

Visible Elements in Photo



- Multiple fossils embedded in light tan/beige sedimentary rock
- One prominent fossil in sharp focus showing detailed surface features (spiral or coiled patterns, segmented body structure)
- Fossils appear to be ammonites or similar shelled organisms
- Varying sizes and orientations of specimens across the rock surface
- Textured, layered rock matrix surrounding the fossils

Reasonable Inferences

- From detailed surface patterns: These organisms had hard shells that could survive burial and preserve intricate details, suggesting the need to protect delicate structures during fossilization.
- From multiple fossils in one rock layer: Organisms lived together in an ancient environment (likely ancient seafloor) before being buried and compressed over time.
- From the sedimentary matrix: The rock formed from layers of sediment that hardened, meaning loose sediment can be compacted and cemented together under pressure.

Engineering Task

K-2 Challenge:

Your job: Design a small container or shelter from clay and sand that will protect a toy shell or spiral object so it doesn't get crushed or broken. You can use sand, clay, and water. Your fossil keeper must:

- Hold your shell safely inside
- Be made from natural materials
- Keep the shell from rolling out when you gently shake it

3-5 Challenge:

Your challenge: Using only plaster, sand, clay, and water, create a two-part mold that can make an accurate copy of a textured object (shell, leaf, or carved item). Your system must:

- Capture all surface details (bumps, grooves, spirals) with at least 80% clarity
- Separate into two pieces without breaking
- Produce a replica that matches the original within 2 mm in key dimensions
- Document which material (sand vs. clay) preserved details better and why

EDP Phase Targeted

Ask / Define Problem

This phase fits best because the photo shows a real-world outcome (fossils preserved in rock) but students have not yet identified how to replicate it. The challenge asks them to first understand the problem ("How do hard shells stay intact and detailed when buried?") before jumping to solutions. This mirrors authentic paleontology: observing the result and working backward to the preservation process.

Suggested Materials

- Plaster of Paris or air-dry clay
- Fine sand and coarse sand
- Water
- Small shells, leaves, or polymer clay objects to mold
- Shallow containers or ice-cube trays for mold frames
- Measuring tools (ruler, calipers if available)
- Spray bottle or sponge for moisture control

Estimated Time

- K-2: 45–60 minutes (one session with drying time overnight optional)
- 3-5: Two 40-minute sessions (Session 1: create molds; Session 2: pour casts, compare results, analyze)

Why This Works for Teachers

This task directly addresses NGSS ETS1.A (defining problems and constraints) by having students reverse-engineer how nature preserves detail under pressure, then apply that understanding to design their own preservation system with measurable success criteria.