Data:

Data is information collected to answer questions. Data can be numbers or categories. Graphs help us organise data so it is easier to read and compare.

Different types of graphs are used for different kinds of data.

Types of Data:

In data handling, we first decide what type of data we need to collect. There are three main types of data:

- **Categorical Data:**

Data that describes qualities or characteristics, putting things into groups or categories (words).

Examples: Favorite color (blue, red, green), type of pet (dog, cat, fish), gender (boy, girl).

- **Discrete Data:**

This is data that can be counted and usually involves whole numbers. Examples: Number of siblings, number of students in a class, number of cars passing by, dice roll outcomes (1, 2, 3, 4, 5, 6).

- **Continuous Data:**

This is data that can be measured and can take any value within a range, including decimals. Examples: height, weight, time, temperature

Before collecting data, they must decide which type of data is suitable for their investigation. This helps them choose the best way to record and represent the data. Different types of graphs are used for different kinds of data.

Bar Charts

A bar chart is used to organise and compare categorical data. Each bar represents a category, and the height (or length) of the bar shows the frequency, which means how many times something occurs.

- One axis shows the categories (for example, types of fruit).
- The other axis shows the frequency.
- A scale is needed so numbers increase in equal steps.

• All bars must be the same width and separated by equal gaps.

Bar charts are useful:

• They help us compare data quickly.

• We can easily see the most and least common categories.

Dot Plot

A dot plot is used to represent small sets of numerical data. Each dot represents one piece of data and is placed above a number on a number line.

Key Features:

• The number line must have equal intervals.

• If the same number appears more than once, dots are stacked vertically.

Dot plots help us see:

• The most common value (mode)

• Clusters where values are close together

• Gaps where no data appears

Dot plots are best used:

• When data values are not too large

• When we want to see patterns clearly

Waffle Diagram:

A waffle diagram is used to show parts of a whole using a grid of equal squares, usually 100 squares. Each square represents 1% of the whole.

• The whole grid represents 100%.

• Shaded squares show the proportion of data in each category.

• Different colours are used for different categories.

Waffle diagrams are helpful:

• They make percentages easy to see visually.

• They help compare proportions clearly.

Pie Chart

A pie chart is a circular graph that shows how a whole is divided into parts. Each part is called a sector, and the size of each sector shows the proportion of the data.

• The whole circle represents 100% or 360°.

• Larger sectors represent larger proportions.

• All sectors together must make a complete circle.

Process step by step:

• Find the total number of responses.

• Convert each category into a fraction or

percentage.

• Use this to work out the size of each sector.

Link to waffle diagrams:

• Both show parts of a whole.

• The proportions should match.

Frequency Diagram

A frequency diagram is used for discrete numerical data, which means numbers that can be counted and listed individually.

Key points:

• Horizontal axis → the values

• Vertical axis → the frequency

• Bars touch because the data follows a number scale

Contrast between Bar charts and Frequency diagrams:

Bar charts compare categories, while frequency diagrams show how often number values occur. A frequency diagram is a type of bar graph that shows how often each value occurs, while a bar chart compares different categories. Bar charts are not suitable for time-based data because they do not show smooth change.

Line Graph:

A line graph is used when data changes continuously, especially over time.

- Points are plotted first
- Points are joined in order
- The line shows overall change, not separate comparisons

Scatter Graph:

A scatter graph is used when we want to investigate whether there is a relationship between two variables. In scatter graph:

- Data is paired
- Each point represents one individual
- The position of the point depends on both values
- Bars compare separate values, but scatter graphs help us see patterns or trends between two measurements.

Line of Best Fit

A line of best fit is a straight line drawn to show the overall trend in the data.

Important points

- The line does not need to touch every point
- It should go through the middle of the points
- There should be roughly equal points above and below

Types of Relationship:

- **Positive correlation:**

Line slopes upwards (As one variable increases, the other increases)

- **Negative correlation:**

Line slopes downwards (As one variable increases, the other decreases)

- **No correlation:**

Points are random (No line drawn)

Plotting Points to Form Lines and Shapes