Force And Motion

Physical Science | Engineering Design Process

Engineering Challenge

Visible Elements in Photo

- A student in a red shirt mid-jump over an orange cone placed on grass
- A white line or tape on the ground (likely a starting or landing marker)
- Outdoor school grounds with a building, parked cars, and other students in the background
- Flat, open grassy area suitable for movement activities
- The cone positioned as a low obstacle to clear

Reasonable Inferences

- From the cone and jump setup: Students need a way to measure, practice, or improve their jumping distance or height over a barrier (the cone represents an obstacle or target).
- From the white line on ground: A baseline or measurement system is needed to track performance (distance traveled, consistency, etc.).
- From outdoor setting with multiple observers: This is a group activity where fair testing and repeatability matter—suggesting a need to design fair test conditions or measurement tools.

Engineering Task

K-2 Challenge:

Design a jumping game where you make a safe obstacle out of blocks, sticks, or rope that kids can jump over. Test it: Can everyone jump over it? Is it too hard or too easy? Fix your obstacle so it's just right for your friends.

3-5 Challenge:

Design a fair jumping-distance test station that measures how far each student can jump over a 12-inch-tall obstacle. Your design must include: (1) a clearly marked starting line, (2) a consistent obstacle height, (3) a way to measure distance to the nearest inch, and (4) instructions so any student can run the test the same way every time. Test with at least 5 students and record results. Can you improve the design so measurements are more accurate?

EDP Phase Targeted

Ask / Define Problem

This photo shows an existing activity (jumping) but no clear measurement or testing system. Students must first identify what's hard to track fairly (Is the jump consistent? How do we measure? Is the obstacle the right height?), then design a solution. This makes Ask the natural entry point—before imagining or building anything, they need to define what problem their design solves.

Suggested Materials

- Foam cones or PVC pipes (obstacles)
- Measuring tape or yard stick

- Chalk or tape (ground markers)
- Clipboard and paper (record sheet)
- Blocks or stacked boxes (adjustable height)

Estimated Time

40–60 minutes (single session for K-2; may extend to two 30-minute sessions for 3-5 with multiple test trials and design iteration)

Why This Works for Teachers

This task directly addresses NGSS ETS1.A (defining and delimiting engineering problems) by asking students to identify variables that affect fair testing and fairness in measurement—core practices in both physical science and engineering.