
How to Make Tree Cookies

Use this “recipe” to make tree cookies that not only look good but will also hold up in your classroom for years. **DO ALL THE STEPS!**

1. Select a Species ... Select species that have nice, dark annual rings, such as pines, spruces, firs, walnut, and buckthorn. Conifers and Christmas trees (spruce, fir, cedar, pines) provide wood that is soft, easy to cut and sand, and display nice rings. Deciduous trees that show nice rings include oaks, ashes, maples, elms, cherry, and walnut. Both trunks and thick branches contain annual rings. Some of the most interesting cookies have rings that show a variety of growth patterns, or fire scars, or wounds.

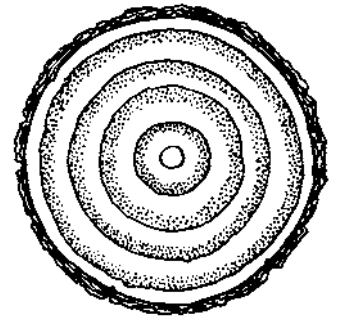
2. Cut the Tree ... Use a large tooth pruning saw (available at hardware stores) to cut the tree at the base and trim off the branches. Then cut the main tree stem into log segments three or four feet in length (up to about a two inch top) and transport them back to work on.

3. Dry the Logs [OPTIONAL]... If you have access to a lumber kiln, dry the log. Just ask the yard supervisor to stick the tree cookie logs in with the lumber being dried. After three or four days in the kiln, the logs should be sufficiently dry and feel much lighter. Otherwise, you can set the logs in a dry, well-ventilated place for about a year.

4. Slice the Logs ... Slice the logs into cookie segments between 1- 2 inches thick. Use a large-tooth pruning saw or a motor-driven saw such as a radial arm saw.

4. Dry the Cookies ... If you dried your cookies as logs, skip this part. Otherwise, **drying is crucial!** If cookies are not dried properly, they will attract mold and fungus. Store your cut cookies in a dry, well-ventilated surface under low humidity for three to ten days. Turn them over daily to allow both sides to dry. Placing them on a driveway on a sunny day also works

well. Air movement is more critical than the amount of sun. If you need faster results, it is possible to very carefully and slowly dry them in an oven set on “warm” (200 degrees or less). This should be done under close monitoring and supervision. Place the cookies on a cookie sheet or foil and allow to slowly dry for three to five hours, turning cookies over occasionally.



***A note about cracking...** By nature, wood often cracks when it dries, and that is just fine for this project! However, if you desire the perfect “uncracked” cookie, there is a lot of discussion about achieving this. The best way to prevent cracking is to cut cookies from a dried, not green, log or branch. The smaller the cookie, the less likely cracking will occur. Some say that cookies are less likely to crack if they are cut at an angle so that the edges are slightly sloped. Finally, others say they get better luck cutting cookies from dried limbs, as the grain is often tighter in the limbs than in the main stem.*

Some cookie-makers soak freshly-cut cookies in a solution of two pounds of sugar for every gallon of water for at least two days. Use a non-metal container and hold the wood down with rocks to submerge. Cookies bigger than three inches in diameter and one-quarter inch thick will need more time. Stir the solution daily. After soaking, put in a well-ventilated place to dry (one week).

Finally, you can get a similar result if you soak fresh-cut cookies in polyethylene glycol (PEG) when the wood is still green. PEG draws the water out and replaces it with the PEG, which is a waxy material. It takes a

few days to dry and the wood becomes a little heavier. PEG looks and feels like paraffin wax. You dissolve it in an equal amount of hot water, then soak the wood in it for about a month, making sure the wood is totally submerged. PEG is sold over the counter under the name of “MiraLAX” (it’s used for constipation). It can be expensive. However, you can get a coupon for it www.miralax.com and find it easily at places like Target.

5. Sand the Cookies ... Properly dried cookies may be sanded by hand or with a mechanical table mounted belt sander. Sand first with course paper and finish with medium paper. Sand the cookies until you can count the annual rings easily.

6. Almost Done ... To stand up to the rigors of classroom life, brush, dip, or spray each cookie with a coat of clear varnish or polyurethane.

7. Label ... It’s an added educational benefit if you can tell the students what kind of tree this cookie came from! Write the species’ name on a piece of masking tape and stick it to the final product. Common names like “white oak” or Latin names like “Quercus alba” are ok.

