

Year 8 - Unit 12: Statistical Diagrams

Learning Journey:

Prior Learning

- Read scales accurately and plot points on graphs.
- Calculate the mean, median, mode and range from lists of data.



Next Steps

- Analyse grouped data using frequency tables and averages.
- Apply statistical skills to GCSE problem-solving and data comparison.

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

- Draw and interpret pie charts, line graphs and stem-and-leaf diagrams accurately.
- Calculate and compare averages from statistical diagrams to interpret data.

Keywords:

- Pie chart** – A chart using sectors to show proportions.
- Sector** – A section of a pie chart representing a category.
- Line graph** – A graph showing how data changes over time.
- Stem-and-leaf diagram** – A way of organising numerical data while keeping the original values.
- Mean** – The total of the values divided by how many there are.
- Median** – The middle value when the data is in order.

Drawing pie charts

A **pie chart** is a visual representation of all items of data within a data set.

The sectors (or slices) of a pie chart are proportional to the different items in the data set; the larger the sector (slice size), the higher the frequency of data in that category.

Data labels (or a key) should be used to make the pie chart easy to understand.



To calculate the angle of a sector we use:

$$A = \frac{F}{T} \times 360$$

where:

- **A** represents the angle of a sector,
- **F** represents the category frequency,
- **T** represents the total frequency.

Top Tip: The sum of the angles for each category **must** equal 360.

Interpreting pie charts

To interpret pie charts we must remember that the frequency of a category and the angle it represents are always in a fixed **proportion**. This allows us to calculate the total frequency or frequency of a category as long as we know one angle and its associated frequency.



Example:

As we are told that Germany won 7 bronze medals, we can calculate how many degrees 1 medal is worth by doing $84 \div 7 = 12^\circ$

Every other category will be in the same ratio, where one medal is worth 12° , so it is easy to calculate.

Number of Gold Medals: $120 \div 12 = 10$ medals
Total Number of Medals: $360 \div 12 = 30$ medals

We can use this to compare multiple pie charts even when the total frequency is different.

REMEMBER:

Pie charts only show you the proportion of the total frequency that fall into each category. Two pie charts could look identical however one could be based on 20 people and the other 4000.

If there are no numbers you cannot comment on if there were more in one pie chart or another, only the proportion of each category.

Drawing and interpreting line graphs

A **line graph** is a way of displaying data to easily see a trend over time.

To draw a line graph, we need to **plot individual items** of data onto a set of axes, and then connect each **consecutive data** point with a **line segment**.



The **x-axis** is labelled as time e.g. Day of the week.
The **y-axis** is labelled as the dependent variable e.g. Earnings (£).

Drawing & interpreting steam and leaf

A stem-and-leaf diagram:

Stem	Leaves
7	6
8	0 5
9	2 6 6
10	
11	3

Key
7 | 6 represents 76 cm

The diagram shows the heights of 7 children, in centimetres.

76 80 85 92 96 96 113

The **stem** shows the digits in the tens (and hundreds) places.

The **leaves** in each row show the last digits of the data values.

Why are there two 6's in the same row?

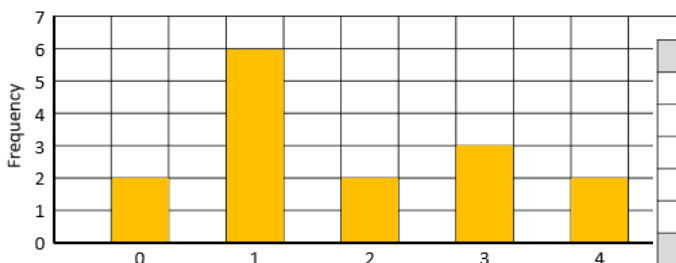
There are two children with a height of 96 cm.

In order to draw a stem and leaf diagram:

- 1 Order the numbers from smallest to largest.
- 2 Split the numbers into two parts, the last part must be one digit only.
- 3 Put the values into the diagram and create a key.

Finding averages from diagrams

Goals Scored by Year 8 Football Team



Goals	Frequency	Total Goals
0	2	0
1	6	6
2	2	4
3	3	9
4	2	8
Totals:	15	27

$$\text{Mean} = \frac{27}{15} = 1.8 \text{ goals}$$

$$\text{Mode} = 1 \text{ goal}$$

$$\text{Range} = 4 \text{ goals}$$

15 pieces of data, so we want the 8th

$$\text{Median} = 1 \text{ goal}$$