THE STANDARD

Kinetic Energy

Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

ANCHORING PHENOMENON

The Slow Truck vs. the Fast Bicycle

A video of a delivery truck rolling into a parked car at 5 mph. A scratch and a dent. Then a video of a cyclist hitting a parked car at 25 mph. The bike is destroyed, the rider goes flying, and the parked car has serious damage. The truck weighs 50 times more than the bike, but the bike did way more damage. That contradiction is what students will keep circling back to all week.

> DRIVING QUESTION
>
> *"How can a small fast thing do more damage than a huge slow thing?"*

INVESTIGATIVE 1

Wiffle Ball or Tennis Ball

Two balls of about the same size. A hollow wiffle ball weighs around 23 grams. A tennis ball weighs about 58 grams. Toss each one at a foam block on a table at roughly the same speed. The tennis ball knocks the block further every time. Same speed, different mass, different damage. Use this one to sharpen the mass-side of what the anchor is asking. Speed is held constant. Mass is doing the work.

> DRIVING QUESTION
>
> *"If you keep the throwing speed the same, how much does the ball's weight change what happens when it hits something?"*

INVESTIGATIVE 2

Same Ball, Different Speeds

One tennis ball. Roll it at a stack of cups at a slow walking pace. A few cups topple. Now throw it at the same stack at a hard throwing speed. The whole stack explodes. Same ball, same mass, two very different results. Use this to sharpen the speed-side of what the anchor is asking. Mass is held constant. Speed is doing the work, and it's doing a lot of it.

> DRIVING QUESTION
>
> *"When you throw the same object faster, how much more energy does it carry?"*