



STATE COUNCIL OF EDUCATIONAL RESEARCH & TRAINING  
TELANGANA, HYDERABAD.

**ACADEMIC YEAR 2020-21**

Class: IX

LEVEL-2

Subject: Physical Science

Name of the lesson: MOTION. Topic: Instantaneous Speed

WORKSHEET: 13

**KEY CONCEPTS**

- Instantaneous speed
- Measure of instantaneous speed from Distance-time graph

**LEARNING OUTCOMES**

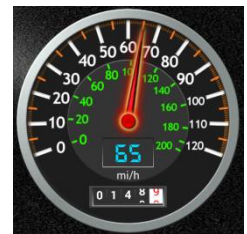
students can,

1. Explain instantaneous speed.
2. Provide examples of instantaneous speed measurements.
3. Measure instantaneous speed from distance-time graph.

❖ **INSTANTANEOUS SPEED:**

Average speed and average velocity can describe the motion of an object during period of time.

When a car or bike travels, you might have noticed that its speed changes continuously. You can tell the speed of that vehicle at any instant by looking at its speedometer. This speed is called instantaneous speed.



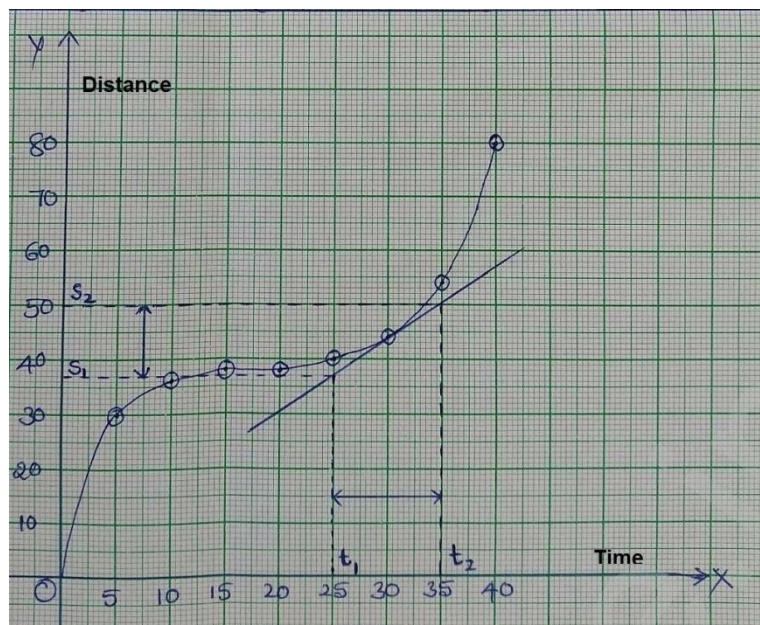
- **The speed of an object at a particular instant of time is called Instantaneous speed.**

❖ **Now let us learn how to find the average speed and instantaneous speed based on the distance-time graph.**

The distances travelled at different instances of time by a student on a bicycle are given below in a tabular form. Observe the distance-time graph drawn based on these values.

Time In sec	5	10	15	20	25	30	35	40
Distance in metre	30	36	38	38	40	44	54	80

$$\text{Average Speed of the student} = \frac{\text{Total Distance}}{\text{Total time}} = \frac{80\text{m}}{40\text{s}} = 2\text{m/s}$$



Now let us find the speed of the student at the instant of 30sec.

- Instantaneous speed of the student at 30s =  $\frac{s_2 - s_1}{t_2 - t_1}$   

$$= \frac{50 - 37}{35 - 25}$$

$$= \frac{13}{10} = 1.3 \text{ m/s.}$$

**Instantaneous speed of student at 30sec = 1.3m/s.**

**> NOTE:**

- The slope of the distance-time graph (or) curve gives instantaneous speed of the object at that instant, if the slope is large, speed is high
- The slope of the curve at any point on it can be found by drawing a tangent to the curve at that point.

**ASSESSMENT**

- How instantaneous speed is different when compared to average speed?
- Write a few instances of measuring instantaneous speed in daily life?
- Which of the following can be known by Speedometer of a vehicle ( )  
 A) Average speed    B) Average velocity  
 C) Instantaneous speed    D) distance
- The average speed of student between 5sec and 25sec from the above graph is ( )  
 A) 0.35m/s    B) 0.5m/s    C) 0.25m/s    D) 5m/s

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