

1. Speed

Speed is the distance travelled by an object in one second.

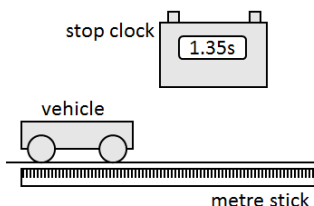
Average Speed

The average speed of an object is the average for the whole journey (total distance travelled divided by time taken).

e.g. Travelling 70km in 2 hours by car

Experiment

Measure distance travelled with a ruler. Measure time taken to travel with a stop clock.



$$\text{Average speed} = \frac{\text{distance}}{\text{total time taken}}$$

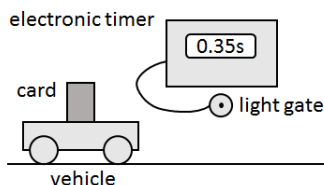
Instantaneous Speed

The instantaneous speed of an object is its speed at one particular point during the journey.

e.g. Looking at the speedometer in the car

Experiment

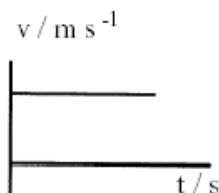
Measure length of card with a ruler. Measure time taken for card to pass through light gate with an electronic timer.



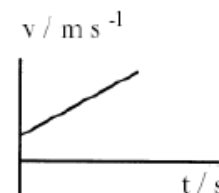
$$\text{instantaneous speed} = \frac{\text{length of card}}{\text{time taken to break the beam}}$$

2. Velocity-time Graphs

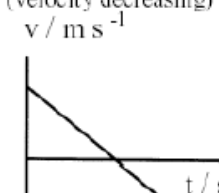
Constant velocity



Constant positive acceleration
(velocity increasing)



Constant deceleration
Constant negative acceleration
(velocity decreasing)



1. MOTION 1

N5 Past Paper HW
 2014 – Sec 2 Q10(b)
 2015 – Sec 2 Q8(a)
 2016 – MC Q15, Sec 2 Q10(a)ii(b)

3. Displacement

The displacement of an object can be calculated from the area under a velocity-time graph.

Example

An object starts from rest and reaches a velocity of 4ms⁻¹ after 2s. It continues at 4ms⁻¹ for a further 4s, before decelerating to rest after another 4s. Calculate the object's displacement from its starting point.

Displacement = Area under graph

This graph can be split into two triangles and one rectangle

Displacement = area under OA + area under AB + area under BC

Displacement = (½ x b x h) + (l x b) + (½ x b x h)

Displacement = (0.5 x 2 x 4) + (4 x 4) + (0.5 x 4 x 4)

Displacement = (4) + (16) + (8)

Displacement = 28m