8. Use the Cookies!

If you are creating cookies as a DNR volunteer project, put the cookies in a box and label them with the species names (if known), location of harvest, your name and contact information, and date (use the attached form).

Drop these cookies off at any DNR office or field station. Tell a DNR staff person on site that the cookies are for Laura Duffey in the Central Office (651-259-5263 or 888-646-6367 or laura.duffey@state.mn.us)

The staff person will be responsible for arranging for the cookies to be shipped, delivered or picked up. The Minnesota PLT program then distributes the cookies to teachers who attend PLT educator workshops. Teachers use the cookies with students in their classrooms to teach about how trees and other woody plants grow, environmental factors affecting tree growth, tree identification, and more.

Finally: THANK YOU! Your work will benefit teachers and their classes across Minnesota!



Why does the DNR need tree cookies?

The Minnesota Department of Natural Resources distributes tree cookies to teachers around the state who participate in the “Project Learning Tree (PLT)” program. Educators use these cookies in their classrooms to teach kids how nature records annual events such as droughts, fires, floods, insects, and growth.

What is PLT?

PLT, or “Project Learning Tree,” is a nationally-recognized, award-winning program that incorporates a suite of activity guides, teacher workshops, grants and other support designed to strengthen the use of environmental education in the classroom. Since PLT arrived in Minnesota in 1978, thousands of educators use lessons in the activity guides to strengthen students’ skills in science, social studies, math, and language arts through an engaging, hands-on environmental context. The Minnesota PLT web site is www.mndnr.gov/plt



Use tree cookies with PLT activities “Tree Cookies” (#76) and “Tree Factory” (#63).

**Next page-
Start your project!**

So you've decided to make some tree cookies for Minnesota Project Learning Tree at the Minnesota Department of Natural Resources!

Thank you!

Please send us a little information about yourself so we can better thank you.
The more we know about you, the more we can help you meet your goals as a volunteer!

Name of primary volunteer: _____

Organization (if applicable to this project): _____

Address: _____

City, State, Zip _____

How should we contact you?

Email address _____

Telephone (_____) _____ (best time to call)

Check one:

I am 17 years old or younger

I am 18 years or older

Why are you volunteering to make tree cookies?

If this is a group project, what are the ages of the other volunteers? (Check all that apply below.)

In elementary school

In middle school

In high school

Adult (age 18 or older)

Volunteer recognition certificates will be mailed upon project completion. For each volunteer who needs a certificate, please send a list of names as they should appear on the certificate.

Please mail, e-mail, or telephone this information to Laura Duffey when you're ready to start. THANKS!

Laura.duffey@state.mn.us

651-259-5263

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MN-DNR, Forestry

500 Lafayette Road

St. Paul, MN 55155-4044

Reading Stories in Tree Rings

Each year, trees that grow in temperate regions (non-tropical) create a layer of wood around the circumference of the trunk and branches. Rapid growth during springtime creates many xylem cells, which make a light-colored wood known as **spring wood**. As tree growth slows during the hot, dry summer, new xylem cells are laid more tightly and produce a darker circle of wood. This is often called **summer wood**. One layer of light-colored spring wood along with one layer of darker summer wood marks the passage of a year in the tree's life. Reading tree rings can give us clues as to former growing conditions, droughts, insect infestations, or fire.

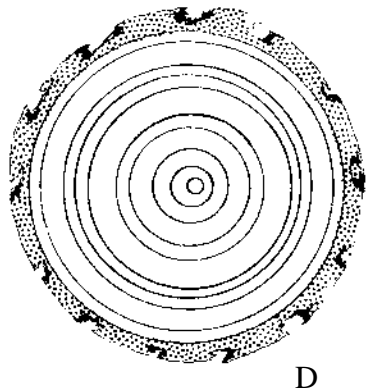
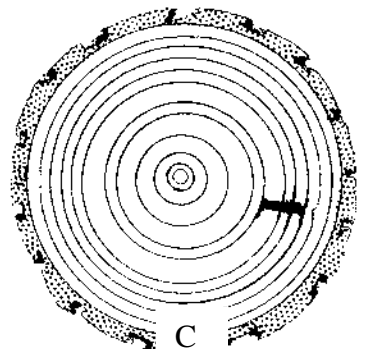
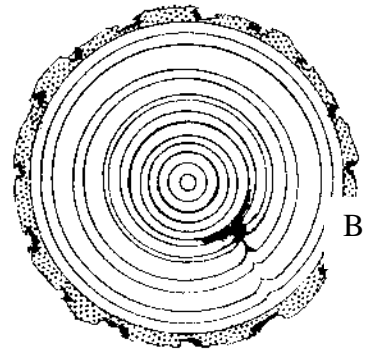
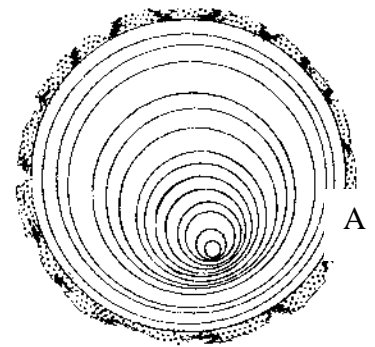
Trained foresters who are familiar with the trees they work with can estimate a tree's age from its appearance. For the rest of us, the only way to know a tree's age is to get a cross-section of the trunk. (Or you can ask a forester for a core sample, which gives you the same information without killing the tree.)

