Track the Motion

Use position readings to explain and predict a toy car's motion.

P.6.6.5 "Conduct investigations to predict and explain the motion of an object according to its position, direction, speed, and acceleration."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the words that set the car's starting position and direction. Beside each later row of the table, write the distance traveled since the previous row to check for changes in speed.

Maya's Toy Car Test

1. At the science table, Maya sets a toy car at the top of a gently sloping, straight track. The track points east. She tapes a ruler beside it and calls the release point zero centimeters. Her partner starts a timer as Maya lets go without pushing. They plan to record the car's position every second.

2. Each time the timer beeps, Maya reads the ruler mark closest to the car's front bumper. Her partner writes the readings in the table. The timer beeps at equal intervals, so changes in position show how far the car traveled during each second. They keep the track at the same tilt throughout the test.

MAYA'S POSITION READINGS

Time (seconds)	Position (centimeters from start)
0	0
1	2
2	5
3	9
4	14

3. On a flat track, another group's car travels the same distance each second, so its speed stays steady. A bicycle that gains speed is accelerating. Maya's group can use a pattern in its own readings to predict a later position, then run another trial to test that prediction. A bump could change the motion.

2 ANSWER WITH EVIDENCE

Use the passage

1. At 3 seconds, where is the car relative to its start, and which way is it moving? Explain using the readings.

2. During which one-second interval does the car travel farthest? How far does it travel?

3. Is the car's speed changing during the four seconds? Use the distance traveled in each second to explain.

4. If the same pattern continues for one more second, predict the car's position at 5 seconds. Explain your prediction.

3 YOUR TURN

Your own words

Design a follow-up test in which a toy car rolls from a flat surface onto a rough towel. Tell how you would measure its position and direction at equal times, predict how its speed would change on the towel, and explain how your measurements would test your prediction.

ANSWER KEY

Track the Motion

GRADE 6 · P.6.6.5

PART 1 · READ AND MARK

Underline the words that set the car's starting position and direction. Beside each later row of the table, write the distance traveled since the previous row to check for changes in speed. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	At 3 seconds, where is the car relative to its start, and which way is it moving? Explain using the readings.	**It is 9 centimeters east of the start and moving east. Its position readings increase along the east-pointing track.**
2	During which one-second interval does the car travel farthest? How far does it travel?	**From 3 to 4 seconds, it travels 5 centimeters.**
3	Is the car's speed changing during the four seconds? Use the distance traveled in each second to explain.	**Yes. It travels 2, 3, 4, and 5 centimeters in successive seconds, so it is speeding up.**
4	If the same pattern continues for one more second, predict the car's position at 5 seconds. Explain your prediction.	**It would be 20 centimeters from the start. The distance traveled each second increases by 1 centimeter, so it would travel 6 more centimeters.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I will mark a straight path east, place a ruler beside it, and record the car's position every second after one gentle push. I predict the car will slow when it reaches the rough towel. I will subtract each reading from the next to find how far it moved during each second. If those distances get smaller on the towel, the data support my prediction.

For the marking job, expect interval distances of 2, 3, 4, and 5 centimeters. For the follow-up test, accept another stated direction or measurement tool if the plan uses equal time intervals and connects smaller distances on the towel to slowing.