

### Visible Elements in Photo



- Bare, sloped ground transitioning from upper bank to water's edge
- Multiple mature trees with exposed root systems near the water
- Wire/metal fencing running along the hillside
- Calm body of water (pond or slow-moving water)
- Wooden posts or stakes marking the slope
- Mix of leaf litter, bare soil, and sparse vegetation on the bank

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### Reasonable Inferences

1. From exposed roots and bare slope: Water erosion or seasonal thaw is removing topsoil and destabilizing the bank, exposing tree roots.
2. From fencing and posts: The landowner has attempted to manage or protect this area from further erosion or animal access.
3. From water level and season: This appears to be early spring (seasonal thaw visible in the water color), when water volume and flow increase, accelerating erosion.

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### Engineering Task

#### K-2 Challenge:

45–60 minutes (includes observation, building, and 2–3 water tests)

#### 3-5 Challenge:

Two 45-minute sessions (Session 1: observe, plan, build; Session 2: test, measure, iterate)

### EDP Phase Targeted

Ask / Define Problem

This photo clearly shows a real environmental problem—bank erosion threatening tree stability and water quality. Students naturally ask: "Why is this happening?" and "How can we fix it?" The visible erosion damage prompts students to observe, question, and identify the need before imagining solutions. This grounding in a genuine problem builds authentic motivation for the design process.

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### Suggested Materials

- Twigs, branches, and fallen logs
- Burlap or landscape fabric scraps
- Cardboard pieces or paper

- Soil and leaf litter (from outdoors or bagged)
  - Wire or garden stakes
  - Cups or pitchers for water testing
  - Optional: clay, straw, or mulch
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### Estimated Time

- K-2: 45–60 minutes (includes observation, building, and 2–3 water tests)
  - 3-5: Two 45-minute sessions (Session 1: observe, plan, build; Session 2: test, measure, iterate)
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### Why This Works for Teachers

This challenge directly addresses NGSS K-ESS2-1 / 2-ESS2-1 (weathering and erosion) and ETS1-1/2 (defining problems and designing solutions), while using a tangible, local environmental context that makes engineering relevance impossible to ignore.