

Photo Description



A small plant with green leaves is growing from a clear plastic bottle. The bottle has dark soil inside and is lying on its side. The plant's stem comes out through the bottle opening and has leaves at the top.

Scientific Phenomena

This image demonstrates seed germination and plant growth as an anchoring phenomenon. The plant has successfully sprouted from a seed and is growing despite being in an unconventional container. This occurs because seeds contain everything needed to start a new plant - stored food, a tiny plant embryo, and a protective coat. When given the right conditions (water, warmth, and eventually light), the seed breaks open and the plant begins to grow, using its stored energy until it can make its own food through photosynthesis.

Core Science Concepts

1. Seed Germination: Seeds contain baby plants that grow when they get water, warmth, and air
2. Plant Needs: Plants need water, light, air, and nutrients from soil to survive and grow
3. Plant Parts: Plants have roots (in the soil), stems (the main body), and leaves (for making food)
4. Growth and Change: Living things grow and change over time as part of their life cycle

Pedagogical Tip:

Use clear containers like this bottle to make plant growth visible to students. They can observe roots developing and track daily changes, making abstract concepts concrete and observable.

UDL Suggestions:

Provide multiple ways for students to document plant growth: drawing pictures, taking photos, measuring with non-standard units like paper clips, or dictating observations to support diverse learners and communication styles.

Zoom In / Zoom Out

1. Zoom In: Inside the seed, tiny cells are dividing and growing to form roots, stems, and leaves. The plant is using stored starches and proteins as food until its leaves can start making sugar from sunlight.
2. Zoom Out: This single plant is part of a larger cycle where plants grow, reproduce, make seeds, and create new plants. Plants also help clean our air and provide food for animals in ecosystems.

Discussion Questions

1. What do you think this plant needs to keep growing bigger? (Bloom's: Apply | DOK: 2)
2. How is this plant the same or different from plants growing outside in a garden? (Bloom's: Analyze | DOK: 2)
3. What might happen if we put this bottle in a dark closet for a week? (Bloom's: Evaluate | DOK: 3)
4. Why do you think the person chose to grow the plant in a clear bottle instead of a regular pot? (Bloom's: Analyze | DOK: 2)

Potential Student Misconceptions

1. Misconception: Plants eat soil for food
Reality: Plants make their own food using sunlight, water, and air. Soil provides support and some nutrients, but not food.
2. Misconception: Seeds are not alive until they start growing
Reality: Seeds are living but dormant, waiting for the right conditions to begin growing.
3. Misconception: Plants don't need air
Reality: Plants need air (carbon dioxide) to make food and oxygen to breathe, just like animals.

NGSS Connections

Performance Expectation: 2-LS2-1 Plan and conduct an investigation to determine if plants need sunlight and water to grow.

Disciplinary Core Ideas:

- 2-LS2.A - Interdependent Relationships in Ecosystems
- K-LS1.C - Organization for Matter and Energy Flow in Organisms

Crosscutting Concepts:

- Patterns - Observable patterns in plant growth and development
- Cause and Effect - Plants grow when their needs are met

Science Vocabulary

- * Germination: When a seed starts to grow into a new plant
- * Seedling: A young plant that has just started growing from a seed
- * Nutrients: Special materials from soil that help plants stay healthy
- * Life cycle: The stages a living thing goes through as it grows and changes
- * Photosynthesis: How plants make their own food using sunlight, water, and air

External Resources

Children's Books:

- From Seed to Plant by Gail Gibbons
- The Tiny Seed by Eric Carle
- A Seed Is Sleepy by Dianna Hutts Aston

YouTube Videos:

- "Seed Germination | The Dr. Binocs Show" - Animated explanation of how seeds grow into plants (<https://www.youtube.com/watch?v=BqazVzTTdKE>)
- "How Do Seeds Grow? | Science for Kids" - Simple demonstration of seed growth stages (https://www.youtube.com/watch?v=tkFPyDSID_Y)