MR SULLY UNFOLDS PHYSICS

Acceleration and velocity–time graphs

AQA 4.5.6.1.5
Forces · Paper 2
Foundation & Higher

Name _____ Class _____ Date _____

Acceleration is how quickly velocity changes. Velocity–time graphs show acceleration and distance travelled.

KEY EQUATIONS

$a = \Delta v \div t$
acceleration (m/s²), change in velocity (m/s), time (s)

$v^2 - u^2 = 2as$
final velocity v, initial velocity u (m/s), distance s (m)

On a velocity–time graph: **gradient = acceleration**; **area under the line = distance travelled** (Higher). Free fall near Earth: about 9.8 m/s².

Section A · Recall and calculate

Grade 4–5

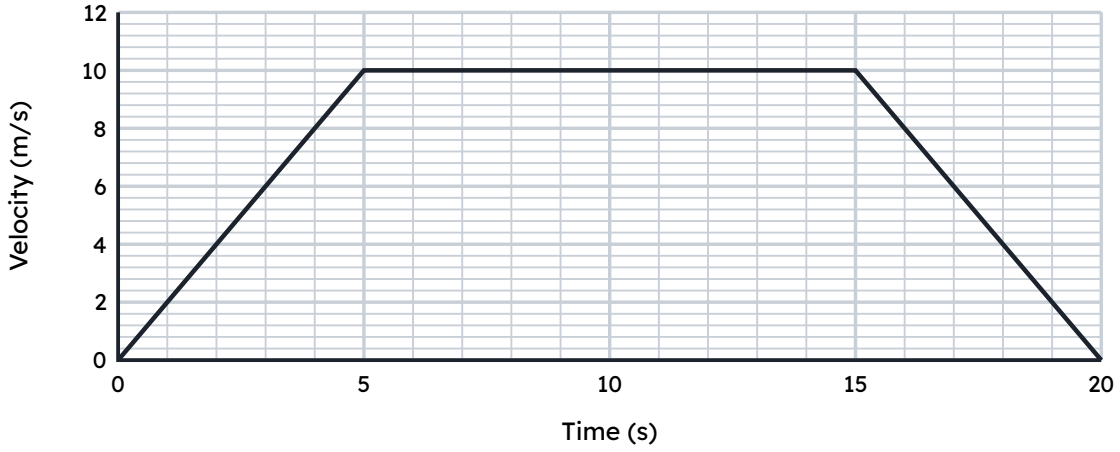
1 A car speeds up from 0 to 12 m/s in 4 s. Calculate its acceleration. [2]

2 What does a negative acceleration mean? [1]

Section B · Read the graph

Grade 5–6

3 The velocity–time graph shows a short bus journey.



a Calculate the acceleration in the first 5 s. [2]

b Describe the motion between 5 s and 15 s. [1]

c Calculate the total distance travelled. (Higher) [3]

Section C · Stretch

Grade 7+

4 A train accelerates uniformly from 4 m/s to 16 m/s over 200 m. Calculate its acceleration. [3]

5 A stone is dropped from rest down a well and falls 20 m. Calculate its speed just before it hits the water. Ignore air resistance. ($a = 9.8\ m/s^2$) [3]

Exam-style question

AQA style

6 A cyclist slows down from 8 m/s to rest in 4 s.

a Calculate her deceleration. [2]

b Calculate the distance she travels while slowing down. [2]

c Sketch the velocity–time graph for this part of the journey. [2]

Total: _____ / 21

How confident am I?

	Not yet	Nearly	Got it
I can use $a = \Delta v \div t$	☐	☐	☐
I can read acceleration and distance from a velocity–time graph	☐	☐	☐
I can use $v^2 - u^2 = 2as$	☐	☐	☐