Vine

Life Science | Lesson Guide

1st Grade

Photo Description

This photo shows a green vine plant growing and climbing up a weathered wooden fence. The vine has large leaves and long, curly tendrils that wrap around the fence boards. You can see a long green pod hanging from the plant, which is part of how the plant makes new seeds.

Scientific Phenomena

Anchoring Phenomenon: Why do vines grow upward and wrap around objects?

Vines demonstrate a behavior called thigmotropism—the plant's ability to sense and respond to touch. As the vine grows, its tendrils (thin, curly stems) make contact with the fence. The plant responds by wrapping these tendrils tightly around the fence for support. This is a survival strategy: by climbing upward, the vine reaches sunlight without using energy to build a thick, sturdy stem like a tree does. The plant "grows toward" support structures because it has evolved to use them as scaffolding. This is an example of how plants interact with their environment to meet their basic needs.

Core Science Concepts

* Plants need sunlight to grow. By climbing the fence, this vine reaches more direct sunlight, which helps it make food and grow stronger.

* Plants have different parts that do different jobs. The leaves capture sunlight, the tendrils help the plant climb and hold on, and the pods contain seeds for making new plants.

* Plants respond to their surroundings. The tendrils curl around the fence because the plant "feels" the fence and responds by holding on tight.

* Living things grow and change over time. This vine started as a tiny seedling and has grown larger, with more leaves and longer vines.

Pedagogical Tip:

For First Grade, focus on observable, tangible features rather than cellular processes. Have students trace the vine's path with their fingers (if safe) or with their eyes. Use the phrase "the plant is holding on to the fence" to help them understand the vine's behavior as intentional adaptation without oversimplifying into anthropomorphism.

UDL Suggestions:

Multiple Means of Representation: Provide both photographs and real vine samples (in a safe, cleaned container) so students can observe from different angles. Create a simple diagram showing the vine, fence, and sun with arrows indicating growth direction.

Multiple Means of Action and Expression: Allow students to demonstrate understanding through drawing the vine's path, acting out how a vine "climbs," or arranging rope/string in a climbing pattern rather than only verbal responses.

Multiple Means of Engagement: Connect to students' experiences: "Have you ever seen ivy on a building?" or "Does a climbing rope at the playground need something to hold onto?" This makes the phenomenon personally relevant.

Zoom In / Zoom Out

Zoom In - Cellular Level:
At the microscopic level, the plant's cells are working hard! When the vine's tendril touches the fence, special cells send signals through the plant (like a message traveling through tiny tubes). These signals tell the plant to grow more cells on one side of the tendril than the other, making it curl around the fence. The plant's cells are also busy absorbing water and nutrients from the soil to fuel all this growing.

Zoom Out - Ecosystem Level:
This vine is part of a larger garden ecosystem. The vine provides shelter and food for insects, birds, and other small animals. When the vine produces flowers and seeds (like the pod visible here), it feeds pollinators such as bees. The fence itself becomes a miniature habitat. Eventually, when the leaves fall and decompose, they return nutrients to the soil, feeding other plants. This single climbing vine demonstrates how one organism connects to many others in its environment.

Discussion Questions

* "Why do you think the vine is growing up the fence instead of spreading out on the ground?" (Bloom's: Analyze | DOK: 2)

* "What would happen to this vine if we took the fence away?" (Bloom's: Evaluate | DOK: 3)

* "How are the tendrils (the curly parts) helpful to the vine?" (Bloom's: Understand | DOK: 1)

* "Can you find a pattern in how the vine wraps around the fence?" (Bloom's: Analyze | DOK: 2)

Potential Student Misconceptions

* Misconception: "The vine is alive, so it can walk or move around like an animal."
  - Clarification: The vine is alive, but it doesn't move like animals do. Plants grow in new directions by making new cells. The vine is growing toward the fence and wrapping around it because that's how the plant gets what it needs (sunlight and support).

* Misconception: "The vine chose the fence on purpose, just like I choose where to go."
  - Clarification: The vine doesn't think or make choices like you do. It responds to sunlight and touch automatically. It's like how you pull your hand away from something hot without thinking—the vine responds to things in its environment the same way, but in slow motion.

* Misconception: "All plants grow the same way."
  - Clarification: Different plants grow in different ways. Some plants stay short and spread along the ground. Other plants grow tall and straight. This vine climbs because that's what works best for it to get sunlight and space.

Extension Activities

* Vine Tracing Walk: Take students on a short outdoor walk to find other climbing plants (ivy, morning glories, or climbing roses). Have them gently trace the vine's path with their eyes and describe what the vine is climbing on. Discuss: "Why might the plant choose to climb on that?"

* Tendrils Everywhere: Provide students with pipe cleaners or yarn and have them create their own "tendrils" by curling the material around pencils, straws, or wooden dowels. Display these alongside photos of real vines to compare the curly shapes. Ask: "How does the curl help the vine?"

* Seed Pod Investigation: If possible, safely obtain or show a dried seed pod (or bean pod) from a similar plant. Let students carefully open it (with guidance) to see and count the seeds inside. Discuss: "How many new plants could grow from these seeds?"

Cross-Curricular Ideas

* Math - Counting & Patterns: Count the leaves visible on the vine. Create a pattern using green paper shapes (leaf, tendril, leaf, tendril). Measure the length of the vine using non-standard units (hand spans, string lengths).

* ELA - Descriptive Writing & Storytelling: Read books about plants and growth. Have students dictate or write a simple sentence: "The vine grows because..." or "The vine climbs the fence to find..." Create a class big book with student illustrations and sentences.

* Art - Drawing & Collage: Draw vines and tendrils using swirly lines. Create a collage using green tissue paper, yarn, and real leaves to represent a climbing vine on a fence.

* Social Studies - Community & Environment: Discuss how climbing plants help our neighborhoods (they shade houses, give birds homes, make yards beautiful). Take photos of vines in your local area and create a "Vines Around Our Community" display.

STEM Career Connection

Botanist: A scientist who studies plants and how they grow. A botanist might study why vines climb and what helps them grow best. This helps farmers and gardeners grow better plants. Average annual salary: $62,000 USD*

Gardener/Horticulturist: A person who grows plants and takes care of gardens. They decide which plants to grow, help them climb on trellises and fences, and make sure they get sunlight and water. Average annual salary: $35,000 USD*

Landscape Designer: A professional who plans and creates beautiful outdoor spaces using plants, including climbing vines. They think about which vines will grow well on fences and walls to make neighborhoods look pretty. Average annual salary: $48,000 USD*

NGSS Connections

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

Disciplinary Core Ideas:
- K-LS1.A: All organisms have basic needs. Plants need sunlight, water, and air.
- K-LS1.C: All animals need food; all plants need light and water to grow.

Crosscutting Concepts:
- Patterns: The vine shows a pattern of wrapping around the fence in a predictable way.
- Cause and Effect: The presence of the fence causes the vine to wrap around it; sunlight causes the vine to grow upward.
- Structure and Function: The tendrils' curly shape allows them to grip and hold the fence; large leaves capture sunlight.

Science Vocabulary

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

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

* Leaf: The green part of a plant that catches sunlight to help the plant make food and grow.

* Pod: The part of a plant that holds seeds inside; it grows from the flower after the plant blooms.

* Climbing: Growing or moving upward by holding onto something for support.

External Resources

Children's Books:
- The Tiny Seed by Eric Carle
- From Seed to Plant by Gail Gibbons
- How a Seed Grows by Helene J. Jordan