

Why Do Fall Leaves Change Color?

Have you ever wondered why the trees seem to put on a spectacular show every fall?

The reds, oranges, yellows, and even purples we see

aren't simply painted onto the leaves. They are the result of a fascinating change taking place inside the tree.



During spring and summer, leaves are filled with a green pigment called **chlorophyll**. Chlorophyll allows plants to capture energy from sunlight and use it to make food through photosynthesis. Because there is so much chlorophyll in a healthy summer leaf, the green color hides many of the other pigments that are already there.

As autumn approaches, something important changes: **the days become shorter**. Trees can sense the changing amount of daylight. Cooler temperatures also play a role. In response, many deciduous trees begin preparing for winter.

The tree gradually stops producing chlorophyll and breaks down the chlorophyll already in the leaves. As the green fades, other pigments become visible.

Yellow and orange colors come mainly from pigments called **carotenoids**. These pigments are actually present in leaves throughout the growing season. They help plants

capture light for photosynthesis, but during summer their colors are hidden by the stronger green of chlorophyll.

Red and purple leaves are a little more mysterious. They are produced by pigments called **anthocyanins**, which can be made by the tree during the fall. Scientists believe these pigments may protect leaves from sunlight and help the tree recover nutrients before the leaves fall.

Weather can make the colors especially spectacular. Sunny days and cool—but not freezing—nights can encourage the development of brilliant red colors. Warm, cloudy, or rainy weather may produce a less dramatic display.

Eventually, the tree forms a special layer of cells where the leaf connects to the branch. This weakens the connection, and the leaf eventually falls.

Why would a tree go through all this? **It is preparing for winter.** Losing leaves helps many trees conserve water and energy when sunlight is limited and the ground may be frozen.

So the beautiful colors of autumn are more than a seasonal decoration. They are evidence of a remarkable survival strategy.