



1

#### What is Projectile Motion?















### **Projectile Motion Overview**

Projectile motion refers to a specific type of two-dimensional movement.

It is characterised by:

- No acceleration along one axis.
- A constant, non-zero acceleration along the other axis.

A projectile can be defined as:

An object travelling freely under the influence of gravity within a two-dimensional space.

Common examples of projectiles:

- Tossing a ball.
- Diving off a platform.
- Hitting a baseball.





4

Projectiles are launched or thrown, and after launch, the only force acting on them is gravity (assuming air resistance is neglected).

## Key Features of Projectile Motion

The constant, non-zero acceleration experienced in one direction is due to Earth's gravitational pull, with g=10m/s<sup>2</sup>

# **Calculations in Projectile Motion**

- Horizontal and vertical motions are independent of each other.
- Each direction must be analysed separately using kinematic equations.
- If launched at any angle (except directly upward), a projectile will follow a parabolic path.
- The resultant velocity at any point is found by combining the horizontal and vertical velocity components.
- Trigonometric methods can be used to calculate the resultant velocity and direction.

Important Terms to Remember

### Time of Flight:

The total duration the projectile remains in the air.

For symmetrical projectile paths, the time to reach the highest point is half of the total flight time.

### Maximum Height:

The peak point where the projectile's vertical velocity becomes zero. It occurs halfway through the total time of flight.

### Range:

The horizontal distance covered by the projectile from launch to landing.