

### Visible Elements in Photo



- Two large footprints pressed into bare soil (center of image)
- Surrounding vegetation: grasses, clover, and small flowering plants (pink flowers visible)
- Bare, compacted earth with no grass coverage in the print area
- Mixed ground cover around the prints suggests variable habitat conditions
- Small rocks and plant debris scattered across the soil

### Reasonable Inferences

- From footprints: A larger animal (deer, raccoon, or similar) has walked through this area recently, indicating it uses this space as a path or feeding ground. The prints suggest weight and size we can measure and compare.
- From bare soil surrounded by vegetation: This spot may receive heavy foot traffic, which could indicate an animal trail that forms a "highway" through the grass.
- From mixed vegetation coverage: The animal may need shelter or cover nearby to stay safe from predators while foraging in this open area.

### Engineering Task

#### K-2 Challenge:

Your job: Make a walking path that an animal can use without getting stuck in mud or leaving deep footprints. Use only leaves, twigs, and grass to build a sturdy trail that keeps the animal's feet dry and safe. Your path should be at least as long as your arm!

#### 3-5 Challenge:

An animal repeatedly walks through muddy ground, leaving deep footprints. Design and build a trail surface that:

- Reduces sinking depth by at least half compared to bare soil
- Uses only natural or recycled materials (leaves, twigs, straw, wood chips, cardboard strips)
- Measures at least 30 cm long and 15 cm wide
- Can support weight (test with a 500g book or similar) without collapsing after 5 "animal walks" (5 passes of your hand or foot)

Success criteria: Measure footprint depth before and after your trail is built. Calculate the reduction percentage.

### EDP Phase Targeted

Ask / Define Problem

This phase fits because the photo shows a real environmental challenge—an animal creating erosion and mud by repeatedly walking the same route. Students first need to observe and measure the problem (print depth, soil type, vegetation loss) before they can design a solution. The task asks them to identify why this is a problem for the animal (mud, exposure, energy loss) before jumping to building.

## Suggested Materials

- Dry leaves and plant clippings
- Small twigs and branches
- Straw or dried grass
- Cardboard strips or newspaper
- Wood chips (if available)
- Ruler or measuring tape
- Optional: sandbox or outdoor soil patch for testing

## Estimated Time

K-2: 30–40 minutes (10 min observation, 15–20 min building, 10 min testing)

3-5: 60–75 minutes (10 min measuring/documentation, 20–25 min material planning and building, 15–20 min testing and data collection, 10 min reflection)

## Why This Works for Teachers

This task directly addresses NGSS 3-5-ETS1-1 (Ask and define problems) by having students observe a real animal behavior, identify a design problem, and test a solution using natural materials—all rooted in authentic outdoor evidence.