

Speed, distance and time are important measures for some of the rides at THORPE PARK.

## CALCULATING SPEED

Rides such as Stealth and Nemesis Inferno move at high speeds. To find the average speed of an object, we need to know how far it has travelled in a given time. Average speed may be calculated by dividing the distance travelled by the time taken.

Speed is measured in a variety of units, for example metres per second (m/s) or kilometres per hour (km/h).

In a distance-time graph, speed is the steepness of the line which is known as the gradient.

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

### ACTIVITY 1

Convert the following units of measure (to 2 decimal points where appropriate):

- A** Tidal Wave's ride duration is 136 seconds. Convert this into minutes.
- B** Colossus' track length is 850m. Convert this into kilometres.
- C** The maximum speed of Stealth is 130km/h. Convert this into m/s.
- D** The maximum speed of SAW - The Ride is 20m/s. Convert this into km/h.



### REMINDER - CONVERSION FACTORS

(some figures are rounded for simplicity)

$s \div 60 = \text{min}$

$\text{min} \times 60 = s$

$m \div 1000 = \text{km}$

$\text{km} \times 1000 = m$

$\text{km/h} \times 0.278 = \text{m/s}$

$\text{m/s} \times 3.6 = \text{km/h}$

### ACTIVITY 2

Using the formula at the top of the page, calculate the average speed of the following rides to two decimal points:

- A** Nemesis Inferno travels 716m in 90s.  
The ride's average speed is:
- B** Tidal Wave travels 886m in 136s.  
The ride's average speed is:

We can also use the formula to work out distance and time to the nearest whole number:

- C** Logger's Leap travels at an average of 1.58 m/s and the ride lasts for 330s. How long is the track?
- D** Colossus travels 850m at an average of 7m/s. How long does the ride last for? (Hint: think about how the formula could be rearranged.)

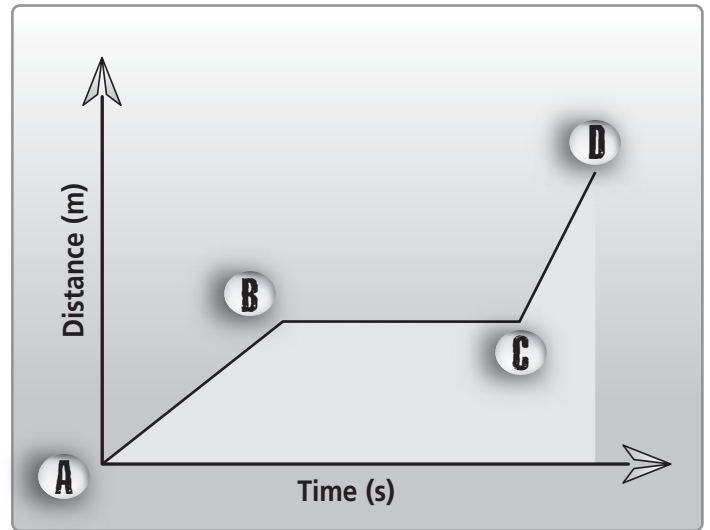


## DISTANCE - TIME GRAPHS

Graphs can be useful tools when interpreting mathematical information that relates to a practical situation. The gradient of a distance-time graph gives the speed of an object.

### in this graph:

- From point A to B, the object is at constant speed; distance increases as time increases steadily.
- From B to C, the object is stationary. We know this because the time is increasing but the distance is not.
- From C to D, the object is moving at constant speed again, but at a greater speed than before. We know this as the gradient is steeper.



### ACTIVITY 3

Tidal Wave is one of the UK's tallest log flumes. Thrill seekers are taken 26 metres high, before a heart-stopping plunge into the blue. The graph below shows distance travelled against time for Tidal Wave. The track is 886 metres long and the ride lasts 136 seconds.

- Between which two points on the graph is the ride moving fastest?
- Give an example of two points between which the speed of the ride is constant.
- Look at the diagram of Tidal Wave. Mark points 1, 2 and 3 on the graph.

