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## Colors of fall

*Here's why leaves change hues, then fall from trees in autumn*

**By La Rue V. Baber**  
Staff Writer

As the days grow shorter and the air turns cooler, rich reds, bright yellows, pale browns and fiery orange leaves emerge from the green masks they've worn all spring and summer.

But how do these leaves achieve such amazing colors?

### WHERE DO THESE COLORS COME FROM?

Actually, leaves already have these colors, they've just been hidden underneath chlorophyll, a chemical that gives leaves their green pigment. Chlorophyll captures and absorbs sunlight, turning it into the energy necessary for transforming carbon dioxide and water into nutrients that feed the tree.

In the fall, chlorophyll begins to break down because the tree needs less food in winter months. As the chlorophyll dissipates, so does the green color. And that's when fall colors start to appear.

While yellow and orange pigments are already in the leaves of certain trees, other trees experience additional chemical processes, giving more color to certain leaves. For example, reds and purples are made mostly in the fall after nutrients have been trapped in the leaf after the food-making process has stopped. So, one leaf could have a mixture of red and purple, another orange and yellow. Some leaves only show yellow colors. Others, like many oaks, only show browns. And browns are made from wastes left in the leaves, according to Science Made Simple's Web site.

All these colors emerge depending on varying amounts of chlorophyll residue and other pigments in the leaf. But not all trees change colors. Pines, spruces, firs and cedars stay green throughout the seasons.

### WHAT AFFECTS COLOR INTENSITY?

There are several factors that affect the radiance of fall colors, said Peggy Sears Perry, professor of horticulture, plants and soil science at Cal Poly Pomona.

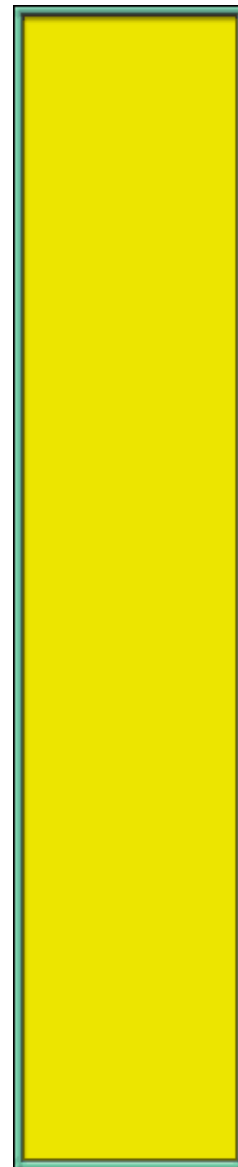
Temperature, light, and water supply influence the degree and duration of colors. For example, maples will produce brilliant reds if temperatures are low but not freezing. But an early frost might muddle the bright red color. Rainy or overcast days can intensify fall colors. More dramatic, sudden cold temperatures will generally increase the



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vibrancy of colors because the process occurs more rapidly, Perry said.

Another factor affecting intensity of color is smog. In California, some leaves' colors aren't as vibrant because of air pollution, Perry said.

Some trees change early in the fall, others later. Higher elevations will see fall colors earlier. For example, Mt. Baldy experienced the autumn change last month.

The rain and colder temperatures recently experienced in the Inland Valley played a big part in so many trees changing colors.

"The process goes faster the colder the temperatures," Perry said. "But sometimes we (Southern California) don't get a real strong color change unless we get good nighttime cooler temperatures."

### HOW DO LEAVES FALL?

After the leaves have changed colors, another process begins -- this time to make leaves fall.

During the process, a layer of special cells forms between the leaf stem and the branch. Eventually, these cells sever each leaf from the branch. Either the leaf's weight pulls it down or a strong gust blows it down. When a leaf falls, the branch seals the cut, so that nothing harmful can enter the tree, according to the State University of New York's College of Environmental Science and Forestry's Web site.

Leaves fall because they are no longer needed to produce food for the tree, since it has already stored up nutrients for colder months. In the spring, the tree sprouts new leaves and the cycle begins anew.

However, not all leaves must fall, even in autumn, explained Perry. And some trees -- like the California buckeye -- can lose leaves in mid-July to escape the effects of drought. Still others might lose their leaves in the spring when the tree is flowering. Even evergreen trees lose leaves, Perry continued.

### WHERE TO GO FOR FALL COLORS

Already trees have changed colors throughout the Inland Valley. Some are still changing, others are finished. One unique thing about California is that people can experience fall colors well into December and even January.

Perry said some of the best places to go to see brilliant colors are Big Bear, Arrowhead, Angeles Crest Highway, the other side of San Gabriel Foothills -- basically, anywhere higher in elevation with cooler temperatures.

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