Why Leaves Change Color

You don't need a vivid imagination to picture Mother Nature, on autumn days with a liberal supply of paint, beautifully coloring the leaves of the trees and other plants. Every year at this time, we are awed by the beauty of the trees, knowing it is only temporary. Before long the leaves will fall and become a part of the rich carpet that covers the forest floor.

Many people suppose that Jack Frost causes this color change, but he doesn't. Some of the leaves begin to turn before we have any frosts. Native Americans thought it was because the celestial hunters had slain the Great Bear—his blood dripping on the forests changing the leaves of many trees to red. Other trees were turned yellow by the fat that splattered out of the kettle as the hunters cooked meat for supper.

Chemical Processes

We now know that change in coloring is the result of chemical processes that take place in the tree during its preparation for winter. In spring and summer, the leaves serve as factories where foods for the trees' growth are manufactured.

This food-making takes place in millions of tiny cells in the leaf and is carried on by small green bodies, called **chlorophyll**, that give the leaf its color. These chlorophyll bodies make food for the tree by combining carbon from the air with hydrogen, oxygen, and various minerals in the water the roots gather.

In the fall, cool weather causes a slowing down of vital processes, and the work of the leaves ends. The machinery of the leaf factory is dismantled, so to speak. The green chlorophyll is broken up into the various substances of which it is made, and whatever food there is on hand is sent to the body of the tree to be stored for spring. All that remains in the cell cavities of the leaf is a watery substance where you can see a few oil globules and crystals and a small number of yellow, strongly refractive bodies. These give the leaves the yellow coloring you see so often.

Extra Sugar

Often there is more sugar in the leaf than can readily be transferred back to the tree. Then the chemical combination with other substances produces many color shades, from the brilliant red of the dogwood to the more austere red-browns of the oaks. The green coloring matter takes on a slightly brownish tinge in the cone-bearing trees that do not lose their foliage in the fall. This gives way to a lighter color in the spring.

While the leaf is changing, other preparations are being made. At the point where the stem of the leaf is attached to the tree, a special layer of cells develops and gradually cuts the tissues that support the leaf. At the same time, nature heals the cut so that, when the leaf is finally blown off by the wind or falls from its own weight, there is a scar where it grew on the twig.

Shedding leaves is another of nature's wise provisions for winter. After broadleaf trees of the North shed their leaves, their branches will more easily endure winter's snow and ice. In the Southern states where there is seldom

snow or ice, some broadleaf trees are practically evergreen. The conifers—pines, spruces, firs, cedars, and hemlocks—have no definite time for leaf shedding. Their leaves are either needle or scalelike forms, helping them shed snow.

The fallen leaves provide a fertile forest floor. Mineral substances that fill the walls of the cells in fallen leaves enrich the top layers of the soil by returning the elements borrowed by the tree. They also provide lots of humus, which absorbs water. If fires are allowed to run through the forest and the leaves are burned, the most valuable fertilizing elements are changed by the heat into gases and escape into the air, and the valuable humus is destroyed. Forests that are burned regularly soon lose their soil fertility and cannot absorb and hold moisture, even though no apparent damage is done to the standing timber.

Leaf Prints

A fascinating pastime for anyone interested in trees is making leaf prints. Here's how to do it: Mix oil paints to match the colors of the leaf you want to print. Apply these colors to the underside of the leaf, copying the exact colors from the brighter upper side. Work swiftly so the first colors put on will not dry before the last are applied. Then place the leaf, vein- or painted-side down, on a sheet of white paper with another sheet of paper on top of it. Hold the leaf very still and rub it hard with your fingers. When you remove the upper sheet of paper and the leaf, there will be a copy of the form and colors of the original leaf. You can make black and white leaf prints by using ink instead of paint. These, of course, will not be as beautiful as those made in color. A scrapbook of the prints with the names and descriptions of the parent trees makes an interesting volume for anyone.

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