NCETM
NATIONAL CENTRE FOR EXCELLENCE
IN THE TEACHING OF MATHEMATICS

Core concept 5.1: Statistical representations and measures

This document is part of a set that forms the subject knowledge content audit for Key Stage 3 maths. The audit is based on the NCETM Secondary Professional Development materials and there is one document for each of the 17 core concepts. Each document contains audit questions with check boxes you can select to show how confident you are (1 = not at all confident, 2 = not very confident, 3 = fairly confident, 4 = very confident), exemplifications and explanations, and further support links. At the end of each document there is space to type reflections, targets and notes. The document can then be saved for your records.

5.1.1 Understand and calculate accurately measures of central tendency and spread

How confident are you that you understand and can explain how to calculate measures of central tendency and spread from data presented in a range of ways?

1 ☐   2 ☐   3 ☐   4 ☐

Students will calculate statistical measures of central tendency (mean, median and mode) and spread (range). They should appreciate how these values, which summarise a set of data in some way, are affected by extra data being added to the whole data set and how such values can be found by comparing averages before and after the inclusion of additional data. For example:

What is the mean, median, mode and range of this data set?
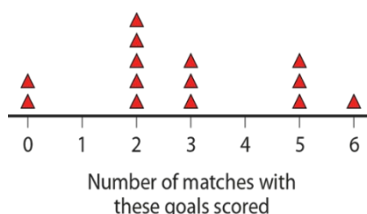
Number of matches with
these goals scored

Further support links

- NCETM Secondary Professional Development materials: Statistical Representations and Measures, pages 6–13

5.1.2 Construct accurately statistical representations

How confident are you that you can explain how to construct bar charts, pie charts, pictograms, and scatter graphs from data presented in a number of different ways?

1 ☐   2 ☐   3 ☐   4 ☐

Students will construct bar charts, pie charts, and pictograms, as well as representing bivariate data in scatter graphs. They should appreciate the difference between a frequency-based chart (such as a bar chart or pictogram) and a proportion-based chart (such as a pie chart).

Students should consider when one type of chart is more appropriate than another and what each type of diagram is communicating about the data. Engagement in a range of real-life, contextual problems that require the collection, analysis and representation of data will be an important part of study in this area.

For example:

A class of students were asked about their level of concern towards litter in their community. Construct a pie chart to represent these results:

Level of concern	Number of students
Very concerned	3
Somewhat concerned	9
Slightly concerned	12
Not concerned	6

Students might use a bar model to calculate the angle size for each sector:

3	9	12	6

360°

?	?	?	?

Or a ratio table:

No. of people	30	1	3	9	12	6
Angle size (°)	360°					

The resulting pie chart:
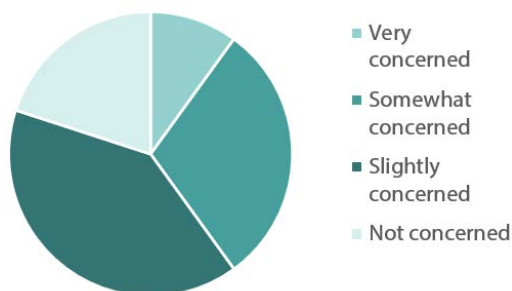
- Very concerned
- Somewhat concerned
- Slightly concerned
- Not concerned

Further support links

- NCETM Secondary Professional Development materials: Statistical Representations and Measures, pages 14–16

Notes