How Far Will It Roll?

Use test results to explore pushes and friction.

P.2.6 "Students will demonstrate an understanding of how the motion of objects is affected by pushes, pulls, and friction on an object. Conduct a structured investigation to collect, represent..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline what Maya kept the same in her test, and circle the two distances for gentle pushes in the table so you can compare the floors.

Maya's Toy Car Test

1. Maya tests how far a toy car rolls on tile and on a rug. She starts the same car at the same line each time. She pushes straight ahead with either a gentle push or a strong push. She measures the distance the car rolls before it stops.

HOW FAR MAYA'S CAR ROLLED

Floor	Push	Distance (cm)
Tile	Gentle	50
Tile	Strong	90
Rug	Gentle	20
Rug	Strong	40

2. The table shows Maya's results. On each floor, a strong push makes the car roll farther than a gentle push. With the same kind of push, the car rolls farther on tile. The rug rubs against the wheels more than tile does. This rubbing is called friction. Friction slows the car down.

3. Maya wants to make a toy road where the car can roll far. She could put a smooth sheet over the rug to try to reduce friction. She could test the car again with the same push and measure its travel. Friction can also make heat. Rub your palms together and feel them get warmer.

2 ANSWER WITH EVIDENCE

Use the passage

1. With a gentle push, how much farther did the car roll on tile than on the rug?

2. On tile, how did a strong push change the car's travel compared with a gentle push?

3. What can rubbing your palms together show about friction?

3 YOUR TURN

Your own words

A student wants to move a lunch box across a desk with less friction. Write three sentences: tell one change you would make, how you would test it fairly, and how you would improve it if it did not help.

How Far Will It Roll?

PART 1 · READ AND MARK

Underline what Maya kept the same in her test, and circle the two distances for gentle pushes in the table so you can compare the floors. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	With a gentle push, how much farther did the car roll on tile than on the rug?	**The car rolled 30 cm farther on tile.**
2	On tile, how did a strong push change the car's travel compared with a gentle push?	**The strong push made the car roll 40 cm farther, from 50 cm to 90 cm.**
3	What can rubbing your palms together show about friction?	**Friction can make heat, which makes your palms feel warmer.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would add small wheels under the lunch box so it rolls instead of slides. I would use the same pull each time and measure how far it moves before and after adding the wheels. If it did not move farther, I would try larger wheels and test again.

For Part 3, accept a workable change that may reduce friction, a fair before-and-after test, and a specific change to try if the first design does not help.