

### Visible Elements in Photo



- One owl with mottled gray-brown plumage perched on a light-colored brick or concrete wall
- Textured white/cream-colored brick or stone surface with visible mortar lines and surface variation
- Owl's ear tufts (horns) clearly visible at the crown of head
- Owl's patterned feathers showing intricate dark and light markings
- Curved metal rim (bucket or container edge) in lower left corner of frame

### Reasonable Inferences

- From mottled plumage + light wall: The owl's coloring matches the brick surface, suggesting camouflage is a survival strategy. The owl blends in with its resting environment to avoid predators or hide from prey.
- From textured wall surface + owl's position: Owls need rough, irregular surfaces with crevices to rest safely during daylight. The mortar lines and brick texture provide grip and concealment.
- From ear tufts + forward-facing eyes: This predator hunts at night and relies on hearing and vision; any shelter design must allow the owl to remain alert while hidden.

### Engineering Task

#### K-2 Challenge:

Design and build a hiding spot for a toy owl using blocks, boxes, or clay. Your hiding spot should:

- Be big enough for the owl to fit inside
- Have a small opening so the owl can peek out and watch for danger
- Be made from materials that look like tree bark or rocks so it blends in

Teacher script: "Owls rest during the day in places where they can hide from other animals. Can you make a safe, secret spot where an owl could sleep?"

### 3-5 Challenge:

Design a wall-mounted roost shelter for a small owl that maximizes concealment while allowing the bird to remain alert. Your design must meet these criteria:

Constraints:

- Use only natural or recycled materials (bark, twigs, moss, cardboard, paper)
- Roost opening must face forward (no top-only entrances)
- Shelter footprint cannot exceed 20 cm x 15 cm
- Structure must support a 200g mass (simulated owl) for at least 2 minutes without tipping or collapsing

Success Criteria:

- Surface texture and color blend with a light brick or concrete wall within arm's reach
- At least 3 distinct materials used
- The roost conceals 80% or more of the mass when viewed from 1 meter away
- Structure can be mounted and removed without permanent damage

Challenge variation: Test multiple camouflage patterns. Which color combination makes your roost hardest to spot?

### EDP Phase Targeted

Ask / Define Problem

This photo shows a real animal in its natural behavior (resting on a textured surface), which makes Ask the ideal starting point. Students first observe what owls actually need—concealment, a textured surface to grip, protection from view—before they design a solution. The owl's camouflage becomes the problem to solve ("How can we help an owl hide?") rather than a pre-designed answer. This grounds the challenge in authentic animal ecology rather than jumping straight to building.

### Suggested Materials

1. Bark pieces, twigs, and moss (collected outdoors or purchased from craft suppliers)
2. Crumpled brown/gray paper, newspaper, or paper bags (for layering and texture)
3. Cardboard tubes, egg cartons, or corrugated cardboard scraps (for frame structure)
4. Natural clay or air-dry clay (to bind materials and model surface)
5. Sandpaper or craft cork sheets (to simulate rough tree bark texture)
6. String or hot glue (for assembly; supervise hot glue with younger students)

### Estimated Time

- K–2: 2 sessions of 30–40 minutes each (building + play/observation)
- 3–5: 2–3 sessions of 45–50 minutes each (design sketch + building + testing/refinement)

### Why This Works for Teachers

This task directly addresses NGSS ETS1.B: Developing Possible Solutions by asking students to design structures that meet multiple constraints (camouflage, stability, size), while ETS1.A: Defining Problems grounds the design in real animal needs observed in nature—turning a wildlife photograph into an authentic engineering problem.