

## Photo Description



This image shows green vines with large leaves growing up and over a wooden fence. The vines have curly tendrils (springy parts) that wrap around the fence to help the plant climb. You can see one long, smooth green pod hanging from the vine, which is where seeds grow.

## Scientific Phenomena

Anchoring Phenomenon: Plants grow toward supports and use special body parts to climb.

This is happening because climbing plants have evolved tendrils—special, springy leaf or stem parts—that naturally curl around nearby objects like fences, poles, or other plants. When a tendril touches something, it coils tightly to secure the plant. This behavior helps the plant reach sunlight higher up without needing a thick, strong stem of its own. The plant "knows" to grow upward because of gravity and light (a response called phototropism and gravitropism). By climbing, the plant can access more sunlight, which it needs to make food through photosynthesis.

## Core Science Concepts

- \* Plant Growth and Structure: Plants have different body parts (stems, leaves, tendrils, roots) that help them survive and grow in their environment.
- \* Plant Adaptations: Tendrils are special adaptations that allow climbing plants to grip and hold onto surfaces, helping them reach sunlight.
- \* Life Cycles and Reproduction: The green pod visible in the photo contains seeds, showing that this plant reproduces and continues its life cycle.
- \* Plants and Their Environment: Plants respond to their surroundings by growing toward light and climbing toward support structures.

### Pedagogical Tip:

When teaching about tendrils, have students feel coiled objects (like springs, curly ribbons, or actual tendrils if available) to understand the concept through touch. Second graders benefit from multi-sensory input, so pairing visual observation with tactile exploration deepens understanding and makes the concept more concrete.

### UDL Suggestions:

**Representation:** Provide images showing different types of climbing plants (pole beans, ivy, morning glories) so students see this adaptation exists in many plants. Use close-up photos and labeled diagrams to highlight tendril structures.

**Engagement:** Let students choose between observing real climbing plants outdoors, drawing tendrils, or building a model fence with string to explore how wrapping works.

**Action & Expression:** Allow students to demonstrate understanding through drawing, physical models, or explaining to a partner rather than only through writing.

## Zoom In / Zoom Out

### Zoom In (Cellular Level):

Inside the plant's stem and leaves are tiny tubes called xylem and phloem. Water travels up through xylem tubes from the roots to feed the leaves and help them stand firm. Food made by the leaves travels down through phloem tubes to feed the rest of the plant. The tendril's ability to curl depends on special cells that grow at different rates on different sides of the tendril, causing it to twist.

### Zoom Out (Ecosystem Level):

This climbing plant is part of a larger garden or landscape ecosystem. It provides food and shelter for insects and small animals. The plant itself may climb on a neighbor's fence or grow alongside other plants. If left to grow wild, climbing plants like these can spread across entire areas, creating networks that support many organisms. The plant also plays a role in the water cycle, absorbing water from soil and releasing it into the air through leaves.

## Discussion Questions

1. "What do you think would happen if this vine didn't have curly tendrils?" (Bloom's: Analyze | DOK: 2)
2. "Why do you think this plant is growing up the fence instead of spreading on the ground?" (Bloom's: Understand | DOK: 2)
3. "How are tendrils like tools? What job do they do?" (Bloom's: Analyze | DOK: 3)
4. "If you were a tiny ant living on this vine, what would the tendrils and leaves give you?" (Bloom's: Synthesize | DOK: 3)

## Potential Student Misconceptions

- \* Misconception: "Plants choose to climb because they want to reach the fence."  
- Clarification: Plants don't have choices or feelings. They respond to their environment automatically. Tendril growth is an instinct programmed into the plant's DNA to help it survive by reaching sunlight.
- \* Misconception: "The curly tendrils are just decoration."  
- Clarification: Tendrils are tools that help the plant do important jobs: holding on to supports and climbing toward light so the plant can grow strong and make seeds.
- \* Misconception: "Only the leaves drink water; the roots don't matter."  
- Clarification: Roots are very important! They drink water and nutrients from the soil and hold the plant in place. The water travels up the stem to the leaves, where it helps make food.

## Extension Activities

1. Tendril Observation Walk: Take students on a nature walk around your school or neighborhood to spot different climbing plants (vines, ivy, beans). Have them sketch or photograph tendrils and compare how different plants climb. Back in class, create a poster showing "Different Ways Plants Climb."
2. Curl and Coil Experiment: Give students strips of paper and show them how to curl them using a pencil or scissors. Then let them build a simple climbing structure with a paper towel tube "fence" and curled paper "tendrils" to explore how wrapping helps hold things up.

3. Seed Pod Dissection: If available, bring in a bean pod or pea pod and let students carefully open it to observe and count the seeds inside. Discuss how seeds grow, what they need, and how this plant makes baby plants. Plant some seeds in small cups and track their growth over several weeks.

### Cross-Curricular Ideas

- \* Math: Measure the height of the vine on the fence using non-standard units (hand-spans, blocks) or estimate how many leaves are visible. Count tendrils and pods. Create a bar graph comparing the heights of different plants in your classroom or garden.
- \* ELA: Read stories about plants or gardens (see book suggestions below). Write or draw "How-To" cards explaining how a tendril climbs. Create a "Plant Needs" poster with pictures and simple captions about what plants need to grow.
- \* Social Studies: Discuss how gardens and farming depend on plants. Connect to community helpers like gardeners and farmers. Explore how different cultures use climbing plants for food (bean plants, grapes).
- \* Art: Create 3D models of climbing plants using string, wire, and painted paper. Make a collage of plant textures using leaves, seeds, and photos. Paint or draw close-up views of tendrils showing their spiral patterns.

### STEM Career Connection

- \* Botanist: A scientist who studies plants and how they grow. Botanists figure out what plants need, how plants climb, and how to help plants grow better. They work in gardens, farms, and labs. Average Salary: \$66,000/year
- \* Farmer/Gardener: A person who grows plants for food or beauty. Gardeners plant vines and vegetables, help them climb on trellises, pick the food, and keep the soil and plants healthy. Average Salary: \$32,000–\$48,000/year
- \* Plant Geneticist: A scientist who studies plant DNA to help plants grow stronger, climb better, or produce more food. They use science to make plants healthier for gardens and farms. Average Salary: \$72,000/year

### NGSS Connections

Performance Expectation: K-LS1-1 Use observations to describe patterns of what plants need to grow.

Disciplinary Core Ideas:

- K-LS1.A Structure and Function
- K-LS1.C Organization for Matter and Energy Flow in Organisms

Crosscutting Concepts:

- Structure and Function (Tendrils have a specific structure that allows them to function as climbing tools)
- Cause and Effect (When tendrils touch a surface, they curl in response)
- Patterns (Plants show predictable patterns of growing toward light and support)

### Science Vocabulary

- \* Tendril: A thin, curly part of a plant that wraps around things to help the plant climb.
- \* Adaptation: A special body part or behavior that helps a plant or animal survive in its environment.
- \* Pod: The outer covering that holds seeds inside a plant.
- \* Photosynthesis: The process where plants use sunlight, water, and air to make their own food.

\* Vine: A long, thin plant that grows by climbing or crawling along the ground or other surfaces.

## External Resources

Children's Books:

The Tiny Seed\* by Eric Carle (about a seed's journey and growth)

From Seed to Plant\* by Gail Gibbons (nonfiction explanation of plant life cycles)

Jack and the Beanstalk\* (traditional tale featuring a climbing plant)