

Photo Description



This image shows a yard covered with colorful fallen leaves in red, yellow, orange, pink, and brown. The grass is still green underneath, and you can see a house with a basketball hoop in the background. The leaves have changed colors and fallen from the trees—this is what happens during autumn, or fall.

Scientific Phenomena

Anchoring Phenomenon: Why do leaves change color and fall off trees in autumn?

Scientific Explanation: As days get shorter and temperatures drop in fall, trees prepare for winter by stopping the flow of water and nutrients to their leaves. The green color in leaves (chlorophyll) breaks down, revealing hidden yellow and orange colors underneath. Eventually, the leaves dry out and fall to the ground. This is a natural cycle that helps trees survive the cold winter months when there is less sunlight and water available.

Core Science Concepts

- * **Seasonal Changes:** Earth's position relative to the sun changes throughout the year, causing seasons. Fall is a season with cooler temperatures and shorter days.
- * **Plant Life Cycles:** Trees go through changes each season. In fall, trees drop their leaves as part of preparing for winter.
- * **Color Changes in Nature:** Leaves contain different pigments (colors). When chlorophyll (green) breaks down, yellow, orange, and red colors become visible.
- * **Observable Patterns:** Seasons follow a predictable pattern that repeats every year—fall always follows summer and comes before winter.

Pedagogical Tip:

Use this image as an opportunity to connect the abstract concept of "seasons" to students' direct experiences. Ask students to think about what they've noticed changing in their own neighborhoods. Create a classroom "season anchor chart" together where students can add drawings or descriptions of fall signs they observe over several weeks. This builds ownership of scientific observation skills.

UDL Suggestions:

Multiple Means of Representation: Show the image on a large screen and use a pointer to highlight different elements (leaves, grass, house). Pair the visual with tactile experiences—bring in real fallen leaves for students to touch, examine with magnifying glasses, and sort by color.

Multiple Means of Action & Expression: Allow students to show understanding through drawing, verbal discussion, or sorting activities rather than writing-only responses. Create a leaf-sorting station where students organize leaves by color, size, or shade rather than requiring written descriptions.

Multiple Means of Engagement: Connect to student interests by asking, "Have you jumped in a pile of leaves?" or "What's your favorite fall color?" Personal connections increase motivation and engagement.

Zoom In / Zoom Out

Zoom In: Inside the Leaf (Cellular Level)

Deep inside each leaf are tiny structures called chloroplasts that contain chlorophyll—the green pigment that traps sunlight to make food for the tree. As fall arrives and days get shorter, trees stop sending water and nutrients to their leaves. Without these resources, the chlorophyll breaks down and disappears. When the green fades away, other colors that were hidden underneath the whole time—yellows, oranges, and reds (called xanthophyll and carotenoids)—become visible! It's like the leaf was wearing a green coat over a colorful outfit, and now the coat is coming off.

Zoom Out: The Forest Ecosystem

When leaves fall to the ground in autumn, they don't just disappear—they become food for the forest! Fallen leaves pile up and slowly break down, returning nutrients to the soil. Insects, worms, fungi, and bacteria all help decompose the leaves into rich, dark soil. This nutrient-rich soil feeds the tree's roots and helps new plants grow in spring. The fallen leaves also provide shelter and food for small animals like beetles, millipedes, and salamanders that live on the forest floor. Seasons and leaf-dropping are connected to the survival of entire forest communities.

Discussion Questions

1. What changes do you see happening to the leaves in this picture, and why do you think that's happening?
(Bloom's: Analyze | DOK: 2)
2. If you collected these leaves and kept them in a warm, sunny place, do you think they would change back to green? Why or why not?
(Bloom's: Evaluate | DOK: 3)
3. Where do you think all these leaves came from, and what do you think happens to them after they fall on the ground?
(Bloom's: Understand | DOK: 2)
4. How is fall different from summer? What would you expect to see in this same yard during summer?
(Bloom's: Compare | DOK: 2)

Potential Student Misconceptions

Misconception 1: "Trees are dying when their leaves turn colors and fall off."

Clarification: Falling leaves is not a sign of death—it's a healthy survival strategy! Trees are actually preparing for winter by protecting themselves. Dropping leaves helps trees save water and energy during cold months when it's harder for roots to absorb water from frozen soil. The tree is resting and will grow new leaves in spring. It's like how you might wear a warm coat in winter to protect yourself; trees "wear" fewer leaves.

Misconception 2: "All the leaves turn red/orange at the same time everywhere."

Clarification: Leaf colors and timing depend on temperature, rainfall, and sunlight. In some years, leaves turn brilliant red because of sunny days and cool nights. In other years with different weather, leaves might be more yellow or brown, or turn colors at different times. This is why fall looks different each year. Even in the same neighborhood, trees on sunny hills might change color before trees in shaded areas.

Misconception 3: "Leaves change color because they are getting ready to die."

Clarification: The leaf itself is not dying—the whole tree is preparing to rest for winter. The leaf's job was to make food for the tree all summer long using sunlight. Once the tree has enough stored food (energy) to get through winter, it doesn't need the leaves anymore. The tree safely removes the leaves and seals the spot where the leaf was attached, kind of like how a scab protects a cut on your skin.

