

Push Power Puzzle

Compare how the same force affects objects with different masses.

SC.5.P.13.3 "Investigate and describe that the more mass an object has, the less effect a given force will have on the object's motion."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline the conditions that were kept the same, circle words that show which wagon had more mass, and draw an arrow to the result for the heavier wagon.

A Wagon Pull Test

- ① At the school garden, Maya tested two empty wagons on the same smooth path. One wagon had a crate of books taped inside, so it had more mass. Maya used a spring scale to pull each wagon with the same steady force. Both wagons started at rest. The lighter wagon sped up more quickly and rolled farther during the same short pull.
- ② Force is a push or pull that can change an object's motion. In this test, the pull was kept the same, but the masses were different. More mass means more matter is being moved. Because the heavier wagon had more mass, that same pull caused a smaller change in its motion. It gained speed more slowly than the lighter wagon.
- ③ The result does not mean a heavy object cannot move. A stronger force can make it change motion more. For a fair comparison, keep the force, starting motion, and surface alike while changing only mass. If one wagon holds books and the other holds more books, predict that the wagon with more books will speed up less when both receive the same pull.

2 ANSWER WITH EVIDENCE Use the passage

1 What conditions did Maya keep the same for both wagons?

2 How did the lighter wagon move differently from the heavier wagon during the same short pull?

3 Why did the same pull cause a smaller change in motion for the heavier wagon?

4 Two wagons receive the same pull. One holds more books. Predict which wagon will speed up less, and explain why.

3 YOUR TURN Your own words

Invent a fair test using two objects with different masses. In 2 or 3 sentences, name what has more mass, tell what you will keep the same, and predict how the objects will move when the same force is used.

PART 1 • READ AND MARK

Underline the conditions that were kept the same, circle words that show which wagon had more mass, and draw an arrow to the result for the heavier wagon. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What conditions did Maya keep the same for both wagons?	She used the same smooth path and the same steady pulling force. Both wagons also started at rest.
2	How did the lighter wagon move differently from the heavier wagon during the same short pull?	The lighter wagon sped up more quickly and rolled farther. The heavier wagon gained speed more slowly.
3	Why did the same pull cause a smaller change in motion for the heavier wagon?	The heavier wagon had more mass, so the same force had less effect on its motion.
4	Two wagons receive the same pull. One holds more books. Predict which wagon will speed up less, and explain why.	The wagon with more books will speed up less because it has more mass, so the same force causes a smaller change in its motion.

PART 3 • YOUR TURN (SAMPLE ANSWER)

I would pull two identical toy cars across the same floor with the same spring scale force, but put washers on one car so it has more mass. The car with washers would gain speed less quickly because the same force has less effect on its motion.

Accept equivalent descriptions that identify a controlled comparison and state that the object with more mass changes motion less when the force is the same. For the open response, accept any reasonable objects, as long as mass changes while the force and other test conditions stay the same.