



Autumn Leaf Exploration



Everywhere you go colorful leaves are on the ground or falling from above. Their abilities to change colors and fall from their tree are phenomenon that generate many questions. Before we can answer any questions, however, we need get outside for a leaf walk and do some observing with our eyes, noses, and fingers. The leaves we will focus on will be from deciduous trees (from the Latin word meaning "to fall"). That means we will NOT collect leaves from evergreen trees. Yes, those needle-like things on evergreens are leaves. We will explore them another time. Note: Even though we consider flowers and vegetables in gardens to be plants, all trees are plants too, just really big, and sturdy plants.

Your quest:

Collect a variety of interesting leaves that have fallen on the ground. Collect any you like that are pretty, BIG, or small, or have a nice feel, smell, color, or shape. See if you can collect five samples of each kind of leaf you find. Once you have your collection, you will sort them by various characteristics (shape, size, color, texture, edges, veins or whatever you want). Eventually, maybe with the help of an adult, you can identify the name of the tree the leaves came from. In the end, we will make a plant press to flatten them, and after that, we will have some creative ideas for using the flattened leaves.



Caution:

Beware of **stinging nettle** (*Urtica dioica*)! "Stinging nettles are typically erect, slender plants reaching two to nine feet high. Minor to severe reactions can result from skin contact with the stinging hairs or bristles of stinging nettles. The stinging sensation results from the presence of irritating chemicals in the hairs. Stinging nettles occur in moist woodlands and shady areas throughout the region. Stream banks are a common site." <http://hortsense.cahnrs.wsu.edu/> →



Theodore Webster, USDA Agricultural Research Service, Bugwood.org

Materials needed:

Paper grocery bag or cardboard box for leaf collecting
Autumn Leaf Exploration packet



Directions:

On a dry day, and dressed in long pants, jacket, and boots (or grubby shoes) walk around your neighborhood or go to a local park. Wherever you go, be on the lookout for trees and the leaves beneath them or nearby. See if you can find some of the leaves that look like those on the leaf illustration pages. Whatever you find examine it carefully. Decide if it is worthy of your collection. To make that decision, pay special attention to its...

- ☑ **Shape:** Is it round, squarish, triangular, oval? Does it have jagged, smooth or scalloped edges? Does it have deep indentations that make it look like fingers? Does it have pointy parts, or rounded parts?
- ☑ **Color:** Is it still green? Is it yellow, orange, red or brown? Does it have more than one color on it? Does it have round dark splotches? Is the leaf shiny or dull?
- ☑ **Texture:** Does your leaf feel smooth and flat, or bumpy? Is it soft, floppy, and thin, or tough and hard to bend? If you feel the underside, is it fuzzy, hairy, or spiky? (If you drip water onto the upper or undersides of a leaf it may reveal tiny hairs.)
- ☑ **Size:** Is your leaf tiny, small, medium, large, or humongous?
- ☑ **Smell:** Without touching your nose to the leaf, does it stink, smell sweet, musty, or spicy?
- ☑ **Uniqueness:** Is there something living on the leaf? Has something been nibbling on it? Is it the prettiest you've seen? Did you find this leaf far away from the tree it came from?



Before you go home:



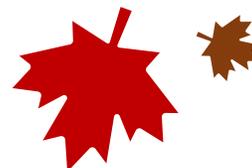
- ☑ If it's a windy dry day and leaves are falling, spend some time just running around trying to catch leaves before they hit the ground.
- ☑ Locate a tree that hasn't changed color yet. Then go back to make observations over the next few weeks to see when, or if, it does change color.



Comparing and sorting leaves at home:

When you get back home, spread your leaves out in front of you. Describe each leaf to yourself, then compare it with other leaves. In what ways are these leaves different? How are they similar? Which tree did they come from? Sorting and grouping similar things is called classification. So, sort by some characteristic like the color yellow. Put all the yellow leaves together. Now sort through them for another characteristic. For instance, they have smooth (entire) edges. This means that you will be sorting and resorting everything you have. Sort by shape, vein patterns, leaf margins (edges), lobes, size, color...whatever you like. Use the illustration pages to help sort leaves and identify trees.

Questions to ponder while sorting:



- ☑ Why do leaves change color?
- ☑ Why are some leaves colorful, while others are not?
- ☑ Why are leaves on the same tree different (size, color, shape)?
- ☑ Why do different trees make red leaves, while others make yellow?
- ☑ Why do leaves fall off? Is there something that "makes" them fall off?
- ☑ Why do leaves fall in autumn and not in other times? Are leaves on a schedule?
- ☑ Can leaves tell what time of year it is?
- ☑ Why don't evergreen trees lose their leaves every fall?
- ☑ What will happen to all the leaves on the ground?

