

### Visible Elements in Photo



- A green and brown grasshopper with long hind legs and prominent antennae (yellow filaments on head)
- A spiky, round seed head (appears to be a thistle or similar plant) attached to a green stem
- The grasshopper is gripping the seed head with its front and middle legs
- Green plant material (leaves/grass) blurred in the background
- The seed head structure is bumpy and irregular, with many small protrusions

### Reasonable Inferences

- From the grasshopper's leg position and grip: The creature needs to hold onto rough, uneven surfaces while feeding or resting, suggesting it requires good traction and stability on irregular textures.
- From the seed head structure: Plants with spiky or bumpy seed heads may have evolved this shape to either protect seeds or provide stable landing platforms for insects that help with seed dispersal.
- From the overall scene: Grasshoppers must navigate plant surfaces that vary in shape and texture, requiring flexible body mechanics and strong appendages.

### Engineering Task

#### K-2 Challenge:

Make a bumpy, spiky platform that a toy grasshopper (or your fingers pretending to be a grasshopper) can hold onto and climb on without sliding off. Use natural materials like sticks, leaves, and bark to make it rough and interesting. Can you make it so the grasshopper stays in place when you tilt it?

#### 3-5 Challenge:

Design and build a structure that mimics the seed head's surface texture and stability. Your structure must:

- Be at least 15 cm tall and 10 cm wide
- Have an uneven, bumpy surface with at least 5 different grip points
- Support a 100-gram weight (or toy grasshopper) without the weight sliding off when the structure is tilted to a 30-degree angle
- Use only natural materials (dried seed heads, twigs, bark, leaves) or craft materials (foam, textured paper, or cardboard)

Test your design by placing the weight on different parts and slowly tilting. Which texture grips best? Redesign any weak spots.

### EDP Phase Targeted

#### Ask / Define Problem

This phase fits because the photo shows a real organism solving a real problem—the grasshopper needs secure grip and stability on an irregular plant surface. Students begin by observing and asking: "How does the grasshopper stay on? What makes a good grip? Why does the seed head's bumpy shape help?" They define the problem before jumping to solutions, which is authentic to how nature works.

## Suggested Materials

- Dried seed heads, teasels, or thistle pods (or substitute with textured natural items)
- Small twigs, bark pieces, and leaves
- Craft foam or textured foam sheets (alternative)
- Corrugated cardboard and sandpaper (alternative)
- Tape, glue, or hot glue gun (for assembly)
- A small weight or toy grasshopper figure (for testing)

## Estimated Time

K-2: 30–40 minutes (exploration and building in one session)

3-5: 45–60 minutes (design, build, and one round of testing; extend to two sessions for redesign cycle)

## Why This Works for Teachers

This task directly addresses NGSS ETS1.A (defining and delimiting engineering problems) and ETS1.B (developing possible solutions) by asking students to identify how a real animal solves the grip-and-stability problem, then translate that observation into a testable human-made structure.