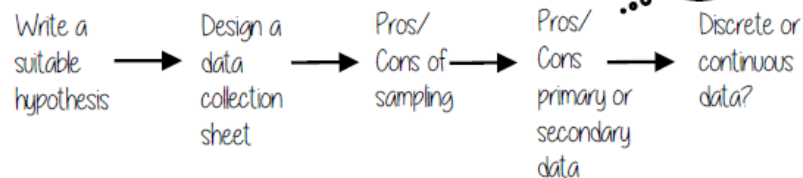


Knowledge Organiser: Year 8 Maths; Statistics



Set up a statistical enquiry



Features of a data collection sheet

	Data Title	Tally	Frequency
Grouped or ungrouped categories			

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



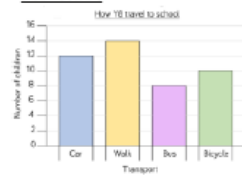
Pictogram

Language	
French	●●●●●
Spanish	●●●●●
German	●●●●●

● - 4 people

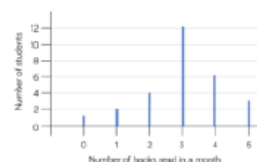
- Need to remember a key
- Visually able to identify mode

Bar Chart



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

Line Chart



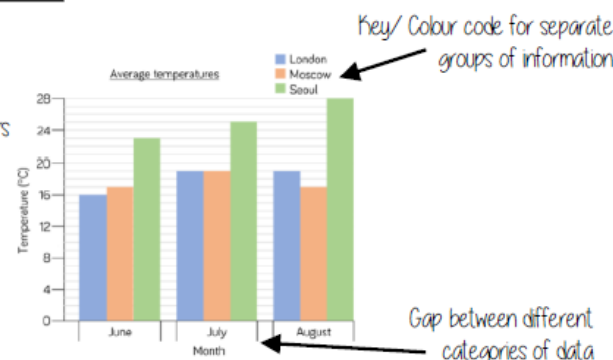
- Gaps between the lines
- Clearly labelled axes
- Scale for the axes
- Discrete Data

Represents quantitative data

Multiple Bar chart

Compares multiple groups of data

- Clearly labelled axes
- Scale for axes
- Comparable data bars drawn next to each other



Mean, Median, Mode

The Mean

A measure of average to find the central tendency... a typical value that represents the data

24, 8, 4, 11, 8

Find the sum of the data (add the values) 55

Divide the overall total by how many pieces of data you have $55 \div 5$

Mean = 11

The Median

The value in the center (in the middle) of the data

24, 8, 4, 11, 8

Put the data in order 4, 8, 8, 11, 24

Find the value in the middle 4, 8, 8, 11, 24

Median = 8

NOTE: If there is no single middle value find the mean of the two numbers left

The Mode (The modal value)

This is the number OR the item that occurs the most (it does not have to be numerical)

24, 8, 4, 11, 8

This can still be easier if the data is ordered first

4, 8, 8, 11, 24

Mode = 8

Keywords

Spread: the distance/ how spread out/ variation of data
 Average: a measure of central tendency - or the typical value of all the data together
 Total: all the data added together
 Frequency: the number of times the data values occur
 Represent: something that shows the value of another
 Outlier: a value that stands apart from the data set
 Consistent: a set of data that is similar and doesn't change very much
 Mean: the average of all the numbers

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

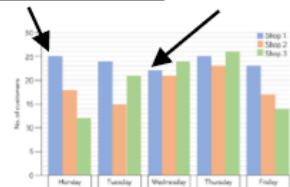
A range of 0 means all the data is the same value

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

Difference between the biggest and smallest values

Shop 1 highest value

Shop 1 lowest value



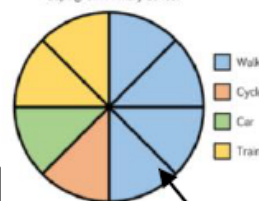
Range of customers = $25 - 22 = 3$ (Shop 1)

