

Calculating Speed

Speed tells us how _____ something is _____.

A cyclist has a constant _____ speed of 6 m/s (six metres per second). Every _____ they travel _____.

In ten seconds, the cyclist will travel _____. In 25 s, they will travel _____.



You can also measure speeds in kilometres per hour _____ or miles per hour _____.
A truck on a motorway moving at 60 km/h travels _____ each hour.
In two hours, the truck will travel _____. In half an hour, the truck will travel _____.

- 1 Fill in the table which shows typical speeds in m/s and km/h. The moving objects are **Snail, Airliner, Bus in town** and **Person walking** (but not in that order).

| Object | Speed (m/s) | Speed (km/h) |
|--------|-------------|--------------|
| | 0.01 | 0.04 |
| | 1.5 | 6 |
| | 12 | 40 |
| | 220 | 800 |

- 2 A long distance runner runs at 3 m/s.

(a) Complete the sentence: They run metres every second.

(b) Work out how far they will run in ten seconds using an equation.

$$\begin{array}{rclcl} \text{distance (m)} & = & \text{speed (m/s)} & \times & \text{time (s)} \\ \hline \text{ } & = & 3 & \times & \text{ } \end{array}$$

(c) Work out how far they will run in 40 s using an equation.

$$\begin{array}{rclcl} \text{distance (m)} & = & \text{speed (m/s)} & \times & \text{time (s)} \\ \hline \text{ } & = & 3 & \times & \text{ } \end{array}$$

(d) Work out how far they would travel in 120 s.

(e) Work out how far they would travel in fifteen minutes.

3 A car on a motorway travels at 30 m/s.

(a) How far does it travel every second?

(b) Work out how much time it will take to travel 150 m using an equation.

$$\begin{array}{ccccc} \text{distance (m)} & = & \text{speed (m/s)} & \times & \text{time (s)} \\ \boxed{\text{---}} & = & \boxed{30} & \times & \boxed{} \end{array}$$

(c) Work out how much time it will take to travel 600 m using an equation.

$$\begin{array}{ccccc} \text{distance (m)} & = & \text{speed (m/s)} & \times & \text{time (s)} \\ \boxed{\text{---}} & = & \boxed{30} & \times & \boxed{} \end{array}$$

(d) Work out how much time it would take to travel 900 m.

(e) Work out how much time it would take to travel 90 km. 1 km = 1000 m

4 A flying duck travels 1000 m in 50 s.

(a) Distance flown in one second = $\boxed{} \div \boxed{} = \boxed{}$ metres

(b) Complete the sentence: The duck's speed (in m/s) is $\boxed{}$.

(c) A seagull flies 90 m in 6 s. Work out its speed using an equation.

$$\begin{array}{ccccc} \text{distance (m)} & = & \text{speed (m/s)} & \times & \text{time (s)} \\ \boxed{\text{---}} & = & \boxed{} & \times & \boxed{6} \end{array}$$

(d) Work out the speed of a pigeon which flies 440 m in 22 s.

(e) Work out the speed (in m/s) of a cyclist who travels 5000 m in thirty minutes.

5 A radio controlled buggy takes 8 s to travel 32 m at a steady speed. What is the buggy's speed in m/s?

6 A train travels 30 km at a steady speed. The journey takes 12 min = 0.2 h. What is the train's speed in km/h?

7 Complete the word equations using **speed**, **distance** and **time**.

(a) distance =

(b) time =

(c) speed =

8 Rewrite your word equations using symbols.

s is the distance, t is the time taken and v is the speed.

(a) $s =$

(b) $t =$

(c) $v =$

9 Use your understanding of speed, or the formulae, to calculate

(a) the distance when a toy car rolls at 2 m/s for 5 s

(b) the distance when a 3 m/s jogger jogs for 4 s

(c) the time taken for a child to run 30 m at 5 m/s

(d) the time taken for a train to travel 150 km at 100 km/h

(e) the speed if a marble rolls 1.5 m in 0.5 s

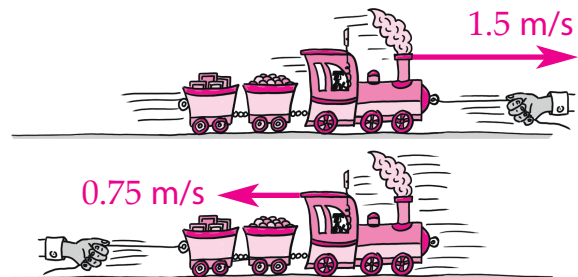
(f) the speed if an athlete runs 200 m in 22 s.

You need to know speed and _____ to work out where something will end up.

Suppose you move a trolley 12 m forwards and then 3 m backwards.

You have moved it _____ in total, but it is only _____ from where it started.

10 A child moves a model train forward at 1.5 m/s for 6 s then backwards at 0.75 m/s for 4 s. How far is the train from where it started?



Most journeys are not done at a steady speed. We calculate _____ = _____

11 The speed limit on a road is 30 m/s. Two **average speed cameras** are 3600 m apart.

(a) A car takes 90 s to travel this distance. Calculate its average speed.

(b) A different car takes 150 s to travel the distance. Did it exceed the speed limit?