FALL COLORS

In many areas of the world, some **deciduous** trees and plants put on a magical show of color before they lose their leaves for the winter. Leaves that are green in the spring and summer may turn into brilliant clusters of gold, red, orange, yellow or purple in autumn.

These beautiful colors come from plant **pigments**, substances produced by leaf cells. The different plant pigments are **chlorophyll,** which gives leaves their green color; **carotenoid** produces yellow, orange and brown; and **anthocyanin** which gives plants a red, purple, or crimson color.

Plants need water, sunlight, carbon dioxide, and other nutrients to grow. The leaves of plants use **chlorophyll** to turn sunlight into food through a process called **photosynthesis** during warm, sunny months. As the days become shorter and colder in the fall and winter, trees react to less sunlight by making less chlorophyll. When that happens, the other colors already in the leaves begin to show through. Carotenoids are always present in leaves, and these are not affected by the weather.

You may notice that red leaves are brighter in some years compared to others. When days are warm, and the nights cool, but not freezing cold, there will be a lot of red leaves. The warm days allow the leaves to continue making sugar. The cool nights stop the sugar sap from flowing through the plants down to the branches and trunk. When this happens, anthocyanins are produced to help protect the plant! They help the plants use the nutrients in the leaves before the fall.

ACTIVITY: See the different plant pigments in green leaves before they change color in the fall
NOTE: You will also need an adult helper!

- Approximately 3-4 leaves from one or more trees
- One clear jar for each set of leaves you have chosen
- Isopropyl alcohol
- Plastic wrap
- Coffee filter
- Scissors
- A bowl to set the jar(s) in
- Water

1. Pick several leaves from one or more trees
2. Cut or tear them into tiny pieces
3. If you are using more than one tree, place the leaves from each tree in separate jars
4. With adult supervision, cover the leaves with alcohol and mash them up very well
5. Cover the jar(s) with plastic wrap
6. Place the covered jars in a bowl/container
7. Add hot water to the container and leave the jar(s) in the container of hot water for about an hour.
8. Cut a strip from a coffee filter – about 2 inches wide
9. Remove the jar(s) from the water, and remove the plastic cover
10. Place one end of the paper strip in the alcohol
11. Let the paper sit in the alcohol overnight

Steps 1 - 4

Steps 5 - 7

Steps 8 - 11

Finished! In these sample, you can see green, yellow, brown, and a hint of orange.

What happened? The rubbing alcohol and hot water help to separate the colors in the leaves. As the alcohol moves up the paper, the pigments in the leaves travel up the paper through a process called chromatography. In addition to green, you may see some brown, orange, red, and yellow colors.

Vocabulary:

Deciduous tree: A tree that loses its leaves in the fall and grows new leaves in the spring.

Chromatography: A method used by chemists to separate the parts of a solution. Paper chromatography is used for separating mixtures that are colored.

ADDITIONAL RESOURCES

Books available from the Washoe County Library
Autumn Leaves by Ken Robbins
Autumn: Signs of the Season Around North America by Mary Pat Finnegan
A Chill in the Air: Nature Poems for Fall and Winter by John Frank
Learning About the Changing Seasons by Heidi Gold-Dworkin
Secrets of the Seasons: Orbiting the Sun in Our Backyard by Kathleen Weidner Zoehfeld
A Tree for All Seasons by Robin Bernard
What Happens in Fall? By Sara L. Latta
Why Do Leaves Change Color? by Terry Allan Hicks
Why Do Leaves Change Color? by Betsy Maestro

Videos

PBS Kids, Elinor Wonders Why, "That's So Interesting: Why Do Leaves Change Colors?" https://youtu.be/4SW8NK4-z_I

SciShow Kids, "Why Do Leaves Change Colors in the Fall?" https://youtu.be/Xk4-6II8l5Q