

Visible Elements in Photo



- A cluster of pale, umbrella-shaped mushrooms (approximately 10–12 caps) with fine vertical ridges
- Thin, fragile-looking white stems supporting the mushroom caps
- Dark, decomposed wood chips and charred debris covering the ground
- Mushrooms emerging from a bed of wood mulch/wood chips
- High contrast between delicate fungal structure and rough, brittle surrounding material

Reasonable Inferences

1. From fragile caps and thin stems: These mushrooms are structurally delicate and depend on support from the material beneath them to remain upright and protected from physical stress (crushing, wind).
2. From wood chip habitat: Mushrooms grow in nutrient-rich, moist decomposing wood environments; the mulch both anchors and nourishes the fruiting bodies.
3. From clustered growth pattern: Mushrooms benefit from proximity to neighbors, suggesting that spacing and density matter for stability and resource sharing in a crowded ecosystem.

Engineering Task

K-2 Challenge:

"Design a Safe Nest for Delicate Mushrooms"

Your job is to build a cozy home for tiny, fragile mushroom-like creatures. Using only sticks, leaves, and small wood pieces, create a protective bed that keeps them upright and safe from getting squished. Your structure should:

- Use natural materials only
- Keep small objects (like pebbles or craft mushrooms) from tipping over
- Be sturdy enough to not fall apart when you gently tap the table

Success: Your mushroom stays standing, and your nest stays together.

3-5 Challenge:

"Engineer a Stable Fungal Fruiting Bed"

Decomposing wood chips create a natural foundation for delicate mushrooms. Your challenge: design and build a miniature mushroom habitat using wood chips, soil, and sticks that meets these criteria:

- Height requirement: Mushroom models must be at least 8 cm tall and remain vertical
- Stability test: Habitat must withstand a gentle 3-second shake without mushroom models tipping
- Material constraint: Use only natural materials (wood chips, soil, sticks, leaves, cardboard)
- Spacing rule: Mushroom models must be spaced 3–5 cm apart (mimicking the cluster in the photo)

Document: Sketch your design, test it, and record what worked and what failed. If mushrooms tip, redesign the base.

EDP Phase Targeted

Ask / Define Problem

The photo shows a real-world system (decomposing wood supporting fragile organisms) but does not show an active failure or design iteration. Students must first observe the mushrooms' delicate structure, infer what challenges they face (staying upright, anchoring in loose substrate), and ask how to support something so fragile. This observational, problem-identification phase is the natural starting point before imagining or building solutions.

Suggested Materials

- Wood chips or bark mulch (bulk/recycled)
- Craft foam or clay mushroom models (to stand in for real fungi)
- Small branches, twigs, and sticks
- Potting soil or garden soil
- Leaves, moss, or dried grass (for bedding layer)
- Container (shallow tray, terracotta saucer, or shoe box)

Estimated Time

K-2: 25–35 minutes (10 min. observation + discussion, 15 min. building, 5 min. testing)

3-5: 45–60 minutes (10 min. photo analysis + inference, 20 min. design & sketching, 20 min. building & testing, 5 min. documentation)

Why This Works for Teachers

This task directly addresses NGSS K-ESS3-1 / 3-LS4-3 (observe how organisms depend on their environment) while practicing ETS1.A (defining engineering problems from real-world observation), making decomposition and organism interdependence tangible and hands-on.