

Visible Elements in Photo



- A tortoise with a hard, patterned shell on rocky/mossy ground
- Vegetation (green plants and grasses) surrounding the tortoise
- A dark hollow or cave-like opening in a rock/log behind the tortoise
- Rough, textured ground with moss and lichen
- The tortoise's head and neck extended, appearing to move or forage

Reasonable Inferences

- From the dark hollow behind the tortoise: This creature needs shelter from predators and weather; natural hiding spaces are critical for survival.
- From surrounding vegetation and ground texture: The tortoise must navigate uneven terrain and dense plant growth to find food and safety.
- From the hard shell: The animal's body is protected, but it still seeks additional shelter, suggesting that a shell alone is not sufficient for all survival needs.

Engineering Task

K-2 Challenge:

Imagine a tortoise that needs a safe place to rest and hide. Use rocks, sticks, leaves, and soil to build a cozy shelter that a toy tortoise can fit inside. Your shelter should have a dark inside (so the animal feels safe) and an opening where the tortoise can go in and out. Test it by placing your toy tortoise inside—does it fit? Can a friend find it easily, or is it well hidden?

3-5 Challenge:

A tortoise needs a shelter that protects it from rain, wind, and predators while allowing it to enter and exit easily. Design and build a shelter using natural or recycled materials (rocks, bark, branches, leaves, cardboard, or soil) that meets these criteria:

- Size: Fits a 15 cm toy tortoise or model with room to turn around
- Durability: Withstands water spray (simulated rain) for at least 30 seconds without collapsing
- Safety: Has at least one entrance/exit hole between 5–8 cm wide
- Concealment: Is difficult to spot from 1 meter away (blends with surroundings)

Test your design by placing the tortoise inside, spraying water gently, and timing how long the shelter stays intact. Redesign one feature based on what fails or could improve.

EDP Phase Targeted

Ask / Define Problem

This phase fits because the photo shows a real animal in its natural environment solving an actual survival problem. Students begin by observing why the tortoise needs shelter (protection from weather and predators) and where it finds shelter (natural crevices, vegetation). This observation-based questioning naturally leads to students asking, "How can we design a shelter that meets similar needs?" rather than jumping to solutions.

Suggested Materials

- Small rocks, pebbles, or stacked stone
- Sticks, twigs, and bark pieces
- Leaves, moss, or grass
- Cardboard tubes or small cardboard boxes
- Soil or sand (optional, for anchoring)
- Toy tortoise or small model (12–15 cm)
- Spray bottle (for rain simulation, grades 3–5 only)

Estimated Time

- K-2: 30–45 minutes (single session: 10 min. exploration, 20 min. building, 10 min. testing)
- 3-5: Two 40-minute sessions (Session 1: design, build, and initial testing; Session 2: redesign and durability testing with water)

Why This Works for Teachers

This task directly supports NGSS ETS1.A (defining and delimiting engineering problems) and ETS1.B (designing solutions) by having students observe an authentic animal behavior and translate it into measurable design criteria, making the engineering process tangible and biologically meaningful.