Fossil in Sedimentary Rock

Earth & Space Science | Lesson Guide

1st Grade

Photo Description

This picture shows a fossil in rock. A fossil is something very old that used to be alive. You can see the shape of a shell with lines going out like a fan. The shell is stuck in brown and tan colored rock.

Scientific Phenomena

The anchoring phenomenon in this image is fossilization - the process by which the remains of ancient organisms become preserved in rock over millions of years. This appears to be a brachiopod fossil, a marine animal that lived in ancient seas. The fossil formed when the organism died and was quickly buried by sediment, preventing decay. Over vast periods of time, minerals replaced the organic material while preserving the original shape and structure, creating a permanent record of life from Earth's past.

Core Science Concepts

1. Fossils are evidence of past life - They show us that different animals and plants lived on Earth long ago
2. Preservation in rock - Hard parts of animals (like shells) can become fossils when they get buried and turn to stone
3. Earth's history - Fossils help us learn what Earth was like millions of years ago
4. Change over time - The animals that made these fossils are different from animals we see today

Pedagogical Tip:

Use concrete, hands-on experiences like making "fossils" in play dough or clay to help first graders understand this abstract concept. Let them press shells or leaves into the material to see how impressions are made.

UDL Suggestions:

Provide multiple ways for students to engage with fossils: visual examination, tactile exploration with fossil replicas, and kinesthetic activities like acting out the fossilization process. This supports different learning preferences and abilities.

Zoom In / Zoom Out

1. Zoom In: At the microscopic level, minerals slowly replaced the original shell material grain by grain, preserving even tiny details of the organism's structure while the organic compounds decomposed.

2. Zoom Out: This fossil represents an ancient ocean ecosystem where countless marine organisms lived, died, and were preserved, helping scientists understand how life on Earth has changed over geological time and how past environments differed from today.

Discussion Questions

1. What do you think this animal looked like when it was alive? (Bloom's: Create | DOK: 3)
2. How do you think this shell got inside the rock? (Bloom's: Analyze | DOK: 2)
3. What does this fossil tell us about what Earth was like long ago? (Bloom's: Evaluate | DOK: 3)
4. Why do you think we don't see animals like this living in our oceans today? (Bloom's: Analyze | DOK: 2)

Potential Student Misconceptions

1. Misconception: Fossils are just old rocks that look like animals
   Clarification: Fossils are the actual remains of real animals and plants that lived long ago, preserved in rock
2. Misconception: All dead animals become fossils
   Clarification: Only very few organisms become fossils - special conditions are needed for preservation
3. Misconception: Fossils are from animals that lived when dinosaurs were alive
   Clarification: Fossils come from many different time periods, some much older than dinosaurs

Cross-Curricular Ideas

1. Mathematics: Create a sorting activity where students sort fossil pictures and real animal pictures into two groups. Count how many fossils are in each category. You could also measure fossil replicas with non-standard units (like blocks or paper clips) to compare their sizes.

2. ELA - Language Arts: Read "Fossils Tell of Long Ago" by Aliki and have students draw pictures of what they think the animal looked like when it was alive. Students can dictate or write simple sentences about their drawings (e.g., "The shell animal lived in the ocean long ago").

3. Art: Create fossil impressions using playdough, clay, or salt dough. Students can press shells, leaves, or toy animals into the material to make their own "fossils." Display these creations and have students explain how their activity is like how real fossils form.

4. Social Studies: Discuss how people long ago didn't have fossils to learn about animals - they had to discover them! Talk about how scientists today use fossils to learn about Earth's history, connecting to the idea that people use tools and evidence to understand the world around them.

STEM Career Connection

1. Paleontologist - A scientist who studies fossils and learns about animals and plants that lived a very long time ago. They dig carefully in rocks to find fossils and figure out what life was like on Earth millions of years ago. Average Salary: $65,000 - $75,000 per year

2. Geologist - A scientist who studies rocks and Earth. Geologists look at rocks to understand how Earth changed over time and where fossils might be hiding. They help us learn about the layers of rock under our feet. Average Salary: $70,000 - $85,000 per year

3. Museum Educator - A person who works at museums and teaches visitors (including kids!) about fossils and dinosaurs. They show real fossils, answer questions, and help people understand how scientists learn about the past. Average Salary: $35,000 - $50,000 per year

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; 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

* Fossil: The remains of a plant or animal that lived long ago and turned to stone
* Ancient: Very, very old - from long before people lived on Earth
* Preserve: To keep something safe so it doesn't get destroyed
* Sediment: Tiny pieces of rock and sand that settle in layers
* Marine: Living in the ocean or sea

External Resources

Children's Books:
- Fossils Tell of Long Ago by Aliki
- Digging Up Dinosaurs by Aliki
- If You Find a Rock by Peggy Christian