

## Tree Cookies

Tree cookies are round. They're full of fiber. But unless you're a termite, you can't eat tree cookies!

### What is a tree cookie?

A tree cookie is a cross section of a tree. The tree is cut down and then sliced into pieces. The tree is like a loaf of bread and the pieces are like individual slices of bread.

### What are the parts of the tree?

The **cambium** is the layer of cells just inside the inner bark. The cambium produces new cells. This is where the tree grows new wood.

The **phloem** (pronounced FLOW-UHM, rhymes with FOAM) is the inner bark. The phloem consists of tube-shaped cells. The phloem carries sugar from the leaves to other parts of the tree such as the roots. Maple syrup comes from the phloem of sugar maple trees.

The **xylem** (pronounced ZY-LEM) also consists of tube-shaped cells. The xylem is the plumbing system of the tree. It carries water and nutrients from the roots to the leaves. Most of the tree cookie consists of xylem cells. In a living tree, all of the xylem cells are dead. The xylem cells are completely empty and hollow. Why are the xylem cells dead and hollow? This helps make the water flow more efficient, just like the pipes that carry water to and from your kitchen sink. The pipes are more efficient at carrying water when nothing blocks the flow inside of the pipes.

The **rays** are the darker-colored radial spokes. The rays are plates of living cells that carry materials to and from the outer and inner layers of the tree. As the tree expands through growth, the rays become longer and extend from the cambium to the middle of the tree trunk.



The **bark** is the outermost layer of cells. The tree produces new bark cells every year, just like we produce new skin cells all the time. The bark of a tree has the same functions as our skin. The bark protects the tree from injury and insulates the tree. Different tree species have different bark textures. A beech tree has smooth bark. A cherry tree has rough bark that looks like burnt potato chips. An ash tree has distinct diamond-shaped grooves in its bark. A shagbark hickory tree has long vertical strips of bark that peel off of the tree. A honey locust tree has long sharp thorns on its trunk.



## What are the tree rings?

Year by year, trees grow in diameter by producing new wood in the layer just beneath their bark. When a tree is cut down, the layers are visible in a cross section. The layers appear as a set of concentric circles known as tree rings.

One layer of wood grows each year. **Each layer consists of two colors of wood.** The light-colored ring is the “**springwood**” that grows in the spring. The dark-colored ring is the “**summerwood**” that grows in the summer.

Tree rings vary in width each year depending on the environmental conditions. Tree rings are wider during years of abundant rainfall and narrower during years of drought. Trees also grow faster when they are young and grow slower when they are old.

- 1.) Look at the cross section of the tree. Identify the springwood and summerwood.
- 2.) Why are the springwood and summerwood different colors?
- 3.) Where is the oldest part of the tree located? Where is the youngest part of the tree located?
- 4.) Make a guess about the age of the tree. Then determine the actual age by counting the rings.
- 5.) Are all the rings the same width? Are some rings wider and some rings narrower? Why do you think some rings are wider and some rings are narrower?
- 6.) Find the ring that grew the year you were born. Is it a wider or narrower ring?
- 7.) Find the rings that grew the year your parents were born. Are they wider or narrower rings?
- 8.) Find the rings that represent years of historical importance.
- 9.) These tree cookies were made from trees that died and fell down. What do you think could have been the cause of the death of these trees?
- 10.) Did you observe any special features in the tree cookies?