# M1.6 – Understand the terms mean, mode and median

### Tutorials

Learners may be tested on their ability to:

* calculate or compare the mean, median and mode of a set of data, e.g. height/mass/size of a group of organisms.

### Mean, median and mode

The mean, median and mode are all measures of central tendency and act as representative values for the whole data set. The mean, usually denoted as x bar (), has already been mentioned in section M1.2 and is the sum of the data values divided by the number of data values.

Mean



The median is the middle value of a data set and is usually denoted by Q2. Formally the middle value is the (n+1)/2th piece of data where n is the number of pieces of data.

Median

Q2 = $\frac{n+1}{2}$th

Finally, the mode is the easiest to spot as it is the most frequently occurring value.

Mode

Most frequent

For example, take this set of data values:

25,24,27,28,19,31,25,31

To calculate the mean you need to add together all the values and divide by the number of values. This gives us 210 divided by 8, which equals 26.25



To find the median for the same data set we have to reorder the data from smallest to largest, meaning our data now looks like this:

19,24,25,25,27,28,31,31

Here there are 8 pieces of data, so using the (n+1)/2th formula we know that the median lies on the (8+1)/2 th piece of data which is the 4.5th piece of data

(8+1)/2 = 4.5

In this example we have an even number of data values, therefore the 4.5 th piece of data is halfway between the 4th and 5th values; 25 and 27. To work out the value halfway between these values we add them together and then divide by two.

25+27 = 52

52/2 = 26

Therefore, the median for this data set equals 26.

Finally, in this set of data there are two values which occur twice – 25 and 31.

**25**,24,27,28,19,**31,25,31**

Mode = 25 and 31

Therefore this data set is “bi-modal”, it has two different modes, 25 and 31.

Generally the mean is the most useful statistical measure. However, if there are outliers in the data then the median is more representative. For example, if a value of 100 was added to the example data set above, the mean would change to 34.4 but the median would move to 27, a far more representative measure.

25, 24, 27, 28, 19, 31, 25, 31, 100



Q2 = 27

You may be asked to calculate and compare these quantities for any biological context where measurements are taken. For example when measuring: the length of leaves, the mass of model cells, or the number of a group of organisms and many more.

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