

THE SCIENCE BEHIND Autumn Leaves



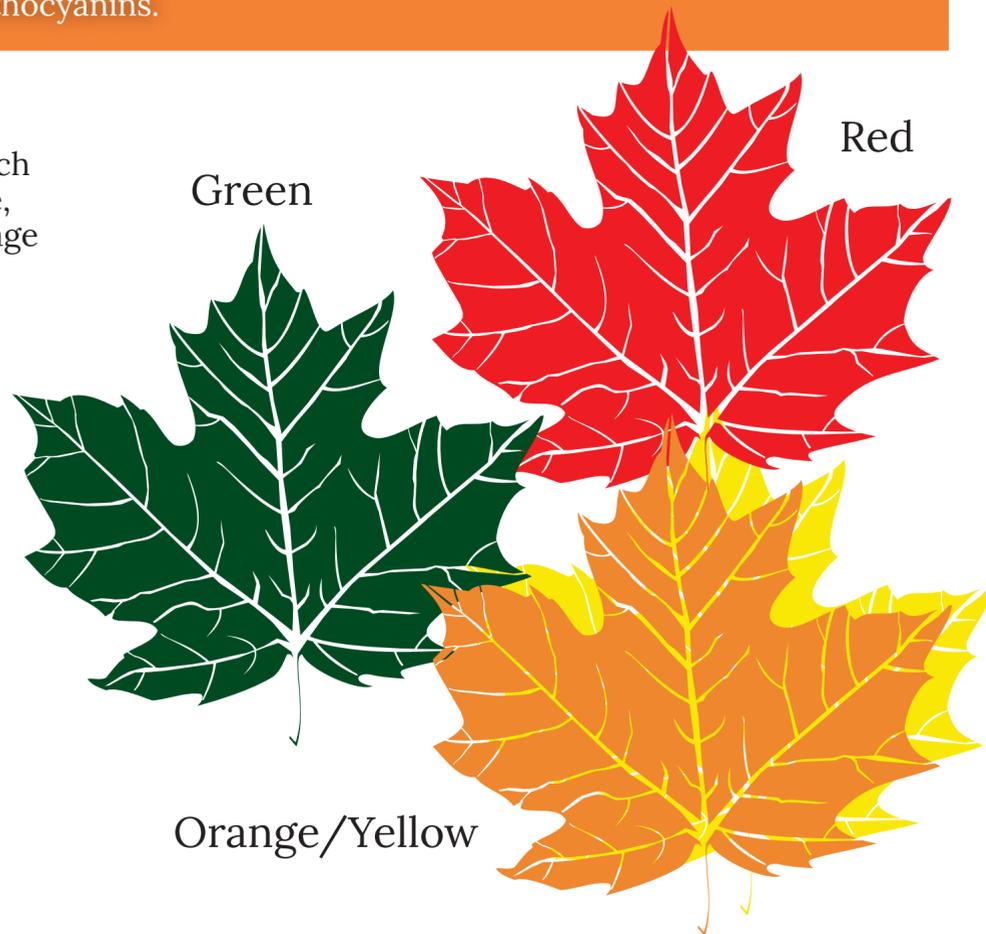
WHY DO LEAVES CHANGE COLOR IN THE AUTUMN?

Across much of North America the green leaves of deciduous trees transform every autumn into various shades of yellow, orange, red, and purple. The yellow and orange fall colors are due to pigments, carotenoids and flavonoids, that are present in the leaves all year, but are normally masked by chlorophyll.

Because chlorophyll is so abundant, leaves normally appear green. In preparation for winter dormancy, however, trees break down the chlorophyll and withdraw it from their leaves. Thus, the carotenoids and flavonoids are “unmasked” and the leaves appear in shades of yellows and oranges. The brilliant red and purple colors of some species result from secondary reactions that give rise to other pigments called anthocyanins.

WHAT IS “LEAF PEEPING?”

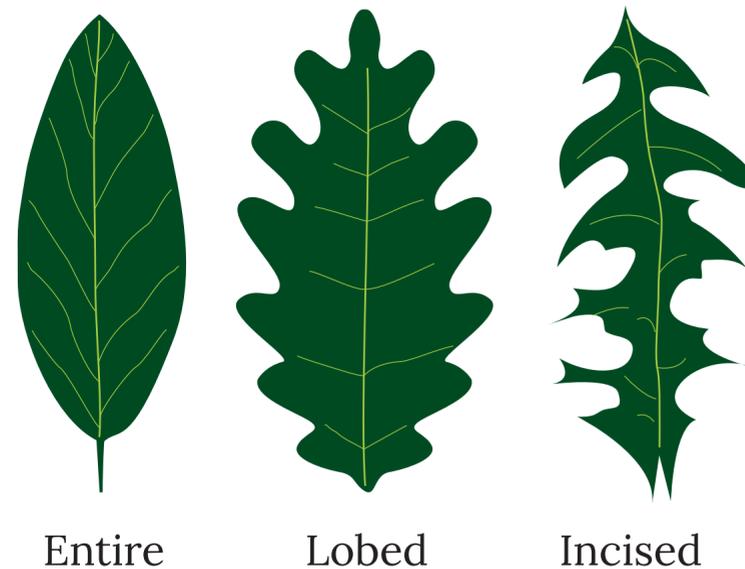
When trees begin to change color depends on various factors, such as temperature and moisture. Each year these factors can change, and tourists try to plan their travel dates to view the best fall foliage in different areas of North America. This tourist activity is sometimes referred to as “leaf peeping.”



FUN FACTS ABOUT PIGMENTS AND TREES

- 1 Plants with anthocyanins can be used to make acid/base indicators. For example, an indicator can be made from red cabbage and water. The red cabbage indicator can be used to determine if a solution is acidic, neutral, or basic.
- 2 Two types of chlorophyll are typically found in higher plants, chlorophyll *a* and chlorophyll *b*. Paper chromatography can be used to separate and view these two types of chlorophyll. For example, this can be done with spinach leaves.
- 3 Deciduous trees produce flowers that develop into seeds after they are pollinated. Oaks and maples are examples of deciduous trees. Conifers keep their leaves and remain green year round. They can withstand very cold temperatures and heavy snow. Coniferous trees produce cones instead of the flowers seen on deciduous trees.

LEAF MARGINS



Leaves have many margins (or edges). Some common leaf margins are shown above.