

### Visible Elements in Photo



- A bee (with fuzzy body, long proboscis, six legs, and wings) visiting a green flower bud or seedpod
- Green plant stem and leaves with visible veins
- The bee's body positioned on a narrow, pointed structure
- Brown spots or damage marks on the plant leaves
- A curved, hook-like appendage at the tip of the flower/seedpod

### Reasonable Inferences

- From the bee's proboscis and flower structure: The bee needs to reach nectar or pollen inside flowers with varying shapes and depths—different flower designs require different access strategies.
- From the narrow, pointed plant structure: Plants with enclosed or hard-to-reach flowers may limit which pollinators can visit them effectively, affecting reproduction.
- From the bee's grip on the stem: Insects need stable landing surfaces to access flowers; slippery or unstable stems make pollination difficult or impossible.

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### Engineering Task

#### K-2 Challenge:

Make a Flower That a Bee Can Visit

Design and build a pretend flower using paper, straws, or cups that a "bee" (your finger or a toy) can land on and reach inside to find a treat (sticker, pom-pom, or marker dot). Your flower must have:

- A safe landing spot (a flat or bumpy place for the bee to stand)
- An opening that the bee can reach into
- A prize hidden inside that the bee can collect

Test it: Can your bee land, stay on, and get the prize?

**3-5 Challenge:****Design a Flower Structure That Accommodates Pollinators**

Pollinators like bees need flowers that are accessible—with stable landing platforms and openings sized for their bodies. Your challenge:

Build a model flower (using paper cups, paper, straws, beads, and tape) that meets these criteria:

- Landing platform: Must support a toy bee (or marble) for at least 3 seconds without sliding
- Access opening: Must allow a straw (representing a proboscis) to reach a hidden "nectar" point 5 cm inside the flower
- Stability: Must remain upright when gently tilted 15 degrees in any direction

Test & iterate: Try at least two design changes. Record whether each version meets all three criteria. Which design works best?

**EDP Phase Targeted****Ask / Define Problem**

This photo shows a real pollinator facing a real structural challenge: reaching food from a specific plant design. Students should begin by observing why the bee's shape, size, and tools matter for flower access—defining the actual problem bees face in nature—before jumping to solutions. This grounds the challenge in authentic need.

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**Suggested Materials**

- Paper cups or toilet paper tubes (flower body)
- Construction paper or tissue paper (petals)
- Straws or thin dowels (proboscis simulators)
- Tape and scissors
- Small beads, pom-poms, or stickers (nectar / pollen rewards)
- Toy bee, marble, or finger (pollinator)

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**Estimated Time**

45–60 minutes (single session for K-2; can extend to two 30-minute sessions for 3-5 with iteration and redesign)

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**Why This Works for Teachers**

This task directly addresses NGSS 3-5-ETS1-1 (define simple design problems that can be solved by applying scientific ideas about plants and animals) by having students connect a real organism's structure and needs to a functional design solution.