Fall Seasons

Earth & Space Science | Lesson Guide

Kindergarten

Photo Description

This image shows a yard covered with many colorful fallen leaves in shades of red, yellow, pink, orange, and brown. Green grass peeks through the leaves, and a basketball hoop and house are visible in the background. The leaves have changed colors and fallen from trees—a sign that fall (autumn) has arrived.

Scientific Phenomena

Anchoring Phenomenon: Leaves changing color and falling from trees in autumn.

Why This Happens: As days get shorter and temperatures drop in fall, trees prepare for winter by stopping the flow of water and nutrients to their leaves. This causes the green chlorophyll (the pigment that helps trees make food) to break down, revealing hidden yellow, orange, and red pigments that were always in the leaves. Once the leaves stop receiving nutrients, they dry out, weaken, and eventually fall to the ground. This is a natural seasonal cycle that helps trees survive the cold winter months.

Core Science Concepts

* Seasonal Change: Seasons are patterns in weather and nature that repeat every year. Fall is the season when temperatures cool, days get shorter, and leaves change color and fall.

* Plant Life Cycles: Trees go through changes throughout the year. In fall and winter, trees rest and prepare for spring growth by losing their leaves.

* Observable Patterns in Nature: Colors in leaves change in predictable patterns each year, helping us recognize when a season is changing.

* Weathering and Decomposition: Fallen leaves break down on the ground and return nutrients to the soil, helping new plants grow.

Pedagogical Tip:

Kindergarteners learn best through sensory experiences. Before or after this lesson, collect real fall leaves with students. Let them touch the textures, observe colors closely with magnifying glasses, and sort leaves by color or size. This concrete experience deepens their understanding far more than images alone.

UDL Suggestions:

Multiple Means of Representation: Provide images, real leaf samples, and video footage of falling leaves to engage visual and tactile learners. Use simple, repetitive language with visual supports (color charts, leaf cutouts). Multiple Means of Action & Expression: Allow students to show understanding through drawing, sorting activities, or acting out falling leaves rather than only verbal responses. Multiple Means of Engagement: Connect to student interests—ask what they notice during walks outside, invite them to predict what will happen next, and celebrate curiosity about seasonal changes.

Zoom In / Zoom Out

Zoom In (Cellular Level): Inside each leaf cell, there are tiny structures called chloroplasts that contain chlorophyll—the green pigment that captures sunlight to make food for the tree. In fall, as temperatures drop and days shorten, the tree stops sending water and nutrients to the leaves. Without these resources, the chlorophyll breaks down and disappears. When the green fades away, we can finally see the yellow, orange, and red pigments (carotenoids and anthocyanins) that were hiding underneath the whole time! These colors were always there, but the bright green chlorophyll covered them up.

Zoom Out (Ecosystem Level): The fallen leaves in this yard are part of a much larger forest ecosystem. As leaves decompose on the ground, they break down and return nutrients (like nitrogen and carbon) back to the soil. These nutrients feed the grass, plants, and tree roots, helping them grow strong. The fallen leaves also provide shelter and food for insects, worms, and microorganisms that live in the soil. What happens in this backyard connects to the health of local gardens, parks, and forests—and even affects the carbon cycle that influences Earth's climate!

Discussion Questions

1. Why do you think the leaves are different colors now than in summer? (Bloom's: Analyze | DOK: 2)
2. What do you think happens to the leaves after they fall on the ground? (Bloom's: Predict | DOK: 2)
3. If it's fall now and leaves are falling, what season comes next, and what will happen then? (Bloom's: Infer | DOK: 3)
4. How is a tree in fall different from a tree in spring? What do you observe? (Bloom's: Compare | DOK: 2)

Potential Student Misconceptions

Misconception 1: "The leaves are dying and that's bad."
- Clarification: The leaves aren't dying in a bad way—the tree is doing this on purpose to get ready for winter! Losing leaves helps trees survive the cold when there's less water available and less sunlight. It's actually a smart survival strategy, not a sign of sickness. The tree will grow new leaves again in spring.

Misconception 2: "All leaves turn the same colors (usually orange and red)."
- Clarification: Different kinds of trees have different leaf colors in fall. Some trees have red or purple leaves, some have bright yellow leaves, and some have orange or brown leaves. The type of tree decides what color its leaves will turn. You can use this to help identify different trees!

