Name: _____ **Date:** _____

Answer Key: Sonic’s Slopes: High-Speed Motion and Position Lab for 2nd Grade

Rising scientists gain mastery over displacement and speed by analyzing complex patterns of movement and predicting where a racer lands.

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1. An astronaut walks 5 steps forward on the Moon, then walks 5 steps backward. Where is the astronaut standing now?

Answer: A) In the exact same spot they started

This demonstrates displacement. If you return to your starting point, your change in position is zero, even if you walked a long way.

2. A blue race car travels 10 miles in 1 minute. A red race car travels 5 miles in 1 minute. The blue car has a higher _____.

Answer: B) Velocity

Velocity describes how fast something is moving in a certain direction. Since the blue car went further in the same amount of time, it is faster.

3. True or False: If a skateboarder is slowing down as they go uphill, they are experiencing acceleration.

Answer: A) True

In physics, acceleration isn't just speeding up; it is any change in motion, including slowing down or changing direction.

4. A marble is rolling across a flat table. If no one touches it and the table never ends, why might it eventually stop?

Answer: C) Friction between the marble and table slows it down

Friction is a force that acts against motion. Analyzing why objects change speed is a key part of kinematics.

5. To describe exactly where a toy robot is in a room, you need to know its distance from a wall and its _____.

Answer: B) Direction

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Position and displacement are vectors, which means they require both a number (distance) and a direction (like North or Left).

6. True or False: A bumblebee flying in circles at the exact same speed is accelerating.

Answer: A) True

Because the bee is changing direction to fly in a circle, its velocity is changing. Any change in velocity is acceleration.

7. Two squirrels move from the same tree to a bird feeder. Squirrel A runs in a straight line. Squirrel B zigs and zags. Which squirrel had a shorter 'displacement'?

Answer: B) Both have the same displacement

Displacement only looks at the starting point and the ending point. Since both started at the tree and ended at the feeder, their displacement is identical.

8. If a soccer ball is kicked and moves 2 meters every second, after 5 seconds the ball will have traveled _____ meters.

Answer: C) 10 meters

Using the relationship between velocity and time (2m/s * 5s), we calculate a total change in position of 10 meters.

9. You are watching a paper boat float down a river. Which of these would mean the boat is accelerating?

Answer: B) The boat turns left around a rock

Acceleration occurs when an object speeds up, slows down, or changes direction. Turning around a rock is a change in direction.

10. True or False: If you know an object's velocity, you know both its speed and which way it is headed.

Answer: A) True

Velocity is a vector quantity that combines speed (how fast) and direction (where).