THE STANDARD

Kinetic Energy Transfer

Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.

ANCHORING PHENOMENON

The Bike That Won't Stay Moving

A cyclist on a flat, paved road stops pedaling. No brakes. No hill. No wind. The bike slows down anyway and eventually stops. Nothing pushed back on it that students can easily see. The kinetic energy clearly went somewhere, but where? Students will keep returning to this one because it feels like it should keep rolling forever.

> **DRIVING QUESTION**
> *"If nothing is pushing back on the bike, why does it slow down at all?"*

INVESTIGATIVE 1

Brake Discs Get Hot Fast

A car coming to a hard stop produces brake discs hot enough to glow on race cars and warm enough to feel on a regular car after a long downhill. Same kind of energy transfer as the bike, but concentrated and visible. Use this one to sharpen the "energy goes somewhere measurable" lens the anchor is pushing on.

> **DRIVING QUESTION**
> *"If brakes get hot enough to glow, how much of the car's kinetic energy is becoming thermal energy?"*

INVESTIGATIVE 2

The Pendulum That Slowly Dies

A pendulum released from one side swings high, then a little less high, then a little less high. Over many swings, the arc shrinks until the bob barely moves. The energy isn't disappearing in one dramatic moment. It's leaking out swing by swing. Same kind of change as the anchor, only in slow motion.

> **DRIVING QUESTION**
> *"Where does the energy go on each swing, and what would the pendulum do without air or pivot friction?"*