

Pt. Yadram Secondary Public School
Class-9 (Physics)
Worksheet: How Force Affects Motion (Ch-6)

1. Fill in the blanks:

- a) Force is a push or pull on an object that can change its state of motion or _____.
- b) The SI unit of force is _____.
- c) Net force is zero when forces acting on an object are _____ (balanced / unbalanced).
- d) Inertia of an object depends directly on its _____.

2. Short Answer Questions:

- a) Define inertia. Give one everyday example of inertia of rest.
- b) State Newton's first law of motion.
- c) What happens to a moving car when the driver applies sudden brakes? Explain using Newton's First Law.
- d) State Newton's Second Law of Motion in words and write its mathematical formula.

3. Conceptual Questions:

- a) Why do fielders in cricket pull their hands backward while catching a fast-moving ball?
- b) A book sits at rest on a wooden table. Identify all the forces acting on the book and explain why it remains stationary.
- c) Distinguish between balanced and unbalanced forces using a neat two-column table. Include their effects on motion.

4. Basic Numerical Problems:

- a) A constant force acts on a mass of 5 kg for 2 seconds. It increases the velocity of the object from 3 m/s to 7 m/s. Find the magnitude of the applied force.
- b) Which would require a greater force: accelerating a 2 kg mass at 5 m/s^2 or a 4 kg mass at 2 m/s^2 ? Show your calculations.
- c) A car of mass 1000 kg is travelling at 20 m/s. How much force is needed to bring it to a complete stop over a distance of 50 m?

5. Answer the following questions:

- a) Explain Newton's Third Law of Motion using the propulsion of a rocket. Clearly identify the action and reaction forces involved.
- b) Action and reaction forces are equal in magnitude and opposite in direction. Why don't they cancel each other out to keep systems motionless?

6. Numerical Problems:

- a) A constant horizontal force F acts on an object of mass m_1 producing an acceleration of 10 m/s^2 . The same force acts on mass m_2 , producing an acceleration of 20 m/s^2 . What acceleration would F produce if both masses m_1 and m_2 were tied together?
- b) A bullet of mass 20 g is moving horizontally with a velocity of 150 m/s strikes a stationary wooden block and comes to rest in 0.02 seconds. Calculate:
 - (i) The distance of penetration of the bullet into the block.
 - (ii) The magnitude of the retarding force exerted by the wooden block on the bullet.