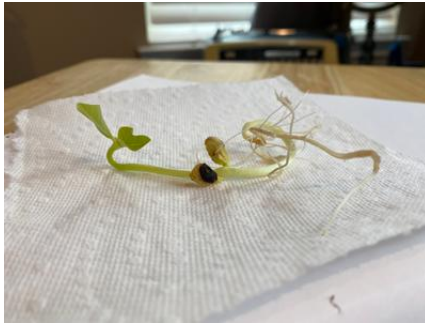


Photo Description



A seed is growing into a small plant. The seed has roots coming out of it and green leaves starting to grow. The plant is sitting on a white paper towel.

Scientific Phenomena

This image shows seed germination - the process where a seed begins to grow into a new plant. The anchoring phenomenon is the transformation from a dormant seed to an active, growing organism. This happens when the seed absorbs water, swells, and activates stored energy and nutrients inside. The seed coat breaks open, allowing the root (radicle) to emerge first to anchor the plant and absorb water, followed by the shoot that will become the stem and leaves.

Core Science Concepts

1. Seeds contain everything needed to start a new plant - Seeds have a baby plant (embryo), food (endosperm), and a protective coat
2. Plants need water to grow - Water activates the germination process and helps the plant transport nutrients
3. Roots grow down and shoots grow up - This is called gravitropism, where plants respond to gravity
4. Living things grow and change - The seed demonstrates the life cycle progression from seed to seedling

Pedagogical Tip:

Use actual seeds and beans for hands-on exploration. Kindergarteners learn best through direct observation and manipulation of real materials rather than just pictures.

UDL Suggestions:

Provide multiple ways to document observations - drawing, verbal descriptions, or simple charts with pictures. Some students may prefer to act out the germination process with their bodies (curled up like a seed, then slowly "growing" upward).

Zoom In / Zoom Out

1. Zoom In: Inside the seed, cells are dividing and growing rapidly. Water enters the seed cells, causing them to swell and break the seed coat. Stored starches are converted to sugars to fuel the growing plant.
2. Zoom Out: This germinating seed will eventually become a full plant that produces flowers, fruits, and more seeds. It will participate in food webs, provide oxygen, and contribute to the larger ecosystem cycle of growth, reproduction, and renewal.

Discussion Questions

1. What do you notice about how this seed is changing? (Bloom's: Observe | DOK: 1)
2. Why do you think the roots came out before the leaves? (Bloom's: Analyze | DOK: 2)
3. What do you predict will happen to this plant if we give it sunlight and water? (Bloom's: Evaluate | DOK: 3)
4. How is this baby plant the same as and different from a big plant? (Bloom's: Compare | DOK: 2)

Potential Student Misconceptions

1. Misconception: Seeds are not alive until they start growing
Clarification: Seeds are living but dormant - they're like sleeping plants waiting for the right conditions
2. Misconception: Plants eat soil for food
Clarification: Plants make their own food using sunlight, while roots absorb water and nutrients from soil
3. Misconception: The green parts should come out of the seed first
Clarification: Roots almost always emerge first to anchor the plant and get water before leaves develop

NGSS Connections

- Performance Expectation: K-LS1-1 - Use observations to describe patterns of what plants and animals (including humans) need to survive
- Disciplinary Core Ideas: K-LS1.C - Organization for Matter and Energy Flow in Organisms
- Crosscutting Concepts: Patterns and Structure and Function

Science Vocabulary

- * Seed: A small part of a plant that can grow into a new plant
- * Germination: When a seed starts to grow and change into a plant
- * Roots: The parts of a plant that grow down to get water from soil
- * Seedling: A very young plant that just started growing from a seed
- * Sprout: When a plant first starts to grow and poke out of a seed

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" by SciShow Kids - Shows beans sprouting over several days in fast motion: <https://www.youtube.com/watch?v=w77zPAtVTuI>
- "How Do Seeds Grow?" by National Geographic Kids - Simple explanation of seed growth with colorful animations: <https://www.youtube.com/watch?v=tkFPyDFhmyk>