Slime Mold

Life Science | Lesson Guide

5th Grade

Photo Description

This bright yellow, sponge-like organism is growing on dead leaves and wood on the forest floor. The yellow structure has a bumpy, foam-like texture and appears to be spreading across the decaying plant material. This unusual living thing is called slime mold, and it moves very slowly to find food.

Scientific Phenomena

The anchoring phenomenon shown here is the plasmodial stage of slime mold growth and feeding behavior. This represents a fascinating example of a protist (neither plant, animal, nor fungi) that exists as a single giant cell with thousands of nuclei. The bright yellow mass is actively moving - though imperceptibly slowly - across the forest floor, engulfing bacteria, fungi, and decaying organic matter through a process called phagocytosis. The organism demonstrates primitive intelligence by solving maze-like problems to find the most efficient paths to food sources, despite having no brain or nervous system.

Core Science Concepts

1. Classification of Living Things: Slime molds belong to the kingdom Protista, demonstrating that not all organisms fit neatly into plant, animal, or fungi categories.

2. Decomposer Role in Ecosystems: These organisms break down dead organic matter, recycling nutrients back into the soil for other living things to use.

3. Cellular Structure and Function: Slime molds exist as massive single cells (plasmodium) that can contain thousands of nuclei working together.

4. Behavioral Responses Without a Brain: The organism exhibits problem-solving behaviors and responds to environmental stimuli through chemical signals and physical changes.

Pedagogical Tip:

Use this image to challenge students' preconceptions about what constitutes "intelligent" behavior. Ask them to predict how this organism finds food without eyes, ears, or a brain, then reveal the fascinating research showing slime molds can solve mazes and optimize networks.

UDL Suggestions:

Provide multiple ways for students to explore this concept: tactile models using yellow playdough, time-lapse videos showing movement, and graphic organizers comparing slime molds to plants, animals, and fungi to support diverse learning needs.

Zoom In / Zoom Out

Zoom In: At the cellular level, the slime mold's cytoplasm flows in rhythmic patterns called cytoplasmic streaming, carrying nutrients and organelles throughout the massive cell. Chemical signals guide the organism toward food sources and away from harmful substances.

Zoom Out: In forest ecosystems, slime molds work alongside bacteria, fungi, and insects as decomposers in the nutrient cycle. They help break down fallen leaves and dead wood, releasing nitrogen, phosphorus, and carbon back into the soil for plants to absorb and use for growth.

Discussion Questions

1. How might this organism's role as a decomposer affect other living things in the forest? (Bloom's: Analyze | DOK: 3)
2. What evidence from the photo suggests this organism is alive and active? (Bloom's: Evaluate | DOK: 2)
3. If you were to design an experiment to test how slime molds find food, what would you try? (Bloom's: Create | DOK: 3)
4. How does the structure of this single giant cell help it survive in its environment? (Bloom's: Analyze | DOK: 2)

Potential Student Misconceptions

1. Misconception: "Slime molds are plants because they don't move around like animals."
   Clarification: Slime molds do move, just very slowly (about 1 cm per hour), and they actively hunt for food like animals do.

2. Misconception: "Only animals can be smart and solve problems."
   Clarification: Intelligence can exist without brains - slime molds use chemical signals and physical changes to make decisions and solve problems.

3. Misconception: "All living things are either plants, animals, or bacteria."
   Clarification: There are actually several kingdoms of life, including protists like slime molds that have characteristics different from plants, animals, and bacteria.

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 and 5-LS2.B
- Crosscutting Concepts: Systems and System Models, Energy and Matter, and Structure and Function

Science Vocabulary

* Protist: A living thing that is not a plant, animal, or bacteria, often made of just one cell.
* Decomposer: An organism that breaks down dead plants and animals into nutrients for the soil.
* Plasmodium: The stage when slime mold exists as one giant cell with many nuclei.
* Phagocytosis: The process of a cell surrounding and eating food particles.
* Cytoplasm: The jelly-like substance inside a cell that helps materials move around.
* Nutrient cycle: The way materials like carbon and nitrogen move between living and non-living things.

External Resources

Children's Books:
- The Magic School Bus Meets the Rot Squad by Joanna Cole
- Fungi by Judy Wearing
- What Is the Life Cycle of a Slime Mold? by Bobbie Kalman

YouTube Videos:
- "The Blob: A Genius Without a Brain" - Documentary showing slime mold problem-solving abilities and research: https://www.youtube.com/watch?v=2UxGrde1NDA
- "Slime Molds: No Brains, No Problem" by SciShow Kids - Kid-friendly explanation of slime mold behavior and characteristics: https://www.youtube.com/watch?v=czk4xgdhdY4