

GCSE Combined Science: Trilogy

Worksheet: Speed

TIME 35 min	TOTAL 31 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Speed

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

A student measures the average speed of a toy car as it travels across the floor.

0 1 . 1

Name **two** measuring instruments the student needs.

[2 marks]

0 1 . 2

The car travels 2.0 m in 1.6 s.
Calculate the average speed of the car.
Use the equation:
average speed = distance travelled ÷ time taken

Average speed = m/s

[2 marks]

0 1 . 3

Suggest why the value calculated is an average speed.

.....

.....

[1 mark]

0 2

0 2 . 1

Which list correctly orders these from slowest to fastest?

Tick (✓) **one** box.

Light in a vacuum, sound in air, a car on a motorway, a person walking ☐

A person walking, a car on a motorway, sound in air, light in a vacuum ☐

Sound in air, a person walking, light in a vacuum, a car on a motorway ☐

A car on a motorway, a person walking, sound in air, light in a vacuum ☐

[1 mark]

0 2 . 2

Write down the equation that links distance travelled (s), average speed (v) and time taken (t), rearranged to give the time.

.....

.....

[1 mark]

0 2 . 3

A cyclist travels 600 m at a constant speed of 15 m/s.
Calculate the time taken.

.....

.....

.....

.....

Time = s

[2 marks]

0 3

A delivery van moves at a constant speed of 13 m/s for 50 s.

0 3 . 1

Calculate the distance travelled by the van.

Use the equation:

distance travelled = speed $\times$ time

.....

.....

.....

.....

Distance = m

[2 marks]

0 4

A jogger moves at a constant speed of 4 m/s for 40 s.

0 4 . 1

Calculate the distance travelled by the jogger.

Use the equation:

distance travelled = speed $\times$ time

.....

.....

.....

.....

Distance = m

[2 marks]

0 5

0 5 . 1

Which of these is a typical speed for a person walking?

Tick (✓) **one** box.

0.15 m/s

☐

1.5 m/s

☐

15 m/s

☐

150 m/s

☐

[1 mark]

0 5 . 2

Which of these is a typical value for the speed of sound in air?

Tick (✓) **one** box.

33 m/s

☐

330 m/s

☐

3300 m/s

☐

300 000 000 m/s

☐

[1 mark]

0 5 . 3

A cyclist rides at a constant speed of 6.0 m/s for 45 s.

Calculate the distance travelled by the cyclist.

Use the equation:

distance travelled = speed × time

.....

.....

.....

.....

Distance = m

[2 marks]

0 6

A road sign in France shows a speed limit of 50 km/h.

0 6 . 1

Convert this speed limit into metres per second.

Speed = m/s

[3 marks]

0 7

A student wants to measure the average speed of a trolley as it moves between two light gates on a runway.

0 7 . 1

Describe how the student could use the light gates to measure the average speed of the trolley between them.

[3 marks]

0 7 . 2

Suggest one advantage of using light gates, rather than a hand-operated stopwatch, to measure this time.

[1 mark]

0 8

Priya travels to college. Priya walks 600 m to a bus stop at a speed of 1.5 m/s and then waits 3.0 minutes for the bus. The bus then travels 4.2 km to the college in 9.0 minutes.

0 8 . 1

Calculate the time Priya takes to walk to the bus stop.

.....

.....

.....

.....

Time = s

[2 marks]

0 8 . 2

Calculate Priya's average speed for the whole journey, including the time spent waiting.

.....

.....

.....

.....

.....

Average speed = m/s

[3 marks]

0 8 . 3

The average speed of the bus was 7.8 m/s.

Explain why the speed of the bus must have been greater than 7.8 m/s for some of the journey.

.....

.....

[1 mark]

0 8 . 4

Give a typical speed for a person running.

.....

.....

[1 mark]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Speed · 31 marks

Question 1 (5 marks)

01.1 [2 marks]

Answer: A tape measure (or metre rule) and a stopwatch.

- metre rule / tape measure / ruler (1)
- stopwatch / stopclock / timer (1)

Notes: Allow light gates and a data logger for the second mark.

01.2 [2 marks]

Answer: 1.25 m/s

- $v = 2.0 \div 1.6$ (1)
- 1.25 (m/s) (1)

Notes: Allow 1.3 m/s.

01.3 [1 mark]

Answer: The car's speed is not constant during the journey.

- the speed of the car changes / is not constant during the journey (e.g. it speeds up at the start and slows down at the end) (1)
-

Question 2 (4 marks)

02.1 [1 mark]

Correct: A person walking, a car on a motorway, sound in air, light in a vacuum

02.2 [1 mark]

Answer: $t = \frac{s}{v}$

- $t = s \div v$ (1)

Notes: Allow time = distance $\div$ speed.

02.3 [2 marks]

Answer: 40 s

- $t = 600 \div 15$ (1)
 - 40 (s) (1)
-

Question 3 (2 marks)

03.1 [2 marks]

Answer: 650 m

- $s = 13 \times 50$ (1)
 - 650 (m) (1)
-

Question 4 (2 marks)

04.1 [2 marks]

Answer: 160 m

- $s = 4 \times 40$ (1)
 - 160 (m) (1)
-

Question 5 (4 marks)

05.1 [1 mark]

Correct: 1.5 m/s

05.2 [1 mark]

Correct: 330 m/s

05.3 [2 marks]

Answer: 270 m

- $s = 6.0 \times 45$ (1)
 - 270 (m) (1)
-

Question 6 (3 marks)

06.1 [3 marks]

Answer: 13.9 m/s

- $50 \text{ km/h} = 50\,000 \text{ m in } 3600 \text{ s}$ (1)
- $v = 50\,000 \div 3600$ (1)
- 13.9 (m/s) (1)

Notes: Allow $50 \div 3.6$ for the first two marks.

Question 7 (4 marks)

07.1 [3 marks]

Answer: Measure the gate separation, time the trolley between the gates electronically, then divide distance by time.

- measure the distance between the two light gates using a ruler or metre rule (1)
 - use a timer, started and stopped automatically by the light gates (or a data logger), to record the time taken for the trolley to travel between them (1)
 - average speed = distance between the gates $\div$ time taken (1)
-

07.2 [1 mark]

Answer: They remove human reaction-time error, giving a more accurate measurement.

- light gates remove the effect of human reaction time, giving a more accurate (and more precise) measurement of the time (1)
-

Question 8 (7 marks)

08.1 [2 marks]

Answer: 400 s

- $t = 600 \div 1.5$ (1)
 - 400 (s) (1)
-

08.2 [3 marks]

Answer: 4.3 m/s

- total distance = $600 + 4200 = 4800$ (m) (1)
- total time = $400 + 180 + 540 = 1120$ (s) (1)
- average speed = $4800 \div 1120 = 4.3$ (m/s) (1)

Notes: Allow ECF from the first part.

08.3 [1 mark]

Answer: The bus slowed down or stopped at times, so to average 7.8 m/s it must have gone faster at other times.

- the bus stopped or slowed down at times (e.g. at junctions, traffic lights or bus stops), so it must have travelled faster than the average at other times (1)
-

08.4 [1 mark]

Answer: About 3 m/s.

- 3 m/s (allow 2–5 m/s) (1)
-