

Family Fun

Be a Plant Physiologist



Why are leaves different colors during autumn?

Every autumn we see many leaves change color and fall to the ground. The colors we see in leaves result from pigments in leaf tissue reflecting certain wavelengths of visible light.

The green color of leaves is the result of a pigment named **chlorophyll**. As the nights get longer and cooler in autumn, chlorophyll degrades, revealing our familiar fall colors, produced by other pigments in the leaves:



chlorophyll



xanthophyll



carotene



anthocyanin



Visible Light Spectrum

Leaves of different colors and from different types of trees contain different amounts of these pigments. *Collect some different colored leaves from the ground at Morris Arboretum and try to guess what pigments these leaves contain.*

Plant Physiologists are scientists who study how plants function. Start your Plant Physiologist career by separating the different leaf pigments in the experiment on the back of this card.



Morris Arboretum of the
University of Pennsylvania

treeadventure



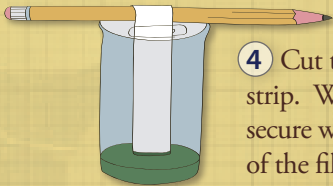
Experiment at home

Do this experiment with an adult. Gather these materials from around the house:

- Rubbing alcohol
- Large beaker (or bowl)
- Small beaker (or cup)
- White coffee filter (or paper)
- Scissors
- Paper clip
- Pencil
- Leaf



- 1 Roll up the leaf and cut it into small pieces. Place these pieces into the small beaker (or cup).
- 2 Pour rubbing alcohol into the small beaker so that the leaf pieces are barely covered. Tilt the beaker and continue to cut the leaf into smaller pieces with the scissors.
- 3 Fill the large beaker with about 1" of hot water and place the small beaker into this hot water bath for about five minutes. The hot water will help the leaf's pigments to be released into the alcohol - you should see the alcohol darken.



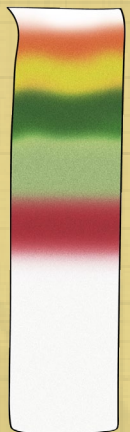
- 4 Cut the coffee filter into a 1/2" wide strip. Wrap the filter around a pencil and secure with a paper clip so that the bottom of the filter hangs just above the bottom of the small beaker but dips into the alcohol.

- 5 After about 30 minutes, remove filter paper from beaker and allow to dry. Notice different color bands on the filter - these are different pigments from the leaf that have been separated in this process called **Chromatography**.

- 6 Try this experiment again with leaves from different trees or different color leaves from the same tree. What differences do you see?

For more detailed instructions, tips, and more information visit:

<http://bit.ly/plantPhysiologist>



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www.morrisarboretum.org