Energy on the Move

Use observations to support an energy-transfer claim.

MS-PS3-5 "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..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each observation about motion or temperature. Circle each claim about where energy was transferred, then draw an arrow showing the transfer direction.

Following Energy Changes

1. During a lab, Maya rolled a cart toward a second cart that was still. Before they touched, the first cart moved quickly and the second cart did not move. After the bump, the first cart moved more slowly, while the second cart rolled forward. The first cart's kinetic energy decreased because its motion decreased. The second cart's kinetic energy increased because it went from still to moving. These motion changes are evidence that energy moved from the first cart to the second cart during the collision.

2. A bicycle brake test gives another kind of evidence. A wheel spins, then brake pads press against its rim. The wheel soon slows and stops. A temperature sensor shows that the brake pads and rim are warmer after the test than before it. The wheel's kinetic energy decreases as it slows. Energy is transferred from the moving wheel to the pads and rim, increasing their thermal energy. The warmer parts are evidence for that transfer, even though the energy cannot be seen moving.

3. An energy inventory helps organize an argument. It lists where energy is observed before and after an event. For the cart collision, the first cart has more kinetic energy before the bump, and the second cart has more kinetic energy afterward. For the brake test, the wheel has kinetic energy before braking, and the pads and rim have higher thermal energy afterward. These inventories do not calculate an amount of energy. Instead, they connect observations to a claim: a change in an object's kinetic energy means energy was transferred to or from that object.

2 ANSWER WITH EVIDENCE

Use the passage

1. What claim does the cart collision support about energy transfer?

2. Which motion observations show that the first cart lost kinetic energy and the second cart gained kinetic energy?

3. Use the brake test to state a claim, name the evidence, and explain the energy transfer.

4. How does an energy inventory help support a claim about kinetic energy changing?

3 YOUR TURN

Your own words

Create an energy-transfer argument about a different event. Include a claim, at least two before-and-after observations, and an arrow or sentence that shows where energy was transferred. Do not use calculations.

ANSWER KEY

Energy on the Move

GRADES 6-8 · MS-PS3-5

PART 1 · READ AND MARK

Underline each observation about motion or temperature. Circle each claim about where energy was transferred, then draw an arrow showing the transfer direction. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What claim does the cart collision support about energy transfer?	**Energy was transferred from the first cart to the second cart during the collision.**
2	Which motion observations show that the first cart lost kinetic energy and the second cart gained kinetic energy?	**The first cart moved more slowly after the bump, and the second cart changed from still to rolling forward.**
3	Use the brake test to state a claim, name the evidence, and explain the energy transfer.	**Energy was transferred from the moving wheel to the brake pads and rim. The wheel slowed and the pads and rim became warmer, showing that the wheel lost kinetic energy while the pads and rim gained thermal energy.**
4	How does an energy inventory help support a claim about kinetic energy changing?	**It compares observations before and after an event and shows where energy changes occurred, which supports a claim that energy was transferred.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Claim: Energy was transferred to the cart because its kinetic energy increased. Before release, the cart was still and the rubber band was stretched. After release, the cart rolled forward and the rubber band was less stretched. The cart gained kinetic energy, so energy was transferred from the rubber band to the cart.

Accept equivalent claims that correctly connect a kinetic energy increase or decrease to energy transferred to or from the object. Student arguments should use observable before-and-after evidence, such as motion or temperature, and should show a correct transfer direction.