MATHEMATICS Unit 16: Measuring Data	Year Group: 8 set 1-3

Key Vocabulary

Data	Information that we can analyse.
Average	A value that represents a typical, central value for a set of data. There are three different types of average. When most people talk about average they are probably talking about the mean.
Mode	The most common result in a set of data or the group that contains the biggest frequency.
Median	The middle item when the values are put in order from smallest to largest.
Mean	The total of all the data added together divided by the number of items there are.
Spread	A measure of how varied the data is.
Range	The highest result minus the lowest result. The larger the range, the larger the spread in the data.
Approximate	With grouped data, we don't know all the individual values and therefore all we can do is get a rough value for the mean.

Key facts / Diagrams

Working out the **estimated mean** from a frequency table with grouped data.

Weight, w Kg	Frequency	Mid point	Working out
40 < w ≤ 50	2	45	45x2=90
50 < w ≤ 60	15	55	55x15=825
60 < w ≤ 70	18	65	18x65=1170
70 < w ≤ 80	10	75	10x75=750
	45		2835

2835 ÷ 45 = 63   The estimated mean is **63kg**

Median:
3, 3, 4, 4, 4, 5, 6, 7, 8
When the numbers are in order, 4 is the middle number, so the median is 4.

Age	0-9	10-19	20-29	30-39
Frequency	24	35	27	14

There are 100 people in the table. The median will be at the 50th and 51st person. This person is in the 10-19 group, but we don't know their age.

Range:
3, 3, 4, 4, 4, 5, 6, 7, 8
The range is 8-3 = 5.

Age	0-9	10-19	20-29	30-39
Frequency	24	35	27	14

We don't know the actual ages of the people. The range could be as big as 39-0 = 39 or as little as 30-9 = 21.

Common misconceptions

- Some pupils may incorrectly estimate the mean by dividing the total by the numbers of groups rather than the total frequency.
- Some pupils may incorrectly think that there can only be one model class.
- Some pupils may incorrectly estimate the range of grouped data by subtracting the upper bound of the first group from the lower bound of the last group.

Worked examples

Mean:
3, 3, 4, 4, 4, 5, 6, 7, 8
Total: 3+3+4+4+4+5+6+7+8 = 44.
The mean = 44 ÷ 9 = 4.8888... ≈ 4.9.
The mean is just under 5.

Age	7	8	9	10
Frequency	24	35	27	14

There are 24 seven year-olds. The best way to find their total age is 24x7 = 168.
8 year-olds: 35x8 = 280
9 year-olds: 27x9 = 243
10 year-olds: 14x10 = 140

The total age is therefore 168+280+243+140 = 831.
The mean age is 831 ÷ 100 = 8.31.
The mean age is roughly 8 years 4 months.