



Footfills

Nature Notes

CITY OF PALO ALTO • COMMUNITY SERVICES DEPARTMENT • OPEN SPACE, PARKS AND GOLF DIVISION



Leaves and Why They Fall

The death of a leaf would probably go unnoticed if it did not die so beautifully. Fall is here and its most obvious sign is the vivid colors of dying leaves on deciduous trees. Deciduous trees are those broadleaved trees which lose all their leaves at the same time, generally in the fall.

To understand why leaves die and fall, you must first understand their function and a little of their structure. The function of a leaf is to produce food for the plant on which it grows. Water from the soil and carbon dioxide from the air are combined in the leaf by a green pigment called chlorophyll. Chlorophyll, using sunlight as an energy source, combines these substances to produce sugar and starches which are used as food by the plant. This process is called photosynthesis.

Photosynthesis takes place throughout the spring and summer, but during the fall a change begins to occur in deciduous trees. As the days grow shorter and the nights colder, a zone of cells at the base of the leaf stalk, or petiole, separates from neighboring cells and forms a layer known as the abscission layer. With the formation of this layer, the leaf is cut off from the tree which is its source of nourishment. At this point the leaf begins to die. The first part of the leaf that decomposes is the green chlorophyll. With the chlorophyll gone, yellow and orange pigments — carotenes, which up till now have been hidden — give the leaf its fall color. Other colors may also be seen. If the fall days remain bright and the nights cold, the leaves of some species will go on making sugar until all the chlorophyll is gone. Since the leaf is sealed off, the sugar accumulates and reacts with minerals in the leaf to produce shades of red and purple, the most spectacular of the fall colors.

As fall progresses, the abscission layer becomes more pronounced, until finally wind, rain, or frost completes the separation process and sends the leaf gliding to the ground. Here it decays, its substance carried back into the soil by moisture, to be reincorporated into the continuing cycle of life.

By Robert Badaracco, First Park Ranger

Edited by Kathleen Jones

Illustrated by Virginia Kolence