

Lesson 1

Distance and Speed

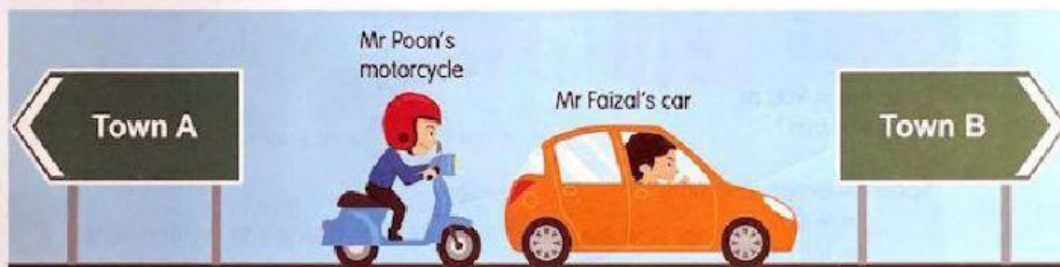
Understanding the relationship between distance covered, speed and time taken

Before you learn ...

The National Physical Fitness Award (NAPFA) test involves a shuttle run station where the amount of time taken by primary school pupils for two laps of fixed distance is recorded. Your teacher recorded the time you took to run 2 laps of 10 m. Compare your time with your classmates. Who ran the fastest? Explain.

LEARN 1

Mr Poon travelled from Town A towards Town B. In 1 hour, he travelled 44 km.
Mr Faizal travelled in the same direction. In 1 hour, he travelled 66 km.



Mr Poon travelled at a speed of 44 km per hour.



Mr Faizal travelled at a speed of 66 km per hour.

The **speed** tells us how fast Mr Poon and Mr Faizal were travelling.
We can write Mr Poon's speed as 44 km/h.
We read 44 km/h as 44 km per hour.

TRY
1

Find the missing numbers.

- a Hui Xin can cycle 9 km in one hour. Her speed is km/h.
- b Xavier can run 200 m in one minute. His speed is m/min.
- c A bowling ball rolls 15 cm in one second. Its speed is cm/s.
- d Kaiwen swims at a speed of 2 m/s. He swims m in one second.

LEARN
2

Wesley ran 900 m in 5 min. Find his speed in m/min.

Method 1

$$\begin{aligned} 5 \text{ min} &\rightarrow 900 \text{ m} \\ 1 \text{ min} &\rightarrow 900 \div 5 \\ &= 180 \text{ m} \end{aligned}$$

To find the speed in m/min, we need to find the distance he ran in one minute.



Method 2

$$\begin{aligned} \text{Distance} &= 900 \text{ m} \\ \text{Time} &= 5 \text{ min} \end{aligned}$$

$$\begin{aligned} \text{Speed} &= \text{Distance} \div \text{Time} \\ &= 900 \div 5 \\ &= 180 \text{ m/min} \end{aligned}$$

Wesley's speed was 180 m/min.

Speed is the distance travelled per unit time. It involves two quantities:

- Distance covered
- Time taken

$$\text{speed} = \text{distance} \div \text{time}$$

The greater the distance travelled per unit time, the faster the speed.

TRY
2

A lorry travelled a distance of 280 km in 4 h. What was the speed of the lorry?

Method 1

4 h → km

1 h → ÷
= km

Method 2

Distance = km

Time = h

Speed = Distance ÷ Time

= ÷

= km/h

To find the speed, we need to know the distance covered and the time taken.



The speed of the lorry was km/h.

LEARN
3A

Joseph drives at a speed of 65 km/h. At this speed, how far does he travel in

- a 2 hours?
- b 5 hours?



65 km/h means
65 km in 1 hour.

In 1 hour, Joseph travels 65 km.

a



In 2 hours, Joseph travels 65 (speed) × 2 (time) = 130 km (distance).

b



In 5 hours, Joseph travels 65 × 5 = 325 km.



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3B

A hamster can run at a speed of 1.6 m/min. How far can the hamster travel in 1 hour?

Method 1

$$1 \text{ h} = 60 \text{ min}$$

$$\begin{aligned} 1 \text{ min} &\rightarrow 1.6 \text{ m} \\ 60 \text{ min} &\rightarrow 1.6 \times 60 \\ &= 96 \text{ m} \end{aligned}$$

Convert the hours into minutes first.



