

Push, Mass, Motion

Read how net force and mass affect an object's motion.

5.3.c "changes in motion are related to net force and mass;"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each sentence that explains what a net force can do to motion. Circle words that compare the mass of objects or the size of forces.

Forces at Work

- ① A force is a push or pull. When forces on an object are balanced, they cancel, so the net force is zero. The object's motion does not change. A soccer ball resting on grass stays still until a player kicks it. If the ball is already rolling at a steady speed in a straight line, balanced forces would let it keep moving that way.
- ② At a skate park, two students push an empty cart in opposite directions. One push is stronger, so the forces do not balance. The net force points in the direction of the stronger push. The cart speeds up in that direction. A net force can also slow a moving object or change its direction. Any of these changes is a change in motion.
- ③ Mass affects how much an object's motion changes when the same net force acts on it. Imagine pushing an empty wagon and a wagon loaded with books with equal pushes. The empty wagon has less mass, so it gains speed more quickly. The loaded wagon has more mass, so its speed changes less. To give the loaded wagon the same change in motion, you would need a larger net force.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What happens to an object's motion when the forces on it are balanced?

2 In the skate park example, which way does the cart speed up? Explain why.

3 With equal pushes, which wagon gains speed more quickly? Use mass in your answer.

4 What would be needed to give the loaded wagon the same change in motion as the empty wagon?

3 YOUR TURN _____ Your own words

Write two sentences about two different objects that receive equal net forces in the same direction but have different masses. Predict which object's motion changes more, and explain why.

PART 1 • READ AND MARK

Underline each sentence that explains what a net force can do to motion. Circle words that compare the mass of objects or the size of forces. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What happens to an object's motion when the forces on it are balanced?	The net force is zero, so the object's motion does not change.
2	In the skate park example, which way does the cart speed up? Explain why.	It speeds up in the direction of the stronger push because the net force points that way.
3	With equal pushes, which wagon gains speed more quickly? Use mass in your answer.	The empty wagon gains speed more quickly because it has less mass.
4	What would be needed to give the loaded wagon the same change in motion as the empty wagon?	A larger net force would be needed.

PART 3 • YOUR TURN (SAMPLE ANSWER)

I push an empty shopping cart and a cart filled with cans with equal net forces toward the door. The lighter empty cart speeds up more, while the heavier cart changes speed less because it has more mass.

Accept any realistic pair of objects receiving equal net forces in the same direction. The response should state that the object with less mass has a greater change in motion, or that the object with more mass has a smaller change in motion.