

Forces at Work

Trace how different forces affect objects in everyday situations.

6.7.A "identify and explain how forces act on objects, including gravity, friction, magnetism, applied forces, and normal forces, using real-world applications;"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each force name in the passage. Then write the numbers 1 through 5 beside the first sentence that explains how **gravity**, **friction**, **magnetism**, **applied force**, and **normal force** act, using that order.

Maya's Garden Cart

- ① At a community garden, Maya rolls a supply cart along a level path. Her hands provide an applied force that pushes the cart forward. Gravity pulls the cart downward toward Earth. The path pushes upward on the wheels with a normal force. On level ground, the upward normal force can balance gravity, so the cart does not move up or down. These forces act even while Maya changes the cart's speed. The cart speeds up when the forward push is greater than forces that oppose its motion.
- ② At the end of the path, Maya guides the cart down a short ramp. Gravity now has a component along the ramp, so it tends to make the cart roll downhill. If Maya pulls uphill on the handle, her applied force can slow it. Friction between the wheels and ramp also acts opposite the cart's motion. The ramp still exerts a normal force perpendicular to its surface, supporting the cart rather than pulling it along the ramp.
- ③ Near a metal shed, Maya parks the cart on a ramp and sets a wheel brake. Without the brake, gravity would tend to pull the cart downhill. The brake creates static friction at the wheel, acting uphill to oppose that tendency and keep the cart at rest. Maya also uses a magnet to collect loose steel screws. Magnetism pulls the screws toward the magnet without direct contact. It does not pull plastic leaves because ordinary plastic is not attracted to the magnet.

2 ANSWER WITH EVIDENCE Use the passage

1 What force do Maya's hands provide on the level path, and what does that force do to the cart?

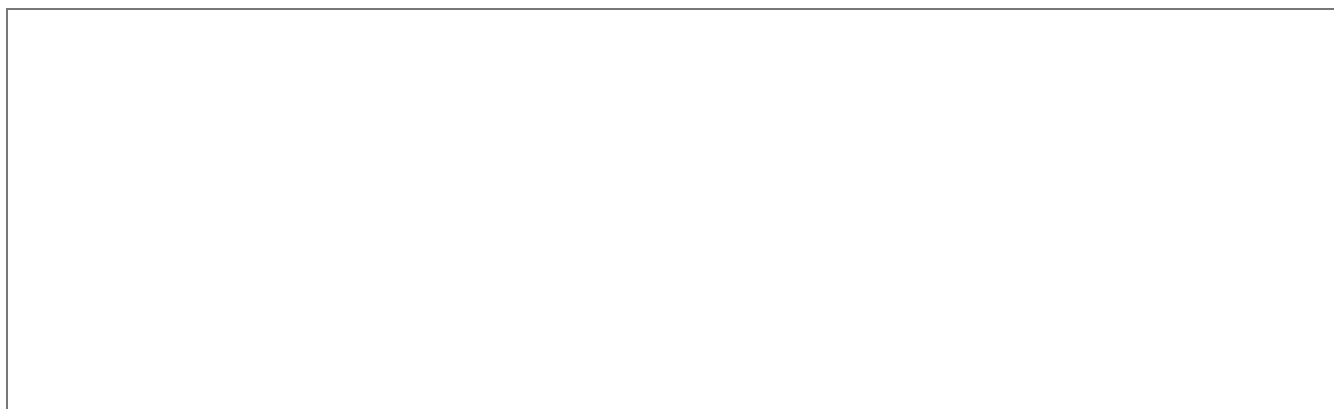
2 Why does the cart not move up or down while it is on the level path?

3 On the ramp, how do gravity, Maya's uphill pull, and friction each affect the cart's motion?

4 Explain how the wheel brake keeps the parked cart still and how the magnet collects steel screws.

3 YOUR TURN Your own words

Draw a steel toy car on a level floor as a hand pushes it toward a magnet. Add and label arrows for gravity, normal force, friction, applied force, and magnetic force, then write two sentences explaining how the forces act on the car.



PART 1 • READ AND MARK

Underline each force name in the passage. Then write the numbers 1 through 5 beside the first sentence that explains how **gravity**, **friction**, **magnetism**, **applied force**, and **normal force** act, using that order. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What force do Maya's hands provide on the level path, and what does that force do to the cart?	Maya's hands provide an applied force that pushes the cart forward.
2	Why does the cart not move up or down while it is on the level path?	The path's upward normal force can balance the downward force of gravity.
3	On the ramp, how do gravity, Maya's uphill pull, and friction each affect the cart's motion?	Gravity tends to make the cart roll downhill. Maya's uphill applied force can slow it, and friction acts opposite the cart's motion.
4	Explain how the wheel brake keeps the parked cart still and how the magnet collects steel screws.	The brake creates static friction that acts uphill to oppose gravity's downhill tendency. Magnetism pulls steel screws toward the magnet without direct contact.

PART 3 • YOUR TURN (SAMPLE ANSWER)

A sketch of a hand pushing a steel toy car toward a magnet has arrows labeled applied force right, magnetic force right, friction left, gravity down, and normal force up. The hand and magnet act forward, friction opposes motion, and the floor's normal force balances gravity on level ground.

Accept equivalent force arrows and explanations when their directions match the stated level-floor situation. Students should show that friction opposes motion, gravity acts downward, normal force acts upward, and magnetism acts on the steel car.