

Push, Pull, Roll

Track how forces and machines change motion.

3.2 "The student will investigate and understand that the direction and size of force affects the motion of an object. Key ideas include multiple forces may act on an object; the net force on an object determines how an object moves..."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each push or pull in the passage. Circle words that tell which way a force acts or an object moves, so you can trace how forces affect motion.

Soil Bags on the Move

- ① At the school garden, Mia pulls a wagon full of soil bags. Her pull is a force, a push or pull that can change motion. When she pulls toward the shed, the wagon rolls toward the shed. A stronger pull can make it speed up more. If Mia pulls gently, the loaded wagon may move slowly or not move at all.
- ② Soon, Leo pushes the wagon from behind while Mia pulls from the front. Both forces point toward the shed, so they work together. The wagon's net force is the overall force after all pushes and pulls are considered. Because the forces work in the same direction, the net force is toward the shed, and the wagon speeds up.
- ③ At the shed, a pulley helps Mia lift a soil bag. She pulls down on the rope, but the pulley changes the direction of her force and raises the bag. A ramp lets Leo roll the wagon upward with less force over a longer distance. A wheelbarrow is a compound machine. Its wheel and axle and its handles, which act as a lever, work together to carry soil.

2 ANSWER WITH EVIDENCE Use the passage

1 How does the direction of Mia's pull affect the wagon?

2 Leo pushes and Mia pulls toward the shed. What is the wagon's net force direction, and why?

3 How does the pulley change Mia's force when she lifts the soil bag?

4 How does the ramp help Leo, and what makes a wheelbarrow a compound machine?

3 YOUR TURN Your own words

In Panel 1, draw an object with two force arrows acting on it. Label each force, label the net force, and write one sentence telling how the object moves. In Panel 2, draw a simple or compound machine doing a job. Label how it changes the size or direction of a force, and write one sentence.



PART 1 • READ AND MARK

Underline each push or pull in the passage. Circle words that tell which way a force acts or an object moves, so you can trace how forces affect motion. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	How does the direction of Mia's pull affect the wagon?	When Mia pulls toward the shed, the wagon rolls toward the shed.
2	Leo pushes and Mia pulls toward the shed. What is the wagon's net force direction, and why?	The net force is toward the shed because both forces act in the same direction.
3	How does the pulley change Mia's force when she lifts the soil bag?	Mia pulls down on the rope, and the pulley changes that force so the bag moves up.
4	How does the ramp help Leo, and what makes a wheelbarrow a compound machine?	The ramp lets Leo roll the wagon up with less force over a longer distance. A wheelbarrow combines a wheel and axle with handles that act as a lever.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Panel 1 labels: large push right, small push left, net force right. Sentence: The cart moves right because the net force points right. Panel 2 labels: pull down, flag moves up. Sentence: The fixed pulley changes a downward pull so the flag rises.

Accept accurate student-created examples with two forces, a correctly labeled net force, and motion in the net-force direction. In Panel 2, accept a simple or compound machine that correctly changes the direction or size of a force.