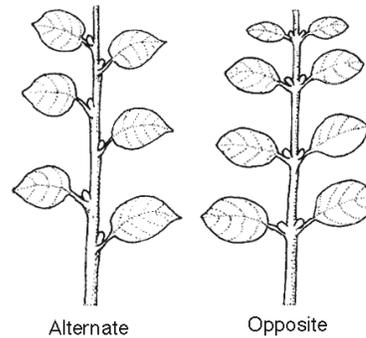


To get your summer fun box, send in a picture of you using your key or a list of tree species you found at <https://www.cacaponinstitute.org/teach/stream-scholars-summer-camp/>

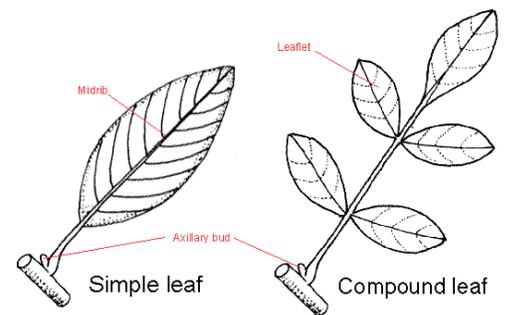
IDENTIFICATION KEY TO SOME COMMON WEST VIRGINIA TREES

Always start with number 1. Read both choices, and follow the directions based on your choice. When you reach a **name**, you have identified the tree! Scientific names are in parentheses.

- 1) Leaves are opposite on the stem → Go to 2, or
- 1) Leaves are alternate on the stem → Go to 5



- 2) Leaves are compound (divided into parts) → Go to 4, or
- 2) Leaves are simple (having only one part); → Go to 3



- 3) Leaves with several large points and lobes, bark is light gray, smooth at top, rougher near base of tree → **Red Maple** (*Acer rubrum*), or
- 3) Leaves are elongated ovals ending in a point, with no teeth along edge; bark rough → **Flowering Dogwood** (*Cornus florida*)
- 4) Leaves have 3 to 5 leaflets and may resemble poison ivy → **Boxelder** (*Acer negundo*), or
- 4) Leaves have 7 to 9 leaflets → **Green Ash** (*Fraxinus pennsylvanica*)
- 5) Leaves are compound (divided into parts) → Go to 6, or
- 5) Leaves are simple (having only one part); → Go to 7
- 6) Compound leaves with 10 to 41 pointed leaflets; bark light gray, resembling cantaloupe skin → **Tree of Heaven** (*Ailanthus altissima*) non-native species,
- 6) Compound leaves with 12 to 23 lance-shaped leaflets; bark rough with deep ridges on bigger trees → **Black Walnut** (*Juglans nigra*)
- 7) Leaves are triangular → Go to 8
- 7) Leaves are heart shaped; → Go to 8, or
- 7) Leaves are NOT triangle or heart shaped; → Go to 9

- 8) Leaves triangular (may appear slightly heart shaped) with TOOTHED edges, 3 to 6 inches long; bark is gray, with deep ridges → **Eastern Cottonwood** (*Populus deltoides*) ,
- 8) Small tree, leaves heart shaped with SMOOTH edges, 3 to 5 inches long, seeds in brown, flattened pods 2 to 4 inches long → **Eastern Redbud** (*Cercis canadensis*)
- 9) Leaves pinnately oval-shaped with toothed edges and a single point at the end → Go to 10, or
- 9) Leaves are pinnate with many lobes → Got to 11, or
- 9) Leaves are palmate with several main points or lobes → Go to 12
- 10) Leaves oval to lance shaped ending in a sharp point, with toothed edges (yellow fall color); bark on a young tree is dark reddish brown to nearly black with horizontal, pores; bark on a mature tree is dark gray breaking into plates. → **Black Birch** (*Betula lenta*)
- 10) Leaves basically oval, rough-feeling, with double-toothed edges; bark is dark gray and may have ridges in a diamond pattern → **American Elm** (*Ulmus americana*)
- 11) Leaves have SMOOTH, wavy, rounded lobes; bark is pale gray, shaggy → **White Oak** (*Quercus alba*)
- 11) Leaves have sharply POINTED and bristle-tipped lobes (fall color is deep red); bark is gray and smooth when young but with shallow ridges on older trees → **Red Oak** (*Quercus rubra*)
- 12) Leaves have 4 to 6 points and SMOOTH edges; bark is light gray, with narrow ridges running lengthwise → **Yellow Poplar aka Tulip Tree** (*Liriodendron tulipifera*), or
- 12) Leaves have 3 to 5 main points and RAGGED edges; bark is a mixture of brown, gray, and white near the top, with some peeling areas → **Sycamore** (*Platanus occidentalis*), or
- 12) Leaves have 5 main pointed lobes in FINE SAW-TOOTHED edges with a palmate pattern (appears star-shaped); bark is gray-brown with deep ridges roughened by corky scales → **Sweetgum** (*Liquidambar styraciflua*)

Alternate Opposite image url: <http://www-saps.plantsci.cam.ac.uk/trees/images/altopp.gif>

Simple Compound leaf image url: <http://www-saps.plantsci.cam.ac.uk/trees/images/simpcomp.gif>