Generally, wide rings indicate years of vigorous growth, and may represent a season of abundant water, sunlight, nutrients, and space. Often, the rings laid on when the tree is a sapling are wider than growth in later years. Narrower rings indicate years of slower growth, and may represent a season of inadequate water, sunlight, nutrients, or space. Sunlight may change from one season to the next due to competition and shading from other trees, topography, or structures.

Sometimes you may notice a ring with wider growth on one side and narrower growth on the other (A). Competition from other nearby trees can cause this condition. Sometimes uneven growth rings result when one tree falls and leans against another live tree and the live tree grew more on one side to curve up around the fallen tree. Other explanations may include a tree growing on a slope or on slumping ground, or a windstorm may have pushed the tree to lean to one side. When that happens, the tree lays on thicker growth on the side closest to the ground in an effort to grow upright again.

Trees record injuries in the form of scars (B). Scars on tree rings may come from fire, insects, or damage from machines like lawnmowers, earth movers, or vehicles. The mark beginning in year six (in C) is all that's left of a branch that died and fell off. Eventually, the tree's trunk grew around the remains of the branch and covered it.

Narrow and wide rings on the same tree (D) could have been caused by intermittent years of drought, insect damage, construction damage or other disturbance. If a tree loses all or most



of its leaves because of an insect attack or drought, it is not able to make food and grows very little that year. Root damage from the construction of a house or sidewalk too close to the tree reduces the water and minerals the roots can absorb.

Are big trees older than smaller trees? Just because a tree is large, don't assume that tree is older than a small tree. For example, a 50-year old cottonwood can grow as tall as 100 feet and grow more than 300 inches in circumference, while the same aged red maple tree could rarely match the cottonwood in diameter and height.

Studying tree rings is called **dendrochronology**. When foresters notice the outside rings of a tree beginning to narrow, which could be a sign that the tree's neighbors are crowding it out.

Sometimes, people cut cross-section disks from the trunk of a tree or branch and then sand and varnish them to make the rings more visible. A sample cross-section is often called a **tree cookie**.



Time to thin this forest. Notice the trees' rings are narrowing toward the outer edges.



Heartrot in American basswood



Fire scar

All photos by Eli Sagor

A note about making tree cookies from European Buckthorn

We know it is tempting to kill two birds with one stone and make cookies from the woody invasive plant, European buckthorn. Buckthorn is a smaller tree with specific characteristics. The following excerpt is pretty technical, but if you can follow it, you'll have better luck!

"Because of buckthorn's dense branching, curving growth habits, and its ability to maintain live branches on lower parts of its stem, any usable piece is likely to contain stresses that cause distortion in addition to that of normal shrinkage."

"Because of the presence of large clusters of earlywood pores, the buckthorn seems a bit coarse compared to the small-pored maple, but not nearly as coarse as ring-porous woods such as the oaks and white ash. In comparison with those woods, precise carved edges are much easier to achieve with the buckthorn. When concave surfaces are cut into its tangential plane and subsequently sanded, the buckthorn does behave like a ring-porous wood, with the earlywood eroding noticeably faster than the latewood. Otherwise, sanding is relatively easy for a wood of this density, and it readily accepts the clear oil-based finishes that I use."

"European buckthorn is not especially photo-reactive, and the attractive orange heartwood darkens only moderately after prolonged exposure to light. The appearance of powderpost beetles and pecky white rot in wood left unprotected outdoors indicates that European buckthorn is not durable."