

# Acceleration 1

Essential GCSE Physics 11.1

GCSE

A Level

Complete the table with the correct values. Each row represents a separate situation.

Acceleration ( $\text{m/s}^2$ )	Velocity ( $\text{m/s}$ ) after ... s						
	0.0	1.0	2.0	3.0	4.0	5.0	6.0
3.0	0.0	3.0	<input type="text"/>	9.0	<input type="text"/>	<input type="text"/>	18
5.0	0.0			<input type="text"/>		<input type="text"/>	<input type="text"/>
7.0	3.0			<input type="text"/>	<input type="text"/>		<input type="text"/>
−25.0	30.0			<input type="text"/>	<input type="text"/>		<input type="text"/>
<input type="text"/>	10.5		13.5		<input type="text"/>		
<input type="text"/>	45		36		27		<input type="text"/>



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# Acceleration 2

## Essential GCSE Physics 11.2

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In 11.1d, what would the velocity be 15 s after the start if the acceleration were maintained?

What is the velocity of an object accelerating at  $5.0 \text{ m/s}^2$  after 15 s having started from rest?

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# Acceleration 3

## Essential GCSE Physics 11.3

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In Q11.1o, at what time does the vehicle come to a stop?

If a vehicle is moving at  $45 \text{ m/s}$  initially,  $36 \text{ m/s}$  after  $2.0 \text{ s}$  and  $27 \text{ m/s}$  after  $4.0 \text{ s}$ , at what time will it come to a stop?

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# Acceleration 4

## Essential GCSE Physics 11.4

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A tennis ball is thrown in the air upwards at  $15 \text{ m/s}$ . If it is accelerating downwards at  $10 \text{ m/s}^2$ , what will its velocity be  $2.0 \text{ s}$  after it is thrown? Let downwards vectors be positive and upwards negative.

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# Motion with Constant Acceleration 2

## Essential GCSE Physics 21.2

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A £5 note is 135 mm long. A friend has a crisp £5 note, and holds the bottom of the note in line with (and between) your thumb and index finger. She drops it, and if you grab it without moving your hand downwards, you are allowed to keep it.

(Acceleration due to gravity  $g = 10 \text{ m/s}^2$ )

How quickly do you have to react to win your prize?

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# Motion with Constant Acceleration 3

Essential GCSE Physics 21.3



The Highway Code assumes that a car with its brakes on fully has an acceleration of  $-6.7 \text{ m/s}^2$ .

## Part A 30 mph braking time

Calculate the time taken to stop a car from 30 mph (13.4 m/s).

## Part B 30 mph braking distance

Calculate the distance taken to stop a car at 30 mph (13.4 m/s).

## Part C 70 mph braking time

Calculate the time taken to stop a car from 70 mph (31 m/s).

## Part D 70 mph braking distance

Calculate the distance taken to stop a car from 70 mph (31 m/s).

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# Motion with Constant Acceleration 4

## Essential GCSE Physics 21.4

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You throw a cricket ball up into the air at  $10 \text{ m/s}$ .

*[Hint: if you take  $u = 10 \text{ m/s}$  then  $a = -10 \text{ m/s}^2$  as the acceleration is in the opposite direction to the initial velocity.]*

### Part A Time elapsed

How much time elapses before it reaches the highest point of its motion?

*[Hint: at the top,  $v = 0$ .]*

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### Part B Highest point

How high does it go?

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# Uniform Accelerated Motion in 1-d 5



## Essential Pre-Uni Physics B3.5

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Assume that any dropped or thrown object accelerates downwards at  $9.8 \text{ m s}^{-2}$ . If a question says that an object is 'dropped' this means that its velocity is zero at the beginning of the motion.

Please give your answers to 2 significant figures. If asked for a velocity or displacement, your answer **MUST** contain a direction in order to be marked as correct. Take the positive direction to be upwards.

An aeroplane cannot take off until it is travelling at  $80 \text{ m s}^{-1}$ . If its acceleration is  $2.5 \text{ m s}^{-2}$ , how much distance does it travel while accelerating from rest to its take-off-speed?

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# Uniform Accelerated Motion in 1-d 9

## Essential Pre-Uni Physics B3.9

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Assume that any dropped or thrown object accelerates downwards at  $9.8 \text{ m s}^{-2}$ . If a question says that an object is 'dropped' this means that its velocity is zero at the beginning of the motion.

Please give your answers to 2 significant figures. If asked for a velocity or displacement, your answer **MUST** contain a direction in order to be marked as correct. Take the positive direction to be upwards.

You want to fire a ball vertically into the air so that it goes 100 m up before coming back down again (its maximum height is 100 m). How fast should you fire it?

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Gameboard:

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# Uniform Accelerated Motion in 1-d 3

## Essential Pre-Uni Physics B3.3

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GCSE



A Level



Assume that any dropped or thrown object accelerates downwards at  $9.8 \text{ m s}^{-2}$ . If a question says that an object is 'dropped' this means that its velocity is zero at the beginning of the motion.

Please give your answers to 2 significant figures. If asked for a velocity or displacement, your answer **MUST** contain a direction in order to be marked as correct. Take the positive direction to be upwards.

### Part A Dropped weight

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How much time does a dropped weight take to fall 120 m down a cliff?

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### Part B Thrown weight

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How much time would the weight take to fall 120 m down the cliff if it was thrown downwards at  $2.5 \text{ m s}^{-1}$ ?

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