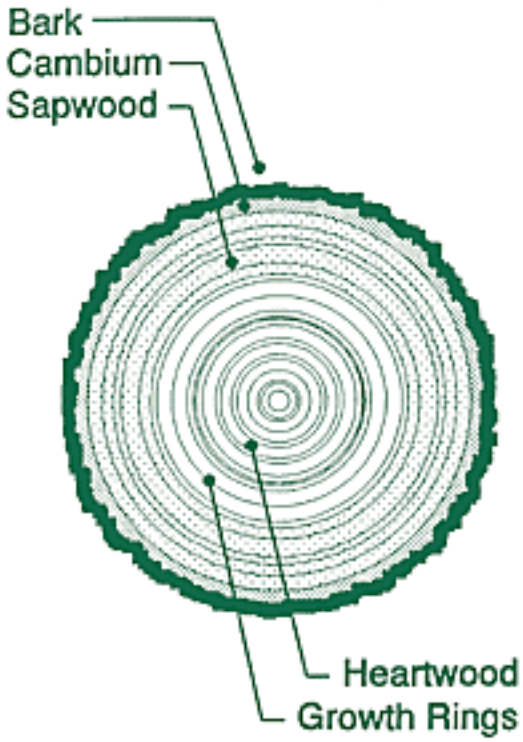
The How's and Why's of Trees

Both trees and people living in the city endure exposure to similar adversities on a daily basis: pollution, limited space, disease, vandalism, injury. But, by learning the basics of the natural physiology of trees you'll discover how to help care for them, resulting in direct benefits for you, your family, and your community.

Basic Tree Physiology



Photosynthesis is the process by which trees develop their food. Energy from the sun mixes with carbon dioxide in the air, chlorophyll in the leaves (the pigment which makes them green), water, and nutrients from the soil to create the sugars necessary to feed the tree. In addition to making food from non-food substances, this system of nourishment is responsible for one other necessity of life: oxygen. Oxygen is "burned off" as a natural by-product of photosynthesis.

The tough exterior of the tree is called the **bark**. It is the "skin" which protects the delicate cell-producing layer beneath it called the **cambium**. The cambium produces the living tissue of the tree, called the **sapwood**. The sapwood forms the "highways" by which water and nutrients travel from the ground up to the leaves, and where the food—produced in the leaves—returns back down to the trunk and roots. Each year, the cambium creates a new layer of sapwood to replace the old one, which then becomes the wood of the tree and makes up its structure. This external layering creates an internal

record of the tree's age. Look at a cross section of a tree (see illustration) and you'll see that each year's layer of cells creates a ring inside the tree. Each ring is equal to one year's growth.

Roots are a tree's foundation. Large roots not only anchor the tree to the ground, but they store sugars—the tree's source of energy. The fine root hairs and feeder roots growing from larger lateral roots collect water and nutrients from the soil. A mature root system can expand 1.5 - 3 times the width of the tree's aboveground canopy. Although, only about 40% of the tree's roots are underneath that canopy; the rest grow outside the canopy where they can access rainwater.

When the cambium or sapwood of the tree becomes damaged or is removed, the circulation of water and nutrients from the roots to the leaves, and that of sugars from the leaves to the roots, is interrupted. Photosynthesis becomes impaired and the health of the tree suffers. The same is true when foliage is damaged or more than half of it removed through inappropriate pruning. Even soil that is too wet, too dry, overly compacted, or lacking nutrients can adversely affect the growth and health of the tree.

Only a healthy, well-maintained community forest can provide maximum benefits. Please make an effort to support the care and planting of trees in Santa Ana.