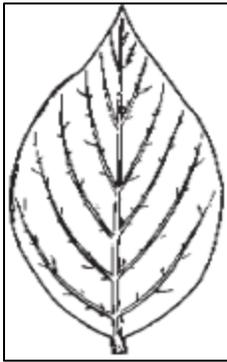


Fun Leaf Math:

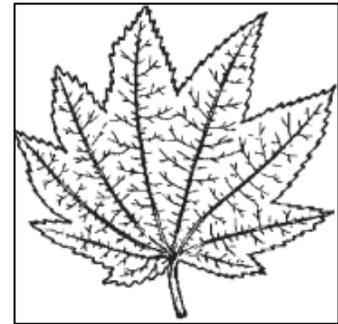
- ☑ Count the total number of leaves you collected. Count them in different categories (size, color, shape...). Count the number of points on each of the pointy leaves. Is there a pattern?
- ☑ Rake an area of lawn or concrete. Then wait 10 minutes and count how many leaves fell within that time. Multiply to figure how many will fall in an hour.
- ☑ Try to figure out how long a leaf has been on the ground by its dryness/wetness.
- ☑ Stack a bunch of leaves of the same kind, one on top of the other. See how many it takes to reach 1 inch tall. Do different kinds of leaves take more or fewer leaves to reach 1 inch?
- ☑ Measure the width of your largest leaf; the smallest one.
- ☑ Measure the length of the leaf stem (petiole). What do you notice?
- ☑ Arrange leaves from largest to smallest, or thinnest to widest
- ☑ Find triangular, oval, circular, diamond, and square leaf shapes.



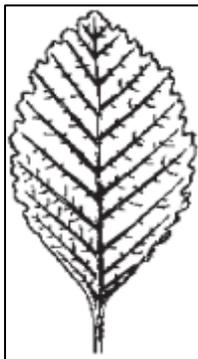
The most common trees you'll find in local parks will be black cottonwood, vine maple, big leaf maple, and red alder. **See if you have collected any of their leaves by using these pictures and descriptions.** (Illustrations and descriptions below are from *Trees of Washington State EB 0440 Washington State University.*)



Black Cottonwood leaves are alternate, simple, usually oval, finely crenate-serrate, rounded or heart-shaped at the base, dark green above, rusty brown to silvery below, and 3 to 6 inches long, leaf stem (petiole) rounded. ←



Vine Maple leaves are opposite, simple, 2 to 6 inches long, circular, heart-shaped at the base, and palmately (hand-like) seven to nine-lobed, doubly serrate. Leaves turn scarlet in the autumn. →



Red Alder leaves are alternate, simple, ovate-elliptical, serrate-dentate with small gland-tipped teeth, rusty hairs on main underside veins, dark green and without hair above, wrinkled, 3 to 5 inches long, 1 1/2 to 3 inches wide. ←



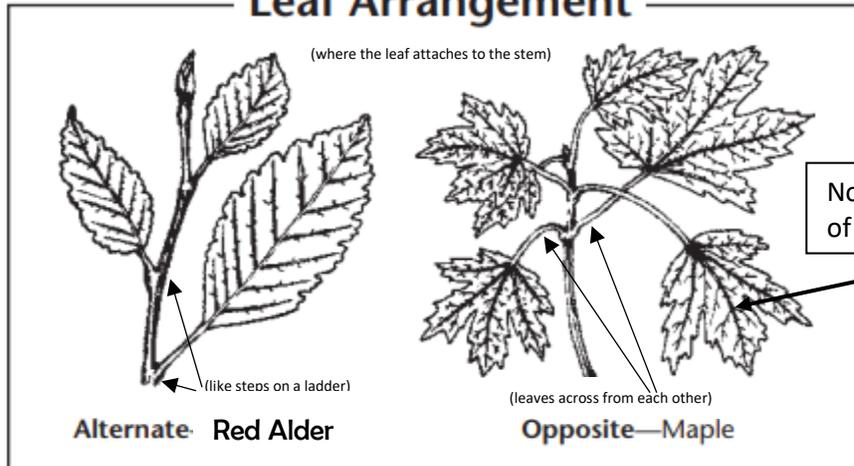
Big Leaf Maple leaves are opposite, simple, palmately (hand-like) five-lobed, top lobe often three-lobed, margins entire, heart-shaped at base, green above, paler below, 8 to 12 inches long, with leaf stem (petiole) 10 to 12 inches long. →

Why study leaves and trees? Are they even important? YES!!!

