

### Visible Elements in Photo



- A small ground-dwelling bird (mourning dove) on dark soil/mulch in a garden bed
- Dense, low green shrub vegetation providing cover
- White flowering plants (foreground, out of focus)
- Yellow flowering plants (background)
- Rust-colored ceramic pot (upper left)
- Dark mulch and soil
- Tall grass or plant stems (left side)
- ...

### Reasonable Inferences

1. From the bird's position on open soil near vegetation: Small ground creatures need accessible shelter from predators and weather, but must still be able to move freely to forage and escape danger.
  2. From the dense shrub and layered plantings: Natural structures like bushes and varied plant heights work together to create multiple escape routes and hiding spots.
  3. From the garden setting with mixed plants: The environment shows intentional design—plants are grouped to create microhabitats, suggesting humans can engineer spaces to support wildlife needs.
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### Engineering Task

#### K-2 Challenge:

Your job: Design and build a safe hiding place for bugs in a garden. Use sticks, leaves, grass, and soil to make a cozy spot where a bug can hide from birds and stay dry when it rains. Your shelter should have an opening small enough that a pencil can fit through, but big enough for a bug to get in and out. Test it by gently spraying it with water—does the inside stay dry?

#### 3-5 Challenge:

Problem: Small ground-dwelling creatures (like ground-feeding birds or insects) need shelter that protects them from predators and weather, but they must be able to see predators approaching and escape quickly.

Your Challenge: Design a shelter structure using natural and recycled materials (sticks, leaves, cardboard tubes, soil, mulch) that:

- Fits within a 20 cm x 20 cm x 15 cm footprint (to match garden bed spacing)
- Has at least 2 separate escape routes (openings)
- Keeps a "test object" (small sponge or moss) dry when exposed to simulated rain (spray bottle, 10 spritzes)
- Allows clear sight lines so an animal inside can detect movement above and around it

Success Criteria:

1. Shelter stays intact after 3 days of classroom testing.
2. Interior stays dry after water test.
3. You can clearly explain why your design allows the creature to sense danger.

## EDP Phase Targeted

### Ask / Define Problem

This photo is best used to launch the Ask / Define Problem phase. The image shows a real creature in its natural habitat, revealing an unmet need: small animals require shelter, but that shelter must balance safety with the ability to escape. Students must observe the creature and its environment, then articulate why simple hiding spots aren't enough—the creature needs both protection and awareness. This problem-finding mindset is the foundation of engineering thinking.

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## Suggested Materials

- Sticks and twigs (various sizes)
  - Dried leaves and grass
  - Soil and mulch
  - Cardboard paper towel tubes
  - Recycled plastic containers (cut open)
  - Moss or dry sponges (for water-resistance testing)
  - Spray bottle (for water testing)
  - Tape or natural plant fibers (for binding)
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## Estimated Time

K-2: 2 sessions of 20–30 minutes each (Day 1: design and build; Day 2: test and observe)

3-5: 2–3 sessions of 40–50 minutes each (Day 1: observe photo and define criteria; Day 2: build and test; Day 3: refine and document findings)

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## Why This Works for Teachers

This task directly addresses NGSS ETS1.A (defining engineering problems) and ETS1.B (developing possible solutions) by asking students to identify what a real creature needs and then design a solution that balances competing demands—the heart of authentic engineering work.