

Photo Description



This image shows two halves of a butternut squash or similar winter squash cut lengthwise, revealing the pale yellow flesh inside and a central cavity filled with stringy fibers and seeds. The seed cavity has an opening at the narrower end of the fruit. This cross-section clearly displays how seeds develop inside a protective fruit structure.

Scientific Phenomena

Anchoring Phenomenon: Why do plants produce fruits with seeds inside them?

Plants create fruits to protect their developing seeds and help spread them to new locations. The flesh of the fruit provides nutrients that help seeds grow, while the tough outer skin protects them from damage, disease, and being eaten before they're ready. When animals or people eat the fruit, the seeds may be dispersed (carried) to new places where they can grow into new plants. This is a reproductive strategy that ensures the species survives and spreads.

Core Science Concepts

- Seed Structure and Function: Seeds contain an embryo (baby plant) and stored food that helps the seed germinate and grow. Different seeds have different shapes, sizes, and coverings designed for different environments.
- Fruit Development: Fruits develop from the flower's ovary after pollination and fertilization. The fruit protects the seeds inside and aids in seed dispersal through animals, wind, water, or human activity.
- Plant Life Cycles: Plants go through distinct stages—germination, growth, reproduction (flowering and fruiting), and seed production—before the cycle repeats with new plants.
- Seed Dispersal Mechanisms: Plants have evolved different strategies to spread their seeds, including animal consumption, wind dispersal, water transport, and explosive pods. Squash seeds are typically dispersed when animals or humans consume the fruit.

Pedagogical Tip:

Pro Tip: Have students predict where squash seeds might naturally be found in the wild before revealing they grow inside the fruit. This activates prior knowledge and creates cognitive dissonance that makes the actual discovery more memorable and meaningful.

UDL Suggestions:

UDL Strategy: Provide actual squash halves for students to handle and observe directly (tactile/kinesthetic learners), while simultaneously displaying labeled diagrams and photographs on a screen (visual learners). Encourage students to draw their observations and use descriptive language (verbal learners). This multi-modal approach ensures all learners engage with the content meaningfully.

Discussion Questions

1. What do you think the stringy fibers inside the squash are for, and why might seeds need them? (Bloom's: Analyze | DOK: 2)
2. If a squash grew in your garden and fell on the ground, how might its seeds end up growing somewhere far away? (Bloom's: Synthesize | DOK: 3)
3. Compare the way squash seeds are protected inside a fruit to how chicken eggs are protected. What's similar, and what's different? (Bloom's: Evaluate | DOK: 3)
4. Why do you think plants invest so much energy in making large fruits with lots of flesh around the seeds instead of just scattering seeds directly? (Bloom's: Evaluate | DOK: 3)

Extension Activities

1. Seed Dissection Lab: Provide students with soaked lima beans or other large seeds to carefully cut in half using plastic knives. Have them locate and identify the embryo, seed coat, and stored food (cotyledon). Students can sketch their findings and label the parts, then plant their seeds in soil to observe germination over the following weeks.
2. Squash Seed Dispersal Investigation: Have students plant squash seeds they've extracted from the fruit into small pots. As seeds germinate and grow, have students measure plant height weekly and hypothesize about which environmental factors (light, water, temperature) most influence growth. This connects seed structure to the conditions needed for successful plant development.
3. Fruit Diversity Exploration: Collect various fruits (apple, orange, bean pod, tomato, walnut, maple seed, etc.) and have students sort them by dispersal method—animal-dispersed, wind-dispersed, water-dispersed, or human-dispersed. Students create a chart showing which fruits are fleshy versus dry, which have hard coverings versus soft ones, and discuss how structure relates to dispersal strategy.

NGSS Connections

Performance Expectation: 5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.

Disciplinary Core Ideas:

- 5-LS1.A Structure and Function: Plants have roots, stems, leaves, and flowers that perform specific functions.
- 5-LS2.A Organisms, Energy, and Dynamics: Plants use light energy to make sugars (food) from carbon dioxide and water.

Crosscutting Concepts:

- Structure and Function The fruit's structure (protective layers, seed cavity) directly relates to its function (seed protection and dispersal).
- Patterns Different plant species show patterns in how they package and distribute their seeds.

Science Vocabulary

- * Seed: A plant structure that contains a baby plant (embryo) and stored food, protected by a seed coat, and can grow into a new plant.
- * Fruit: The ripened ovary of a flowering plant that contains seeds and often has flesh or a protective covering.
- * Embryo: A tiny, undeveloped plant inside a seed that will grow into a new plant when conditions are right.

- * Dispersal: The spreading or scattering of seeds from one place to another by wind, water, animals, or other means.
- * Germination: The process where a seed begins to grow roots and shoots and develops into a young plant.
- * Pollination: The transfer of pollen from one flower to another, which allows seeds to form.

External Resources

Children's Books:

- From Seed to Plant by Gail Gibbons (Clear, illustrated exploration of plant life cycles with labeled diagrams)
- The Tiny Seed by Eric Carle (Picture book showing seed dispersal and growth across seasons)
- Seeds! Seeds! Seeds! by Nancy Wallace (Interactive, engaging introduction to seed diversity and plant growth)

YouTube Videos:

- "How Plants Make Seeds" by Crash Course Kids (3:39 min) - Animated explanation of pollination, fertilization, and fruit/seed formation. <https://www.youtube.com/watch?v=UMBQVtv3fQc>
- "Seed Dispersal Explained" by National Geographic Kids (4:15 min) - Fascinating real-world footage showing how different plants spread their seeds via wind, water, and animals. <https://www.youtube.com/watch?v=tVkFCCfTcjE>