

Why Do Leaves Change Colours?

Suggested Age / Grade Level	Curriculum Covered	Duration
Grades 2-8	<p>The process of photosynthesis.</p> <p>The concept of pigments with a focus on chlorophyll.</p> <p>Introduction to the experimental method of chromatography.</p>	1 hr

Overview

Students will investigate the question of why leaves begin to change colours in the fall months. Students will be introduced to what pigments are, and some of the main pigments that are seen in fall leaves. Students will learn the importance of the chlorophyll pigment to plants in the process of photosynthesis. Students will learn the basic process of photosynthesis by learning its inputs and outputs. The pigments of leaves collected from your own neighbourhood will be examined using an experimental method called chromatography.

Learning goals

- ✓ Learn why leaves change colour
- ✓ Understand the importance of pigments such as chlorophyll and be able to name a few different pigments
- ✓ Understand the basic process of photosynthesis including its inputs and outputs
- ✓ Learn the parts of chromatography experiments and be able to carry out your own chromatography experiment

Background Information

Pigments can be human made or found naturally in the environment around us. Some natural pigments we see are those in flowers and plants. One of the most common pigments in plants is called chlorophyll, and it is what makes plants green. Chlorophyll plays an important role in the process of photosynthesis, which is how plants make their own food. Chlorophyll absorbs the sunlight that hits the plant throughout the day, and

uses it along with oxygen and water to make food in the form of sugars. When the sunlight starts to fade in the fall months as it cools down, chlorophyll begins to break down because it doesn't need to absorb as much sunlight. When this happens, the pigments that were hidden underneath begin to show through!

Key Terms

Pigments - Give colour to things, they can be natural or human made

Photosynthesis - The process by which plants use sunlight to make their own food

Chlorophyll - A dominant green pigment found in leaves

Chromatography - A method for separating the different components of a mixture

Cohesion - The description of how water molecules stick to one another

Adhesion - The description of how water molecules stick to other solids

Ontario Curriculum Connections

Grade 2: Properties of Liquids and Solids

Grade 3: Growth and Changes in Plants

Grade 5: Understand Earth Systems

Grade 7: Interactions in the Environment

Activity Timeline/Agenda

Watch Video (10 minutes)

Introduce the activity, review or introduce any key terms students will need and review key concepts (5 minutes)

Tear up leaves and mix with rubbing alcohol (5 minutes)

Let mixture rest in hot water bath (20 minutes)

Complete chromatography experiment (10 minutes)

Discussion (10-15 minutes)

Materials

2-3 types of leaves

150 mL of rubbing alcohol

Fork

2-3 bowls

2-3 clear jars or cups

Lids or plastic cling wrap
2-3 cups of water
Kettle or microwave
coffee filter
Scissors
Tape

Additional Setup Requirements

If you do not have a coffee filter, paper towels can be used as a substitute.

Procedure

1. Collect 2-3 types of leaves from your neighbourhood. Try to collect a few of each type of leaf.
2. Rip the leaves up into small pieces and place each leaf type into its own jar.
3. Add enough rubbing alcohol into the jar so that the leaves are just submerged. Cover the jars with lids or plastic cling wrap.
4. Get 2-3 bowls of hot water ready using either a kettle or a microwave. Submerge your jars in these hot water baths for 20 minutes.

***Safety Warning - be careful when handling the hot water and consider using an oven mitt when handling for an extra precaution.**

***Also ensure that the material of the bowl used is able to handle hot liquids**

5. Grab your coffee filter and carefully cut 2-3 thin strips from it.
6. Secure these strips into the jars so that the bottom is submerged in the liquid and the top half is taped to the top of the jar.
7. Observe as the different colour pigments move up the coffee filter in the chromatography experiment.