

Photo Description



This image shows a climbing vine plant with large, heart-shaped leaves growing up and over a wooden fence. The vine has long, curly tendrils (thin, spiral-shaped stems) that wrap around the fence to help the plant climb upward. The plant has bright green leaves that catch the sunlight, and you can see small yellow flowers blooming along the vine.

Scientific Phenomena

Anchoring Phenomenon: Why do some plants climb up fences and walls instead of staying on the ground?

Plants like vines have evolved special adaptations that allow them to climb toward sunlight. The curly tendrils act like the plant's "hands," wrapping around nearby structures for support. This climbing behavior helps the vine reach sunlight more efficiently than sprawling on the ground, where it would be shaded by other plants. The plant grows upward through phototropism (growth toward light) and uses its tendrils for mechanical support—a clever survival strategy that allows vines to compete for light in crowded plant communities.

Core Science Concepts

- * **Plant Structures and Their Functions:** Tendrils are specialized stems that coil and grip objects, allowing the plant to climb. Leaves capture sunlight for food-making, and flowers produce seeds for reproduction.
- * **Plant Growth Patterns:** Vines exhibit directional growth—they grow upward and outward, following light. This behavior helps them reach better light conditions for photosynthesis.
- * **Adaptation:** Climbing vines have evolved special features (tendrils, flexible stems) that help them survive in environments where ground space is limited or shaded.
- * **Life Cycles:** The vine flowers and produces seeds, continuing the plant's life cycle year after year.

Pedagogical Tip:

When teaching about plant structures, encourage students to observe with their senses (except taste!). Have them gently touch a tendril, measure leaf size, and sketch what they see. Sensory observation builds deeper understanding than pictures alone and helps concrete thinkers in Grade 3 move toward more abstract plant biology concepts.

UDL Suggestions:

Multiple Means of Representation: Provide both labeled diagrams of vine parts AND a real vine specimen for students to examine. Some learners need visual labels; others need tactile, three-dimensional interaction. Offer both.

Multiple Means of Action & Expression: Allow students to show understanding through drawing, writing, building with straws and yarn, or verbal explanations. Not all Third Graders are ready for formal written descriptions.

Zoom In / Zoom Out

Ø=Ý, Zoom In: The Cellular Level

Inside each leaf, tiny structures called chloroplasts contain chlorophyll, the green pigment that traps sunlight and converts it into energy (sugar) through photosynthesis. At the cellular level, water moves through tiny tubes in the stems and tendrils, helping the plant stay firm and rigid so it can climb.

Ø<ß Zoom Out: The Ecosystem Connection

In nature, vines are part of complex ecosystems. They provide food and shelter for insects, birds, and small animals. In a garden or fence ecosystem, the climbing vine competes with other plants for sunlight and water, but it also creates shade and structure that benefits other organisms. Vines are part of food webs, nutrient cycles, and the overall health of their habitat.

Discussion Questions

1. "What do you think would happen if this vine didn't have tendrils? How might the plant look different?"
 - Bloom's: Analyze | DOK: 2
2. "Why might a plant benefit from climbing up a fence instead of staying flat on the ground?"
 - Bloom's: Explain | DOK: 2
3. "Can you think of other plants or animals that have special body parts that help them climb or grip things? What are those parts?"
 - Bloom's: Analyze | DOK: 3
4. "If a vine is growing on a fence in the shade for most of the day, but there's sunlight on the other side of the fence, predict what the vine might do as it grows."
 - Bloom's: Evaluate | DOK: 3

Potential Student Misconceptions

Misconception 1: "Plants have brains and choose to climb toward the sun."

- Clarification: Plants don't have brains, but they respond to light through chemical signals inside their stems. It's an automatic response, like how your hand automatically pulls away from something hot. The plant "grows toward" light, not "chooses to move toward" it.

Misconception 2: "Tendrils are like roots—they get food from whatever they touch."

- Clarification: Tendrils are modified stems that grip and support the plant, but they don't absorb nutrients from the fence. The plant's roots in the soil get water and nutrients. Tendrils simply help the plant climb toward sunlight.

Misconception 3: "All plants climb; some just don't want to."

- Clarification: Not all plants are climbers. Climbing vines have special traits (like tendrils) that other plants don't have. These traits evolved because climbing helps vines survive in certain environments. Tomato plants or sunflowers don't have tendrils because they have different survival strategies.

