# Physical Education

## Time, Distance and Speed

In maths you learn that:

Speed = $\dfrac{\text{Distance travelled}}{\text{Time taken}}$



In PE you will need to consider speed when working out how fast someone runs, cycles or swims a given distance. Comparing speeds allows you to analyse performance.

Speeds can be given in different units including metres per second (m/s) and kilometres per hour (km/h).
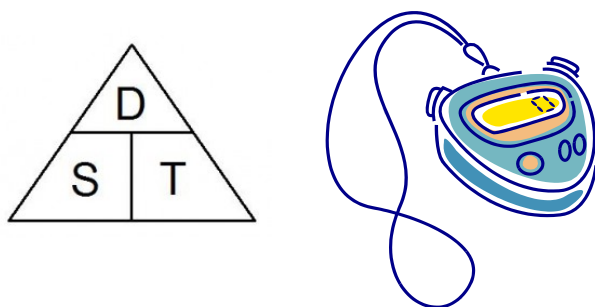
Ussain Bolt took Gold in the 100 metres at the 2012 London Olympics in 9.63 seconds.



Speed = $\dfrac{\text{distance}}{\text{time}}$ = $\dfrac{100 \text{ m}}{9.63 \text{ s}}$ = 10.4 m/s



Ellie Simmonds won Gold in the SM6 200 metres medley at the London 2012 Paralympics with a time of 3 minutes 6.97 seconds.



There are 60 seconds in a minute so

3 min = 3 x 60 s = 180 s

Total time = 180 + 6.97 = 186.97 s

Speed = $\dfrac{\text{distance}}{\text{time}}$ = $\dfrac{200 \text{ m}}{186.97 \text{ s}}$ = 1.1 m/s

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## Collecting and Analysing Data

In PE you will often have to collect and analyse data to assess your performance.
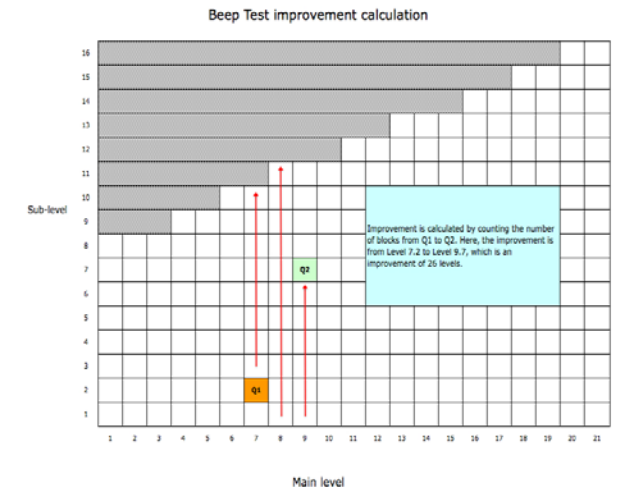


20 m © topendsports.com
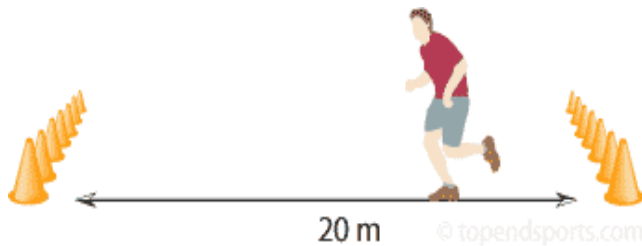
In PE the multi-stage fitness test, also known as the **bleep test**, is used to estimate your maximum oxygen uptake or $VO_2$ max. The test is an accurate test of your Cardiovascular fitness.

The test involves running continuously between two points that are 20 m apart from side to side. These runs are synchronized with beeps played at set intervals.

As the test proceeds, the interval between each successive beep reduces, forcing you to increase your speed until it is impossible to keep up.

At the end of the test you get a bleep score or level.

Jobs require different bleep scores to meet their physical requirements. For an Officer in the British Army, males need a minimum score of 10.2 while females need a minimum score of 8.1.





Beep Test improvement calculation

Improvement is calculated by counting the number of blocks from Q1 to Q2. Here, the improvement is from Level 7.2 to Level 9.7, which is an improvement of 26 levels.

Sub-level
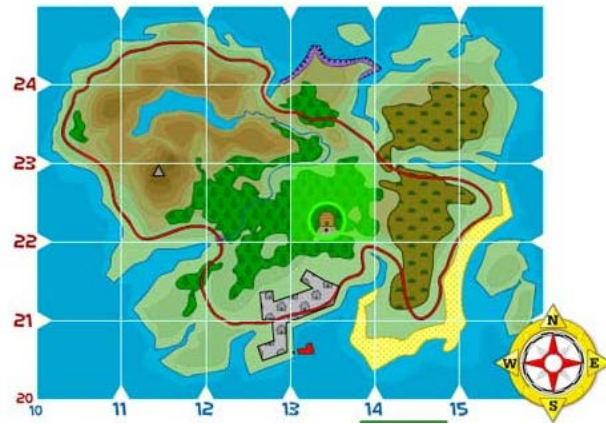
Main level

As your fitness improves you would expect your bleep test score to improve.

Charts can be used to see how many levels you have improved by between tests.

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## Map References and Bearings

Physical Education isn't just limited to what you do in PE lessons. At school you have the opportunity to participate in the Duke of Edinburgh Award Scheme which gives you the chance to go on expeditions where you will need to plan your own route using maps. Map reading links strongly with your maths lessons involving work on coordinates and bearings.

### 3 figure-bearings

Bearings tell you what direction one object is from another.

They are always measured clockwise from North and given using 3 figures.

Here the bearing of O from A is 040°.

The bearing of A from O is 220°.

Maps use grid references in the same way coordinates are used in maths.

Read along the horizontal scale first and then along the vertical scale.

On this map the square shaded light green would be given by the four figure grid reference 1322. The specific location of the temple within it would be given by a six figure grid reference, 133223.
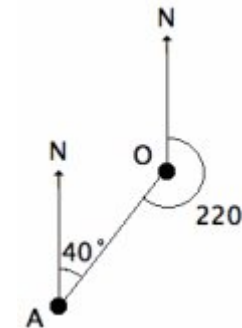
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## Using Averages - Mean, Mode and Median

An athlete's performance will vary from event to event depending on their level of fitness at the time and the conditions they are competing in. It is useful to measure performance on different occasions and use an "**average**" measurement to give a more balanced indication of their overall performance.

In the javelin at the London Olympics 2012 Barbora Spotakova won Gold.

She threw four throws

| Attempt | Mark (m) |
|---------|----------|
| 1 | 66.90 |
| 2 | 66.88 |
| 3 | 66.24 |
| 4 | 69.55 |

What was her average throw?

There are three main types of average: mode, median and mean.

The **mode** is the most common value. Since all her throws were different there is no mode for this data.

The **median** is the middle value. First put the values in ascending order:

66.24 , 66.88 , 66.90 , 69.55

Then find the middle value. When there are 2 middle values use the number half way between them.

**Median** = $\dfrac{66.88 + 66.90}{2}$ = 66.89 m

The **mean** is found by adding up all the values and then dividing by how many values there are.

**Mean** = $\dfrac{66.24 + 66.88 + 66.9 + 69.55}{4}$ = 67.4 m

Which average best indicates her performance? Why?