Name _____ Date _____

Balanced and Unbalanced Forces: Why a Soccer Ball Stops

Directions: Read about Nia's soccer ball. Then answer each question.

Why the Ball Stopped

Nia kicked a soccer ball across a flat, grassy field. The ball rolled fast at first. Then it slowed down and stopped. Why?

A push or a pull is a **force**. Nia's kick was a force that got the ball moving. Once the ball left her foot, nothing pushed it forward. But the grass rubbed against the ball, and the air pushed against it too. Forces like these that work against motion are called **friction**. Friction slowed the ball until it stopped. The ball did not run out of force. A moving ball does not carry force inside it.

Unbalanced forces change the way an object moves. They can make it start, stop, speed up, slow down, or turn. **Balanced** forces do not change the way an object moves. An object that is sitting still stays still. An object that is moving keeps going at the same speed in the same direction.

1. What made the soccer ball start to move?

A. The ball pushing itself forward
B. The grass pulling it forward
C. The air rubbing against the ball
D. The push of Nia's kick

2. Why did the ball slow down and stop?

A. The air pushed it forward faster and faster.
B. Friction from the grass and air pushed against its motion.
C. The ball ran out of force.
D. Nia's kick pulled it back toward her.

3. Use the word bank to finish the sentences about a tug-of-war.

Word bank
unbalanced • balanced • gravity • friction

Two teams hold a rope that is not moving. They pull in opposite directions. If both teams pull just as hard, the rope stays still. The forces on it are _____. If one team pulls harder, the rope moves toward that team. Now the forces are _____.

4. Before Nia kicked it, the ball sat still on the grass. Which sentence best describes the forces on it then?

A. The forces were unbalanced, so it stayed still.

B. Friction was pushing it forward.

C. The forces were balanced, so it stayed still.

D. The ball was full of force, waiting to be kicked.

5. Jalen pulls a wagon that is already rolling. He pulls it forward just as hard as friction pushes back on it. What happens to the wagon?

A. It rolls backward.

B. It speeds up.

C. It slows down and stops.

D. It keeps rolling at the same speed.

6. Nia rolls the same ball, just as hard, across a smooth gym floor. It rolls much farther than it did on the grass. What most likely explains this?

A. There is less friction on the smooth floor than on the grass.

B. The gym has no air inside it.

C. The gym floor pushes the ball forward.

D. The ball has more force inside it in the gym.

7. Which of these shows unbalanced forces changing an object's motion?

A. A book sits still on a desk.

B. Two teams pull a rope just as hard, and it stays still.

C. A goalie's hands stop a moving soccer ball.

D. A wagon keeps rolling at the same speed.

8. What would happen if no grass or air pushed against Nia's rolling ball?

A. It would keep rolling at the same speed.

B. It would start rolling backward.

C. It would roll faster and faster.

D. It would stop anyway, because it would run out of force.