

Visible Elements in Photo



- A large, roughly spherical rock or boulder covered in lichen (white and pale green patches) and moss (darker green growth)
- Surrounding ground covered with brown leaf litter and wood chips
- Green grass and plant growth adjacent to the rock on the right side
- Moist, shaded forest floor environment

Reasonable Inferences

- From lichen and moss coverage: The rock's surface provides habitat for slow-growing organisms that thrive in moisture and shade; different organisms favor different areas (inference: microhabitats with varying light and moisture conditions exist on a single surface).
- From leaf litter and proximity to grass: The rock is partially buried or settled into organic material, suggesting it has been in place long enough to accumulate soil and support plant colonization.
- From dense growth patterns: The rock's irregular surface and crevices trap moisture and organic matter, creating shelter for decomposers and small organisms.

Engineering Task

K-2 Challenge:

Design a cozy home for tiny bugs and creatures that need a damp, shady place to live. Use rocks, sticks, leaves, and soil to build a shelter that stays wet and keeps bugs safe from the sun. Can you make it so water doesn't wash it away?

3-5 Challenge:

Design a wildlife shelter structure (using rocks, wood, soil, and natural materials) that maintains moisture and shade for decomposer organisms and small arthropods. Your shelter must:

- Retain moisture for at least 24 hours without active watering
- Provide at least two distinct microhabitats (e.g., a damp crevice and a covered space)
- Be stable enough to withstand light rain or water spray without collapsing
- Measure no larger than 30 cm across

Test your design by placing it outside for one week and observing what organisms colonize it.

EDP Phase Targeted

Ask / Define Problem — This phase fits best because the photo reveals a real environmental need (small organisms require shelter and moisture) without showing an existing solution. Students must first observe and question why organisms live on rocks like this, then define what conditions a shelter must provide. This observation-first approach builds scientific thinking before engineering.

Suggested Materials

- Rocks of various sizes (collected from schoolyard or provided)
- Sticks and twigs
- Dried leaves and bark pieces
- Soil or potting mix
- Moss or grass clippings (optional, to jumpstart colonization)
- Spray bottle or watering can
- Observational tools (hand lens, notebook)

Estimated Time

Two 30-minute sessions (Day 1: design and build; Day 2-7: observation and iteration) or one extended 45-60 minute session for design and initial build with follow-up observation over 1-2 weeks.

Why This Works for Teachers

This task directly addresses NGSS ETS1.A (defining and delimiting problems) and ETS1.B (developing possible solutions) by asking students to identify real environmental constraints (moisture, shade, stability) and engineer a structure that meets them, grounding abstract engineering in observable natural systems.