THE STANDARD

Distance & Potential Energy

Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.

ANCHORING PHENOMENON

The Paused Roller Coaster

Video of a roller coaster cart clicking its way up the first hill, then pausing right at the top. No movement. No motor. Just a cart sitting still, ninety feet in the air. A second later it drops, and the rest of the ride happens without any motor at all. Every loop, every hill, all of it powered by something that was set up while the cart sat still at the top. Students will keep circling back to this all week.

DRIVING QUESTION

"Where is the energy when the cart is paused, and why is it enough to power the whole rest of the ride?"

INVESTIGATIVE 1

Two Magnets That Won't Touch

Two ring magnets on a vertical pencil, both with the same pole facing up. The top magnet floats above the bottom one with a visible gap. Press the top magnet down toward the bottom and it pushes back harder the closer it gets. Let go and it jumps back up. Use this one to sharpen the lens the anchor is pushing on: stored energy lives in the arrangement, and changing the arrangement changes how much is stored.

DRIVING QUESTION

"Why does it get harder to push the magnets together, and where does that effort go?"

INVESTIGATIVE 2

The Balloon and the Hair

A balloon rubbed on a head of hair, held near someone's arm. As the balloon gets closer to the arm hairs, the hairs start to lift toward it. No contact yet. The closer the balloon, the more the hairs rise. Same kind of arrangement-changes-stored-energy idea as the anchor, only now the interaction is electric and the system is balloon-and-hair.

DRIVING QUESTION

"Why does the hair start moving before the balloon touches it, and what changes about the system as the balloon gets closer?"