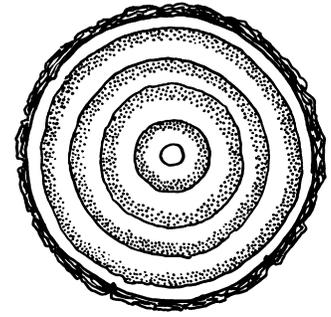


How to Make Tree Cookies

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!**

Select a Species ... Select species that have nice, dark annual rings, such as pines, spruces, firs, walnut, and buckthorn. Christmas trees provide a plentiful supply of wood that is soft and easy to cut and sand. Trunks and thick branches both contain annual rings. Some of the most interesting cookies have rings that show a variety of growth patterns, fire scars, or wounds.



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.

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 poles should be sufficiently dry and feel much lighter.

Slice the Logs ... Slice the logs into cookie segments between $\frac{3}{4}$ " to $1\frac{1}{2}$ " thick. Use a large-tooth pruning saw or a motor-driven saw such as a radial arm saw.

Dry the Cookies ... If you dried your cookies as logs, skip this part. Otherwise, **drying is crucial!** Store your cut cookies in a dry, well-ventilated surface under low humidity for three to ten days. Turn them over periodically to allow both sides to dry. Placing them on a driveway on a sunny day also works well. 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.

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.

Almost Done ... To stand up to the rigors of classroom life, brush, dip, or spray each cookies with a coat of clear polyurethane or a more eco-friendly replacement such as mineral oil, tung oil, or beeswax - all can be used without concern for fumes. Silicone spray (the stuff used to lubricate) also works on wood; use the food grade type. Make sure to have some ventilation as it contains solvents.

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.

Reading Stories in Tree Rings

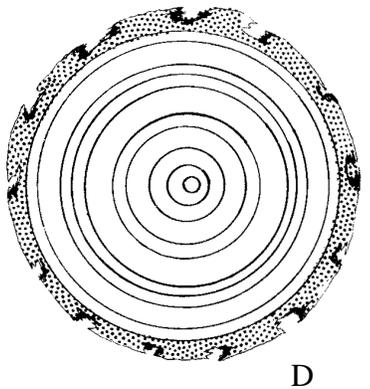
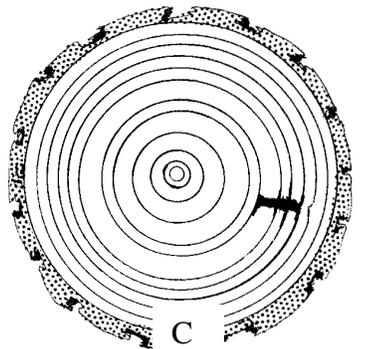
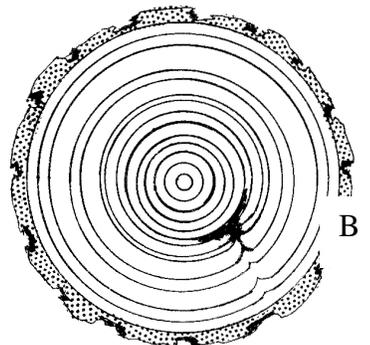
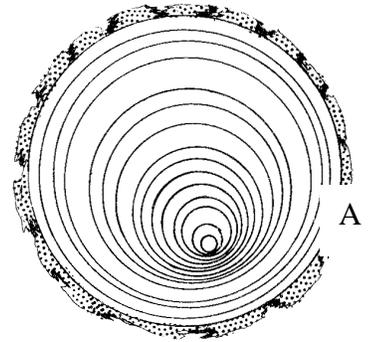
Each year, trees that grow in temperate regions (non-tropical) create a layer of wood around the circumference of the trunk and branches. Rapid growth during springtime creates many xylem cells, which make a light-colored wood known as **spring wood**. As tree growth slows during the hot, dry summer, 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