Vine

Life Science | Lesson Guide

5th Grade

Photo Description

This image shows climbing vines growing over a weathered wooden fence. The vines have large, lobed leaves and long, green bean-like pods hanging down. You can see the vines have wrapped around and grown along the fence structure, demonstrating how plants can grow in different directions and use structures for support.

Scientific Phenomena

Anchoring Phenomenon: Plants growing upward and outward to reach sunlight

This image illustrates phototropism and structural adaptation—the tendency of plants to grow toward light sources and develop special features to climb. The vine is growing upward along the fence because sunlight is more abundant at higher elevations. Additionally, the vine has adapted to use the fence as physical support, allowing it to climb rather than sprawl on the ground. This is an example of how plants solve problems in their environment through growth patterns and structural features like tendrils or twining stems.

Core Science Concepts

* Plant Growth Patterns: Plants grow in response to their environment, including light direction (phototropism) and the availability of support structures. This vine grows upward to maximize light exposure.

* Adaptation for Survival: Climbing vines have developed special features (like tendrils or twining stems) that help them climb structures or other plants to reach sunlight without using as much energy to build thick, sturdy stems.

* Life Cycle & Reproduction: The large green pods visible in the image are the fruit of this plant, containing seeds for reproduction. Understanding plant reproduction helps us see why these vines produce seeds.

* Energy and Photosynthesis: Plants need sunlight to make their own food through photosynthesis. By climbing higher on the fence, this vine positions its leaves to capture more direct sunlight.

Pedagogical Tip:

When teaching about plant growth, use the "observable vs. inferred" distinction. Students can observe that the vine grows upward along the fence, but they must infer that it's responding to light. Encourage students to distinguish between what they see and the scientific explanation for why it's happening. This builds critical thinking skills essential for NGSS practices.

UDL Suggestions:

Provide multiple means of engagement by offering students choice in how they explore plant growth: some students might observe a climbing vine in person, others might watch time-lapse videos, and still others might create labeled diagrams. For representation, use both visual images and descriptive text, and provide a vocabulary list with both pictures and definitions. For action/expression, allow students to demonstrate understanding through drawings, writing, physical models, or presentations—not just traditional tests.

Discussion Questions

1. Why do you think this vine is growing upward along the fence instead of growing flat on the ground? (Bloom's: Analyze | DOK: 2)

2. What structures or features does this vine have that help it climb? (Bloom's: Understand | DOK: 1)

3. If we moved this fence into complete shade, how do you predict the vine's growth would change, and why? (Bloom's: Evaluate | DOK: 3)

4. How might the long green pods (fruit) help the plant survive and grow in new locations? (Bloom's: Synthesize | DOK: 3)

Extension Activities

1. Climbing Plant Investigation: Provide each student or small group with a fast-growing vine plant (like a bean plant or sweet potato vine) and a stick or small trellis. Have students predict how the plant will grow over 2-3 weeks and observe whether it naturally climbs the support structure. Students can measure growth, sketch changes, and record observations in a science journal.

2. Light Direction Experiment: Place a potted plant in a box with a single hole for light. Predict and observe which direction the plant grows toward the light source over one week. This hands-on demonstration of phototropism is safe and visually compelling for fifth graders.

3. Seed Dispersal Design Challenge: Examine the green pods in the image and discuss how seeds travel. Challenge students to design and test their own seed dispersal method using materials like paper, cotton, or foam. This connects the fruit visible in the photo to plant reproduction and adaptation.

NGSS Connections

Performance Expectation:
5-LS1-1: Support an argument that plants get the materials they need for growth chiefly from air and water.

Disciplinary Core Ideas:
- 5-LS1.A: Structures and Properties
- 5-LS1.B: Growth and Development of Organisms

Crosscutting Concepts:
- Structure and Function: The vine's climbing structures (tendrils or twining stems) are directly related to its function of reaching sunlight.
- Cause and Effect: Sunlight availability causes the plant to grow in specific directions.
- Systems and System Models: The plant, fence, and sunlight work together as a system.

Science Vocabulary

* Phototropism: The way plants grow toward light sources to get the energy they need.

* Adaptation: A special feature or behavior that helps a living thing survive in its environment.

* Tendrils: Thin, curly plant parts that help vines wrap around and climb structures.

* Photosynthesis: The process where plants use sunlight, water, and air to make their own food.

* Germination: When a seed begins to grow and sprout into a new plant.

External Resources

Children's Books:
- The Tiny Seed by Eric Carle (a classic about seed growth and adaptation)
- How Do Plants Grow? by Gail Gibbons (clear illustrations of plant structures and growth)
- A Seed Is Sleepy by Dianna Hutts Aston (poetic exploration of seed life cycles)

YouTube Videos:
- "Plant Growth Time-Lapse" by National Geographic Kids — Shows plants growing and responding to light over days, making growth visible. https://www.youtube.com/results?search_query=plant+growth+timelapse+national+geographic+kids

- "How Do Plants Grow?" by Crash Course Kids — Explains photosynthesis and plant growth in student-friendly language with engaging animations. https://www.youtube.com/watch?v=yNgvVEpy5mE

Teaching Note: This image is an excellent hook for a unit on plant structures and adaptations. Consider starting with the anchoring phenomenon (asking students, "Why is this vine growing up the fence?"), then building investigations around their observations and questions. This aligns with the NGSS practice of using phenomena to drive student inquiry.