Stinkhorn Mushroom

Life Science | Lesson Guide

5th Grade

Photo Description

This image shows an unusual orange and olive-green fungus called a stinkhorn mushroom growing from wood chips on the forest floor. The mushroom has a bright orange stem and cap with a dark green, slimy coating on top that attracts flies and other insects. Unlike the mushrooms we see in grocery stores, this fungus has a very strong, unpleasant smell.

Scientific Phenomena

The anchoring phenomenon here is fungal reproduction through spore dispersal. The stinkhorn mushroom produces a foul-smelling, sticky substance called gleba that contains millions of microscopic spores. This "stinky slime" attracts flies and beetles who land on the mushroom to feed. As insects crawl through the smelly coating, spores stick to their bodies and legs. When the insects fly away, they carry these spores to new locations where they can grow into new fungi. This is a brilliant example of how organisms have evolved unique strategies to ensure their species survives by spreading their offspring to new environments.

Core Science Concepts

1. Decomposer Role in Ecosystems: Fungi like stinkhorn mushrooms break down dead organic matter (wood chips, fallen leaves) and return nutrients to the soil, making them available for plants to use.

2. Adaptation for Survival: The strong odor and bright colors are evolutionary adaptations that help the fungus attract insects for spore dispersal, increasing reproductive success.

3. Symbiotic Relationships: The relationship between the stinkhorn and insects demonstrates mutualism - insects get food while the fungus gets spore transportation services.

4. Life Cycles: Fungi have complex life cycles involving spores, underground networks (mycelium), and fruiting bodies (mushrooms) that emerge above ground for reproduction.

Pedagogical Tip:

Use the "think-pair-share" strategy when introducing decomposers. Have students first think individually about what happens to fallen leaves in their yard, then discuss with a partner, and finally share with the class. This builds understanding gradually.

UDL Suggestions:

Provide multiple ways for students to explore fungi by offering hands-on activities (examining mushrooms with magnifying glasses), visual supports (lifecycle diagrams), and kinesthetic learning (acting out the spore dispersal process as insects and mushrooms).

Zoom In / Zoom Out

Zoom In: At the microscopic level, millions of tiny spores (reproductive cells) are embedded in the slimy coating. Each spore contains genetic material and can potentially grow into a new fungus when conditions are right. The spores are so small that thousands could fit on the head of a pin.

Zoom Out: This stinkhorn is part of a vast underground fungal network called mycelium that connects throughout the forest ecosystem. These fungal networks help trees and plants share nutrients and water, creating an underground "internet" that scientists call the "wood wide web."

Discussion Questions

1. Why do you think the stinkhorn mushroom evolved to smell bad instead of good like flowers? (Bloom's: Analyze | DOK: 3)

2. What might happen to a forest ecosystem if all the decomposer fungi suddenly disappeared? (Bloom's: Evaluate | DOK: 3)

3. How is the way this mushroom spreads its spores similar to and different from how flowering plants spread their seeds? (Bloom's: Analyze | DOK: 2)

4. What evidence from the photo supports the idea that this organism is adapted to attract insects? (Bloom's: Apply | DOK: 2)

Potential Student Misconceptions

1. Misconception: "All mushrooms are plants because they grow from the ground."
Scientific Clarification: Fungi are neither plants nor animals - they're their own kingdom of life. Unlike plants, fungi cannot make their own food through photosynthesis and must get nutrients by decomposing other organisms.

2. Misconception: "The mushroom we see is the whole fungus."
Scientific Clarification: The visible mushroom is just the "fruiting body" - like an apple on a tree. The main part of the fungus lives underground as a network of thread-like structures called mycelium.

3. Misconception: "Smelly, weird-looking organisms are always harmful or bad."
Scientific Clarification: The stinkhorn's appearance and smell are adaptations that help it survive and reproduce. These traits serve important ecological functions and don't make the organism "bad."

Cross-Curricular Ideas

1. Language Arts - Creative Writing: Have students write from the perspective of a fly landing on the stinkhorn mushroom. What does it see, smell, and feel? This narrative writing activity helps students understand the fungus's adaptations while practicing descriptive language and sensory details.

2. Math - Data Collection and Graphing: Students can observe and measure the growth of mushrooms over several days (or use time-lapse photos). They can create bar graphs or line graphs showing how the mushroom's height changes daily, practicing data representation skills while learning about organism growth rates.

3. Art - Nature Observation Sketching: Students can create detailed colored-pencil or watercolor drawings of the stinkhorn mushroom, focusing on its unique orange and olive-green colors and unusual shape. This combines scientific observation with artistic expression and helps students develop visual literacy skills.

4. Social Studies - Ecosystem and Community Roles: Connect the stinkhorn's role as a decomposer to the concept of different jobs and roles in a community. Discuss how just as the mushroom has an important "job" in the forest, different people have different jobs that help society function. This builds understanding of interdependence in both ecosystems and human communities.

STEM Career Connection

1. Mycologist - A mycologist is a scientist who studies fungi, including mushrooms, molds, and yeasts. They learn about how fungi grow, reproduce, and affect ecosystems and human health. Some mycologists work in laboratories discovering new fungi species, while others work in forests studying how fungi help trees communicate and share nutrients. Average Annual Salary: $48,000 - $65,000

2. Forest Ecologist - A forest ecologist studies how all the living and nonliving things in a forest work together as a system. They investigate how decomposers like fungi, plants, animals, soil, and water interact to keep the forest healthy. Some forest ecologists help protect forests from disease or plan how to manage forests sustainably for the future. Average Annual Salary: $52,000 - $72,000

3. Entomologist - An entomologist is a scientist who studies insects. Some entomologists focus on the relationships between insects and other organisms, like how flies interact with fungi. They might study which insects help spread fungal spores or how insects and fungi depend on each other for survival. Average Annual Salary: $50,000 - $68,000

NGSS Connections

- Performance Expectation: 5-LS2-1 - Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment
- Disciplinary Core Ideas: 5-LS2.A (The Interdependence of Organisms and Their Environment), 5-LS2.B (Cycles of Matter and Energy Transfer in Ecosystems)
- Crosscutting Concepts: Systems and System Models, Structure and Function, Cause and Effect

Science Vocabulary

* Decomposer: An organism that breaks down dead materials and returns nutrients to the soil.
* Spore: A tiny reproductive cell that can grow into a new organism under the right conditions.
* Adaptation: A special trait that helps an organism survive and reproduce in its environment.
* Mycelium: The underground network of thread-like structures that make up the main body of a fungus.
* Fruiting body: The visible part of a fungus (like a mushroom) that produces and releases spores.
* Ecosystem: A community of living and nonliving things that interact with each other in an environment.

External Resources

Children's Books:
- The Magic School Bus Meets the Rot Squad by Joanna Cole
- Fungus Is Among Us by Julie K. Lundgren
- The Hidden Life of Trees (Young Readers Edition) by Peter Wohlleben