Converting units of speed

This is usually best done in stages.

e.g. Convert 60 km/h into m/s

1000m in a km	60 km/h = 60,000 m/h	(x 1000)
60 minutes in an hour	60,000 m/h = 1000 m/min	(÷ 60)
60 seconds in an hour	1000 m/min = 16.67 m/s (2d.p.)	(÷ 60)

Problem solving with speed

On the first part of the journey a car travels 160 km in 3 hours. On the second part of the journey the car travels at 70km/h for 2 hours. What is the average speed of the journey?

During the second part of the journey the car travels:

Distance = speed x time = 70 x 2 = 140km.

So total distance = 140 + 160 = 300km.

And total time = 3 + 2 = 5 hours.

Average speed = total distance ÷ total time = 300 ÷ 5 = 60 km/h.

Problem solving with density

Material A has a density of 5.8g/cm³.

Material B has a density of 4.1g/cm³.

377g of Material A and 1.64kg of Material B form Material C.

Work out the density of Material C.

Density is in grams per cm³ so all mass needs to be in grams 1.64kg = 1640g

Volume of Material A = 377 ÷ 5.8 = 65 cm³

Volume of Material B = 1640 ÷ 4.1 = 400 cm³

Total volume of Material C = 65 + 400 = 465 cm³

Total mass of Material C = 377 + 1640 = 2017 g

Density of Material C = 2017 ÷ 465 = 4.34 g/cm³ (2d.p.)

Density

Density is mass ÷ volume

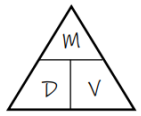
Density is usually measured in:

Kilograms per metre cubed	kg/m³
Grams per centimetre cubed	g/cm³

The formula can also be rearranged to give:

Volume = mass ÷ density

Mass = density x volume



Pressure

Pressure is force ÷ area

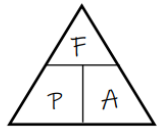
Pressure is usually measured in:

Newtons per square metre	N/m²

The formula can also be rearranged to give

Force = pressure x area

Area = Force ÷ pressure



Speed

Speed = distance ÷ time

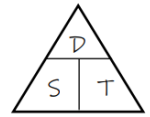
Speed is usually measured in:

Kilometres per hour	km/h
Miles per hour	mph
Metres per second	m/s

The formula can also be rearranged to give:

Time = distance ÷ speed

Distance = speed x time



Questions involving speed will often talk about 'average speed'. Objects rarely travel at a constant speed and instead speed up and slow down during the journey. To get around this we often use the average speed of the journey instead.

Average speed = total distance ÷ total time