

Our Dynamic Universe

Motion — equations and graphs

Use of appropriate relationships to solve problems involving displacement, velocity and acceleration for objects moving with constant acceleration in a straight line.

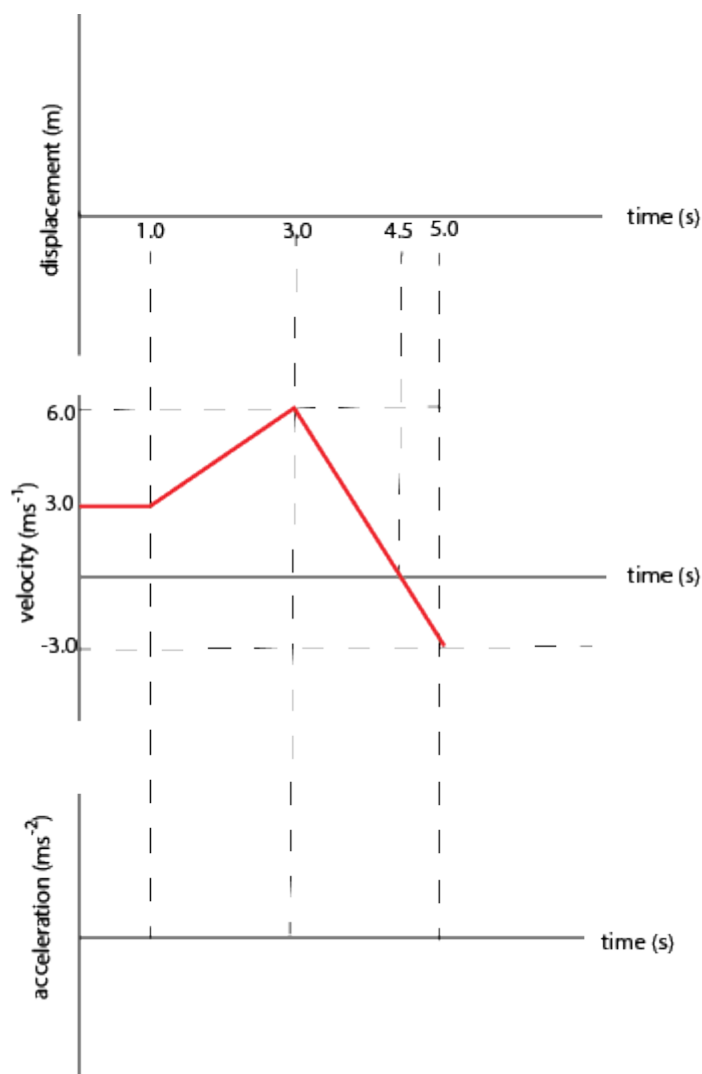
Interpretation and drawing of motion-time graphs for motion with constant acceleration in a straight line, including graphs for bouncing objects and objects thrown vertically upwards.

Awareness of the interrelationship of displacement, velocity and acceleration-time graphs.

Calculation of displacement, velocity and acceleration from appropriate graphs.

All graphs restricted to constant acceleration in one dimension, inclusive of change of direction.

1. The velocity time graph for a vehicle is shown in the middle diagram below. Copy out the whole diagram and draw the corresponding displacement and acceleration time graphs.



2. A ball is dropped and bounces twice until it is caught. Draw the velocity and acceleration time graphs from the moment it is dropped until it is caught. Remember the ball loses energy on each bounce so does not leave the ground with the same speed at which it struck the ground.
3. A ball is thrown upwards and arrives back at the throwers hand after 5.0 s. Draw labelled corresponding, displacement, velocity and acceleration graphs.
4. A helicopter is 20.0 m above from the ground and rising at a speed of 3.0 ms^{-1} when the pilot drops a parcel. How long will it take the parcel to hit the ground after it is released?