

GCSE Combined Science: Trilogy

Worksheet: Velocity

TIME 20 min	TOTAL 21 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Velocity

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.

01

01.1

Which of these is a velocity?

Tick (✓) **one** box.

15 m/s

☐

15 m

☐

15 m/s due south

☐

15 s

☐

[1 mark]

01.2

A parcel on a conveyor belt moves 6.0 m to the right in 4.0 s.
Calculate its average velocity.

Average velocity = m/s

[2 marks]

0 2

0 2 . 1

Which of these is a velocity?

Tick (✓) **one** box.

20 m/s

20 m/s due north

20 m

20 m due north

☐☐☐☐

[1 mark]

0 2 . 2

What is meant by the velocity of an object?

.....

.....

[1 mark]

0 2 . 3

Two trains pass each other on parallel tracks. Each train travels at 30 m/s, but in opposite directions.

Explain why the trains have the same speed but different velocities.

.....

.....

.....

.....

[2 marks]

0 3

A lift moves upwards at a constant 2.5 m/s. Later, the same lift moves downwards at a constant 2.5 m/s.

0 3 . 1

Compare the lift's speed in the two cases.

.....

.....

[1 mark]

0 3 . 2

Compare the lift's velocity in the two cases.

.....

.....

[1 mark]

0 4

A student records the velocity of a lift as -2.0 m/s when it moves downwards and $+1.5 \text{ m/s}$ when it moves upwards.

0 4 . 1

A second student says:
'Since -2.0 is less than $+1.5$, the lift must be moving slower when it goes down than when it goes up.'
Explain why this reasoning is incorrect.

.....

.....

.....

.....

[2 marks]

0 5

A swimmer swims one length of a 50 m pool in 40 s . The swimmer then turns and swims back to the start in 45 s .

0 5 . 1

Calculate the average velocity of the swimmer during the first length. Give the direction.

.....

.....

.....

.....

Average velocity = m/s

[2 marks]

0 5 . 2

Calculate the average speed of the swimmer for the two lengths.

.....

.....

.....

.....

Average speed = m/s

[2 marks]

0 5 . 3

What is the average velocity of the swimmer for the two lengths? Explain your answer.

.....

.....

.....

.....

Average velocity = m/s

[2 marks]

0 6

Table 1 shows the velocity of a car at different times during a short journey along a straight road. A positive velocity means the car is moving forwards; a negative velocity means it is moving backwards.

Table 1

Time in s	0	10	20	30	40
Velocity in m/s	12	12	0	-15	-15

0 6 . 1

Describe the motion of the car between 20 s and 30 s.

.....

.....

[1 mark]

0 6 . 2

At what time does the car change direction?

.....

.....

.....

Time = s

[1 mark]

0 6 . 3

During which 10 s interval is the car’s speed the greatest? Explain your reasoning.

.....

.....

.....

.....

[2 marks]

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: Velocity · 21 marks

Question 1 (3 marks)

01.1 [1 mark]

Correct: 15 m/s due south

01.2 [2 marks]

Answer: 1.5 m/s to the right

- $v = 6.0 \div 4.0$ (1)
- 1.5 (m/s) to the right (1)

Notes: The direction is needed for the second mark.

Question 2 (4 marks)

02.1 [1 mark]

Correct: 20 m/s due north

02.2 [1 mark]

Answer: Its speed in a given direction.

- its speed in a given direction (1)
-

02.3 [2 marks]

Answer: Speed has no direction so both are 30 m/s; velocity includes direction and the directions are opposite.

- speed has no direction, so both trains have a speed of 30 m/s (1)
 - velocity includes direction, and the trains move in opposite directions (1)
-

Question 3 (2 marks)

03.1 [1 mark]

Answer: The speed is the same in both cases (2.5 m/s).

- the speed is the same (2.5 m/s) in both cases (1)

03.2 [1 mark]

Answer: The velocities differ, because the directions (up and down) are opposite.

- the velocity is different in the two cases, because the directions are opposite (even though the magnitudes are equal) (1)

Question 4 (2 marks)

04.1 [2 marks]

Answer: The signs only show direction; comparing magnitudes, 2.0 m/s (down) is actually greater than 1.5 m/s (up).

- the + and – signs show direction only, not size (1)
- the lift's speed when moving down is 2.0 m/s, which is actually greater than its speed of 1.5 m/s when moving up (comparing magnitudes, not the signed values) (1)

Question 5 (6 marks)

05.1 [2 marks]

Answer: 1.25 m/s away from the start

- $50 \div 40 = 1.25$ (m/s) (1)
- away from the start / towards the far end of the pool (1)

05.2 [2 marks]

Answer: 1.2 m/s (1.18 m/s)

- $100 \div 85$ (1)
- 1.2 (m/s) / 1.18 (m/s) (1)

05.3 [2 marks]

Answer: 0 m/s

- zero (1)
- the swimmer finishes where they started, so the displacement is zero (1)

Question 6 (4 marks)

06.1 [1 mark]

Answer: It speeds up from rest while moving backwards.

- it speeds up while moving backwards (from rest to 15 m/s) (1)
-

06.2 [1 mark]

Answer: 20 s

- 20 (s) (1)
-

06.3 [2 marks]

Answer: 30 s to 40 s: the speed is 15 m/s (the minus sign only shows direction), which is greater than 12 m/s.

- 30 s to 40 s (1)
 - the speed then is 15 m/s, which is greater than 12 m/s: speed is the size of the velocity, and the negative sign only shows the direction (1)
-