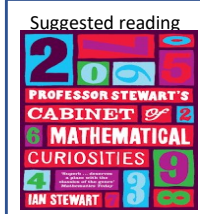


Year 8 – Reasoning with Data

The Data Handling Cycle



Want to know more? Scan the QR code to visit the curriculum overview for Year 8 Maths, including topic summaries, key words, and books that you may want to read in your own time



What do I need to be able to do?

By the end of this unit you should be able to:

- Set up a statistical enquiry
- Design and criticise questionnaires
- Draw and interpret multiple bar charts
- Draw and interpret line graphs
- Represent and interpret grouped quantitative data
- Find and interpret the range
- Compare distributions

Keywords

Hypothesis: an idea or question you want to test
Sampling: the group of things you want to use to check your hypothesis
Primary Data: data you collect yourself
Secondary Data: data you source from elsewhere e.g the internet/ newspapers/ local statistics
Discrete Data: numerical data that can only take set values
Continuous Data: numerical data that has an infinite number of values (often seen with height, distance, time)
Spread: the distance/ how spread out/ variation of data
Average: a measure of central tendency – or the typical value of all the data together
Proportion: numerical relationship that compares two things

Set up a statistical enquiry

Write a suitable hypothesis → Design a data collection sheet → Pros/ Cons of sampling → Pros/ Cons primary or secondary data → Discrete or continuous data?

Features of a data collection sheet

Grouped or ungrouped categories	Data Title	Tally	Frequency

Total number of that group observed

Design and criticise a questionnaire

The Question - be clear with the question - don't be too leading/ judgemental
 e.g How much pocket money do you get a week?

Responses – do you want closed or open responses? – do any options overlap? – Have you an option for all responses?

Zero option → £0 £0.01 - £2 £2.01 - £4 more than £4 → More option

NOTE: For responses about continuous data include inequalities $< x \leq$

Pictograms, bar and line charts

Pictogram

Language	Frequency
French	10
Spanish	8
German	4

● = 4 people

- Need to remember a key
- Visually able to identify mode

Bar Chart

How 15 travel to school

Transport	Number of students
Car	12
Walk	15
Bus	8
Bicycle	10

- Gaps between the bars
- Clearly labelled axes
- Scale for the axes
- Title for the bar chart
- Discrete Data

Line Chart

Number of books read in a month

Month	Number of books
1	1
2	2
3	4
4	6
5	4
6	2

- Gaps between the lines
- Clearly labelled axes
- Scale for the axes
- Discrete Data

Multiple Bar chart

Compares multiple groups of data

Key/ Colour code for separate groups of information

Average temperatures

Month	London (°C)	Moscow (°C)	Seoul (°C)
June	16	18	24
July	18	18	24
August	18	16	26

- Clearly labelled axes
- Scale for axes
- Comparable data bars drawn next to each other
- Gap between different categories of data

Draw and interpret Pie Charts

Remember a circle has 360°

Type of pet	Dog	Cat	Hamster
Frequency	32	25	3

There were 60 people asked in this survey (Total frequency)

Multiple method
 As 60 goes into 360 – 6 times
 Each frequency can be multiplied by 6 to find the degrees (proportion of 360)

$\frac{32}{60} \times 360 = 192^\circ$

Use a protractor to draw This is 192°

Represents quantitative, discrete data

Draw and interpret line graphs

Commonly used to show changing over time

The points are the recorded information and the lines join the points

Line graphs do not need to start from 0

More than one piece of data can be plotted on the same graph to compare data

It is possible to make estimates from the line e.g temperature at 9.30am is 5°C

Playground Temperature

Time	Temperature (°C)
9 am	4
10 am	6
11 am	8
12 noon	9

Grouped quantitative data

This is a frequency diagram There are no gaps between the bars

Time (minutes)	Frequency
$0 \leq t < 5$	4
$5 \leq t < 10$	6
$10 \leq t < 15$	5
$15 \leq t < 20$	8
$20 \leq t < 25$	10
$25 \leq t < 30$	1

Grouping the data is useful if there is a large spread of data to begin with

More than or equal to 25 and less than 30 minutes

The use of inequalities shows that this will be a frequency diagram

Find and interpret the range

The range is a measure of spread

A smaller range means there is less variation in the results – it is more consistent data

A range of 0 means all the data is the same value

Difference between the biggest and smallest values

Shop 1 highest value

Shop 1 lowest value

Shop 1 has the smallest range – this indicates it has a more consistent flow of customers each week

Range of customers = $25 - 22 = 3$ (Shop 1)