

Leaf Chromatography

Thank you for downloading the science and mathematics activity packet! Below you will find a list of contents with a brief description of each of the items. This activity packet contains all the information (including any handouts) you will need to run this activity in your own classroom or at a science festival.

Please note: some activities might require the need for a facilitator to be present to oversee the activity. Activities that require a facilitator will be clearly noted.

-Community Resources for Science



ACTIVITY PACKET CONTENTS

1. Organizer instructions for the person running the activity
 - Print suggestion: 1 for the facilitator
 - Includes information for setup prior to the event (e.g., materials prep_
2. Background information for organizer/facilitator
 - Print suggestion: 1 for the facilitator
 - Provides additional information for the organizer or activity facilitator regarding the science behind the activity
3. What's Going On? (tabletop sign/printout)
 - Print suggestion: 1 to put in a plastic sign holder
 - Explains the science and background information behind the activity
4. Participant Instructions (tabletop sign/printout)
 - Print suggestion: 1-2 to put in a plastic sign holder
5. Take home sheet for participants
 - Print suggestion: number of expected participants (formatted as 2 half-sheet handouts)
 - Easy-to-follow materials list and instructions for participants to try the activity at their homes



Leaf Chromatography

ORGANIZER INSTRUCTIONS

Grade(s): K-6

Standard connections:

Next Generation Science Standards:

Science and Engineering Practices

Asking Questions and Defining Problems Ask questions about what would happen if a variable is changed.

Planning and Carrying Out Investigations Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.

Objective: Separate the pigments in different colored leaves.

Activity overview and background: In this activity students will explore the different kinds of pigments in leaves, how the pigments in various leaves differ, and raise questions about how colors are created.

Estimated cost for activity supplies: \$16.75

This activity requires the presence of a facilitator to assist students with the solvent.

Materials

- Leaves of different colors (e.g., red chard, spinach, amaranth); (\$4)
- White coffee filters, cut into ½ inch wide strips (\$1.50/100 ct pack)
- Clear plastic drink cups (\$4/50 ct pack)
- Plastic lids with x-cut for straws (\$3.75/100 ct pack)
- Solvent: white vinegar or isopropyl alcohol (\$3.50/1 gal. white vinegar)

Set up:

1. Cut the coffee filters into strips approximately ½ inch wide and a little longer than the cup provided
2. Place all materials on the table



Leaf Chromatography

Botany On Your Plate (pg. 41)



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BACKGROUND INFORMATION

What is a Pigment?

Pigments are what give plants their colors. Leaves contain different pigments, which give them their color. Green chlorophyll is the most common type of pigment, but there are also carotenoids (yellow, orange) and anthocyanins (red). Chlorophyll, which is essential for photosynthesis, usually hides the other pigments, except when autumn comes along and it begins to break down. This is why leaves turn different colors during the fall.

What is Chromatography?

Chromatography is a method for analyzing mixtures by separating them into the chemicals from which they are made.

Background

Plant pigments play an important role in capturing light for photosynthesis. These pigments give leaves their colors. Chlorophyll pigment makes leaves green and allows the plant to capture energy from the sun for photosynthesis. Anthocyanins make leaves red. Carotenoids make leaves yellow.

In the fall, trees prepare for winter by shutting down photosynthesis. As this happens, the chlorophyll (green pigment) disappears from the leaves. As this happens, the green color fades and we begin to see yellow and orange – colors that have been there all along, but were hidden by the green pigment. Sugars trapped inside the leaves react with light and other chemicals to reveal new colors.



WHAT'S GOING ON?

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What is Chromatography?

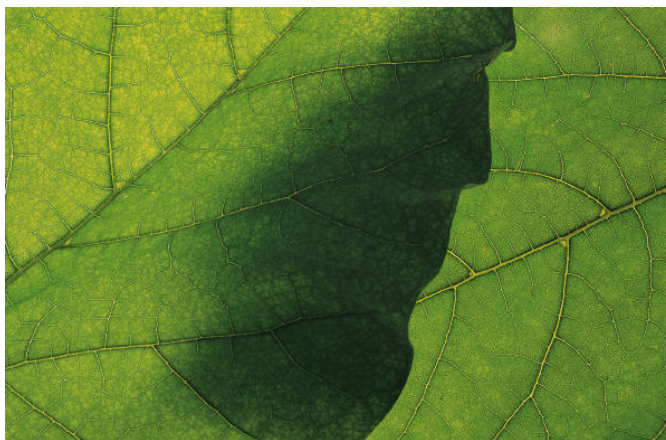
Chromatography is a method for analyzing mixtures by separating them into the chemicals from which they are made. In this experiment you will be separating the pigments found in leaves.

What pigments do you think can be found in each of the leaves?

What pigments will green leaves contain? What about red leaves, or yellow leaves?

Instructions

1. Pour $\frac{1}{2}$ inch of solvent into a cup
2. Using the edge of a penny, press a line of pigment from a leaf onto the filter strip, 1 inch from the end
3. Place the strip in the cup so that the lower end of the strip is in the solvent and the line of leaf pigment is just above its surface
4. Watch as the solvent moves up the paper and record your observations about the location and colors of the pigments
5. Repeat with different and compare your observations
6. How many different plant pigments you observe? Is there a pigment all the leaves have in common?



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TRY IT AT HOME!

What you'll need:

- Leaves of different colors (e.g., red chard, spinach, amaranth)
- White coffee filters, cut into ½ inch wide strips
- Clear plastic drink cups
- Plastic lids with x-cut for straws
- Solvent: white vinegar or isopropyl alcohol

Instructions:

1. Pour ½ inch of solvent into a cup
2. Using the edge of a penny, press a line of pigment from a leaf onto the filter strip, 1 inch from the end
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