Speed and Velocity

What is speed?

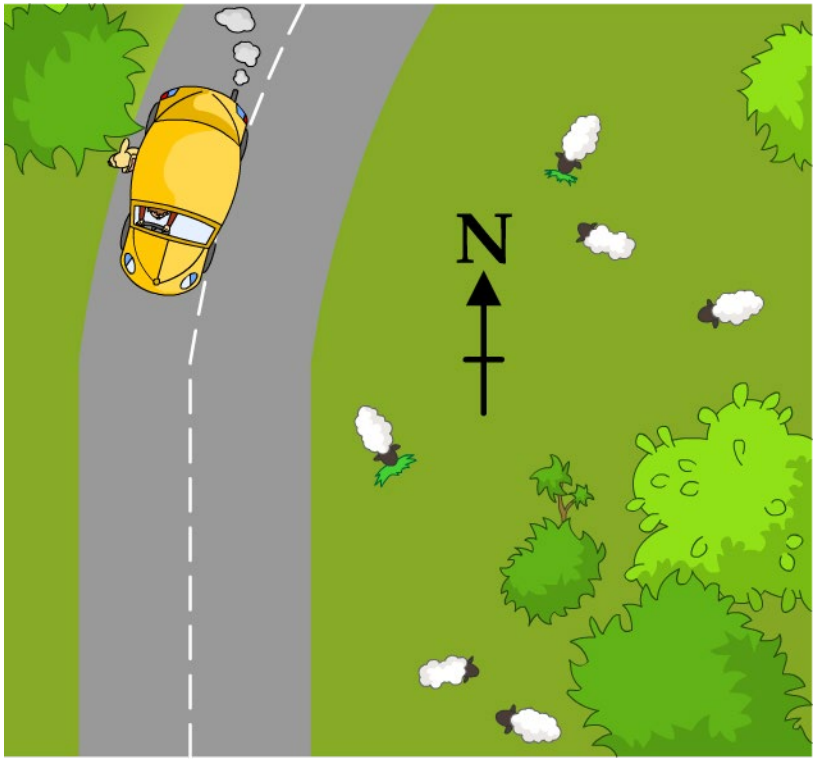
Speed is a measure of how far an object moves in a given time.

This truck is traveling at 60 mph. This means the truck travels 60 miles every hour.

This jet is traveling at 350 m/s. This means the jet travels 350 meters every second.

How is velocity different than speed?

The speed of an object does not depend on the direction in which it is traveling. The **velocity** of an object is the speed **and** direction in which it is moving.



The car is traveling south with a velocity of 10 m/s.

As the car goes around the corner, the speed of the car remains constant but the velocity changes.

How is speed calculated?

The speed of an object can be calculated using this equation:

$$\text{speed} = \frac{\text{distance traveled}}{\text{time taken}}$$

- Distance traveled is measured in **meters** (**m**).
- Time taken is measured in **seconds** (**s**).
- Speed is measured in **meters per second** (**m/s**).

The standard unit for speed in physics is **m/s**, but other units, such as kilometers per hour (km/h), are more convenient when measuring the speed of vehicles. Why is this?

Calculating speed question

A train takes 100 seconds to travel 1,500 m.
What is the speed of the train?

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

$$= \frac{1{,}500}{100}$$

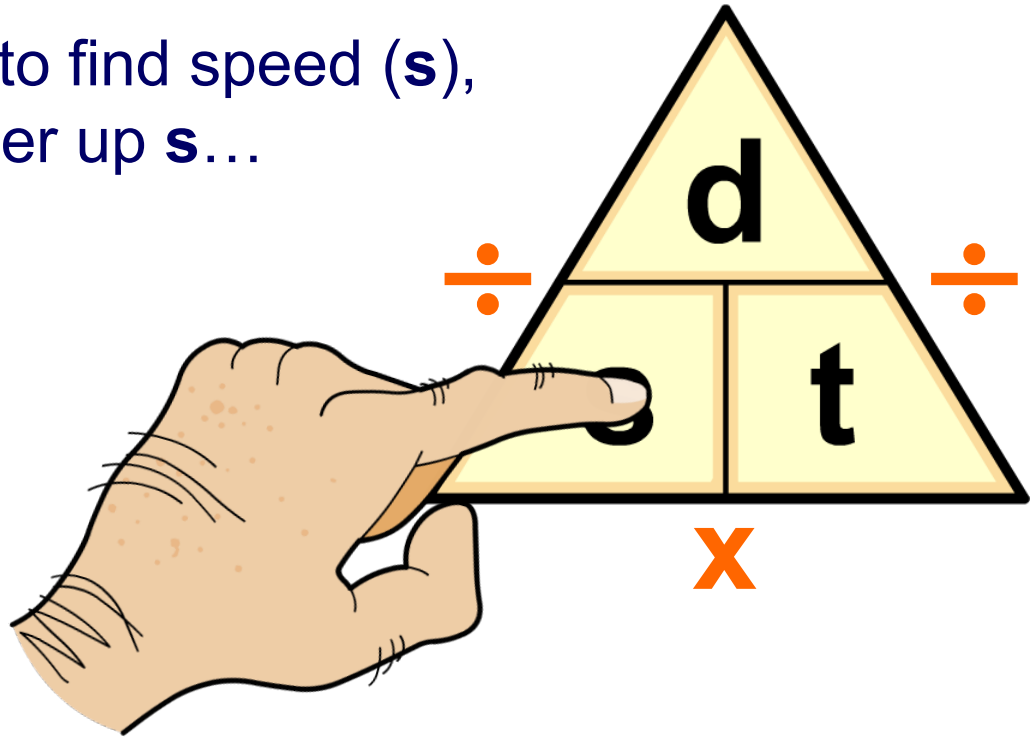
$$= 15\,\text{m/s}$$

Using a formula triangle

A formula triangle helps you to rearrange a formula. The formula triangle for **speed (*s*)**, **distance (*d*)** and **time (*t*)** is shown below.

Cover the quantity that you are trying to find, which gives the rearranged formula needed for the calculation.

So to find speed (**s**), cover up **s**…



…which gives the formula…

$$s = \frac{d}{t}$$

Calculating speed question

A car travels at 25 m/s for 3 minutes. How far does it travel?

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

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

$$= 25 \times 180$$

$$= \mathbf{4{,}500\,m} = \mathbf{4.5\,km}$$

Speed, distance, time calculations

You will need this equation to answer the following questions about speed, distance and time:

speed = distance / time

Click "**start**" to begin.

start