

How a Tree Eats, Drinks, and Breathes



Root System



Leaf Buds



It's hard to believe but only the very tips of a tree's roots, its leaves, buds, seeds and a thin cover of cells are living. But those few living parts of a tree, approximately one percent of its entire bulk, perform functions so complex that they can build a structure a hundred feet high that will last for centuries.



Cambium Layer



Leaves or Needles



The Living, Breathing Tree!

Only the very tips of a tree's roots, its leaves, its buds, its flowers, and seed live. A single, thin layer of cells sheathes the entire tree from the tips of its roots to the buds on the ends of the smallest of its branches. But those few living parts of a tree - approximately one percent of its bulk - perform amazingly complex functions. They nourish the tree and allow it to grow into a structure that will soar skyward a hundred feet or more.



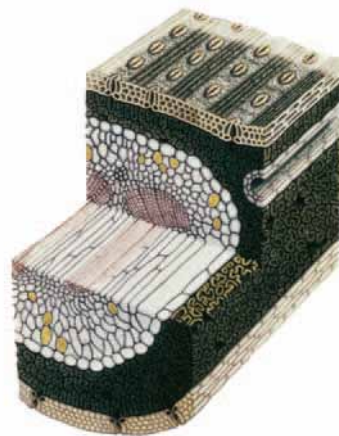
Root System

A large tree has hundreds of miles of roots to anchor it to the soil. But most of that length is dead, woody matter. At the very tips of the roots are living, growing cells that push a protective cap of dead cells through the soil. Just behind the tip are the root-hairs which are tiny, single-cell projections that absorb water and dissolved minerals from the soil.



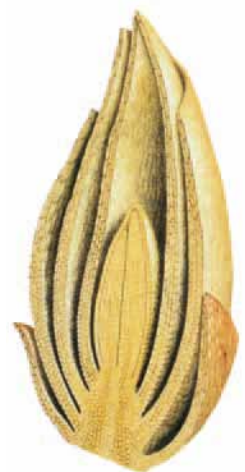
Cambium Layer

Extending from the tips of the roots to the ends of the branches is a single layer of living cells - the cambium layer. These are the only living cells in the trunk. In summer, when the tree grows, these cells divide continually - adding thickness but no height to the tree. The cells that form on the outside of the cambium layer become bark; those that form on the inside become wood.



Leaves or Needles

The leaves, or needles in coniferous trees, make sugar out of water passed up from the roots and carbon dioxide in the air. In doing this they utilize the energy of light, with the aid of chlorophyll. The sugar is passed back to the other living cells of the tree so that they can breathe, and help create energy for the infinite processes of life which enable them to grow and develop.



Leaf Buds

The leaf buds on the twigs are alive, too. It is their growth that gives a tree height, and extends its branches. Cells at the base of the bud divide and elongate, building a new twig behind the developing leaf. The growth is coordinated with the growth in the cambium layer so that as a tree grows in height, its trunk and its branches are all growing in thickness at the same time.