Extension Activities

Activity 1: Grow Your Own Climbing Vine

Provide small pots with climbing bean or pea seeds. Have students plant seeds and place wooden skewers or small trellises in the pots. Over weeks, students observe and sketch how the tendrils develop and wrap around the support structure. This builds understanding of growth patterns and plant structures through long-term observation.

Activity 2: Tendril Exploration and Model-Building

Provide students with images and real vine samples (if available). Have them draw and label vine parts, then build a "vine model" using green pipe cleaners (for the vine), paper leaves, and a block or toy fence. Challenge them to show how tendrils wrap and grip. This hands-on model-building bridges from observation to abstract representation.

Activity 3: Habitat Investigation Walk

Take students on a nature walk (in the schoolyard, local park, or garden) to find climbing plants. Have them observe what the vine is climbing on, where the sunlight hits, and what insects or animals they see near the vine. They can photograph or sketch findings, then discuss how vines fit into their local ecosystem.

Cross-Curricular Ideas

Math Connection: Measure the length of a vine or the size of leaves using non-standard units (handspans, paper clips) or standard rulers. Create a bar graph showing vine growth over several weeks. Compare the heights of vines growing in sunny vs. shady spots.

ELA Connection: Read *Jack and the Beanstalk* and discuss how the story compares to real plant growth. Have students write their own "pourquoi" story explaining why a vine climbs. Create descriptive writing by observing a vine and using sensory words (curly, smooth, bright green, delicate).

Social Studies Connection: Research how different cultures use climbing vines for food (grapes, ivy) or materials (rope, baskets). Create a map showing where climbing fruits like grapes or kiwis are grown around the world.

Art Connection: Press dried leaves from climbing plants into paper, or create vine-inspired drawings using spiral patterns. Make collages from photographs of real vines, or design a garden on paper that includes climbing plants on a fence or trellis.

STEM Career Connection

Plant Scientist / Botanist – Plant scientists study how plants grow, what they need to survive, and how they adapt to different environments. They might work at a university, garden center, or farm to help people grow plants better. They ask questions like "Why do some plants climb?" and "What helps plants stay healthy?"

Average Salary: \$60,000–\$85,000 USD per year

Garden Designer / Landscape Architect – These professionals design beautiful outdoor spaces, including deciding where to plant climbing vines on fences and walls. They think about which plants will grow best in sunny or shady areas and how to arrange plants so they look nice and stay healthy.

Average Salary: \$55,000–\$80,000 USD per year

Agricultural Technician – These workers help farmers and gardeners grow plants successfully. They might study climbing crops like grapes or beans, observe plant growth, take measurements, and help solve problems when plants aren't growing well.

Average Salary: \$35,000–\$55,000 USD per year

NGSS Connections

Performance Expectation: 3-LS1-1 Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

Performance Expectation: 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.

Disciplinary Core Ideas:

- 3-LS1.A Structure and Function
- 3-LS4.C Adaptation

Crosscutting Concepts:

- Structure and Function (Tendrils have a specific structure that allows them to function as climbing tools)
- Cause and Effect (Because vines have tendrils, they can climb toward sunlight; because they reach sunlight, they can make more food)
- Adaptation (Climbing ability is an adaptation that helps vines survive)

Science Vocabulary

- * Tendril: A thin, curly part of a plant stem that wraps around objects to help the plant climb.
- * Photosynthesis: The process where plants use sunlight, water, and air to make food (energy) to grow.
- * Adaptation: A special body part or behavior that helps a plant or animal survive in its environment.
- * Chlorophyll: The green pigment (coloring) in plant leaves that helps plants capture sunlight for making food.
- * Habitat: The place where a plant or animal lives and finds food, water, and shelter.

External Resources

Children's Books:

The Tiny Seed* by Eric Carle – A beautifully illustrated story about a tiny seed's journey, growth, and life cycle, perfect for introducing plant concepts.

From Seed to Plant* by Gail Gibbons – A clear, labeled nonfiction book showing how seeds grow into plants, with accurate diagrams of plant parts.

Jack and the Beanstalk* (various authors/illustrators) – A classic tale that can spark curiosity about how plants grow and change, great for creative connections to real plant science.