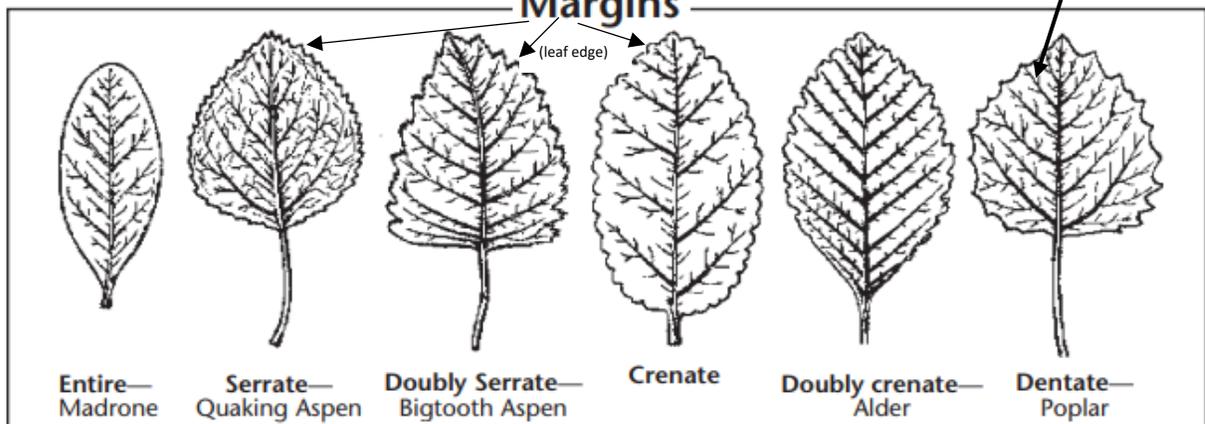
- 🟢 Leaves produce the oxygen we breathe.
- 🟢 Leaves gobble up carbon dioxide in the air and reduce the amount of carbon dioxide in the atmosphere, helping to reduce climate change.
- 🟢 Leaves can make their own food. That's right! We can't do that, but they can. They take sunlight plus water, plus carbon dioxide, and make a sugar, which feeds the rest of the plant from top to bottom root. AMAZING! This is a good thing too, because most living things, including us, directly or indirectly eat them.
- 🟢 Trees and their leaves provide habitat for animals from bees to owls. Trees provide lots of space, food, shelter, and places to raise young.
- 🟢 Trees can reduce the temperature of the air around them.
- 🟢 Some trees and leaves are sources of medicine.
- 🟢 They filter fine particle pollutants (like smoke) within 300 yards of a tree.
- 🟢 A tree's canopy of leaves intercepts rain. Tree roots with their surrounding soil intercept water runoff. Both reduce the effects of flooding.

The following illustrations came from *Trees of Washington State* EB 0440 Washington State University. They represent many native trees that have grown here naturally for thousands of years. You might find many of these, or none at all, during your exploration. Some of the trees you encounter could very well be from different parts of the world and purchased in a nursery.

