

## 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

## Cross-Curricular Ideas

1. Math - Counting and Measuring: Have students count the number of roots, leaves, and seed parts. Use simple rulers or string to measure how tall the seedling has grown each day. Create a class chart showing plant growth over time with picture graphs.
2. ELA - Storytelling and Writing: Students can dictate or draw the "life story" of the seed from dormant to growing plant. Read *The Tiny Seed* by Eric Carle and have students retell the story using puppets or props. Create a simple "seed journal" where students draw observations daily.
3. Art - Nature Collage: Students can create seed and plant artwork using real seeds, beans, and plant materials glued onto paper. Draw or paint their own versions of growing seeds at different stages. Make leaf rubbings and prints using the actual seedling as inspiration.
4. Social Studies - Plant Care and Community Responsibility: Discuss how gardeners and farmers help plants grow. Connect to local community gardens or school gardens. Talk about how taking care of plants teaches us about responsibility and caring for living things.

## STEM Career Connection

1. Botanist (Plant Scientist): A botanist studies plants and how they grow. They learn about seeds, roots, leaves, and flowers to help plants grow better and healthier. Some botanists work in gardens, farms, or laboratories with microscopes to see tiny plant parts. They might discover new types of plants or figure out how to help sick plants feel better. Average Annual Salary: \$63,000
2. Farmer/Gardener: A farmer or gardener grows plants and vegetables that people eat. They plant seeds, water them, pull weeds, and harvest the food when it's ready. They use their knowledge of how seeds grow to produce healthy crops. Gardeners work outdoors with soil, seeds, and plants every day. Average Annual Salary: \$48,000
3. Environmental Scientist: An environmental scientist studies how plants help our planet stay healthy. They learn about seeds and plants because plants give us oxygen to breathe and help clean our air. They work to protect forests and gardens so all plants can grow strong. Average Annual Salary: \$71,000

## 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