Forces in Motion

Read how pushes, pulls, and friction change motion.

P.3.6 "Students will demonstrate an understanding of magnets and the effects of pushes, pulls, and friction on the motion of objects. Compare and contrast the effects of different strengths and directions of forces on the motion of an object..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline one push and one pull in the passage. Circle the words that show how the car moves in each example.

Nia Tests a Toy Car

1. At the science table, Nia rolls a toy car with a small steel washer taped to its front. She puts a magnet ahead of the car. The magnet pulls the washer, so the car rolls toward it. When she moves the magnet behind the car, its pull is in the other direction. A magnet can change the car's motion without touching it.

2. On the same smooth floor, Nia gives the car a gentle push, then a stronger push from the same spot. The stronger push makes the car start moving faster. Next, she gives it the same gentle push on carpet. The car stops sooner because friction between the wheels and carpet slows it down. To compare the floors fairly, she keeps the car and push the same.

3. Nia also tests two bar magnets on a desk. When the north ends face each other, the magnets push apart. When a north end faces a south end, they pull together. This push or pull is a magnetic force. A cabinet door can use a magnet to help keep it shut. That magnet pulls on a steel piece inside the door.

2 ANSWER WITH EVIDENCE

Use the passage

1. How does moving the magnet from ahead of the car to behind it change the direction of its pull?

2. On the smooth floor, how does the stronger push change the car's motion compared with the gentle push?

3. With the same gentle push, why does the car stop sooner on carpet than on the smooth floor?

4. How is the force between two north ends different from the force between a north end and a south end?

3 YOUR TURN

Your own words

Plan a test to find out how changing a ramp's height affects how far a toy car rolls on the floor after it comes down the ramp. Tell what you will change, what you will keep the same, what you will measure, and what you predict.

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PART 1 · READ AND MARK

Underline one push and one pull in the passage. Circle the words that show how the car moves in each example. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How does moving the magnet from ahead of the car to behind it change the direction of its pull?	**The magnet pulls the car toward the front when it is ahead and toward the back when it is behind.**
2	On the smooth floor, how does the stronger push change the car's motion compared with the gentle push?	**The stronger push makes the car start moving faster.**
3	With the same gentle push, why does the car stop sooner on carpet than on the smooth floor?	**Friction between the wheels and carpet slows the car down.**
4	How is the force between two north ends different from the force between a north end and a south end?	**Two north ends push apart, but a north end and a south end pull together.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I will raise one end of the ramp with one book, then with two books. I will use the same car, ramp, and floor each time. I will let the car go from the top without pushing it. I will measure how far it rolls on the floor before it stops. I predict the car will roll farther when the ramp is higher.

For the plan, accept any fair test that changes ramp height, keeps the car and floor the same, measures distance on the floor, and includes a prediction. Predictions may differ if the student gives a reasonable explanation.