

### Activity 1 – sheet 1 of 1

### Programme Questions

#### Speed

1. What is meant by 'average speed'?

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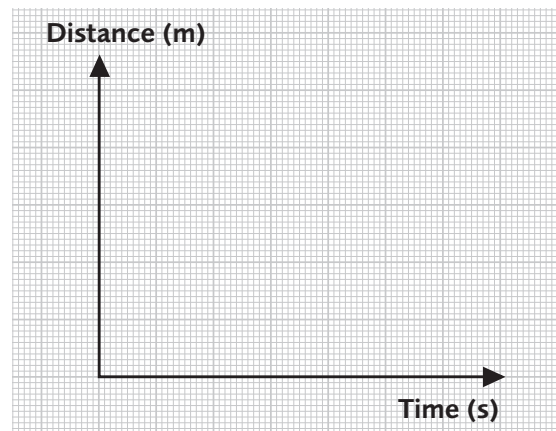
2. What is a light gate?

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3. How can two light gates connected to timers be used to measure the time a vehicle takes to travel between two points?

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4. Sketch on these axes the graph for an object moving at constant speed:
5. On the same axes above, sketch and label the graphs for an object moving at a constant speed which is:
  - a) faster
  - b) slower



#### Acceleration

1. Complete this explanation: We say a car is accelerating if ...

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2. How does increasing the pulling force on a vehicle affect the acceleration?

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#### Gravity and Falling

1. Does the mass of a diver affect how fast the diver falls?

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2. Why does a larger object fall slower than a smaller object with the same mass?

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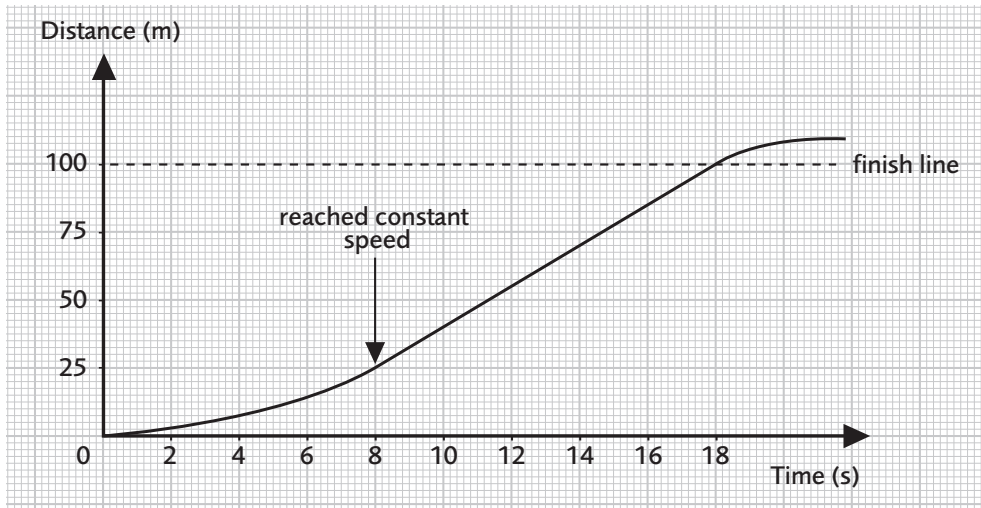
3. If a melon is dropped from the top of a tall building, at what rate does it accelerate?

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## Activity 2 – sheet 1 of 2

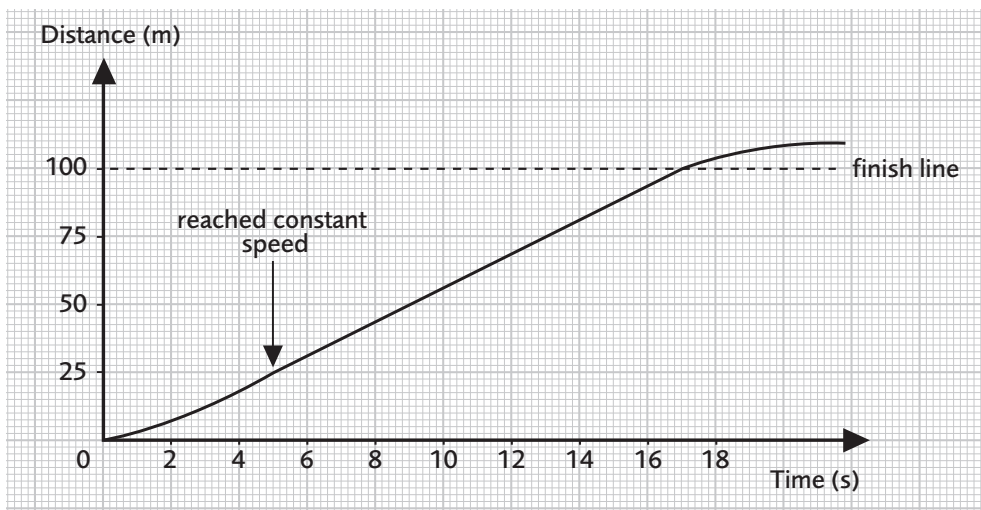
### Speed and Acceleration 1

1. Look at this graph showing how the speed of a runner changes during a race:



- How long was the distance of the race?
- Did the runner stop at the finish line?
- For how many seconds did the runner move at a constant speed?
- How many metres did the runner cover at this constant speed?
- Use the time from **c)** and the distance from **d)** to calculate the constant speed.
- What was the average speed for the whole race?