Misconception 3: "Once a leaf falls off the tree, it's just gone/useless."
- Clarification: Fallen leaves aren't trash—they have an important job! They break down on the ground and turn into soil that helps new plants grow. The nutrients in the leaves go back into the earth, making it rich and healthy for next year's growth. Nothing in nature gets wasted!

Extension Activities

1. Leaf Collection Walk: Take students on a nature walk to collect fallen leaves. Sort them by color, size, or texture back in the classroom. Create a colorful leaf collage or arrange them in a pattern on poster board.

2. Falling Leaves Experiment: Drop leaves and other objects from a safe height (indoors or out) to observe how they fall. Discuss why leaves twirl and spin—connect this to their light, thin shape. Try to predict which objects will fall fastest or slowest.

3. Tree Mural Over Time: Create a large tree on butcher paper or a wall. In week one, color leaves green and attach to the tree. Each week, change some leaves to yellow, orange, red, and brown, then remove them to show the changing seasons. Return in spring to add new leaves.

Cross-Curricular Ideas

Math: Sorting and Graphing Leaves — Collect fallen leaves with students and sort them by color, size, or shape. Create a simple bar graph or picture graph showing how many leaves fall into each category (e.g., "5 red leaves, 7 yellow leaves, 3 brown leaves"). This builds classification and early data representation skills.

ELA: Leaf Descriptive Writing & Poetry — Students can dictate or draw descriptions of leaves using sensory words (soft, crunchy, smooth, bumpy, red, bright). Create a class poem with a repeating line like "Fall leaves are ___, fall leaves are ___" where each student contributes one color or feeling word. Pair with picture books about fall to build vocabulary.

Art: Leaf Rubbings and Color Mixing — Place leaves under paper and rub over them with crayons to create leaf prints. Use watercolors or paint to mix colors and discover how yellow and red make orange—connecting to the actual colors they see in nature. Display rubbings in sequence to show the color-change cycle.

Social Studies: Seasonal Clothing & Community Changes — Discuss how people dress differently in fall (sweaters, jackets) compared to summer. Take a neighborhood walk to observe other seasonal changes people make (pulling out yard decorations, preparing gardens for winter, raking leaves). Create a chart showing "What We Do in Fall" to help students understand how seasons affect human activities and communities.

STEM Career Connection

Botanist (Plant Scientist) — Botanists study plants and trees to understand how they grow, what makes them healthy, and how they change with seasons. A botanist might spend time outside collecting leaf samples, taking photographs, and studying why some trees turn red while others turn yellow in fall. They help us learn about plants so we can protect forests and keep our world green. Average Salary: $63,000–$68,000/year

Meteorologist (Weather Scientist) — Meteorologists study weather and climate patterns. They track temperature changes and predict when seasons will change, which helps them forecast when leaves will start turning color in different places. By understanding weather patterns, they help farmers and communities prepare for winter. Average Salary: $62,000–$73,000/year

Environmental Scientist / Ecologist — These scientists study how plants, animals, soil, and water all work together in nature. They learn about decomposition—how fallen leaves break down and help the soil—and how this supports whole ecosystems. They work to protect forests and natural areas so they stay healthy for the future. Average Salary: $68,000–$80,000/year

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 (patterns of weather and seasonal changes)
- K-LS1.D Information processing (observing and describing patterns in the natural world)

Crosscutting Concepts:
- Patterns (Seasonal patterns; color changes follow predictable patterns)

- Change and Stability (Trees change with seasons but the pattern repeats yearly)

Science Vocabulary

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

* Leaves: Flat green parts of plants and trees that use sunlight to make food for the plant.

* Season: A time of year with its own weather patterns and changes in nature.

* Chlorophyll: The green color in leaves that helps plants catch sunlight and make food.

* Decompose: When dead leaves and plants slowly break down into soil.

External Resources

Children's Books:
- Fall Leaves by Loretta Holland (simple, rhyming text about falling leaves)
- Why Do Leaves Change Color? by Betsy Maestro (age-appropriate seasonal explanation)
- Fall by Manya Stojic (sensory-rich picture book celebrating autumn)