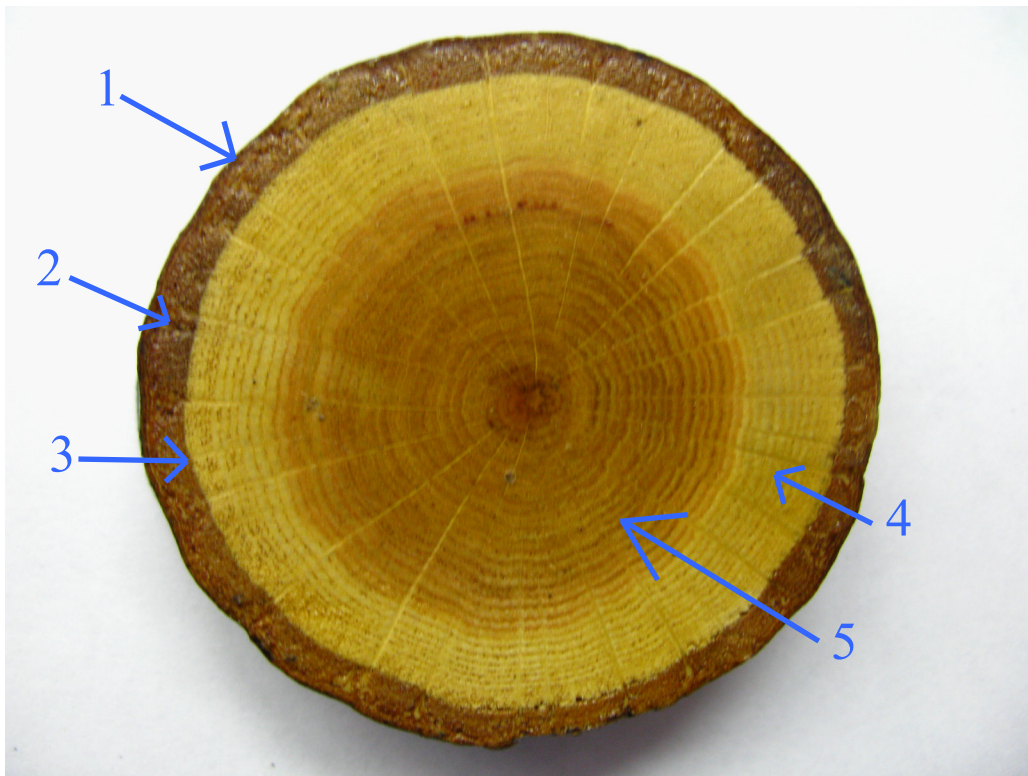


# HOW A TREE GROWS

There are five layers to the trunk of a tree – the outer bark, inner bark, cambium, sapwood, and heartwood. The branches and roots also grow by cell producing layers. External factors that affect the growth rate of the tree might include the amount of sunlight and moisture the tree receives, soil conditions, disease, fire, other plants and trees also growing in the area, animals, and many other variables. This is a wood cookie, a slice of tree trunk showing the five different layers.



1. **OUTER BARK:** Protects the tree from injuries by animals, harmful insects, diseases, excessive heat, cold, dryness, etc. Its function is similar to the function of human skin.
2. **INNER BARK (PHLOEM):** This carries the sugar made in the leaves **DOWN** to the branches, trunk, and roots, where the sugar is made into other substances.
3. **CAMBIUM:** A single layer of living cells between bark and wood where growth in diameter occurs. It forms annual rings of new wood inside (**XYLEM**) and new bark outside (**PHLOEM**).
4. **SAPWOOD (XYLEM):** Carries sap (water and dissolved minerals and nitrogen) from the roots **UP** to the leaves, where sugar is made. The summerwood is usually denser than the winterwood. The growing season for trees is primarily May thru September.
5. **HEARTWOOD or DEADWOOD:** This gives extra strength and stiffness to the tree. It was sapwood, but is now inactive. This part of the tree is similar to the function of the human spine.