

Distance Time Graphs

KS3 Physics · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

What does a flat (horizontal) section on a distance–time graph mean?

Step 1 · Read the axes

Time keeps increasing along the bottom, but the distance does not change.

Step 2 · Meaning

The object is not moving: it is stationary.

Answer: Stationary (speed = 0)

Check: Gradient of a flat line = 0.

2. Now try one with the steps

A straight line goes from (0 s, 0 m) to (10 s, 50 m). Find the speed.

Step 1 · Gradient = rise ÷ run

Step 2 · Speed

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. On a distance–time graph, what does a horizontal line show? [1]

2. On a distance–time graph, what does a steeper straight line show? [1]

3. What does the gradient of a distance–time graph represent? [1]

4. A straight line goes from (0 s, 0 m) to (10 s, 50 m). What is the speed, in m/s? [1]

5. A straight line goes from (0 s, 0 m) to (20 s, 30 m). What is the speed, in m/s? [1]
6. A journey graph rises from 0 m to 100 m between 0 s and 20 s. What is the speed in this part, in m/s? [1]
7. The same graph is flat from 20 s to 30 s. For how many seconds is the object stationary? [1]
8. The graph then rises from 100 m to 200 m between 30 s and 40 s. What is the speed in this part, in m/s? [1]
9. What is the average speed for this whole journey (200 m in 40 s), in m/s? [2]
10. A distance–time line curves and gets steeper. Describe the motion. [1]
11. A distance-from-home graph slopes back down to zero. What is happening? [1]
12. Two lines start at (0 s, 0 m). Line A reaches 80 m at 10 s; line B reaches 40 m at 10 s. How much faster is A than B, in m/s? [2]
13. An object moves at a constant 3 m/s from the start. What distance will the graph show at 7 s, in metres? [1]
14. Describe the shape of the distance–time graph for a car that moves at a steady speed, stops at traffic lights, then moves off more slowly. [3]

4. Before you hand it in

"A flat line means moving at a steady speed."

On a distance–time graph, flat means stopped. Steady speed is a straight sloping line.

Reading the gradient from the axis values only.

Gradient = (distance at end – distance at start) ÷ (time at end – time at start).

"A line going down means slowing down."

A downward line shows the object coming back towards the start.