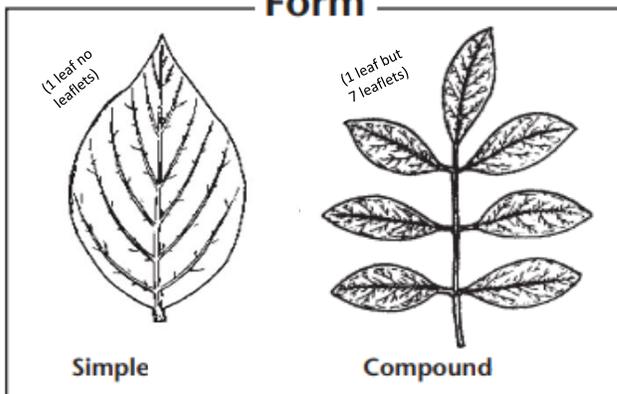
Leaf Arrangement



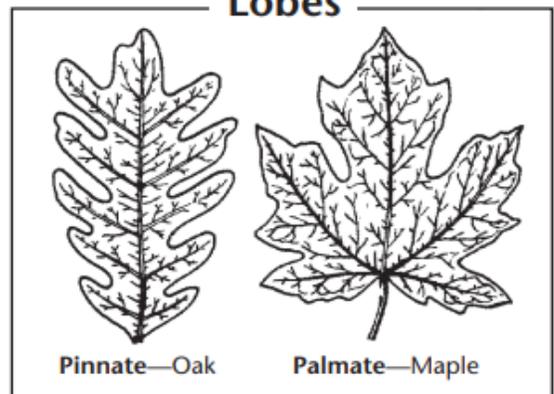
Margins



Form

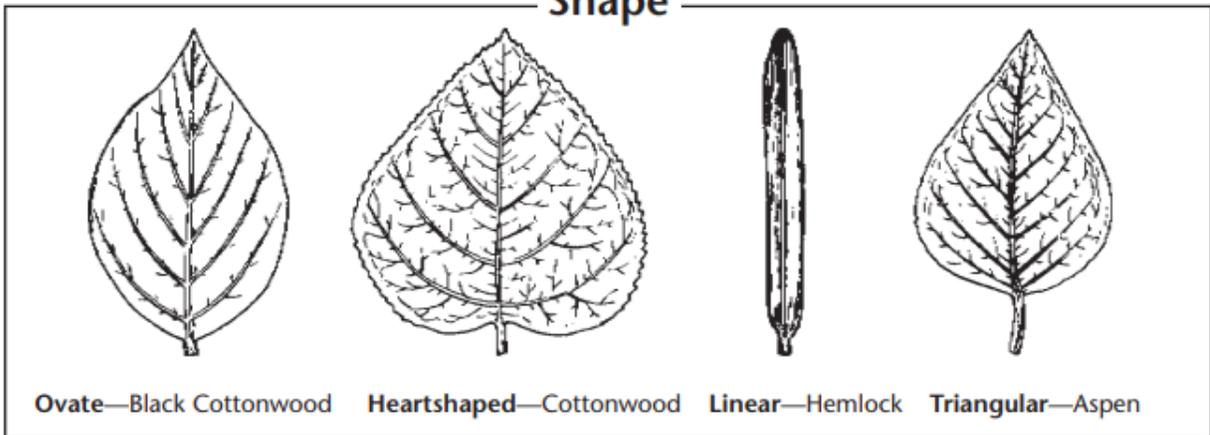


Lobes

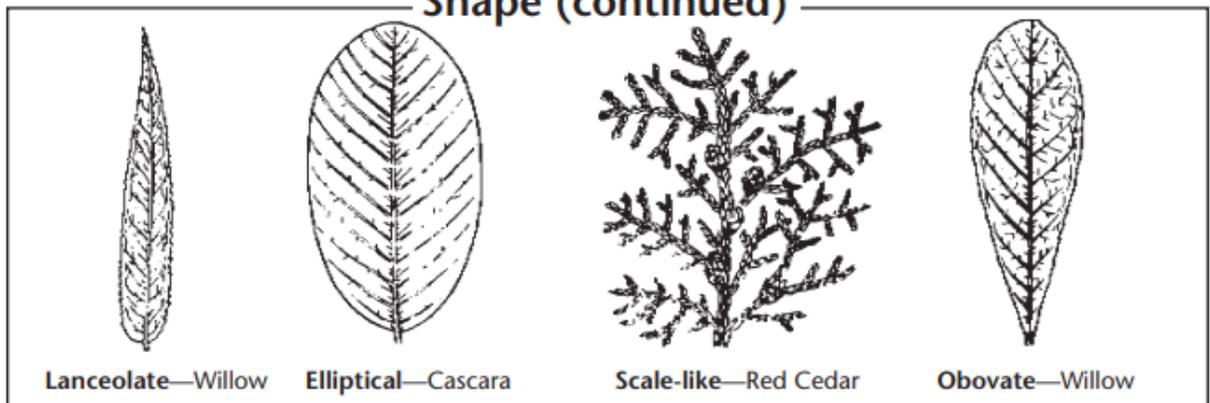


(Lobes are like peninsulas--Leaves with indentations)
 Pinnate = like feathers
 Palmate = like your hand

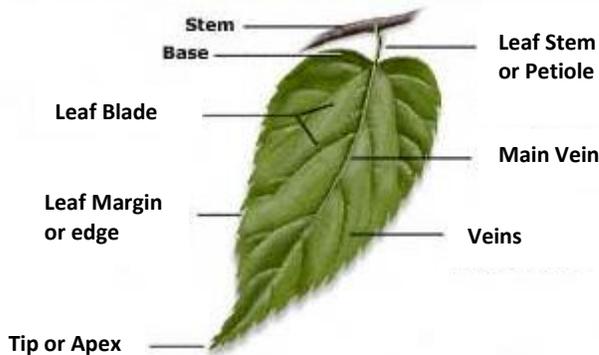
Shape



Shape (continued)



Parts of a Leaf



What are leaf veins? Leaf veins are similar to the blood veins in our bodies. Instead of blood, though, they transport water, minerals, and sugars throughout the plant, top to bottom.

