Cart Force Lab

Compare how pushes and gravity change a cart's motion.

P.3.6.1 "Compare and contrast the effects of different strengths and directions of forces on the motion of an object (e.g., gravity, polarity, attraction, repulsion, or strength)."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two places where a change in a force changes the cart's motion. Circle the words that tell which way the cart moves in those places.

Which Way Will It Go?

1. Mira sets a toy cart on a smooth floor. She gives it a small push toward the door. The cart rolls a short way before it stops. Next, she starts it from the same spot and gives it a stronger push toward the door. It rolls farther before it stops. Both pushes point in the same direction, but the stronger push changes the cart's motion more.

2. Now Leo starts the cart rolling toward the door at the same speed for each try. He gives it a gentle push toward the window, the opposite way. The cart slows but keeps rolling toward the door. With a stronger push toward the window, the cart stops, then rolls toward the window. Both pushes act against the cart's first motion.

3. Mira places a steep ramp on the floor. Gravity pulls the cart toward Earth. On the ramp, that pull helps a cart rolling downhill speed up. If Mira gives the cart a push uphill, gravity acts against its uphill motion. A gentle push sends it partway up before it rolls back down. A stronger uphill push sends it farther up before it rolls back down.

2 ANSWER WITH EVIDENCE

Use the passage

1. How do the small and strong pushes toward the door affect how far the cart rolls?

2. How does the cart move after Leo's gentle push toward the window? How is its motion different after his stronger push?

3. Compare what gravity does to the cart when it rolls downhill and when it moves uphill.

4. Mira pushes a cart toward the door, but Leo pushes one that is rolling toward the door in the opposite direction. How does the direction of each push affect the cart?

3 YOUR TURN

Your own words

Imagine a ball rolling across a playground. In three sentences, compare a gentle push in the ball's direction with a push strong enough to send it back the other way. Explain how the pushes' directions and strengths affect its motion.

ANSWER KEY

Cart Force Lab

GRADE 3 · P.3.6.1

PART 1 · READ AND MARK

Underline two places where a change in a force changes the cart's motion. Circle the words that tell which way the cart moves in those places. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How do the small and strong pushes toward the door affect how far the cart rolls?	**The small push makes the cart roll a short way. The stronger push makes it roll farther.**
2	How does the cart move after Leo's gentle push toward the window? How is its motion different after his stronger push?	**After the gentle push, it slows but keeps rolling toward the door. After the stronger push, it stops and rolls toward the window.**
3	Compare what gravity does to the cart when it rolls downhill and when it moves uphill.	**Gravity helps the cart speed up downhill. It acts against the cart's motion uphill.**
4	Mira pushes a cart toward the door, but Leo pushes one that is rolling toward the door in the opposite direction. How does the direction of each push affect the cart?	**Mira's push sends the cart toward the door. Leo's push acts against the cart's motion toward the door, slowing it or sending it toward the window.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

A gentle push in the ball's rolling direction makes it move faster. A much stronger push in the opposite direction slows it until it stops. As that strong push continues, the ball rolls back the other way.

Accept answers that correctly compare both strength and direction. For the open task, the strong opposite push must stop and reverse the ball's motion.