Vine

Life Science | Lesson Guide

Kindergarten

Photo Description

This image shows a green vine plant growing on a wooden fence. The vine has long, smooth pods hanging down and big heart-shaped leaves. You can see the vine is climbing up and over the fence, reaching toward the sun and sky.

Scientific Phenomena

Anchoring Phenomenon: Why do plants grow upward and wrap around things?

Plants are living things that grow toward light and sometimes climb on structures for support. This vine is demonstrating phototropism—the plant's natural tendency to grow toward sunlight. Additionally, the vine exhibits thigmotropism (growth in response to touch), as the tendrils and stems wind around the fence for structural support. The plant's growth is driven by a combination of seeking light energy for photosynthesis and finding stable support to reach higher toward sunlight sources.

Core Science Concepts

1. Plants are living things that grow – This vine is alive and growing larger over time. It needs sunlight, water, and soil nutrients to survive and develop.

2. Plants grow toward light – The vines reach upward and sprawl across the fence because they are seeking sunlight. This helps them make food through photosynthesis.

3. Plants use structures to climb and adapt – Vines have tendrils and flexible stems that wrap around supports (like fences). This helps them grow tall without having thick, woody stems like trees.

4. Living things change their environment – As the vine grows, it covers the fence and creates shade. It also provides shelter and food for small animals and insects.

Pedagogical Tip:

For Kindergarteners, avoid the technical terms "phototropism" and "thigmotropism" in direct instruction. Instead, use concrete language: "Plants reach toward the sun" and "Plants hold onto things to help them grow tall." Use hand motions to show vines wrapping and reaching—kinesthetic learning is powerful at this age.

UDL Suggestions:

Accessibility: Provide multiple means of engagement by offering tactile exploration (feel real vines or rope), visual observation (photos and the actual plant), and verbal description. Students with visual impairments can feel textured leaves and stems. English Language Learners benefit from picture cards showing vine growth stages paired with simple captions.

Zoom In / Zoom Out

Zoom In: Inside the Leaf (Cellular Level)
If we could shrink down and look inside one of the vine's green leaves with a super-powerful microscope, we would see tiny, tiny structures called chloroplasts. These are like little food-making factories inside the leaf cells. When sunlight hits the leaf, the chloroplasts use that light energy, along with water and air, to make food (sugar) that helps the plant grow. This process is called photosynthesis, but for Kindergarteners, we can simply say: "The leaf catches sunlight and turns it into food for the plant, kind of like how your tummy turns food into energy to run and play!"

Zoom Out: The Neighborhood Ecosystem
This single vine on a fence is actually part of a much bigger living community. The vine provides shelter and food for insects like bees, butterflies, and beetles. Birds may eat those insects or use the vines to build nests. The vine's leaves also create shade on the ground below, which helps keep the soil cool and moist for other plants and small animals living beneath the fence. When the vine eventually dies and breaks down, it returns nutrients to the soil, feeding the next generation of plants. The vine is just one small but important piece of the outdoor world around us!

Discussion Questions

1. What do you think this vine needs to stay alive and healthy? (Bloom's: Remember | DOK: 1)
2. Why do you think the vine is growing upward on the fence instead of staying on the ground? (Bloom's: Analyze | DOK: 2)
3. If we moved this fence to a shady spot with no sun, what do you predict would happen to the vine over time? (Bloom's: Evaluate | DOK: 3)
4. How do you think the vine helps other living things, like bugs or birds? (Bloom's: Understand | DOK: 2)

Potential Student Misconceptions

Misconception 1: "Plants eat food like animals do."
Clarification: Plants don't eat food from the ground or air like we eat lunch. Instead, plants make their own food using sunlight, water, and air. The roots drink up water from the soil, the leaves catch sunlight, and together they create food the plant needs to grow. We can tell students: "Plants are like little chefs—they use sunshine and water to cook up their own food!"

Misconception 2: "The vine is wrapping around the fence because it wants to hold on, like I hold onto a rope."
Clarification: The vine doesn't think or choose to wrap around the fence on purpose. Instead, the vine's stems and tendrils are naturally sensitive to touch. When they bump into something, they automatically curl and wrap around it for support. It's an instinct, not a choice—similar to how your hand automatically pulls away from something hot without you having to think about it.

Misconception 3: "Plants only need sunlight to grow; water isn't as important."
Clarification: Students may notice that we water plants but forget that water is equally essential to sunlight. Both are critical. Without water, the vine's roots cannot absorb nutrients, and the plant will wilt and die—even with plenty of sun. A simple analogy: "Sunlight is like breakfast, and water is like lunch—plants need both to stay healthy and strong!"

