Fall Seasons

Earth & Space Science | Lesson Guide

1st Grade

Photo Description

This image shows a lawn completely covered with fallen leaves in autumn colors—bright reds, yellows, oranges, and browns. The leaves are resting on green grass, and a house with a basketball hoop is visible in the background. This is what happens every fall when trees drop their leaves before winter arrives.

Scientific Phenomena

Anchoring Phenomenon: Deciduous trees shed their leaves in fall, covering the ground with colorful fallen foliage.

Why This Happens (Scientific Explanation for Teachers):
As daylight decreases and temperatures drop in autumn, deciduous trees respond to these environmental cues by reducing water transport to their leaves. This triggers the breakdown of chlorophyll (the green pigment), revealing underlying pigments like carotenoids (yellows/oranges) and anthocyanins (reds/purples). The tree creates a protective layer (abscission zone) at the leaf stem, causing leaves to separate and fall. This adaptation helps trees conserve water and energy during the cold, harsh winter months when water is frozen in the soil and unavailable for uptake. This is a survival strategy refined over millions of years of evolution.

Core Science Concepts

* Seasonal Change: Earth's tilt causes seasons to change throughout the year. Fall is when many trees lose their leaves as temperatures drop and days get shorter.

* Tree Life Cycles: Different types of trees respond differently to seasons. Deciduous trees (like oak, maple, and birch) lose all their leaves in fall, while evergreens keep their needles year-round.

* Color Change in Leaves: Leaves appear green because of a pigment called chlorophyll. When chlorophyll breaks down in fall, we see other colors underneath—yellows, oranges, and reds that were always there.

* Plant Survival Strategies: Trees drop their leaves to save water and energy when it's cold. This helps them survive the winter when water in the ground freezes.

Pedagogical Tip:

Use the "color reveal" concept to help first graders understand that the vibrant fall colors were always in the leaves—they just couldn't see them under the green. This makes the abstract concept of pigment breakdown more concrete and less mysterious. You might compare it to wearing a yellow shirt under a green jacket: when you take off the jacket, the yellow appears!

UDL Suggestions:

Multiple Means of Representation: Display real fallen leaves alongside pictures so students can examine them closely. Provide color-coded diagrams showing how green fades to reveal other colors. Multiple Means of Action/Expression: Allow students to sort leaves by color, create leaf mosaics, or draw their observations rather than only writing about them. Multiple Means of Engagement: Connect to students' personal experiences: "Have you played in leaves? What did they feel like? Smell like?" This makes the science phenomenon personally relevant and emotionally engaging.

Discussion Questions

1. What do you notice about the colors of the leaves on the ground? (Bloom's: Remember | DOK: 1)

2. Why do you think trees drop their leaves when it gets cold? (Bloom's: Analyze | DOK: 2)

3. If you were a tree, how would dropping your leaves help you survive the winter? (Bloom's: Evaluate | DOK: 3)

4. Compare the leaves in this picture to leaves you see in spring. What is different? Why do you think that happens? (Bloom's: Analyze | DOK: 2)

Extension Activities

1. Leaf Color Sorting and Pattern Hunt: Take students on a nature walk to collect fallen leaves. Back in the classroom, sort leaves by color (reds, yellows, oranges, browns). Create a color graph showing which colors appeared most often. Discuss: "What colors appeared the most? Why?" This builds observation, classification, and data skills.

2. Leaf Decay Investigation: Place fallen leaves in clear plastic bags with moist soil. Store in a cool place and observe over 4-6 weeks (time permitting into winter). Draw pictures or take photos weekly to document how leaves break down and return to the soil. This introduces decomposition and nutrient cycling in an age-appropriate way.

3. Seasonal Tree Bulletin Board: Create a large tree outline on bulletin board paper. Have students place leaves, drawings, and photos on the tree representing fall. Plan to change the display seasonally (bare branches in winter, buds in spring, full canopy in summer). This reinforces the cyclical nature of seasonal change.

NGSS Connections

Performance Expectation: K-ESS2-1 Plan and conduct investigations to provide evidence that objects in motion can be pushed or pulled and have different forces acting upon them (not directly applicable); however, this lesson aligns with broader K-2 Earth Science standards.

Disciplinary Core Ideas:
- K-LS1.A Structure and Function (trees have structures that help them survive)
- K-ESS2.E Dynamics of Earth's Systems (weather patterns and seasonal changes)

Crosscutting Concepts:
- Patterns The pattern of leaf color change repeats every fall
- Cause and Effect Shorter days and cooler temperatures CAUSE trees to drop leaves

Science Vocabulary

* Leaf: The flat, usually green part of a plant that catches sunlight and helps the plant make food.

* Deciduous: A tree that loses all of its leaves when fall comes and grows new ones in spring.

* Season: A time of year with certain weather patterns and changes in nature (spring, summer, fall, winter).

* Chlorophyll: The green color in leaves that helps plants make their own food using sunlight.

* Autumn (or Fall): The season between summer and winter when leaves change color and fall off trees.

* Pigment: A natural color in leaves that we can only see when the green color goes away.

External Resources

Children's Books:
- Why Do Leaves Change Color? by Betsy Maestro (explains seasonal science in simple language)
- Fall Leaves: A Counting Book by Loretta Holland (combines math and seasonal observation)
- Come On, Rain! by Karen Hesse (focuses on weather and seasons)

YouTube Videos:
- "Why Leaves Change Color" by Crash Course Kids (2:44 minutes) — Explains chlorophyll breakdown and why leaves fall. https://www.youtube.com/watch?v=KOfZuA_rD5I

- "The Reason Trees Lose Their Leaves" by TED-Ed (4:14 minutes) — A story-based explanation of why trees prepare for winter. https://www.youtube.com/watch?v=FzuJKNPdv0E

Teacher Tip: This lesson is best taught in early-to-mid fall when leaf color change is happening in real time in your local environment. Students learn better when they can observe the phenomenon directly!