Animal Behavior

Life Science | Engineering Design Process

Engineering Challenge

Visible Elements in Photo

- A bright green lizard with detailed scale patterns (yellow-green, white, and darker markings)
- Rough, gray-brown bark or rock surface serving as the lizard's perch
- The lizard's eye, nostril, and jaw structure clearly visible in profile
- Textured skin with individual scales visible at high magnification
- Natural outdoor setting with lichen or moss growth on the substrate

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Reasonable Inferences

1. From green coloration + gray-brown background: The lizard's color helps it blend into leafy or mossy environments, suggesting camouflage is essential for survival in this habitat.

2. From textured scales + rough substrate: The lizard's body texture matches tree bark, implying that surface grip and blending with natural materials are design features that aid climbing and hiding.

3. From visible eye and alert posture: The lizard actively monitors its surroundings, suggesting that any shelter or habitat design must allow for sightlines and quick escape routes.

Engineering Task

K-2 Challenge:

"Design a Hide-Out for a Lizard Friend"

Make a cozy spot where a pretend lizard can hide and feel safe. Use leaves, twigs, bark, and grass to build a little home. Your lizard needs to be able to peek out and see what's happening around it. Can you make it blend in so it's hard to spot?

3-5 Challenge:

"Design a Camouflaged Lizard Shelter"

Design and build a shelter for a green lizard that:
- Uses natural materials (bark, leaves, moss, small rocks) to match the lizard's environment
- Provides at least two hiding spots within 15 cm of the structure
- Allows the lizard to observe its surroundings (has at least one sightline that is 180° or greater)
- Stays structurally sound when tilted 30° (simulate climbing on a slope)
- Blends visually with its surroundings (test: can a partner identify it from 1 meter away without guidance?)

Success criteria: Shelter is camouflaged AND functional for observation AND structurally stable.

EDP Phase Targeted

Ask / Define Problem

This photo is an excellent launching point for the problem-identification phase because it shows why camouflage and shelter design matter in the natural world. Students observe the lizard's real-world survival needs (hiding, observing, climbing) and can ask: "What does this animal need to stay safe in its home?" Rather than starting with a solution, the photo prompts students to define problems the lizard faces—predators, temperature, visibility—which they then solve through design.

Suggested Materials

1. Natural materials (collected or provided): bark pieces, leaves, twigs, moss, small pebbles, grass
2. Fasteners: non-toxic hot glue or craft glue, paper tape
3. Base structure: small cardboard box, piece of cork board, or flat wood scrap (to anchor the shelter)
4. Measurement tools: ruler or meter stick, protractor (for 3–5 tilt test)
5. Optional: craft paint in greens/browns to touch up materials if natural camouflage is limited

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Estimated Time

- K–2: 30–40 minutes (one session: 10 min. observation, 20 min. building, 10 min. testing and sharing)
- 3–5: 60–90 minutes across two sessions
  - Session 1 (40 min.): Observation, problem definition, and material planning
  - Session 2 (50 min.): Building, testing against criteria, and iteration

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Why This Works for Teachers

This challenge directly addresses NGSS K.ETS1.A (asking what plants and animals need to survive) and 3-5.ETS1.A (defining and delimiting engineering problems based on specific criteria), while making camouflage and biomimicry tangible and hands-on.