
DIY
MATHS

What's the Project?

How to find the speed, distance or time of any moving object.

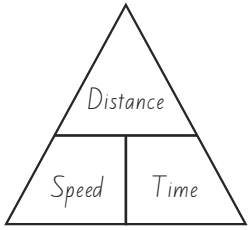
The Why Behind the What

Calculating the speed, distance or time of something or someone can be useful in everyday life. For example:

- How long it will take to travel to a holiday destination by car, train or plane.
- Comparing the speeds of vehicles.
- The police use speed radars to check people are sticking to the speed limit!
- Exercise programmes – can you improve your time every day for the distance and speed you are running?

What You Need to Know

Speed tells us how fast something or someone is travelling.



Not everything moves at the same speed all the time, so we need to find an average. You can find the average speed of an object if you know the distance travelled and the time it took.

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Technical Vocabulary

If you had to explain these mathematical terms to someone else, what would you say? Write your definitions of these mathematical terms. You may want to add a diagram to some of your definitions. Check online if you're not sure.

Speed:

Distance:

Time:

Average:

Variable:

Equation:

Handy Hint: Don't forget to add the units of speed to your answer. Without this, your answer isn't actually showing the speed of an object, it's just a number!

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Job Share

Create a speed, distance or time problem for a buddy, then see if they can solve it. If they don't know how to calculate speed, distance or time, then show them what to do. When you can teach it, you'll know you've learnt it.

Optional Extension

You know how to find speed for things that are moving on earth, but what about speed in space? How does that work?

Using your choice of app on a digital device, create a video or visual presentation explaining the following:

- The relationship between speed, distance and time.
- How does speed work in space?
- How is speed measured in space?

The Formula

The formula for calculating speed is:

Speed (S) = Distance (D) ÷ Time (T)

To work out what the units are for speed, you need to know the units for distance and time.

Example: An athlete ran 150 metres in 25 seconds.

In this example, **distance is in metres** (m) and **time is in seconds** (s), so the units will be in **metres per second** (m/s).

Speed = Distance ÷ Time

= 150 metres ÷ 25 seconds

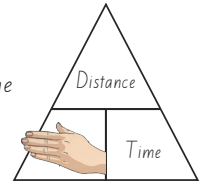
Speed = 6 metres per second or **6m/s**

Rearranging the Formula

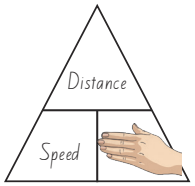
The formula **Speed = Distance ÷ Time** can be rearranged, just like any other equation.

To calculate one of the **variables** (speed, distance or time) you need the other two. For example, to find the time taken to make a journey, you need the length of the journey (distance) and the speed of travel.

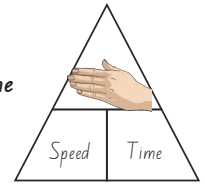
- **Speed** = Distance ÷ Time



- **Time** = Distance ÷ Speed



- **Distance** = **Speed** × **Time**



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Installing the Formula

Get the formula installed in your brain by filling in the missing distance, time or average speed from this inline speed skating competition. The first row has been done for you as an example.

Short Course Competition Results

Name	Region	Distance (m)	Time (seconds)	Average Speed (m/s)
Manaia	Auckland	500	50 seconds	500 ÷ 50 = 10 m/s
Jack	Canterbury	1200		12 m/s
Chloe	Northland		45 seconds	8 m/s
Amanaki	Otago	650	1 minute	
Elizabeth	Taranaki	1350		15 m/s

Who is the fastest skater?

Long Course Competition Results

Name	Region	Distance (km)	Time (minutes)	Average Speed (km/m)
Ethan	Hawkes Bay	6	12	
Riley	West Coast		5	1.1 km/m
Nikau	Waikato	10.5	25	
Xavier	Manawatū		4.5	1.3 km/m
Aroha	Tasman	1500m		0.75 km/m

Which competitor covered the **second greatest** distance?

Practical Project

You will need:

- 6 friends
- Stopwatch
- Long measuring tape

Measure out a 100m distance with the long measuring tape or use an existing running track you may have at your school.

Using your stopwatch, time each of your friends. Make sure they run the 100m distance one at a time.

Name	Distance	Actual Time (seconds)	Average Speed (m/s)
	100m		
	100m		
	100m		
	100m		
	100m		

Here are the world record times for the men's and women's 100m race. Calculate the average speed then answer the questions.

Name	Distance	Year Record Set	Actual Time (seconds)	Average Speed (m/s) *Round to 2 decimal places.
Usain Bolt	100m	2009	9.58	
Florence Griffith–Joyner	100m	1988	10.49	

Which of your friends has the closest average speed to Usain Bolt?

Which of your friends has the closest average speed to Florence Griffith Joyner?