Turtles

Life Science | Engineering Design Process

Engineering Challenge

Visible Elements in Photo

- Two turtles in shallow water with algae/green coating on their shells
- Decomposing wood log partially submerged in water
- Shallow wetland environment with muddy bottom
- Dried plant stalks and green vegetation in background
- Moss or algae growth on surfaces (log, turtle shells)

Reasonable Inferences

- From turtle shells covered in algae: Turtles spend extended time in water where growth accumulates; they need shelter or structures that allow aquatic living while managing environmental buildup.
- From the submerged log: Natural materials in wetlands provide structural support and habitat; logs decay over time and may need replacement or reinforcement to remain functional.
- From shallow water + vegetation mix: Turtles depend on both wet and dry zones; a successful habitat requires a transition area between land and water.

Engineering Task

K-2 Challenge:

Design a safe resting spot for turtles in a shallow pond. Build a platform or log shelter using sticks, rocks, and leaves that turtles can climb onto to rest and dry off. Make sure it doesn't tip over when you gently push it.

3-5 Challenge:

Design a turtle basking platform for a shallow wetland habitat. Your structure must:
- Support at least 2 kg of weight (simulating turtle load) without sinking or tipping
- Remain stable in 5 cm of standing water for 10 minutes
- Use only natural or recycled materials (sticks, bark, cork, burlap)
- Provide at least one exposed dry surface where algae growth can be monitored over 2 weeks

Test your design by placing it in a shallow water container. Measure stability and water absorption. Redesign if the platform sags or tips.

EDP Phase Targeted

Ask / Define Problem

The photo shows a real habitat where turtles interact with their environment. Students can observe that the log provides structure but also accumulates growth, raising questions: Why do turtles need resting spots? What makes a good basking platform? How do materials break down in water? This observation-based approach naturally leads students to define the problem before jumping to solutions.

Suggested Materials

- Sticks and small branches (collect or purchase)
- Cork pieces or bark strips
- Rocks (various sizes)
- Burlap or natural fabric scraps
- Shallow plastic container or aquarium (for testing)

Estimated Time

45–60 minutes (single session for K-2; 3-5 may benefit from two 30-minute sessions: one for build/test, one for redesign and observation)

Why This Works for Teachers

This task directly addresses NGSS 3-5-ETS1-1 (define engineering problems and propose solutions) and K-2-ETS1-1 (ask questions and make observations about the natural world to solve design problems) by asking students to identify a real organism's need, test a solution in conditions that mirror the actual environment, and refine their design based on performance data.