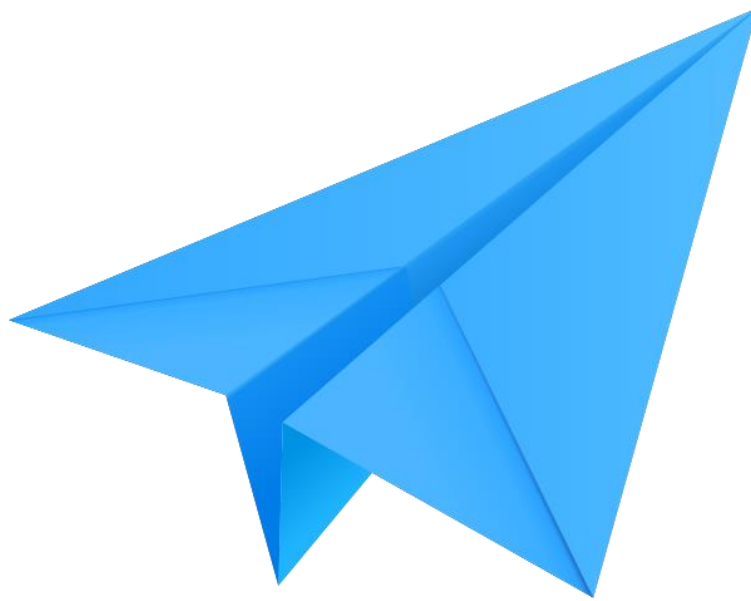




THE
HOLGATE
— ACADEMY —

Maths transition work - Speed investigation



Today we will be building paper planes and investigating how we can work out how fast they fly.

Starter

Try to match the question to the answer.

9×7	6
5^2	-4
$36 \div (4 + 3 + 2)$	24
$\frac{28}{14}$	63
$-8 + 4$	8
2^3	361
$\sqrt{25}$	5
$\sqrt{18 \times 2}$	25
$(19 \times 2^2) + 5$	4
$(4 \times 3 + 7)^2$	2
$\frac{7^2 + 5}{2}$	81
$(43 + 5) \div (18 \div 9)$	27

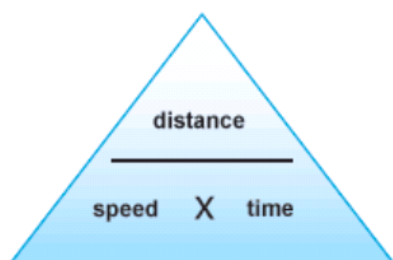
What is speed?

Write down everything you think of when you hear the word speed. What is it? How do we work it out? What is it used for?

[illegible]

The dictionary describes speed as: the rate at which someone or something moves or operates or is able to move or operate.

In maths, we are able to calculate the speed of something if we know how far it has gone and how long it has been moving for.



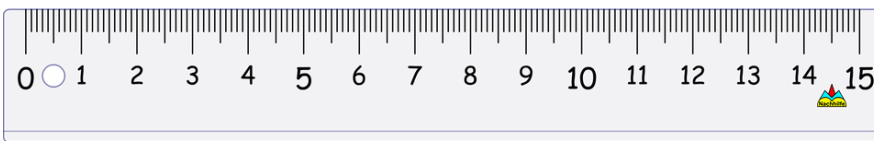
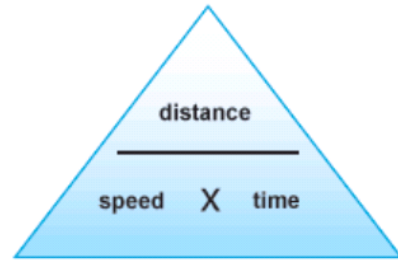
We use the Speed Distance Time triangle to help us with this.

Speed = distance travelled \div time taken.

Sammy the snail.

1. Sammy the snail slid 1cm in 1 second.
How fast is Sammy sliding?

How far did he slide in 5 seconds?



Example 1a:

Speed = distance \div time

Distance = 1cm

Time = 1 second

Speed = $1 \div 1 = 1\text{cm/s}$ (this means 1 cm per second)

Example 1b:

Distance = speed \times time

Speed = 1cm/s

Time = 5 seconds

Distance = $1 \times 5 = 5\text{cm}$

2. Later that day, Sammy spotted a lovely, juicy cabbage.

He now slid 2cm in 1 second.

How fast is he sliding?

How long will it take for him to reach the cabbage that is 10cm away?