<http://texastreeid.tamu.edu/content/howToID/>

For beautiful color images and great plant descriptions go to this website from Washington State Native Plant Society. Scroll down to coniferous trees to look at evergreens, and scroll down more to flowering trees, to look through deciduous trees. <https://www.wnps.org/starflower>



NGSS—Next Generation Science Standards touched on with this leaf exploration

- 📌 LS1-A Structure and Function: All organisms have external parts. Plants have different parts (roots, stems, leaves, flower, fruit) that help them survive and grow.
- 📌 Science and Engineering Practices--Planning and carrying out investigations: Make observations and/or measurements to collect data that can be used to make comparisons.
- 📌 Science and Engineering Practices—Constructing explanations and designing solutions: Make observations to construct an evidence-based account for natural phenomena.

Now Let's Make a Plant Press

Materials:

pieces of cardboard
Several pieces of newspaper
2 super large rubber bands, bungie cords, or a belt



Directions:

1. Select the best leaves of your collection but choose ones that will fit inside your plant press. Dab them with a paper towel to dry them if they are damp.
2. Keep your leaves fresh. If you need to keep them overnight before pressing, place a damp paper towel along with the leaves inside a sealed plastic bag. This will keep them from wilting too much. Get them into the plant press as soon as possible, though.
3. A plant press sandwiches leaves and other plant parts between layers of absorbent material and cardboard. This will help them dry quickly. Newspaper, or paper towels work fine. The inside of your plant press will consist of alternating layers of plants arranged on newspaper or paper towels, and layers of cardboard.
4. Start making your plant press sandwich. The sandwich will alternate like this: cardboard, paper, leaves, paper, and then repeat cardboard, paper, leaves, paper. Be sure to carefully lay each leaf in between 2 sheets of paper. You can lay a few leaves of the same thickness on the same piece of paper, as long as they don't touch. Continue layering until all your cardboard is used up and you have a piece of cardboard on the top and bottom.
5. Once your sandwich is constructed, bind everything together with the two large rubber bands, bungies, or belt. Then to squish leaves flatter, put something heavy on top of the plant press, like a big book, a rock or brick, a bag of flour or sugar, or cans of water. You get the idea. Leave the press in a warm place inside your home.
6. Press the leaves for 10 days and then check on their drying/flattening process. If they are still moist, give them another day or two and check again. You can tell if they are too moist when the leaves stick to the newspaper/paper towel. The process could take 14 or more days.



Some creative ideas using leaves:

- Use them to decorate bookmarks, notecards, boxes, or other objects. Review **TIPS** beforehand.
- Preserve leaves between 2 layers of waxed paper. Iron wax paper/leaf sandwich with a cool iron. The wax on the paper will melt and “glue” the leaves in place.
- Glue (see **TIPS**) leaves to construction paper and cover with clear, self-sticking plastic paper like *Con-Tact Paper*. This is a sticky job appropriate for an adult or older child.
- Do a rubbing. With the leaf’s veiny underside facing up, cover it with white paper. Hold paper and the leaf steady, keeping leaf in place, and rub the side of a crayon over the leaf, over and over again until you see the leaf margins and veins. Consider using the actual color of the leaf. →→
- Do another rubbing but use aluminum foil and your fingers.
- Do a leaf print. Paint the veiny side with tempera or watercolors, and while wet, flip the leaf over so the painted side is faces down. Then gently press the leaf on the paper, making sure to press edges and veins, to get the best results. →→
- Create a leaf collection book by gluing leaves onto papers and binding the papers together.



Giftofcuriosity.com---public domain



Creativejewishmom.com---creative commons

TIPS:

- Be sure the leaf is completely dry. Otherwise as the leaf dries, it loses its shape, and pulls away from the paper.
- Before doing anything, decide on a layout of your leaves. Then decide how you will stick the leaves to the paper or surface. This is important because once leaves are attached, they are NOT easily removed.
- Use white glue thinned with water or a Mod Podge to attach leaves to heavy paper.
- If a leaf seems breakable, put the glue on the paper and let it sit until it dries a bit and becomes tacky. Then pick up the leaf with damp fingertips and depress it gently onto the glue.

