Name _____

# Inertia Answer Key

1. Inertia is the property of a body due to which it resists any change in its state of rest or motion. For example, when a car suddenly stops, the passengers tend to jerk forward due to inertia.

2. $a = F/m = 60\ N / 15\ kg = 4\ m/s^2$

3. The principle of equilibrium states that an object is in equilibrium when the net force acting on it is zero, i.e., the object is at rest or moving at a constant speed in a straight line.

4. The net force = 200 N (right) - 120 N (left) = 80 N to the right

5. The value of acceleration due to gravity on Earth's surface is approximately $9.81\ m/s^2$.

6. Weight = mass x gravity = $50\ kg \times 9.81\ m/s^2 = 490.5\ N$

7. Distance is a scalar quantity that represents the interval between two points in space, while displacement is a vector quantity that represents the shortest distance from the initial to the final position of a point. Thus, displacement includes both the distance and direction.

8. The man's displacement is the hypotenuse of a right triangle with sides of 5 km and 3 km. Using the Pythagorean theorem, displacement = $\text{sqrt}((5\ km)^2 + (3\ km)^2) = 5.83\ km$, in the northeast direction.

9. Impulse is the product of the force applied to an object and the time period over which it is applied. It equals the change in momentum of the object. For example, when playing tennis, the longer the racket is in contact with the ball, the greater the impulse and thus the greater the ball's change in momentum.

10. Change in momentum (impulse) = Force x Time = $20\ N \times 3\ s = 60\ kg \cdot m/s$