Extension Activities

1. Observe a Climbing Plant (Hands-On Exploration)
Bring a potted vine or climbing plant into the classroom (such as a Pothos or Philodendron). Have students observe its leaves, count how many tendrils they can see, and gently feel the texture. Over 2-3 weeks, let students draw pictures of the plant weekly to track how it grows. Tape it next to a sunny window and watch where it reaches.

2. Build a Vine Climbing Path (Engineering Activity)
Provide students with string, yarn, or pipe cleaners. Set up a "fence" using a small cardboard box or wooden frame. Have students wrap and weave their string around the structure to mimic how vines climb. Ask, "What helps your vine stay attached?" This builds understanding of plant structures while practicing fine motor skills.

3. Read and Dramatize Plant Growth (Language + Science Integration)
Read a simple plant growth book aloud, then have students act out being seeds, sprouting, growing leaves, and reaching toward the sun. Use scarves or ribbons as "vines" that students can twirl and wrap around each other, dramatizing how vines climb. This combines movement, imagination, and science learning.

Cross-Curricular Ideas

Math: Measuring and Counting Growth
Bring a potted climbing plant into the classroom and have students use non-standard measurement tools (string, blocks, hand-spans) to measure the plant's height each week. Create a simple bar graph or picture chart showing the vine getting taller over time. This integrates measurement, data collection, and visual representation of growth patterns.

ELA: Descriptive Language and Storytelling
Read students The Tiny Seed by Eric Carle, then have them dictate or draw a story about the "life of the vine." Ask prompts like: "What does the vine see from the fence? What friends does it make (insects, birds)? What will happen to it in winter?" Create a class book with student illustrations and teacher-scribed captions, emphasizing descriptive words like "curly," "climbing," "bright," and "stretchy."

Art: Vine Collage and Nature Rubbings
Have students create a fence and vine collage using torn green paper, yarn, and natural materials. Alternatively, take students outside to do leaf and bark rubbings with crayons and paper against real vines and fence textures. Display artwork alongside photos of the vine from the lesson, creating a gallery that celebrates observation and creativity.

Social Studies: Community Gardens and Shared Spaces
Connect the vine-on-fence image to the idea of shared neighborhoods and community gardens. Discuss: "This fence belongs to a family, but the vine provides food and shelter for many creatures in the neighborhood. How do we share our spaces with nature? What other plants grow in our community?" This builds awareness of interdependence and environmental stewardship in an age-appropriate way.

STEM Career Connection

1. Botanist (Plant Scientist)
A botanist is a scientist who studies plants—how they grow, what they need, and how they change. A botanist might spend time in a garden or greenhouse observing vines like the one in this photo, measuring their growth, and learning why they climb. Some botanists help farmers grow better vegetables, and others work in nature preserves to protect wild plants. Botanists help us understand how to keep our Earth healthy and green!
Average Annual Salary: $63,000 USD

2. Landscape Designer
A landscape designer is someone who plans and creates beautiful outdoor spaces using plants, trees, flowers, and vines. They decide where to plant climbing vines on fences, which plants will grow best in sunny spots, and how to design gardens that are pretty and healthy. Landscape designers use science to know what plants need and art to make spaces look wonderful.
Average Annual Salary: $69,000 USD

3. Environmental Scientist / Ecologist
An environmental scientist studies how all living things—plants, animals, insects, and people—live together in nature. They might study a vine-covered fence to see what bugs and birds live there and how everything connects. Environmental scientists help protect nature and make sure plants and animals have healthy homes.
Average Annual Salary: $68,000 USD

NGSS Connections

Performance Expectation:
K-LS1-1: Use observations to describe patterns of what plants and animals (including humans) need to survive.

Disciplinary Core Ideas:
- K-LS1.A – All organisms have basic needs such as water, materials to make structures, and energy
- K-ESS2.E – Plants depend on water and light to grow
- K-LS1.C – Many characteristics of an organism are inherited from parents, and some are learned or influenced by the environment

Crosscutting Concepts:
- Patterns – Observe that plants grow in predictable patterns toward light and upward
- Structure and Function – The vine's flexible stem and tendrils help it climb and grow

Science Vocabulary

* Vine: A plant with a long, thin stem that grows along the ground or climbs up things like fences or trees.

* Leaf (leaves): The green parts of a plant that catch sunlight and help the plant make food.

* Grow: To become bigger and taller over time; what living things do when they get food, water, and sunlight.

* Sunlight: Bright light and warmth that comes from the sun; plants need it to live and make food.

* Tendril: A thin, curly part of a vine that wraps around things to help the plant climb.

External Resources

Children's Books:
- The Tiny Seed by Eric Carle – A wonderful story about a seed's journey and growth toward the sun
- From Seed to Plant by Gail Gibbons – Simple, illustrated non-fiction about how plants grow
- What Do Roots Do? by Kathleen V. Kudlinski – Explores what plants need and how they grow