Summarising data numerically

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By the end of the lesson I would hope that you have the knowledge and understanding for the following points:

- Understand what is meant by the terms:
  - Mean
  - Median
  - Mode
  - Range
- Know how to find the Mean, Median, Mode and Range for a set of **ordered data**.

RECAP

During the last lesson, we looked at the different types of data there are in the world.
We can classify this in the following ways:

- Numerical
  - Discrete
  - Continuous
- Categorical

This lesson is going to look at how we can **describe numerical data** such that we can compare two (or more) sets of data with each other.

For example, which of the Year 8 classes has **on average** the highest people in it?

Notice the word **average** there!

Let's start easy: MODE

I love the mode as it's the easiest one to find!
What do you notice about their first few letters of the word Mode?

To find the mode of a set of numbers, we need to put them into numerical order, and then find out which number there is the most of!

Example:
Find the mode of the following numbers:

5, 31, 12, 47, 21, 65, 12

Mode = 12 ✓

Important information: **Always put the numbers in order**

OK! Let's get harder: RANGE

The range is really easy to find out when you place numbers in numerical order.
The range is simply the **difference** between the **highest** and the **lowest** numbers!

Remember: **Difference** means that you take two numbers away from each other.

Example:
Find the range of the following numbers:

5, 31, 12, 47, 21, 65, 12

5) 12, 12, 21, 31, 47, 65

Range = Largest Number − Smallest Number

= 65 − 5

= 60

Harder still: MEDIAN

It's not really harder!
It's just another word … and … like MODE … look at the first few letters!
The Median is the number which sits in the middle **of an ordered list of numbers**.

MEDIAN → **MEDIUM** → **MIDDLE**

And they say that Maths is hard!!!

Example:
Find the median of the following numbers:

5, 31, 12, 47, 21, 65, 12

5, 12, 12, 21, 31, 47, 65

Median = 21

5, 12, 12, 21, 31, 47

$\frac{12+21}{2} = 16.5$

$\frac{1+3}{2} = 2$

$\frac{3+29}{2} = 16$

$\frac{33}{2}$

Last one: The average: The MEAN

The most interesting thing is the word MEAN.
When I think of the word mean, I think of the Grinch!

Whilst he might be mean, he's not quite the mean I was thinking of!

Barry has managed to find a word which really confuses people.

He calls **finding the average** as **taking the mean**.

When we take the mean of a set of numbers, all we do is:

1. Add all the numbers together
2. Divide the answer by how many numbers there are

The mean is another way of finding a middle number.
It's different from the median.
The mean is more open to problems with **outliers.**

Teachers like to use the average when looking at test scores for a group.
It's a better Mathematical measure of centre.

Example:
Find the mean of the following numbers:

5, 31, 12, 47, 21, 65, 12

Mean = Average = 5 + 31 + 12 + 47 + 21 + 65 + 12 ÷ 7

5, 31, 12, 47, 21, 65, 12

Mean = Average = 5 + 31 + 12 + 47 + 21 + 65 + 12 ÷ 7

= (5 + 31 + 12 + 47 + 21 + 65 + 12)

= ☐ Ans

Ans ÷ 7 = ☐

How does this get more challenging???

There are lots of ways of showing numbers.
In the examples above we have listed them out in the following way:

5, 31, 12, 47, 21, 65, 12

There weren't many numbers above.
So, it was easy to write them in a list.

What about the following?

Match	1	2	3	4	5	6	7	8
Aces	11	18	11	17	19	22	23	12

How would we find the median number of aces?

11 18 11 17 19 22 23 12

11 11 17 18 19 22 23

$\frac{17+18}{2}$

Median = 17½

What about the following data:

0, 0, 1, 1, 1, 2, 3, 3, 3, 3, 4, 4

It would be nice if it was shown as a list, but we can express the same data in a table:

Number of saves	0	1	2	3	4	5
Number of games	4	3	0	1	2	2

Median = 1

0 0 0 0 1 1 2 3 3 3 4 4

IMPORTANT
As students (and teachers) we need to be able to look at all the ways they give us data, and make sure we know that the table is showing first.

What happens if?

What happens if we take our data from above and add 5 to each number?

Becomes:

5, 31, 12, 47, 21, 65, 12

10, 36, 17, 52, 26, 70, 17

What happens to the mean, median, mode and range?

+5

Original : 1 2 3 4 5 5 6

Median = 4

Mode = 5

Range = 5

Mean = $\frac{26}{7}$ = 3.71

New : 6 7 8 9 10 10 11

Median = 9

Mode = 10

Range = 5

Mean = 8.71

New 2 : 2 4 6 8 10 10 12

Mode = 10

Range = 10

Median = 8

Mean = 7.42