

Notes for parents (1).

The purpose of the activity is to help your child to:

- Make sense of average as a measure of ‘the middle’
- Interpret data presented in a dot plot
- Make statements about data

Here is what to do:

Read the problem statement together and discuss what the word ‘average’ means. The key idea is that an average is a measure of the centre of a set of data.

What do you think average means?

This question will give you an idea of what your child thinks average is all about. Many children will tell you a procedure, such as “You add up all the scores then divide by the number of scores.” In fact they are telling you how to calculate the mean which is one measure of centre.

Are there other ways to measure the centre of the data?

The two other common ways:

- Median: Find the central score by closing in one by one from the lowest and highest data values
- Mode: Find the most common score. There may be more than one mode.

Encourage your child to estimate the centre of the data by ‘eyeballing’.

Where do you think the centre is?

Is the centre different for males and females?

It would time consuming to calculate the means which are 152.17 for females and 154.64 for males. However, the medians are easier to estimate. The actual medians are 152.5 for females and 155 for males. The modes are made a bit difficult to find by the stacked nature of the dots. There are several modes for female heights (3 dots) while the mode for males is 150.

Go back to the original question.

Is your height average for your age?

Ask your child to make some statement about their height compared to the average. You might encourage them to think about how far away from the average they are.



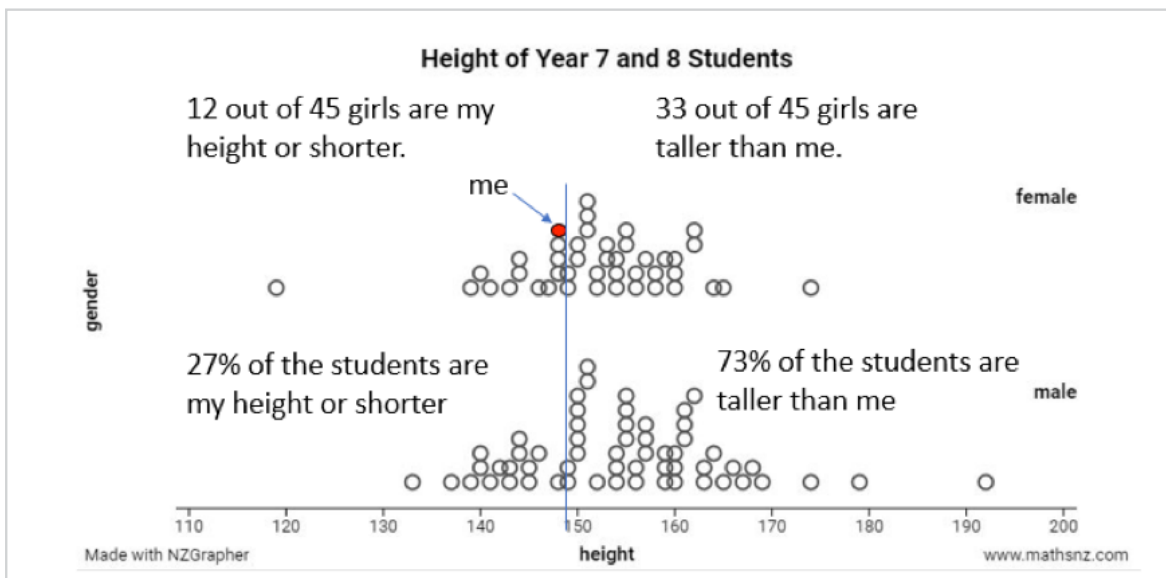
Notes for parents (2).

How many centimetres are you from the average?

How much is that? Show me with your hands.

What fraction/percentage of these 100 children are taller/shorter than you?

Your child might like to draw on a copy of the graph to record their findings.



Discuss whether a sample of 100 children is large enough to make these statements. 100 is a reasonable sample size but clearly 1000 would be more reliable. Asking every Year 7 and 8 child to provide their height would be totally reliable but a lot of hard work to process.

Points to note:

Average is a concept that is frequently misinterpreted. The purpose for calculating measures of centre is always comparison. The comparison can be between groups and helps to answer questions like "Are Year 7/8 males taller than females?" In that sense an average is representing a group of data values. This is a simplification because obviously the heights of males and females will overlap.

Another comparison is within a group. Asking if your child is of average height is asking them to compare their height with those in the same group as them. That group might be all the children in the sample of 100, or the female subgroup. A statement of being below or above average is one of comparison with some measure of the centre (mean, median or mode). Spread is also important as it give some idea of how from centre the data distributes itself. Other measures of spread are too complex for this level and are left until secondary school.



Notes for parents (3). Activity next page

Interpreting data displays is an important life skill. The advantage of dot plots is that each piece of data is visible. Adding their personal dot helps your child imagine themselves as part of the sample and make comparative statements. Using proportions, expressed as fractions or percentages, is important in these statements. Sample sizes can vary. For example, if the sample size was doubled or trebled the fraction of children below and above your child's height should stay approximately the same, with some variation.

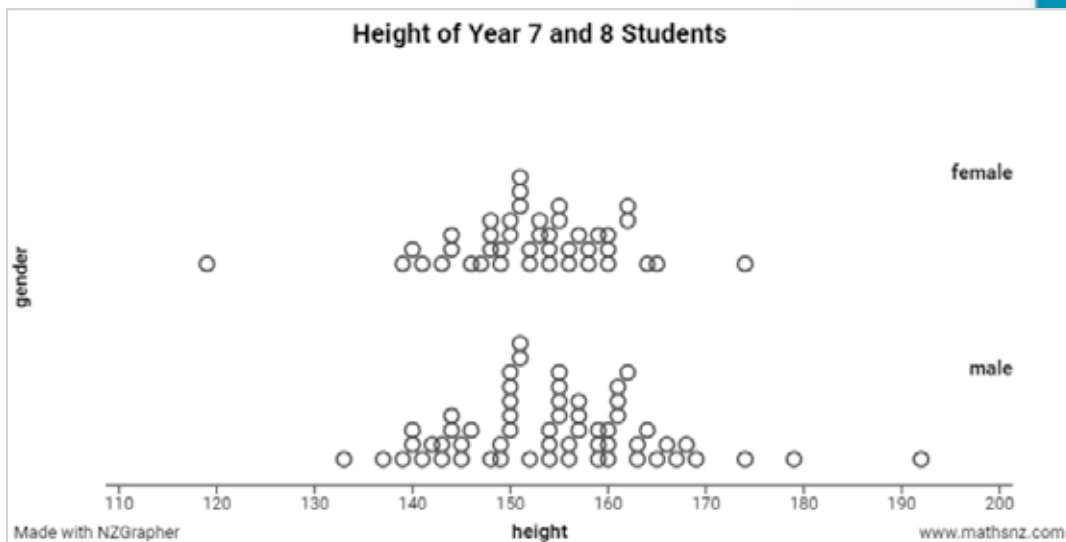
Increasing the sample size increases the confidence in any findings. Greater sample sizes have less variation from actual averages than smaller samples.



Is your height average for your age?

Here is a dot plot of the heights of 100 Year 7 and 8 students.

They are New Zealand students who completed Census at School in 2017.



Does gender make any difference to average height?

Is the data from 100 students enough to find average height?