

The Science of the Golden Season: A Lesson in Autumn's Arrival

Materials Needed:

- **For the Nature Walk:** A small bag or basket for collecting leaves, comfortable walking shoes.
- **For the Craft:**
 - A collection of colorful fall leaves from your nature walk (flattened in a heavy book for an hour if possible)
 - Two pieces of clear contact paper (or wax paper) of the same size (e.g., 8x10 inches)
 - Construction paper (in fall colors like brown, orange, red) for a frame
 - Scissors
 - A hole punch
 - A piece of string or ribbon for hanging
 - Optional: A permanent marker for writing
- **For the Lesson:** A globe or ball to represent Earth, and a lamp or flashlight to represent the Sun.

Part 1: Story Time - Engaging with the Season (10 minutes)

Let's start with a short story to get us thinking about the change from summer to fall.

Lily and the Whispering Wind

Lily loved summer. She loved the hot sun that warmed her skin and the long days that seemed to stretch forever. But one morning, she woke up and something was different. A cool, crisp whisper of wind snuck through her open window, making her pull her blanket up to her chin. When she went outside, the world felt quieter. The buzzing of the summer cicadas was gone. Instead, she saw a single, bright red leaf that had drifted down from the giant maple tree in her yard. "Where did summer go?" she asked the tree.

The maple tree didn't answer, but a squirrel scampered down its trunk, its cheeks full of an acorn. It stopped, looked at Lily, and then hurried off to bury its treasure. Over the next week, Lily saw more changes. More leaves turned from green to brilliant shades of yellow, orange, and red. The sun set a little earlier each evening, painting the sky in deep pinks. The air smelled different, too—like damp earth and sweet, decaying leaves. Lily realized that summer wasn't gone forever; it was just making way for something new and beautiful. Autumn hadn't just arrived; it had tiptoed in, sharing its secrets one golden leaf at a time.

Discussion Question for Ann: What changes did Lily notice that told her the season was changing?

Part 2: The Science of Fall - Why Does it Happen? (15 minutes)

Lily wondered why the seasons change. It's not because the Earth is closer or farther from the sun! It's all about a special tilt. Let's explore why.

1. The Earth's Tilt (Demonstration):

- Place the lamp (Sun) in the middle of the room. Hold the globe or ball (Earth) and show Ann how the Earth is tilted on its axis (an imaginary line running through the North and South poles).
- Walk around the "Sun" in a big circle, keeping the Earth tilted in the *same direction*.
- Explain that when our part of the Earth (the Northern Hemisphere) is tilted **towards** the sun, we get direct sunlight and it's summer.
- When we are tilted **away** from the sun, the sunlight is less direct and spreads out, making it cooler. That's when we have fall and winter! Autumn is the special time when we are transitioning from tilting toward the sun to tilting away.

2. The Secret Colors in Leaves:

- Ask Ann: "Why do you think leaves change color?"
- Explain that leaves get their green color from something called **chlorophyll**. Chlorophyll's job is to soak up sunlight to make food for the tree (photosynthesis). It's so good at its job that it covers up other colors that are already in the leaf!
- In the fall, when there are shorter days and less sunlight, the trees stop making food. The green chlorophyll fades away.
- When the green is gone, the **yellow and orange colors** (called carotenoids), which were there all along, can finally be seen!
- Some trees, like maples, also make a new color in the fall—bright reds and purples (called anthocyanins)—as a kind of sunscreen to protect the leaf as it shuts down.

Part 3: Autumn Detective - Nature Walk (20 minutes)

Now let's be like Lily and go outside to find our own clues that fall is here! Take your collection bag.

Your Mission:

- **Find Leaves:** Collect at least 5-10 different leaves. Look for different colors, shapes, and sizes. Notice which trees have changed color and which are still green.
- **Listen:** What do you hear? Are there different bird sounds? Do you hear the crunch of leaves under your feet?
- **Look for Animals:** Can you spot any squirrels gathering nuts? Or see birds flocking together?
- **Feel the Air:** Does the air feel cooler or breezier than it did in the summer?

Part 4: Creative Science - Fall Leaf Suncatcher Craft (25 minutes)

Let's use the beautiful leaves you collected to create a piece of art that celebrates the science of fall colors. This will capture the sunlight just like leaves do!

Instructions:

1. **Create Your Frame:** Take two pieces of construction paper. Cut a large window out of the center of each one, leaving a 1-inch border to create two identical frames.
2. **Prepare Your Canvas:** Take one piece of clear contact paper. Peel the backing off and lay it on the table, sticky-side up. Place one of your paper frames on top of it.
3. **Design Your Art:** Arrange the leaves you collected inside the frame on the sticky surface. Overlap them, make a pattern, or create a scene! This is your celebration of autumn's colors. You can use the marker to write "Fall" or your name on a leaf.
4. **Seal Your Suncatcher:** Take the second piece of contact paper, peel off the backing, and

carefully lay it over your leaf design, sticky-side down. Press firmly to smooth out any air bubbles.

5. **Finish the Frame:** Glue the second paper frame on top, so your contact paper "window" is neatly framed on both sides. Trim any excess contact paper around the edges.
6. **Get Ready to Hang:** Punch a hole at the top of your suncatcher, thread the string or ribbon through it, and tie a loop.

Now you can hang your art in a window and watch the sun shine through the beautiful fall colors you found!

Part 5: Conclusion & Assessment (5 minutes)

Let's talk about our amazing work today!

- **Show and Tell:** Have Ann hold up her suncatcher and explain why she chose the leaves she did.
- **Check for Understanding:** Ask Ann the following questions:
 1. In your own words, can you tell me the real reason we have fall? (Looking for: Earth's tilt).
 2. What is the name of the green stuff in leaves that disappears in the fall? (Looking for: Chlorophyll).
 3. What was your favorite sign of fall that we discovered on our nature walk today?

Differentiation & Extension

- **For Support:** If the science concept is tricky, focus on the observation part. What do we see, feel, and hear that is different? During the craft, you can pre-cut the frames or help arrange the leaves.
- **For Extension:** Challenge Ann to choose one type of tree she saw on the walk (like an oak or maple) and research it online or in a book. Why is it important? What animals depend on it? She could also write her own short story, like "Lily and the Whispering Wind," about her experience today.

Curriculum Alignment

This lesson touches upon key concepts found in the Next Generation Science Standards (NGSS) for elementary students, including:

- **5-ESS1-2:** Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. (Connects to the reason for seasons).
- **3-LS4-3:** Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. (Connects to how plants and animals adapt to seasonal change).