

Photo Description



This picture shows green moss growing on rocks. The rocks have different colors like pink, gray, and brown. The moss looks soft and fuzzy covering parts of the hard rocks.

Scientific Phenomena

The anchoring phenomenon here is biological weathering - the process where living organisms break down rocks over time. The moss is slowly breaking apart the rock by producing weak acids and physically growing into tiny cracks. As the moss absorbs water, it expands and creates pressure that widens existing cracks in the rock. This process happens very slowly over many years, demonstrating how living things can change Earth's surface materials.

Core Science Concepts

1. Living vs. Non-living Materials: Moss is a living organism that grows on non-living rocks, showing how living and non-living things interact in nature.
2. Weathering Process: Living things like moss can slowly break down rocks through chemical and physical processes, changing Earth's surface over time.
3. Habitat and Adaptation: Moss can survive on rocks because it has special adaptations like being able to absorb water directly from the air and surviving without soil.
4. Material Properties: Rocks appear solid and permanent, but they can actually change and break down when acted upon by living organisms and other forces.

Pedagogical Tip:

Use concrete examples and hands-on materials when teaching about living vs. non-living. Have students sort actual objects (rocks, leaves, shells) to reinforce these concepts before discussing the more abstract weathering process.

UDL Suggestions:

Provide multiple ways for students to explore this concept: visual observation of real moss and rocks, tactile exploration of different textures, and kinesthetic activities like acting out how moss "hugs" and slowly breaks apart rocks.

Zoom In / Zoom Out

1. Zoom In: At the microscopic level, moss produces tiny amounts of acid that chemically dissolve minerals in the rock. The moss also sends out thread-like structures called rhizoids that work like tiny roots, growing into microscopic cracks and slowly widening them.

2. Zoom Out: This weathering process is part of the larger rock cycle on Earth. As rocks break down, they create soil that other plants can grow in. Over thousands of years, this process helps shape mountains, valleys, and landscapes across our planet.

Discussion Questions

1. What do you notice about how the moss is growing on these rocks? (Bloom's: Remember | DOK: 1)
2. How do you think the moss might be changing the rocks over time? (Bloom's: Analyze | DOK: 2)
3. What would happen to this rock if the moss kept growing on it for 100 years? (Bloom's: Evaluate | DOK: 3)
4. Why do you think moss can survive growing on hard rocks instead of soft soil? (Bloom's: Analyze | DOK: 2)

Potential Student Misconceptions

1. Misconception: "Rocks never change because they are so hard."
Clarification: While rocks are hard, they do change very slowly over time through weathering caused by plants, water, wind, and temperature changes.
2. Misconception: "Plants can only grow in dirt."
Clarification: Some plants like moss can grow directly on rocks because they get nutrients from the air and rainwater instead of from soil.
3. Misconception: "Only big things can break rocks."
Clarification: Even tiny living things like moss can break apart rocks, but it happens very slowly over many years.

NGSS Connections

- Performance Expectation: 2-ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly.
- Disciplinary Core Idea: 2-ESS1.C - Some events happen very quickly while others occur very slowly, over a time period much longer than one can observe.
- Crosscutting Concept: Patterns - Patterns in the natural world can be observed and used as evidence.

Science Vocabulary

- * Moss: A small, soft green plant that can grow on rocks and trees
- * Weathering: The slow process of breaking down rocks into smaller pieces
- * Living: Things that grow, need food and water, and can make more of themselves
- * Non-living: Things like rocks that do not grow, eat, or make babies
- * Habitat: The place where a plant or animal lives and gets what it needs

External Resources

Children's Books:

- Let's Go Rock Collecting by Roma Gans
- Rocks Hard, Soft, Smooth, and Rough by Natalie Rosinsky
- A Seed Is Sleepy by Dianna Hutts Aston

YouTube Videos:

- "Rock Cycle for Kids" - Simple explanation of how rocks change over time with clear animations suitable for elementary students

<https://www.youtube.com/watch?v=1H2yl-rN-QM>

- "Living and Non-Living Things" - Educational video helping students identify characteristics of living vs non-living materials

<https://www.youtube.com/watch?v=sKGfq-p2MQs>