Dot plots and column graphs

Monday, 4 February 2019   8:05 AM

By the end of the lesson I would hope that you have the knowledge and understanding for the following points:
- Understand that we can represent numerical and categorical data using dot plots
- Understand that we can represent numerical and categorical data using column graphs
- Understand that column graphs can be drawn vertically or horizontally
- Understand that we can read graphs to help us find one, or more, of the following:
    - Mean
    - Median
    - Mode
    - Range
- Understand what an outlier is.
- Understand how to take some data and construct a dot plot or column graph.

RECAP:

Last lesson we started to look at the wonderful topic of data representation. We discovered that there is this stuff called Data and we can, when it's presented as numerical variables, perform calculations on it to help us find the average. This average can come in a number of ways using something called the mean, median, mode or range.

Having lots of raw data is sometimes not very helpful. We like to see diagrams and pictures to help us makes sense of the data.

This lesson is going to look at two types of pictures (graphs).

Graph 1: Dot plots

Dot plots are awesome!
They are graphs made up of dots.
An example is shown on the left.

Each dot stands for a response from a person.

People might have been asked for their favourite colour.

Data shown this way helps us find the number of students who chose each colour.

Example:
10 students had red as their favourite colour.

We need to remember that Maths is linked.
Each new thing we learn can be applied to Mathematics from previous lessons.
We need to now realise that we can apply our learning of Mean, Median, Mode and Range.

Question:
Which of the following is it possible to calculate from a dot plot with **categorical data**?

Question:
Which of the following is it possible to calculate from a dot plot with **categorical data**?

Mean ~~✗~~

Median ~~✗~~

Mode *(circled)*

Yellow!

Range ~~✗~~

We need to be careful with categorical data as, this data is described using words. As we cannot put words into an order, then some of the measures of centre, cannot be used.

Example: Can we place gender into an order? Are Males more important than females? Are females more important than males?
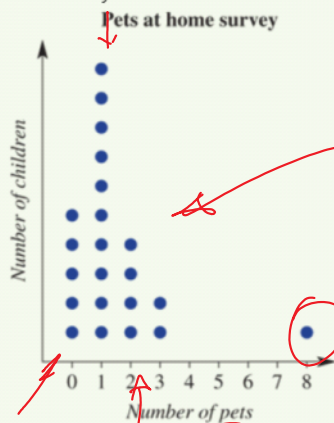
Example
The following example is taken from the Cambridge Essentials Textbook Series
*This question deals with **NUMERICAL** data!*
How do we tell it's NUMERICAL data?
Which measures of centre can we use?

The dot plot below represents the results of a survey that asked some children how many pets they have at home.

Pets at home survey

Number of children (vertical axis)
Number of pets (horizontal axis) 0 1 2 3 4 5 6 7 8

a   Use the graph to state how many children have 2 pets. (4)
b   How many children participated in the survey? 22
c   What is the range of values? (8 - 0) = 8
d   What is the median number of pets? 1
e   What is the outlier? 8
f   What is the mode?

Outliers

Here is some data I received when, whilst conducting a survey, I asked people their ages:

12	16	18	21	26	72	1	82	25	18	16
19	14	18	23	43	76	54	45	3	67	9
10	5	6	4	18	6	19	17	-3	16	10

Can you see any numbers which seem "odd" or "out of place"?

Graphs Type 2: Column Graphs

Column graphs are very much like dot plots, except we don't use single dots, we use bars.
The great thing about column graphs is they can be expressed vertically and horizontally.
Examples are shown below:
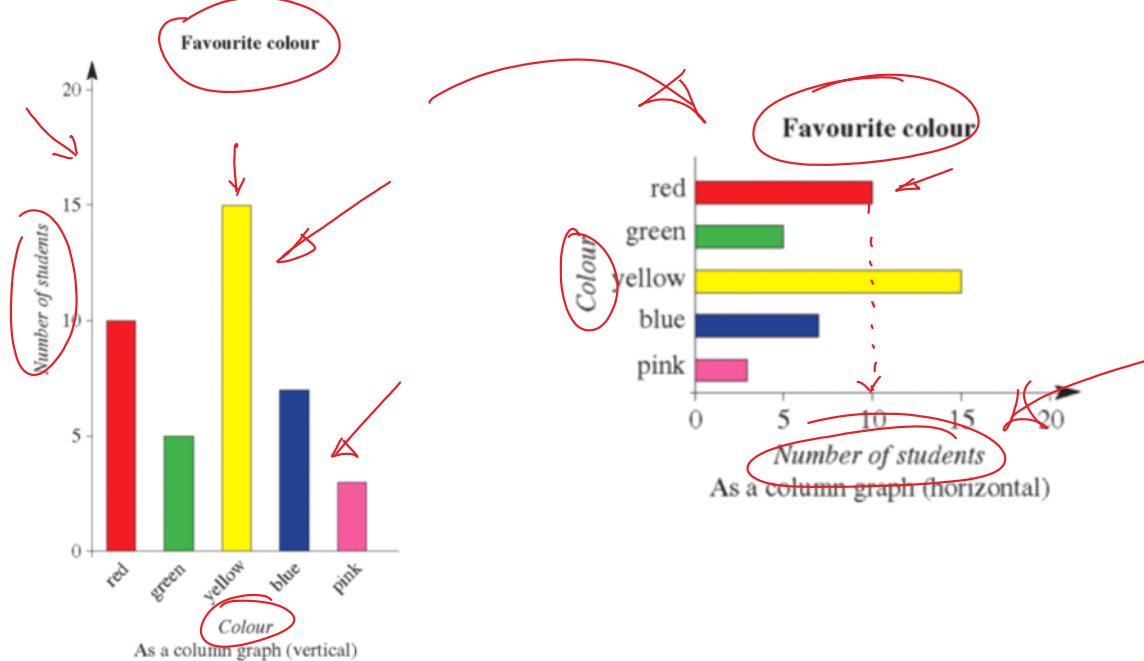
What type of data is being shown?
Which of Mean, Median, Mode and Range can we find?

Things to notice about column (and dot) graphs:

- Frequency (or number of ...) goes on the vertical axis
- Categories goes on the horizontal axis
- **The bars have gaps**
- The scales are uniform (equal spaces between each of the numbers for frequencies)
- Colour is used to better show the trends in the data.
- Labels must be placed on each axis
- There must be a title for the graph

The hard part about drawing column graphs is making sure you use a good scale and know how to read a table.

Here is an example extracted from the *Cambridge Essentials Textbook Series*

Draw a column graph to represent the following people's heights.

Name	Tim	Phil	Jess	Don	Nyree
Height (cm)	150	120	140	100	130

Questions to ask:
- What scale makes the most sense?
- Which axis does the name go on?
- Which axis does the Height go on?

BIG FAT TRICK

Remember! Mathematics is a Big Fat Trick!
We try and trick you.

There are other graphs which have dots or columns.
Examples are shown below!

Class 3M

Class 3S

Number of students

Score

Train passengers at Urbanville Station

No. of passengers

Year

■ interstate ■ country ■ local