

Forces Change Motion

Read how unbalanced forces affect a skateboard's motion.

SC.6.P.13.3 "Investigate and describe that an unbalanced force acting on an object changes its speed, or direction of motion, or both."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each phrase that names a force. Circle each phrase that tells how the skateboard's speed or direction changes, then write 1, 2, or 3 beside each event where forces are unbalanced.

A Ride Through the Park

- ① At a skate park, a rider rolls straight across a smooth concrete area. While the rider moves at a steady speed in a straight line, the forces are balanced. Gravity pulls downward, the ground pushes upward, and small forces such as air resistance do not cause a change in motion. Balanced forces can act on a moving object, but their combined effect is zero. The rider keeps the same speed and direction until another force has an unequal effect.
- ② Near the edge, the rider presses one foot against the ground to start moving faster. The push from the foot is stronger than the forces slowing the skateboard, so the forces are unbalanced. The skateboard speeds up in the same direction. Later, the rider leans and the trucks press the wheels sideways against the curved ramp. This unbalanced sideways force changes the skateboard's direction. It can turn even if its speed stays nearly the same. A force does not need to make an object stop to change its motion.
- ③ At the bottom of the ramp, the rider rolls into a patch of rough pavement. Friction from the rough surface acts opposite the skateboard's motion. Because this friction is greater than the other forces pushing forward, the forces are unbalanced. The skateboard slows down. If the rider eventually stops, forces still act: gravity and the ground force may balance, while the skateboard has zero speed. Whether an object is moving or stopped, an unbalanced force can change its speed, its direction, or both at once.

2 ANSWER WITH EVIDENCE Use the passage

1 At the beginning of the ride, how is the skateboard moving, and what kind of forces are acting on it?

2 What unbalanced force makes the skateboard speed up near the edge? What change does it cause?

3 How does the sideways force from the curved ramp change the skateboard's motion?

4 Why does the skateboard slow down on the rough pavement?

3 YOUR TURN Your own words

In two panels, draw a soccer ball moving straight, then show it after a player's kick changes its motion. Use arrows to show the direction before and after, then write two sentences that identify the unbalanced force and explain whether speed, direction, or both changed.



PART 1 • READ AND MARK

Underline each phrase that names a force. Circle each phrase that tells how the skateboard's speed or direction changes, then write 1, 2, or 3 beside each event where forces are unbalanced. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	At the beginning of the ride, how is the skateboard moving, and what kind of forces are acting on it?	It moves at a steady speed in a straight line, and the forces are balanced.
2	What unbalanced force makes the skateboard speed up near the edge? What change does it cause?	The rider's push against the ground is stronger than the slowing forces. It makes the skateboard speed up.
3	How does the sideways force from the curved ramp change the skateboard's motion?	It changes the skateboard's direction, causing it to turn. Its speed can stay nearly the same.
4	Why does the skateboard slow down on the rough pavement?	Friction from the rough surface acts opposite the skateboard's motion and is greater than the forces pushing it forward, so the forces are unbalanced.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Panel 1 shows a soccer ball moving right with a short arrow, and Panel 2 shows a foot kicking it up-right with a longer arrow. The player's kick is an unbalanced force, so the ball changes direction and speeds up.

Accept equivalent descriptions of balanced forces causing no change in speed or direction, and unbalanced forces causing a speed change, direction change, or both. For the open task, accept any accurate before-and-after motion model with a clearly identified unbalanced force.