Name: _____ **Date:** _____

Answer Key: Why Don't Fast Trains Feel Fast? 6th Grade Kinematics Quiz

Analyze the mechanics of motion by calculating the velocity of animals and predicting the acceleration of maglev trains in various travel scenarios.

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1. A Peregrine Falcon dives with a constant velocity of 90 meters per second. If it maintains this motion for 3 seconds, what is its total displacement?

Answer: B) 270 meters

Displacement is calculated by multiplying velocity by time (90 m/s * 3 s = 270 meters).

2. An Olympic sprinter reaches a top speed of 12 m/s starting from rest (0 m/s) in exactly 4 seconds. Their average acceleration is _____ m/s^2.

Answer: C) 3

Acceleration is the change in velocity (12 - 0 = 12) divided by the time taken (4 seconds), resulting in 3 m/s^2.

3. If a honeybee flies 5 meters forward and then 5 meters backward to its starting point, its total displacement is 10 meters.

Answer: B) False

Displacement measures the change in position from start to finish. Since the bee returned to the start, its total displacement is 0 meters.

4. A Maglev train travels at a constant velocity of 120 km/h. Why is its acceleration considered zero during this period?

Answer: B) Because there is no change in its speed or direction

Acceleration is defined as the rate of change of velocity; if velocity remains constant, acceleration must be zero.

5. To find the average velocity of a migrating whale, you must divide the total displacement by the _____.

Answer: C) Total Time

Velocity is a measure of displacement over time; without the time interval, the rate cannot be determined.

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6. In kinematics, an object that is slowing down is experiencing a form of acceleration.

Answer: A) True

Acceleration refers to any change in velocity, including speeding up, slowing down (negative acceleration), or changing direction.

7. A skateboarder starts at 2 m/s and increases their velocity to 10 m/s over 2 seconds. What is the rate of change in their motion?

Answer: A) 4 m/s^2

Change in velocity is 8 m/s (10 - 2). Dividing 8 m/s by 2 seconds gives an acceleration of 4 m/s^2.

8. A vector quantity, such as velocity, differs from a scalar quantity because it includes both magnitude and _____.

Answer: B) Direction

In kinematics, vectors require a direction (like 'North') to fully describe the motion, unlike scalars which only have a value.

9. If a drone travels 100 meters North and then 50 meters South, what is the magnitude of its final displacement from the starting point?

Answer: B) 50 meters

Displacement is the straight-line distance from start to end; 100m North minus 50m South leaves the drone 50m North of the start.

10. A car traveling at a constant 60 mph around a sharp circular curve has an acceleration of zero.

Answer: B) False

Because velocity includes direction, changing direction (turning a curve) means the velocity is changing, which requires acceleration.