Read and interpret pie charts

Always read the data for the total amount the pie chart represents

Coppingham Primary School has 600 students

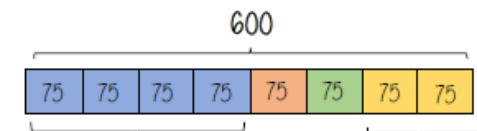
Coppingham Primary School



There are 8 equal sectors in this pie chart

There are 360° in a circle

This bar model represents the information in the bar chart



Walking represents half of this data

Train represents a quarter of this data

Draw and interpret a scatter graph

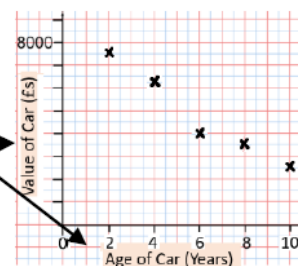
Age of Car (Years)	2	4	6	8	10
Value of Car (£)	7500	6250	4000	3500	2500

- This data may not be given in size order
- The data forms information pairs for the scatter graph
- Not all data has a relationship

"This scatter graph shows as the age of a car increases the value decreases"

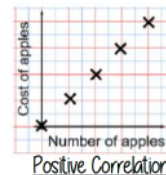
The link between the data can be explained verbally

All axes should be labelled

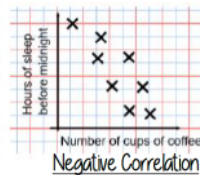


The axis should fit all the values on and be equally spread out

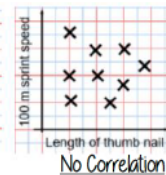
Linear Correlation



As one variable increases so does the other variable



As one variable increases the other variable decreases



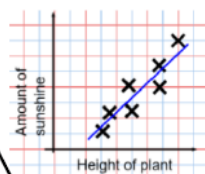
There is no relationship between the two variables

The line of best fit

The Line of best fit is used to make estimates about the information in your scatter graph

Things to know

- The line of best fit **DOES NOT** need to go through the origin (The point the axes cross)
- There should be approximately the same number of points above and below the line (It may not go through any points)
- The line extends across the whole graph



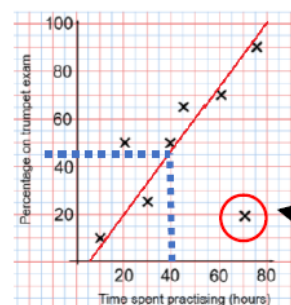
It is only an estimate because the line is designed to be an average representation of the data

It is always a straight line

Using a line of best fit

Interpolation is using the line of best fit to estimate values inside our data point

e.g. 40 hours revising predicts a percentage of 45



Extrapolation is where we use our line of best fit to predict information outside of our data
This is not always useful – in this example you cannot score more than 100%. So revising for longer can not be estimated

This point is an "outlier" It is an outlier because it doesn't fit this model and stands apart from the data

Draw pie charts

Type of pet	Dog	Cat	Hamster
Frequency	32	25	3

"32 out of 60 people had a dog"

The fraction of the 360 degrees represents dogs

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



Use a protractor to draw This is 192°

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

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



How do we use Knowledge Organisers in Mathematics?

How can you use knowledge organisers at home to help us?

- **Retrieval Practice:** Read over a section of the knowledge organiser, cover it up and then write down everything you can remember. Repeat until you remember everything.
- **Flash Cards:** Using the Knowledge Organisers to help on one side of a piece of paper write a question, on the other side write an answer. Ask someone to test you by asking a question and seeing if you know the answer.
- **Mind Maps:** Turn the information from the knowledge organiser into a mind map. Then reread the mind map and on a piece of paper half the size try and recreate the key phrases of the mind map from memory.
- **Sketch it:** Draw an image to represent each fact; this can be done in isolation or as part of the mind map/flash card.
- **Teach it:** Teach someone the information on your knowledge organiser, let them ask you questions and see if you know the answers.

How will we use knowledge organisers in Mathematics?

Knowledge organisers will be used before I complete a Learning Check or Common Assessment. I will spend part of the lesson looking over each of the key topics of the half term before completing the Learning Check or Common Assessment.

I will also use these at home to complete my own independent learning and revision of these key topics.