

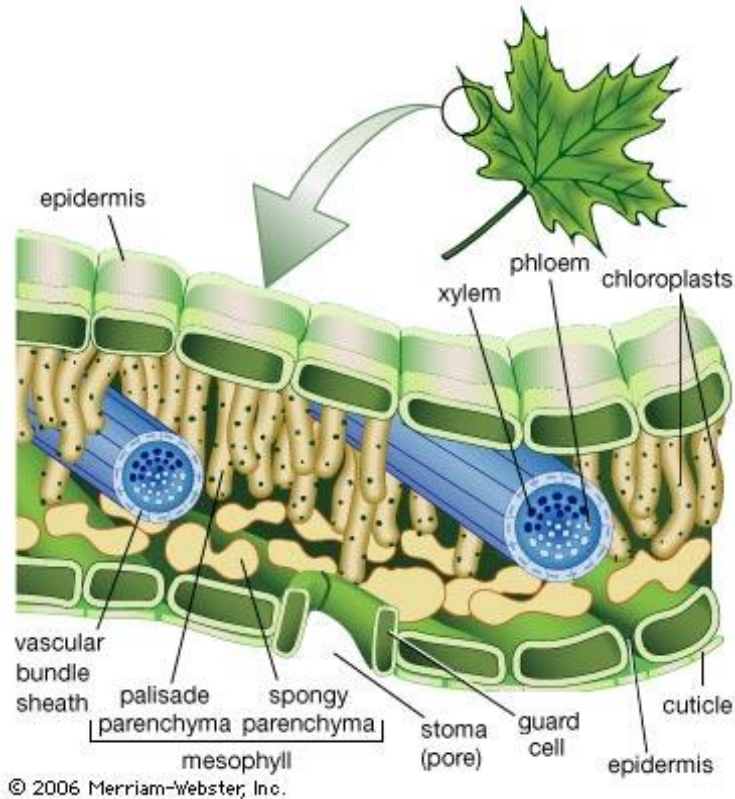
Why Do Leaves Change Colour?

With the days starting to get shorter, the air is crisper, and it is time to put on an extra layer. As all of this is happening, leaves are starting to change from green to yellow and orange. So why do the leaves change colour?

In the spring months, trees develop leaves that are used to produce food. Many trees have green leaves, ignoring those pesky invasive king crimson Norway maples of course.

Leaves serve as food factories for trees. Food is produced in chloroplast cells in the leaves, by absorbing sunlight and transforming water and carbon dioxide into carbohydrates. Leaves are filled with chlorophyll, which is green. In the spring and summer months, tree leaves work to produce as much food as possible so the tree can grow and survive over the winter when no food is produced. As the amount of sunlight diminishes, chlorophyll starts to breakdown and be absorbed and other chemicals start to show through, mainly carotene and xanthophylls. These two chemicals, respectively, give the leaves orange and yellow colour (carrots have carotene too). The red colours (red and purple) in leaves come from anthocyanins, which are only produced in some trees and only in late summer or early fall.

In the fall, when the days are getting shorter, trees begin planning for the next spring. One of the first steps they take is to start moving sugars out of the leaves and into the twigs and roots. The next step is to start producing cells at the base of the leaf stem that will sever the leaf from the tree. There are several reasons this happens including reducing the amount of moisture lost throughout the winter season and to lower the trees surface area and therefore reduce the risk of damage resulting from snow, ice, and wind. Losing leaves helps protect the tree until spring.



The changing of colours depends on several factors including weather, sunlight, and moisture levels. Each of these will influence the intensity and duration of the fall colours. Low temperatures above freezing promote bright reds in maples, while an early frost will weaken these reds. Rainy and overcast days intensify the fall colours.

Trees have developed over thousands of years and have developed annual processes. With a changing climate, we are experiencing higher temperatures, increased precipitation, and increased cloud cover. The disconnect between extreme temperatures, disrupts the 'synchrony of colour development' causing trees to change colours at sporadic times and for different lengths of time.

Tree Species	Expected Autumn Colour
Sugar Maple	Reds and oranges
Red Maple	Blazing red or yellowy-orange
Red Oak	Brownish
White Birch / Poplar	Yellow
White Ash	Yellow to deep purple
Yellow birch	Yellow
Conifers (evergreens)	Green

<https://www.esf.edu/pubprog/brochure/leaves/leaves.htm#:~:text=Chlorophyll%20Breaks%20Down,part%20of%20their%20fall%20splendor>

<https://askabiologist.asu.edu/questions/why-do-leaves-change-color>

<https://treecanada.ca/blog/why-do-leaves-change-color/>

<https://coldcreek.ca/environmental-info/fall-pigments/>

<https://www.eekwi.org/plants/why-do-leaves-change-color>