

CLASS 9

SCIENCE

NCERT SOLUTIONS

NCERT Solutions for Class 9 Science Chapter 4: Describing Motion Around Us – Free PDF Download

Chapter 4 of Class 9 Science Exploration is Describing Motion Around Us, the first physics chapter of the book. It builds up the mathematical language used to describe how objects move — distance, displacement, speed, velocity, acceleration, and graphs of motion — along with uniform circular motion. These Class ...

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Chapter 4 of Class 9 Science *Exploration* is Describing Motion Around Us, the first physics chapter of the book. It builds up the mathematical language used to describe how objects move — distance, displacement, speed, velocity, acceleration, and graphs of motion — along with uniform circular motion. These Class 9 Science Chapter 4 solutions are also useful as quick revision notes before exams.

Distance and Displacement

Distance is the total path length covered by a moving object, always positive. **Displacement** is the shortest straight-line distance from the initial to the final position, along with direction — it can be zero even if distance travelled is not (e.g. a runner returning to the starting point).

Speed and Velocity

Speed = distance / time (a scalar quantity, magnitude only). **Velocity** = displacement / time (a vector quantity, with direction). **Uniform velocity** means equal displacements in equal time intervals in a fixed direction; average velocity = total displacement / total time.

Acceleration

Acceleration is the rate of change of velocity with time. It is positive when velocity increases, negative (retardation/deceleration) when velocity decreases, and zero for uniform velocity.

Graphs of Motion

Position–time graphs: the slope gives velocity; a straight line means uniform velocity, a curve means changing (non-uniform) velocity. **Velocity–time graphs:** the slope gives acceleration, and the area under the graph gives the displacement covered.

Kinematic (Equations of Motion)

Using the graphical method (from a velocity–time graph), three key equations relate initial velocity (u), final velocity (v), acceleration (a), time (t), and displacement (s):

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

Uniform Circular Motion

When an object moves at constant speed along a circular path, it is in **uniform circular motion**. Even though speed is constant, velocity keeps changing because direction changes continuously — so the motion is accelerated, directed toward the centre of the circle.