Example 2a:

Speed = distance \div time

Distance = 2cm

Time = 1 second

Speed = $2 \div 1 = 2\text{cm/s}$ (this means 2 cm per second)

Example 2b:

Time = distance \div speed

Speed = 2cm/s

Distance = 10cm

Time = $10 \div 2 = 5$ seconds

Your turn

Find how fast Sammy is sliding in each of the following

a) 8 cm in 4 seconds

.....

b) 6 cm in 2 seconds

.....

c) 10 cm in 5 seconds

.....

d) 3 cm in 2 seconds

.....

e) 7 cm in 4 seconds

.....

f) 15 cm in 4 seconds

.....

g) 25 cm in 2 seconds

.....

h) 24 cm in 15 seconds

.....

i) 32 cm in 10 seconds

.....

j) 26 cm in 5 seconds

.....

Extension

1. Sammy the snail decided to go for a slide after his big lunch and ended up sliding 5cm in 2 seconds. How far did he slide after 10 seconds?

2. On Sammy's travels, he met Peter the paper plane. Peter offered to fly Sammy home. They flew 10cm in 1 second and Sammy lives 50cm away.

How long would it take them to get home?



3. The next day, Sammy was feeling very tired, today he could only slide at 1 cm every 3 seconds.

Sammy's best friend Stuart wasn't tired.

He could slide at 1 cm every 1 second.

How much further than Sammy will Stuart travel in 12 seconds?

4. If Stuart stops after 12 seconds, how long will it take for Sammy to catch up?

5. Sandy the slug has been watching Sammy and Stuart having their race.

She thinks that she is faster than both of them.

She says that she can travel at 2 cm every 3 seconds.

How far would she travel in 12 seconds?

6. Is she faster than both of the snails?

7. Usain Beetle claims to be the fastest insect in all the world. He can travel at 2.5cm in 3 seconds. How far can he travel in 12 seconds?

8. Is Usain Beetle faster than the Sandy, Sammy and Stuart?

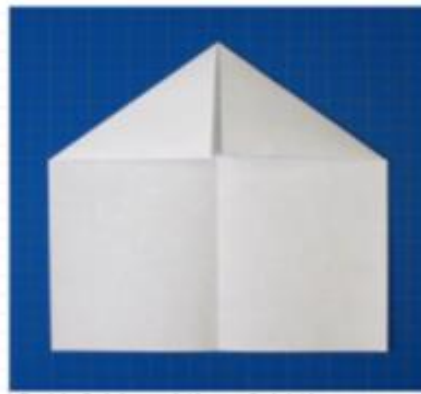
Now it is your turn to do some experimenting.

Using the following instructions, or with the help of an adult, create 4 paper planes.

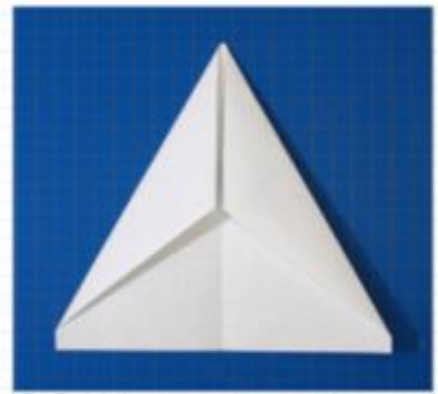
Plane folding instructions:



1. Fold the paper in half.



2. Unfold and then fold the corners into the center line.



3. Fold the top edges to the center.



4. Fold the plane in half.



5. Fold the wings down to meet the bottom edge of the planes body.



Final Paper Airplane Design

Add different things to each one that you think may affect the way it flies. For example, you could add a paper clip to one of the wings or some blue-tac to the nose of the plane. Use whatever you have to try and make your 4 planes different.

The experiment.

Which plane is the best? Which one goes furthest, which one goes fastest?

You will need: Your 4 planes, a ruler/tape measure and a stopwatch/clock.

- 1) Have your planes ready.
- 2) Throw your first plane forward and start the timing it.
- 3) Stop the timer when you see the plane has touched the floor.
- 4) Find the plane and record the distance the plane has travelled.
- 5) Swap planes and repeat.
- 6) Record your planes speeds in the box below.

Remember to keep your results so that we can see how well you have done.

Let's try and work out how well we did at making planes.

To do this, we need to find the mean of our speeds, distances and times.

The higher the answer, the longer, further and faster our planes flew.

Mean is: $\text{total} \div \text{number of throws}$

	Plane 1	Plane 2	Plane 3	Plane 4	Total
Distance					
Time (to the nearest second)					
Speed (distance \div time)					

Mean distance =

Mean time =

Mean speed =