

Photo Description



This image shows ancient fossils preserved in rock. The fossils appear to be sea creatures like shells and coral that lived millions of years ago. You can see the detailed shapes and patterns of these organisms pressed into the stone, showing us what life looked like long before humans existed.

Scientific Phenomena

The anchoring phenomenon here is fossilization - the process by which living organisms become preserved in rock over millions of years. This happens when organisms (especially those with hard parts like shells, bones, or exoskeletons) are quickly buried by sediment after death. Over time, minerals replace the organic material or create impressions, preserving the shape and structure. The fossils in this image likely formed in ancient ocean environments where marine creatures were buried by layers of sand and mud that eventually hardened into rock.

Core Science Concepts

1. Fossil Formation: Fossils are evidence of ancient life preserved in rock through natural processes over very long periods of time.
2. Deep Time: The Earth is extremely old (4.6 billion years), and these fossils represent life from millions of years ago, helping us understand Earth's history.
3. Ancient Environments: These marine fossils tell us that this area was once covered by an ocean, even if it's now on dry land.
4. Evidence of Change: Fossils provide evidence that life on Earth has changed over time and that different organisms lived in the past than live today.

Pedagogical Tip:

Use the "think-pair-share" strategy when introducing fossils. Have students first think individually about what they notice in the fossil image, then discuss with a partner, and finally share with the class. This builds confidence and helps students practice scientific observation skills.

UDL Suggestions:

Provide multiple ways for students to engage with fossil concepts: tactile experiences with fossil replicas, visual diagrams showing the fossilization process, and audio recordings of fossil discovery stories. This supports learners with different strengths and preferences.

Zoom In / Zoom Out

Zoom In: At the molecular level, fossilization involves the replacement of organic molecules in shells and bones with minerals like silica, calcite, or pyrite. Water carrying dissolved minerals seeps into the tiny spaces within the organism's remains, slowly replacing the original material atom by atom while preserving the structure.

Zoom Out: These fossils are part of Earth's rock layers that form a timeline of life's history. Paleontologists study fossils from around the world to understand how life evolved, how climates changed, and how major events like mass extinctions shaped the diversity of life we see today.

Discussion Questions

1. What can these fossils tell us about what this place was like millions of years ago? (Bloom's: Analyze | DOK: 3)
2. Why do you think we find more fossils of shells and bones than of soft body parts like skin or leaves? (Bloom's: Evaluate | DOK: 2)
3. If you found a fossil of a fish in the mountains, what would that tell you about the history of that area? (Bloom's: Apply | DOK: 2)
4. How might scientists use fossils like these to learn about ancient climates and environments? (Bloom's: Synthesize | DOK: 3)

Potential Student Misconceptions

1. Misconception: "Fossils are just old rocks that look like animals."
Clarification: Fossils are actual remains or traces of once-living organisms that have been preserved through natural processes.
2. Misconception: "All dead animals and plants become fossils."
Clarification: Fossilization is rare and requires special conditions like rapid burial and the right chemical environment.
3. Misconception: "Fossils form quickly, like in a few years."
Clarification: Fossil formation takes thousands to millions of years under specific conditions.

Cross-Curricular Ideas

1. Math + Fossils: Have students measure fossil sizes using rulers and create bar graphs comparing the lengths of different fossils in the photo. They can also practice estimating how many millions of years ago fossils formed and create a timeline showing ancient time periods (like the Triassic, Jurassic, and Cretaceous periods) on a number line.
2. ELA + Fossils: Students can write fictional "diary entries" from the perspective of a sea creature that lived millions of years ago, describing what their ocean environment was like before becoming a fossil. They could also read and discuss fossil discovery stories, then write their own adventure narrative about finding a fossil.
3. Social Studies + Fossils: Explore how different regions and countries have famous fossil sites (like the Grand Canyon, China's Gobi Desert, or Argentina's fossil beds). Students can locate these on maps and learn how paleontologists from around the world share discoveries and work together to understand Earth's history.
4. Art + Fossils: Students can create their own "fossils" using clay, pressing shells, leaves, or found objects into it to make impressions. They can also draw and label detailed sketches of fossils, practicing observation and scientific illustration skills.

STEM Career Connection

1. **Paleontologist:** A paleontologist is a scientist who digs up and studies fossils to learn about animals and plants that lived millions of years ago. They work in museums, universities, and dig sites around the world, solving puzzles about Earth's ancient history. Average Annual Salary: \$63,000 - \$75,000
2. **Geologist:** A geologist studies rocks and Earth's layers to understand how our planet formed and changed over time. They help find fossils, study rock formations, and learn about natural resources. Geologists work both in offices and outdoors doing fieldwork. Average Annual Salary: \$65,000 - \$90,000
3. **Museum Curator/Educator:** A museum curator takes care of fossils and other artifacts in museums, organizing them and helping visitors learn about ancient life. They might prepare fossils for display, do research, and teach school groups about paleontology and Earth's history. Average Annual Salary: \$55,000 - \$80,000

NGSS Connections

- Performance Expectation: 4-ESS1-1 - Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
- Disciplinary Core Ideas: 4-ESS1.C - Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes.
- Crosscutting Concepts: Patterns - Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena.
- Science and Engineering Practices: [[NGSS:SEP:Analyzing and Interpreting Data]] - Analyze and interpret data to make sense of phenomena.

Science Vocabulary

- * **Fossil:** The preserved remains or traces of organisms that lived long ago
- * **Sediment:** Small pieces of rock, sand, and mud that settle in layers
- * **Paleontologist:** A scientist who studies fossils to learn about ancient life
- * **Preservation:** The process of keeping something from decaying or being destroyed
- * **Ancient:** Very, very old, from long ago in Earth's history
- * **Marine:** Related to or living in the ocean

External Resources

Children's Books:

- Fossils Tell of Long Ago by Alikei
- The Magic School Bus In the Time of Dinosaurs by Joanna Cole
- National Geographic Readers: Fossils by Kathleen Weidner Zoehfeld