Method 2

$$\begin{aligned} \text{Speed} &= 1.6 \text{ m/min} \\ \text{Time} &= 1 \text{ h} \\ &= 60 \text{ min} \end{aligned}$$

$$\begin{aligned} \text{Distance} &= \text{Speed} \times \text{Time} \\ &= 1.6 \times 60 \\ &= 96 \text{ m} \end{aligned}$$

To find the distance covered, we need to know the speed and the time taken.



The hamster can travel 96 m in 1 hour.

TRY
3

The speed of a train is 120 km/h. How far can the train travel in 5 min?

Method 1

$$\begin{aligned} 5 \text{ min} &= \boxed{} \text{ h} \\ 1 \text{ h} &\rightarrow \boxed{} \text{ km} \\ \boxed{} \text{ h} &\rightarrow \boxed{} \times \boxed{} \\ &= \boxed{} \text{ km} \end{aligned}$$

Method 2

$$\begin{aligned} \text{Speed} &= \boxed{} \text{ km/h} \\ \text{Time} &= \boxed{} \text{ min} \\ &= \boxed{} \text{ h} \\ \text{Distance} &= \text{Speed} \times \text{Time} \\ &= \boxed{} \times \boxed{} \\ &= \boxed{} \text{ km} \end{aligned}$$

The train can travel $\boxed{}$ km in 5 min.

LEARN

4

Benedict ran round a field at a speed of 6 m/s. How long did he take to run 456 m?

Method 1

$$\begin{aligned} 6 \text{ m} &\rightarrow 1 \text{ s} \\ 456 \text{ m} &\rightarrow 456 \div 6 \\ &= 76 \text{ s} \end{aligned}$$

Method 2

$$\begin{aligned} \text{Distance} &= 456 \text{ m} \\ \text{Speed} &= 6 \text{ m/s} \end{aligned}$$

$$\begin{aligned} \text{Time} &= \text{Distance} \div \text{Speed} \\ &= 456 \div 6 \\ &= 76 \text{ s} \end{aligned}$$

Benedict took 76 s to run 456 m.



LEARN

Hands-On Activity

Understand the relationship between the distance covered, speed and time taken.

Work in pairs.

- 1 Mr Chen takes 10 min to travel from his home to the community centre. The distance between his home and the community centre is 6500 m. Find Mr Chen's speed. Tell your partner the information needed to find the speed.
- 2 What do you notice about the relationship between the information you need and speed?
- 3 Solve the following.
 - a At 8 a.m., Taufik drove from his home to his office, travelling at a speed of 60 km/h. He reached his office at 8.45 a.m. Find the distance between Taufik's home and his office.
 - b Maureen cycled 36.4 km at a speed of 28 km/h. Find the time Maureen took.
- 4 What do you notice about the relationship between distance covered, speed and time taken?



The distance between Town X and Town Y is 108 km. Mr Gan rides his scooter at a speed of 54 km/h. How long does he take to travel from Town X to Town Y?

Method 1

km $\rightarrow$ 1 h

km $\rightarrow$ $\div$
= h

Method 2

Distance = km

Speed = km/h

Time = Distance $\div$ Speed

= $\div$

= h

Mr Gan takes h to travel from Town X to Town Y.



Farah cycles from her home to the beach at a speed of 18 m/s. The distance between her home and the beach is 1350 m. How long will she take to cycle from her home to the beach?

Time = Distance $\div$ Speed

= $\div$

= s

She will take s to cycle from her home to the beach.

Let's Practise

1 Find the missing numbers.

- a A worm can move 20 cm in one second. Its speed is cm/s.
- b An elevator can travel 500 m in one minute. Its speed is m/min.
- c A cheetah can run 120 km in one hour. Its speed is km/h.
- d Ben runs at a speed of 4 m/s. He runs m in one second.
- e A snail moves at a speed of 32 cm/min. It moves cm in one minute.
- f An aeroplane travels at a speed of 965 km/h. It travels km in one hour.



2 Mariah ran 200 m in 25 s at an inter-school sports meet. What was her speed in m/s?

3 An eagle can travel at a speed of 300 km/h. How far can the eagle travel in 15 minutes?

4 Damien can walk at a speed of 2 m/s. How far in metres can Damien walk in 10 minutes?

5 The distance between Town A and Town B is 150 km. A tourist took a taxi that travelled at a speed of 50 km/h from Town A to Town B. How long did the tourist take to travel from Town A to Town B?



6 The distance between Singapore and Bintan is 45 km. A ferry travels at a speed of 900 m/min. How long will the ferry take to travel from Singapore to Bintan?