

## THE STANDARD

# Energy & Collisions

"Ask questions and predict outcomes about the changes in energy that occur when objects collide."

 ANCHORING PHENOMENON

## One Marble Stops, the Other Takes Off

Roll a marble into a line of still marbles sitting tight against each other. The rolling marble nearly stops. But the marble at the far end takes off, all by itself. Nothing touched it directly. Roll the first marble faster and the far one flies away faster. Same marbles every time, but the energy keeps showing up at the other end.

## DRIVING QUESTION

*"How does the marble at the far end take off when the marble that hit the line stopped?"*

 INVESTIGATIVE 1

### Crash the Carts

Send one toy car rolling into a parked car, first slow, then fast. The parked car gets knocked forward every time, and the harder crash sends it farther. Use this to sharpen the anchor's big question: the energy of the moving car transfers into the still car, and a faster crash hands off more energy.

## DRIVING QUESTION

*"What happens to the parked car when a faster car crashes into it, and why?"*

 INVESTIGATIVE 2

### Listen for the Energy

Drop a ball onto a hard floor from low, then high. The higher drop hits faster, bounces higher, AND makes a louder bang. Same setup as the anchor, but now 4th graders hear something. Some of the crash energy turns into sound, which is a clue that energy spreads into more than just the bounce.

## DRIVING QUESTION

*"Why does the ball make a louder sound when it hits the floor faster?"*