

# Fall

In fall, trees undergo changes that help them survive winter.

## DECIDUOUS TREES

The cool nights and shorter days of autumn signal deciduous trees to shut down the food-making factories in their leaves. A membrane forms between the leaves and twigs. Chlorophyll production stops.

Carotenoids—yellow, orange, and brown pigments that were overshadowed by the green chlorophyll in summer—begin to show, making the leaves glow with autumn color. In some tree leaves, reds and purples appear when pigments called anthocyanins are produced. The leaves eventually fall off.



CAROTENOIDS GIVE COLOR TO CARROTS, CORN, CANARIES, DAFFODILS, EGG YOLKS, RUTABAGAS, BUTTERCUPS, AND BANANAS AS WELL AS TREE LEAVES.



At the same time, the living tissue in the tree's trunk and branches goes through a process called hardening that prepares them for winter. Hardening enables a tree to survive colder weather. If a tree were suddenly exposed to winter temperatures in July, it would be injured or die. But after it's gone through the hardening process, a tree can survive temperatures far below freezing.

## CONIFEROUS TREES

Coniferous trees also undergo hardening. But they don't lose all of their leaves in the fall. Instead, they shed them over time—much as a dog or cat sheds hair gradually, rather than going bald all at once.

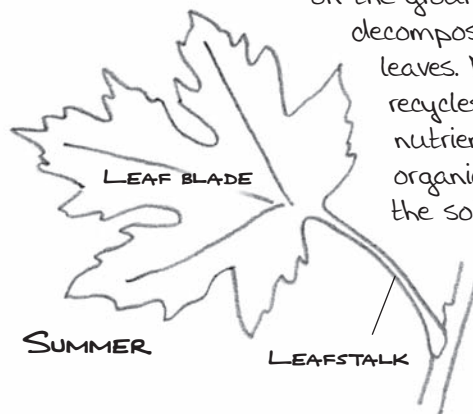
The needlelike shape and waxy coating of coniferous tree leaves prevent them from drying out in winter, when little if any liquid water is available to the tree.

The pyramid shape of coniferous trees helps keep branches from breaking off from the weight of snow that accumulates on the needles.

## GETTING READY FOR WINTER

1. As days get shorter and the temperature drops, deciduous trees produce a hormone called abscisic acid. This hormone signals the tree to build a membrane, called the abscission layer, that cuts the leaf off from the rest of the tree.
2. The leaves stop photosynthesizing and the chlorophyll fades. The leaf turns color and falls to the ground.
3. The membranes surrounding the tree's cells become more permeable. This allows water to seep out so it won't burst the cell when it freezes.
4. Mammals, insects, fungi, and bacteria

on the ground help decompose the fallen leaves. Decomposition recycles the leaves' nutrients and adds organic material to the soil.



LEAF DROPS OFF WHEN ABSCISSION LAYER WEAKENS

