

Photo Description



Scientific Phenomena

This image shows germination - the anchoring phenomenon where a seed begins to grow into a new plant. The seed has absorbed water, which caused it to swell and crack open. Inside the seed, the baby plant (embryo) used stored food to grow its first root downward and its first shoot upward toward the light. The green leaves are now starting to make their own food through photosynthesis, marking the transition from seed to independent plant.

Core Science Concepts

1. Seed Structure and Function - Seeds contain everything needed to start a new plant: a baby plant (embryo), stored food, and a protective coat.
2. Life Cycle Stages - This represents the germination stage in a plant's life cycle, showing the transition from seed to seedling.
3. Plant Needs - The successful germination demonstrates that plants need water, warmth, and eventually light to grow and survive.
4. Growth and Development - Plants grow in predictable patterns, with roots growing down and shoots growing up toward light.

Pedagogical Tip:

Have students draw and label what they observe in the image before explaining the science. This activates prior knowledge and helps you assess their current understanding of plant growth.

UDL Suggestions:

Provide tactile experiences by bringing in real seeds at different stages of germination. Students who struggle with abstract concepts will benefit from handling actual seeds, sprouts, and seedlings while discussing the image.

Zoom In / Zoom Out

1. Zoom In: Inside the seed, tiny cells are dividing and growing rapidly. The plant cells are creating new cell walls and filling with water, causing the dramatic growth we can see.

2. Zoom Out: This single germinating seed is part of a larger ecosystem where plants provide food and oxygen for animals, and animals help spread seeds to new locations, continuing the cycle of life.

Discussion Questions

1. What do you think happened to this seed before we could see the green plant? (Bloom's: Analyze | DOK: 2)
2. Why do you think the plant's leaves are green while the seed shell is brown? (Bloom's: Evaluate | DOK: 3)
3. What do you predict will happen to the seed shell that's still on top of the plant? (Bloom's: Apply | DOK: 2)
4. How is this baby plant the same as and different from a full-grown plant? (Bloom's: Compare | DOK: 2)

Potential Student Misconceptions

1. Misconception: Plants eat soil for food.

Clarification: Plants make their own food using sunlight, water, and air. Soil provides support and minerals, but not food.

2. Misconception: Seeds are dead until they start growing.

Clarification: Seeds are alive but dormant, waiting for the right conditions (water, warmth) to begin growing.

3. Misconception: The seed shell becomes part of the plant.

Clarification: The seed shell (coat) protects the baby plant but falls off as the plant grows, like we see in the image.

NGSS Connections

- Performance Expectation: 2-LS2-1 - Plan and conduct an investigation to determine if plants need sunlight and water to grow
- Disciplinary Core Idea: 2-LS2.A - Plants depend on water and light to grow
- Crosscutting Concept: Patterns - Plants and animals have predictable characteristics at different stages of development

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
- * Embryo: The baby plant inside a seed
- * Seed coat: The hard outer shell that protects the seed
- * Cotyledons: The first leaves that come from a seed (the green parts we see)

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 Time Lapse" - Shows seeds sprouting over several days in fast motion: <https://www.youtube.com/watch?v=w77zPAtVTU>
- "How Do Seeds Grow? | Backyard Science | SciShow Kids" - Kid-friendly explanation of seed growth: <https://www.youtube.com/watch?v=tkFPyDSUDfE>