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| **UNIT 3: Drawing and interpreting graphs, tables and charts** |

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**SPECIFICATION REFERENCES**

G2 use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); use these to construct given figures and solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line

G14 use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)

G15 measure line segments and angles in geometric figures …

S2 interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, tables and line graphs for time series data and know their appropriate use

S4 interpret, analyse and compare the distributions of data sets from univariate empirical distributions through:

* appropriate graphical representation involving discrete, continuous and grouped data
* appropriate measures of central tendency (… mode and modal class) and spread (range, including consideration of outliers)

S5 apply statistics to describe a population

S6 use and interpret scatter graphs of bivariate data; recognise correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing

**PRIOR KNOWLEDGE**

Students should be able to read scales on graphs, draw circles, measure angles and plot coordinates in the first quadrant, and know that there are 360 degrees in a full turn and   
180 degrees at a point on a straight line.

Students should have experience of tally charts.

Students will have used inequality notation.

Students must be able to find the midpoint of two numbers.

Students should be able to use the correct notation for time using 12- and 24-hour clocks.

**KEYWORDS**

Mean, median, mode, range, average, discrete, continuous, qualitative, quantitative, data, scatter graph, line of best fit, correlation, positive, negative, sample, population, stem and leaf, frequency, table, sort, pie chart, estimate

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| **3a. Tables, charts and graphs**  (G14, S2, S4, S5) | **Teaching time**  10-12 hours |

**OBJECTIVES**

By the end of the sub-unit, students should be able to:

* Use suitable data collection techniques (data to be integer and decimal values);
* Design and use data-collection sheets for grouped, discrete and continuous data, use inequalities for grouped data, and introduce ≤ and ≥ signs; Sort, classify and tabulate data, both discrete and continuous quantitative data, and qualitative data; Extract data from lists and tables;
* Use correct notation for time, 12- and 24-hour clock and work out time taken for a journey from a timetable;
* Construct tables for time–series data;
* Design, complete and use two-way tables for discrete and grouped data;
* Calculate the total frequency from a frequency table;
* Read off frequency values from a table;
* Read off frequency values from a frequency table;
* Find greatest and least values from a frequency table;
* Identify the mode from a frequency table;
* Identify the modal class from a grouped frequency table;
* Plotting coordinates in first quadrant and read graph scales in multiples;
* Produce and interpret:
  + pictograms;
  + composite bar charts;
  + dual/comparative bar charts for categorical and ungrouped discrete data;
  + bar-line charts;
  + vertical line charts;
  + line graphs;
  + line graphs for time–series data;
  + histograms with equal class intervals;
  + stem and leaf (including back-to-back);
* Calculate total population from a bar chart or table;
* Find greatest and least values from a bar chart or table;
* Find the mode from a stem and leaf diagram;
* Identify the mode from a bar chart;
* Recognise simple patterns, characteristic and relationships in bar charts and line graphs;
* Interpret and discuss any data.

**POSSIBLE SUCCESS CRITERIA**

Construct a frequency table for a continuous data set, deciding on appropriate intervals using inequalities

Plan a journey using timetables.

Decide the most appropriate chart or table given a data set.

State the mode, smallest value or largest value from a stem and leaf diagram.

**OPPORTUNITIES FOR REASONING/PROBLEM SOLVING**

Misleading graphs, charts or tables can provide an opportunity for students to critically evaluate the way information is presented.

Students should be able to decide what the scales on any axis should be to be able to present information.

**COMMON MISCONCEPTIONS**

Students struggle to make the link between what the data in a frequency table represents, so for example may state the ‘frequency’ rather than the interval when asked for the modal group.

**NOTES**

Other averages are covered in unit 5, but you may choose to cover them in this unit.

Ensure that students are given the opportunity to draw and complete two-way tables from words.

Ensure that you include a variety of scales, including decimal numbers of millions and thousands, time scales in hours, minutes, seconds.

Misleading graphs are a useful life skill.