2. This graph shows the speed of a second runner in the same race:



**Activity 2** – sheet 2 of 2**Speed and Acceleration 1**

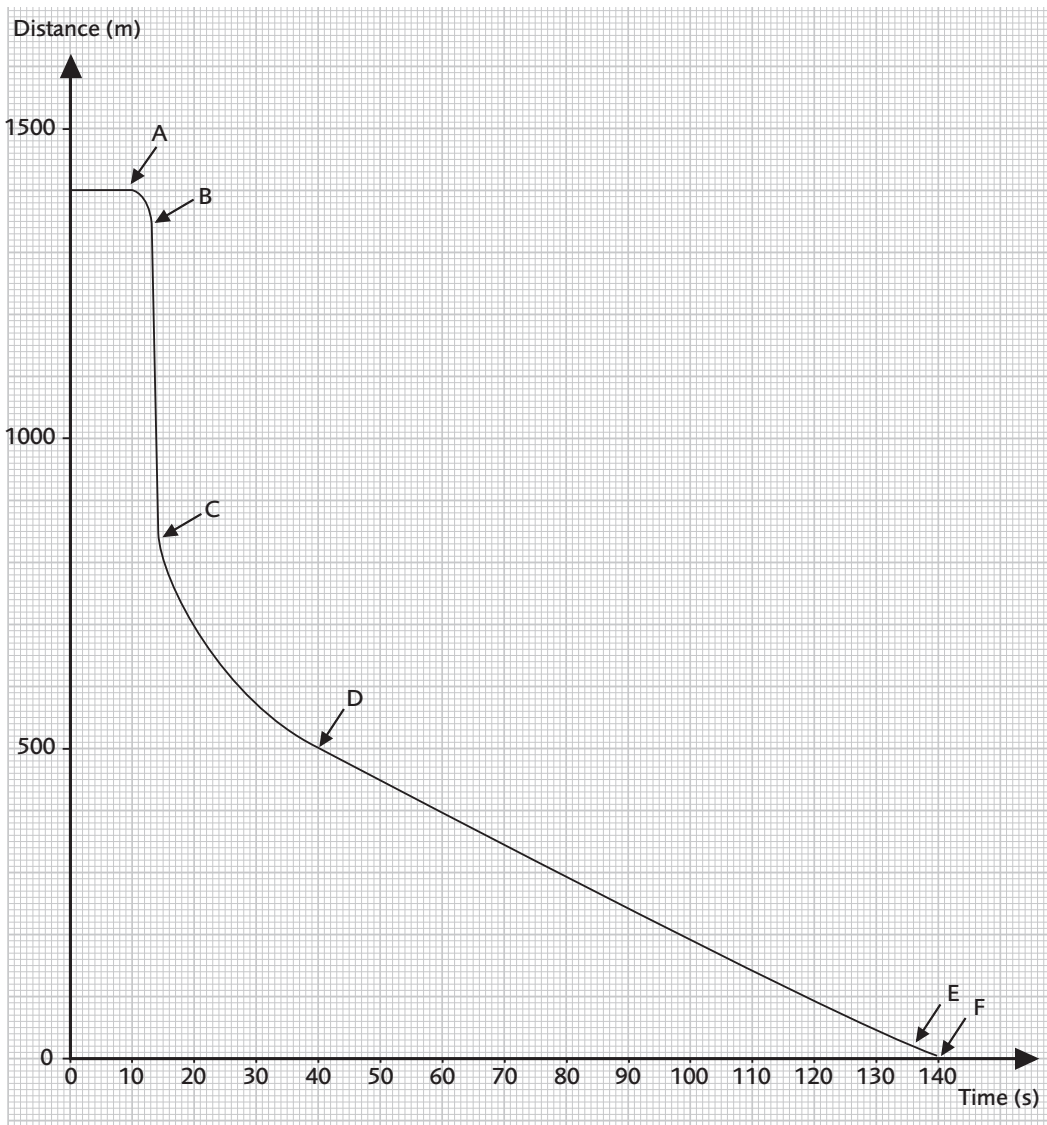
- a) Which of the two runners won the race?
  - b) What was the average speed of this runner for the whole race?
  - c) From the time that this runner moved at constant speed and the distance covered at constant speed, calculate the constant speed of this runner.
  - d) Which runner reached the highest speed during the race?
  - e) If you were advising the losing runner, what would you tell them to improve?
3. This data was recorded for a car. Use graph paper to plot a graph of distance travelled in metres against time in seconds.

Distance from the start in metres	Time taken in seconds
0	0
15	5
60	10
130	15
250	20
375	25
500	30

- a) When was the car travelling at constant speed?
- b) When was it accelerating?
- c) What was the average speed for the whole 30 seconds?

**Activity 3** – sheet 1 of 2**Speed and Acceleration 2**

1. This graph shows what happens when a skydiver jumps from an aircraft and spends some time in free fall before opening his parachute.



Give the letter, eg B, or the range of letters, eg BC, which match the times of the following events. There may be more than one correct answer. The first one is done for you:

The skydiver:

- a) jumps out of the aircraft: A
- b) is falling at a constant speed:
- c) stops falling:
- d) is slowing down:
- e) speed is increasing (acceleration):
- f) his/her parachute opens:

## Activity 3 – sheet 2 of 2

### Speed and Acceleration 2

2. These graphs show different objects moving. Describe in words what each one shows. Use words like stop, start, constant speed, accelerating and slowing down.

