

Pre-Content/content Post-Content	Learning outcomes/Objectives	
	General	Specific
<u>Pre Content</u> Students must be aware of scalar and vector quantities, distance, displacement, speed, velocity and acceleration. <u>Content</u> Instantaneous speed, average speed, instantaneous acceleration, average acceleration, uniform acceleration, s-t, v-t, a-t graphs, equations of method using graph and calculus method, free fall, relative velocity. <u>Post Content</u> Numerical problems of: Position, velocity, acceleration, relative velocity using formulae and equations of motion. Express the given motion in s-t, v-t and a-t graphs.	Students will be able to: express the motion of an object in terms of fundamental and derived quantities. solve numerical problems to calculate position, velocity and acceleration of the body. draw and interpret the graphs for uniform and non-uniform motion. apply the kinematic equations of motion in various situation based problems.	Students will be able to: - describe the motion of an object traveling in a straight line or in one dimension. - define position, displacement, distance, speed and velocity. - define the concepts of instantaneous velocity and average velocity. - define the concepts of instantaneous acceleration and average acceleration. - calculate the position, velocity, and acceleration of an object moving in a straight line. - describe motion of an object in a straight line with constant acceleration with the help of s-t, v-t and a-t graphs. - derive equations of motion for a uniformly accelerated motion using graph and calculus method. - describe free fall in one dimension where it undergoes constant acceleration due to gravity. - describe relative motion and hence calculate relative velocity of an object with respect to the other.

Home Work /Assignments:

- NCERT exercise discussed in the class is given as the home task.
- Assignment worksheets are given at the end of the chapter.

Teacher's Activity	Student's Activity	Teacher's observation and Remedial
Teacher will help students recall the concepts of distance, displacement, speed, velocity and acceleration. provide the mathematical expressions of the above stated quantities to solve numerical problems. draw graphs for various types of motion with the active participation of students. facilitate the derivation of equations of motion graphically. introduce the calculus method to derive the same set of equations of motion. Annexure 2(A) demonstrate the example of free fall in the class. explain the concept of relative motion and relative velocity.	Students will participate in the discussion and will answer the questions posed by the teacher. apply the formulae to calculate position, velocity and acceleration. analyse the given question to represent various types of motion graphically. interpret the v-t graph for uniformly accelerated motion and deduce the three equations of motion under the guidance of the teacher. derive the equations of motion using the method of calculus. Annexure 2(a) perform the activity to calculate their reaction time calculate relative velocity of a moving object with respect to another moving object.	

Teaching Aids: Active inspire, ICR, Power point presentation

Methodology/Innovative: Enquiry, Discussion, and Demonstration

Interdisciplinary Links: Mathematics (Graphical representation, differentiation, integration).

Annexure 2(A), 2(a) - Know your Reaction Time

Subject	Physics
Class	XI
Chapter/Unit	Motion in a Straight Line
Topic	Reaction Time
Time	10 minutes
Nature of Activity	Pair Work

What will I learn(Learning Outcome)?

To experimentally calculate their reaction time.

Skills: Applying, Analyzing and Creating

What I have to do?

To calculate the reaction time of an individual with the help of a freely falling body.

What do I require?

Ruler (range up to 15 cm or more)

What do I need to know?

When a situation demands our immediate action, it takes some time before we really respond. Reaction time is the time a person takes to observe, think and act. For example, if a person is driving and suddenly a boy appears on the road, then the time elapsed before he slams the brakes of the car is the reaction time.

➤ **Teacher's Activity**

Teacher will

1. ask students to recall the motion of a freely falling body having constant acceleration due to gravity equal to the value 9.8 ms^{-2}
2. make pairs of the students and will explain the steps of the activity.
3. ensure that each participant of the pair performs the activity on his/her own.

How will I proceed?

➤ **Student's Activity**

1. Take a ruler and ask your friend to drop it vertically through the gap between your thumb and forefinger.
2. After you catch it, find the distance d travelled by the ruler by reading the graduation on the scale.
3. Calculate the reaction time using three equations of motion.
4. Repeat the procedure by swapping the role and responsibility. (i.e. you drop the ruler and your partner will catch it)

What have I observed?

S. No.	Student's Name	Distance Travelled (cm)	Reaction Time (s)
1			

What have I learnt?

Reaction time depends on complexity of the situation and on an individual and it can be calculated using _____ body.

What am I curious to learn?

- Let us try to prove Galileo's law of odd numbers i.e. "The distances traversed, during equal intervals of time, by a body falling from rest, stand to one another in the same ratio as the odd numbers beginning with unity [namely, 1: 3: 5: 7.....]."

Let me evaluate myself

1. What is meant by reaction time?

2. What is meant by free fall?

3. Plot v-t and x-t graph depicting the motion of a freely falling body.

4. Derive an expression for the final velocity of a freely falling body.

5. A ball is thrown from a cliff 25 meter high calculate the time it takes to hit the ground and also its final speed.
