# Anole

Life Science | Engineering Design Process

**Engineering Challenge**

## Visible Elements in Photo


- A brown lizard with textured, patterned skin gripping a light-colored tree branch
- The branch has an irregular, rough surface with visible bark texture and lichen patches
- The lizard's claws and toe pads are in contact with the branch surface
- Dark background (suggesting a natural or shaded environment)
- The lizard's body is elongated and flexible, positioned horizontally along the branch

## Reasonable Inferences

- From the lizard's grip position: The animal needs strong foot contact to avoid falling while climbing or resting on uneven, angled surfaces—a survival necessity in its natural habitat.
- From the rough bark and lichen: Tree branches in nature are not smooth; surfaces vary in texture, diameter, and angle, requiring the lizard's feet to adapt to different conditions.
- From the lizard's body posture: Animals with claws and toe pads are designed to grip and hold onto uneven terrain; engineers can learn from this biological adaptation to design better climbing or gripping mechanisms.

## Engineering Task

**K-2 Challenge:**

Make a pretend branch using craft materials so a toy lizard (or lizard puppet) can hold on tight without sliding off. Your branch can be straight or wiggly, smooth or bumpy—but the lizard must stay in place when you tilt it!

**3-5 Challenge:**

Your challenge is to design and build a climbing surface (8–12 inches long) that allows a small object (representing a lizard's foot) to grip securely on slopes up to 45 degrees. The surface must include at least two different texture zones (e.g., smooth bark vs. rough lichen patches). Success criteria:
- Object does not slide off when the surface is tilted to 45 degrees.
- Surface is made from natural or recycled materials only.
- At least two distinct textures are identifiable and serve a grip-enhancing purpose.

## EDP Phase Targeted

Ask / Define Problem

This task starts with Ask because students observe a real-world biological challenge (how a lizard grips an uneven branch) and must identify the engineering problem beneath it: How can we create surfaces that prevent slipping on angled terrain? The photo naturally prompts the question "Why does this work?"—perfect for problem definition before designing solutions.

## Suggested Materials

- Twigs, branches, or rolled paper tubes (branch structure)
- Sandpaper, bark chips, or crumpled aluminum foil (texture variations)

- Small toy lizard, wooden block, or felt-covered weight (test object)
- Hot glue gun or craft adhesive (fastening)
- Protractor or adjustable ramp/clipboard (for tilting to 45 degrees)

## Estimated Time

45–60 minutes (one session for 3–5; two 25-minute sessions for K–2)
- K–2: 10 min. intro + 20 min. building + 10 min. testing
- 3–5: 10 min. problem framing + 25 min. design/build + 15 min. test and iterate

## Why This Works for Teachers

This task aligns with NGSS 3-5-ETS1-2 (Generate and compare multiple solutions using design criteria and constraints) by having students test different surface textures against a measurable grip criterion, bridging observable biology into engineered solutions.