Moss on Rock

Earth & Space Science | Engineering Design Process

Engineering Challenge

Visible Elements in Photo

- Layered stone or brick with distinct color variations (gray, tan, reddish tones)
- Dense moss covering (bright green) on upper and side surfaces
- Lighter-colored lichen or weathered patches on exposed areas
- Cracks and crevices in the stone creating sheltered pockets
- Rough, porous texture of the rock surface

Reasonable Inferences

- From moss density and placement: Moss thrives in moist, shaded microclimates; it prefers areas protected from direct sun and wind (inferred from its concentration on upper ledges and crevices rather than flat exposed faces).
- From rock layering and color variation: The stone has weathered over time; different layers absorb and retain moisture differently, creating conditions where some surfaces support growth better than others.
- From cracks and texture: Small spaces in rock provide shelter and moisture retention for living organisms like moss and lichen.

Engineering Task

K-2 Challenge:

Design and build a pretend "moss hotel"—a structure using rocks, clay, or stacked blocks that has shady spots, cracks to hold water, and rough surfaces where moss could grow. Your hotel should have at least 2 different room types (a wet corner and a shadier corner). Test it by sprinkling water on it and watching where water stays longest.

3-5 Challenge:

Engineer a small rock or brick structure (no larger than 15 cm × 15 cm base) that maximizes moisture retention and shade for moss and lichen growth. Your design must include: (1) at least one crevice or pocket that holds water for 5+ minutes after sprinkling, (2) a shaded overhang area, and (3) a rough surface texture. Test your structure by applying water and measuring how long moisture persists on different surfaces. Iterate your design if water drains too quickly.

EDP Phase Targeted

Ask / Define Problem — This phase fits best because the photo shows a real environmental condition (moss growth on specific rock surfaces) without presenting an obvious human-made solution. Students must first observe why moss grows where it does before designing a structure that replicates those conditions. The challenge frames a natural phenomenon as a design problem to solve.

Suggested Materials

- Rocks, bricks, or stone tiles (varied sizes)
- Air-dry clay or modeling clay
- Spray bottle or water cup

- Ruler or measuring tape
- Sandpaper or wire brush (to roughen surfaces)
- Cardboard or foam scraps (for shading structures)

Estimated Time

45–60 minutes (single session for K-2; one 45-minute session for initial design + one 20-minute follow-up session for 3-5 to test and iterate)

Why This Works for Teachers

This task directly addresses NGSS ETS1.A (defining and delimiting engineering problems) by asking students to identify the real conditions that support organism growth and then engineer a human-made structure that mimics nature's design principles.