

## Photo Description



This image shows two halves of a winter squash or butternut squash that has been cut open. The yellow-orange flesh is visible, along with the central cavity containing fibrous tissue and many seeds. The seeds are tan or cream-colored and are arranged in a pattern within the fruit. This is an excellent example of how plants protect and disperse their seeds.

## Scientific Phenomena

Anchoring Phenomenon: Why do fruits contain seeds?

This image illustrates seed dispersal and plant reproduction. Plants produce fruits as a strategy to protect their developing seeds and help spread them to new locations. The fleshy part (flesh) of the squash is nutrient-rich and attractive to animals, who eat the fruit and carry seeds away from the parent plant. The fibrous material surrounding the seeds cushions and protects them during development and transport. This is a mutualistic relationship—the animal gets food, and the plant's seeds get dispersed to new growing areas where they have less competition for water, nutrients, and sunlight.

## Core Science Concepts

1. Seed Structure and Function
  - Seeds contain an embryo (baby plant), stored food, and a protective seed coat
  - Seeds need the right conditions (water, warmth, oxygen) to germinate and grow into new plants
2. Fruit Development and Purpose
  - Fruits develop from the flower's ovary after pollination
  - Fruits protect seeds and help disperse them to new locations
3. Plant Life Cycles
  - Plants grow from seeds, develop leaves and flowers, produce seeds, and complete their cycle
  - This cycle repeats year after year
4. Seed Dispersal Strategies
  - Animals disperse seeds by eating fruits and dropping seeds in different locations
  - Wind, water, and explosion mechanisms also help spread seeds

### Pedagogical Tip:

When teaching about seeds and plant reproduction, create a multi-sensory experience. Have students handle actual seeds (beans, pumpkin seeds, squash seeds) and observe their size, shape, color, and texture. This concrete experience helps them understand abstract concepts like "seed coat" and "embryo." You might also crack open a seed and show students the tiny plant inside—this "aha!" moment is powerful for fourth graders.

**UDL Suggestions:**

To support diverse learners, provide multiple means of representation: (1) Use actual squash halves for hands-on observation alongside labeled diagrams showing internal structures; (2) Create a word wall with images of different fruits containing seeds (apples, tomatoes, peppers, watermelons) so visual learners connect the concept to familiar foods; (3) Offer a video showing time-lapse seed germination for students who need dynamic visual input; (4) Provide pre-cut fruit samples and individual magnifying glasses so students with fine motor challenges can still participate fully in observation activities.

**Discussion Questions**

1. "What do you think would happen to this seed if an animal ate the fruit and carried it far away from the parent plant?" (Bloom's: Analyze | DOK: 2)
2. "Why might it be better for a plant to have its seeds scattered to different locations instead of all falling directly below the parent plant?" (Bloom's: Evaluate | DOK: 3)
3. "How is the structure of this squash fruit different from a seed, and why does a plant need both?" (Bloom's: Analyze | DOK: 2)
4. "If you planted one of these seeds and gave it water, soil, and sunlight, what would grow? Explain your thinking." (Bloom's: Understand | DOK: 1)

**Extension Activities****1. Seed Sorting and Classification**

Provide students with various seeds collected from different fruits and vegetables (pumpkin, bean, apple, squash, watermelon). Have them sort seeds by size, shape, color, and texture. Create a chart showing their classifications. Discuss how different seed structures might help plants in different environments. This builds observation skills and introduces the concept of plant adaptation.

**2. Seed Germination Investigation**

Place several squash or bean seeds in clear plastic cups with moist paper towels. Have each student predict what they think will happen and draw a "before" picture. Over 1-2 weeks, students observe and sketch the sprouting seeds every few days, recording observations about root and shoot development. This hands-on experiment demonstrates the plant life cycle and teaches the scientific method through direct observation.

**3. Fruit and Seed Scavenger Hunt**

Take students on a walk around the school grounds or neighborhood to find different fruits and seeds (acorns, berries, seed pods, fallen fruit). Collect non-toxic examples and bring them back to class. Create a display showing the variety of seeds and fruits, and discuss how each might be dispersed (by animals, wind, water, or explosion). This connects classroom learning to the real world and builds ecological awareness.

**NGSS Connections****Performance Expectation:**

4-LS1-1: Use evidence to construct an explanation for how the structures of plants enable them to obtain the materials they need to grow.

**Disciplinary Core Ideas:**

- 4-LS1.A Structure and Function: Plants obtain materials they need for growth chiefly from air and water.

- 3-LS1.B Growth and Development of Organisms: Reproduction is essential to the continued existence of every kind of organism.
- 3-LS4.B Natural Selection: Organisms have variations in their traits, and sometimes the variations give the organism an advantage in its environment.

**Crosscutting Concepts:**

- Structure and Function The structures of fruits and seeds have specific functions that help plants reproduce and survive.
- Systems and System Models A plant is a system with interdependent parts (roots, stems, leaves, flowers, fruits, seeds) that work together.

**Science Vocabulary**

- \* Seed: A tiny plant package that contains a baby plant, stored food, and a protective outer layer; seeds grow into new plants.
- \* Fruit: The part of a plant that develops from a flower and contains seeds; fruits help protect and spread seeds.
- \* Germinate: When a seed begins to grow and sprout into a new plant, usually after water, warmth, and oxygen are present.
- \* Seed Coat: The tough, protective outer layer of a seed that keeps the baby plant and food inside safe.
- \* Embryo: The tiny baby plant inside a seed that will grow into a new plant.
- \* Disperse: To spread or scatter seeds to different locations so plants can grow in new areas.

**External Resources****Children's Books:**

- The Tiny Seed by Eric Carle (explores seed dispersal and the plant life cycle with beautiful illustrations)
- From Seed to Plant by Gail Gibbons (clear, factual diagrams showing how plants grow from seeds)
- What Do Roots Do? by Kathleen V. Kudlinski (helps students understand how all plant parts work together)

**YouTube Videos:**

- "Plant Life Cycle" by National Geographic Kids (3:45 minutes; shows the complete life cycle from seed to flowering plant with engaging visuals) — <https://www.youtube.com/watch?v=JaFjMppM-Pk>
- "How Do Seeds Travel?" by SciShow Kids (4:20 minutes; explores different seed dispersal methods through animation and real footage) — <https://www.youtube.com/watch?v=XqxhWB0qQH8>

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**Teacher Note:** This lesson scaffold directly supports student understanding of plant structures and their functions while building scientific reasoning skills. The combination of observation, discussion, and hands-on exploration ensures all learners can engage meaningfully with the content.