

Collision Energy Trail

Trace contact forces and changing motion.

5.3.d “when objects collide, the contact forces transfer energy and can change objects’ motion; and”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Read the passage. Underline words that show objects touching or pushing, circle each change in motion, and number each statement that tells where energy is transferred.

Motion at the Moment of Contact

- ① At recess, Maya rolls a soccer ball across the blacktop. The ball moves toward a backpack lying in its path. When the ball hits the backpack, the two objects touch and push on each other. This contact force transfers energy from the moving ball to the backpack. The ball slows, while the backpack slides forward a short distance.
- ② Later, Maya taps a still tennis ball with a racket. Before the collision, the ball is not moving. During contact, the racket pushes the ball and transfers energy to it. The tennis ball moves away quickly. The ball also pushes the racket. Both objects exert contact forces on each other, and the racket may slow a little during the collision.
- ③ At home, Maya sends a toy car down a ramp toward another toy car at rest. They collide nose to nose. Energy transfers through the contact forces between their bumpers. The first car may slow or stop. The second car begins moving. How much each motion changes depends on such things as speed, mass, and how the objects bounce or bend.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What two objects collide on the blacktop? What happens to each object's motion after the collision?

2 What transfers energy from the soccer ball to the backpack?

3 Describe the tennis ball's motion before and after the racket touches it.

4 Name one thing that can affect how much the toy cars' motions change when they collide.

3 YOUR TURN _____ Your own words

Invent a collision between two objects. Write two sentences that tell how the objects move before the collision and how contact forces transfer energy and change their motion.

PART 1 • READ AND MARK

Read the passage. Underline words that show objects touching or pushing, circle each change in motion, and number each statement that tells where energy is transferred. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What two objects collide on the blacktop? What happens to each object's motion after the collision?	A soccer ball collides with a backpack. The ball slows, and the backpack slides forward.
2	What transfers energy from the soccer ball to the backpack?	The contact force when the objects touch and push on each other transfers energy.
3	Describe the tennis ball's motion before and after the racket touches it.	Before the collision, the tennis ball is still. After the racket touches it, the ball moves away quickly.
4	Name one thing that can affect how much the toy cars' motions change when they collide.	Speed, mass, or how the objects bounce or bend can affect the motion changes.

PART 3 • YOUR TURN (SAMPLE ANSWER)

A rolling marble hits a block that is still. Contact forces transfer energy to the block, so the marble slows and the block moves forward.

Accept any realistic collision that names two objects, describes motion before contact, and explains a motion change caused by contact forces transferring energy. Students may describe one object slowing, stopping, starting, speeding up, or changing direction.