Other Creative Ideas:

Write a Joke
Why do leaves fall from dogwood trees?
They're afraid of the bark.
😄
Knock, Knock.
Who's there?
Autumn

Write an acrostic poem using autumn words.
Falling
A bundant
Lovely
Leaves

Write a Haiku about fall!
Orange, red, and gold (5 syllables)
Leaves are simply delightful (7 syllables)
Let us collect some (5 syllables)



Resources to find answers for your curious mind.

Books

- 🌿 A Tree Is Growing by Arthur Dorros
- 🌿 Autumn Leaves by Ken Robbins
- 🌿 Count Down to Fall by Fran Hawk
- 🌿 Fall Leaves by Erika L. Shores
- 🌿 Fall Leaves by Katie Peters
- 🌿 Fall Leaves by Loretta Holland
- 🌿 Fall Leaves Fall! By Zoe Hall
- 🌿 Fall Leaves Fun by E. H. Rustad
- 🌿 Fall Leaves, Colorful and Crunch by Martha E. H. Rustad
- 🌿 Fall Walk by Virginia Brimhall Snow
- 🌿 Fletcher and the Falling Leaves by Julia Rawlinson
- 🌿 I see Fall Leaves by Mari C. Schuh
- 🌿 In the Leaves by Huy Voun Lee
- 🌿 Investigating Why Leaves Change Their Color by Ellen Rene
- 🌿 Leaf Trouble by Jonathon Emmett
- 🌿 Leaves and Trees by Elaine Pascoe
- 🌿 Leaves by Charlotte Guillain
- 🌿 Leaves by David Ezra Stein
- 🌿 Leaves by John Farndon
- 🌿 Leaves by Lynn M. Stone

More Books

- 🌿 Leaves by Patricia Whitehouse
- 🌿 Leaves Change Color and Other Questions About Plants by Andy Charman
- 🌿 Leaves Change Color, Why? By Linda Crotta Brennan
- 🌿 Leaves Fall Down by Lisa Bullard
- 🌿 Leaves! Leaves! Leaves! By Nancy Elizabeth Wallace
- 🌿 My Leaf Book by Monica Wellington
- 🌿 One Leaf, Two Leaves, County with Me! By John Micklos
- 🌿 Red Leaf Yellow Leaf by Lois Ehlert
- 🌿 Science and Craft Projects with Trees and Leaves by Ruth Owen
- 🌿 The Little Yellow Leaf by Carin Berger
- 🌿 The Nature and Science of Leaves by Jane Burton
- 🌿 Trees, Leaves, Flowers & Seeds by Sarah Jose
- 🌿 Why Do Leaves Change Color? By Beth Bence
- 🌿 Reinke
- 🌿 Why Do Leaves Change Color? By Betsy Maestro
- 🌿 Why Do Leaves Change Color? By Terry Allan Hicks
- 🌿 Why Evergreen Keep Their Leaves by Annemarie Riley-Guertin

Field Guides

Field guides are books with drawings or color pictures that describe living things, like trees. Compare leaves to the pictures inside these guides to help you identify trees.

- 🌿 Field Guide to the Trees of North America by Keith Rushforth
- 🌿 National Audubon Society Field Guide to North American Trees, western region by Elbert L. Little
- 🌿 National Wildlife Federation Field Guide to Trees of North America
- 🌿 Plants of the Pacific Northwest Coast: by Jim Pojar and Andy MacKinnon
- 🌿 Trees of North America by C. Frank Brockman
- 🌿 Native Trees of Western Washington by Kevin Zobrist
- 🌿 Champion Trees of Washington State by Robert Van Pelt
- 🌿 Trees of the Pacific Northwest by George Petride
- 🌿 Northwest Trees by Stephen F. Arno

Websites:

- Why Leaves Change Colors (Washington State University)
<https://askdruniverse.wsu.edu/2016/09/26/why-do-leaves-change-colors/>
- Why Leaves Fall (National Wildlife Federation)
<https://blog.nwf.org/2014/09/why-leaves-fall-from-trees-in-autumn/>
- Leaf Investigation video (BS Kids)
<https://pbskids.org/video/sid-science-kid/1568872704>
- Features of a Leaf (BBC bite-size)
<https://www.bbc.co.uk/bitesize/topics/znyvcdm/articles/z6btng8>
- Leaf Size and Shape Strategies (Penn State University—best for adults)
<https://www.psu.edu/dept/nkbiology/naturetrail/leaves.htm>