Extension Activities

1. **Fall Color Walk & Collection:** Take students on a neighborhood walk to observe and collect fallen leaves of different colors. Return to class and sort leaves by color, size, and shape. Press leaves between wax paper using a warm iron (teacher-supervised) to create a fall display. Students can draw predictions about what will happen to fresh leaves left in a dry, warm place versus a cool, damp place.
2. **Seasonal Comparison Photo Project:** Take photos of the same outdoor location (school playground, nearby tree, etc.) once per week for 4-6 weeks. Display photos in order and discuss changes. Create a class book titled "Our Neighborhood Through the Seasons" with student illustrations and simple captions describing what changed.
3. **Tree Study Over Time:** Adopt a tree outside the classroom to observe throughout fall. Students sketch the tree weekly, noting colors, number of leaves, and ground coverage. Create a simple bar graph showing how many leaves they estimate are on the tree each week. Discuss patterns they notice.

Cross-Curricular Ideas

Math Connection: Leaf Graphing & Counting

Students can sort the fallen leaves from the photo (or real leaves collected on a walk) by color and create a simple bar graph showing how many of each color they found. This builds graphing skills and data interpretation. Students can also estimate: "If there are 50 leaves on this small patch of grass, how many leaves do you think are on the whole yard?" This introduces beginning multiplication and estimation concepts.

ELA Connection: Descriptive Writing & Sensory Language

Have students write or dictate sentences describing the leaves using sensory words: "The red leaves feel crispy and crumbly. The yellow leaves look bright like the sun. The brown leaves smell earthy." Create a class "Fall Word Wall" with describing words (crispy, crunchy, colorful, soft, dry, damp). Students can use these words to write simple poetry or create illustrated word cards. This builds vocabulary and descriptive writing skills.

Social Studies Connection: Seasonal Preparation & Community

Discuss how people and communities prepare for fall and winter, just like trees do. Talk about activities people do in fall: raking leaves, harvesting crops, preparing gardens, getting ready for colder weather. Compare human preparation to tree preparation. Take a neighborhood walk to observe how the community changes in fall (decorations, clothing, activities). Students can draw or photograph examples and create a class book about "How Our Community Prepares for Fall."

Art Connection: Mixed Media Fall Collage

Students create fall scenes using the fallen leaves themselves, along with colored paper, markers, and paint. They can arrange leaves by color to create patterns or pictures, press them into paint or watercolor, or glue them onto paper to make collages. This builds fine motor skills and helps students appreciate the natural beauty and variety of leaf colors while connecting art to seasonal observation.

STEM Career Connection

Botanist (Plant Scientist)

Botanists study plants of all kinds, including how and why trees change with the seasons. They might spend time in forests observing trees, collecting leaves to study under microscopes, or growing plants in laboratories to learn about how plants respond to temperature and light changes. Botanists help us understand nature and can work to protect forests and plants.

Average Annual Salary: \$65,000–\$75,000

Meteorologist (Weather Scientist)

Meteorologists study weather and climate patterns. They track temperature changes, rainfall, and sunlight throughout the year and predict when seasons will change. They use their knowledge to help us understand why fall arrives when it does and how weather patterns affect when leaves change colors. Some meteorologists even study how climate changes over many years.

Average Annual Salary: \$62,000–\$80,000

Environmental Scientist / Ecologist

Environmental scientists study how living things interact with each other and their environment. They investigate what happens to fallen leaves, how decomposition works, and how seasonal changes affect entire ecosystems—from soil organisms to animals that depend on leaf litter for shelter. They work to protect forests and natural areas.

Average Annual Salary: \$66,000–\$76,000

NGSS Connections

Performance Expectation:

K-ESS2-1: Use and share observations of local weather conditions to describe patterns over time.

Disciplinary Core Ideas:

- * K-ESS2.D - Weather and Climate (seasonal patterns)
- * 1-LS1.A - Structure and Function (plants have different parts and needs)

Crosscutting Concepts:

- * Patterns - Seasons follow patterns that repeat every year
- * Cause and Effect - Shorter days and cooler temperatures cause changes in plants

Science Vocabulary

- * Autumn (or Fall): The season after summer when leaves change color, the weather gets cooler, and days get shorter.
- * Chlorophyll: The green color in leaves that helps plants make food using sunlight.
- * Deciduous Trees: Trees that lose all their leaves in fall and grow new ones in spring.
- * Season: A time of year with its own weather patterns and changes in nature (spring, summer, fall, winter).
- * Pigment: Natural colors found in plants and other living things.
- * Leaf: The flat green part of a plant that makes food for the plant using sunlight.

External Resources

Children's Books:

Fall Leaves* by Loretta Holland (simple, beautifully illustrated board book perfect for Second Grade)

Why Do Leaves Change Color?* by Betsy Maestro (explains the science in accessible language)

Come On, Rain!* by Karen Hesse (celebrates seasonal weather changes through poetic language)