

## Year 9

In Year 9, alongside revision of Year 7 & 8 topics, we cover the following topics (bold topics are higher tier only):

<b>Half Term 1</b>
Currency conversion
Plotting straight-line graphs
Finding the gradient of a line
Gradient of a straight line graph as a rate of change
Finding the midpoint between two points
Similarity (of lengths) using scale factors or ratios
Rotations
Enlargements (with positive integer & fractional scale factors)
Corresponding angles on parallel lines
Alternate angles on parallel lines
Co-interior angles
Sets
Venn diagrams
Calculating probabilities using a Venn diagram
Theoretical possibility spaces
Vocabulary: discrete & continuous data
Modal class from grouped data
Tree diagrams
<b>Half Term 2</b>
Hypotheses
Design of an investigation to test a hypothesis
Fractional change
Original value fraction problems
Percentage change
Original value percentage problems
<b>Converting recurring decimals into fractions</b>
Rearranging formulae to change the subject

Volume of a cuboid
Units of volume (including conversion)
Speed, distance, time
Know the constraints that may be faced in designing an investigation to test a hypothesis including factors such as time, costs, ethical issues, confidentiality, convenience.
Mitigation of issues that might arise during the statistical enquiry process (e.g. identification of the population, non-response, unexpected outcomes)
<b>Petersen capture recapture formula</b>
Vocabulary: raw data, quantitative, qualitative, categorical, ordinal, discrete, continuous, ungrouped, grouped, bivariate & <b>multivariate</b>
Advantages & disadvantages of primary and secondary data
Identification of variables relevant to an investigation or hypothesis
Identifying and controlling extraneous variables
<b>Half Term 3</b>
Factorising quadratic expressions of the form $x^2 + bx + c$
Solving quadratic equations by factorising
Difference of two squares
Similarity (of areas & volumes) using scale factors or ratios
Distortion when interpreting 3D representations
Reflections
Plans and elevations of 3D shapes
Pythagoras' theorem
Sources of data
Vocabulary: population, sample frame & sample
Judgement sampling (how to, pros & cons)
Opportunity (convenience) sampling (how to, pros & cons)
Cluster sampling (how to, pros & cons)
Quota sampling (how to, pros & cons)
Random sampling (how to, pros & cons)
Systematic sampling (how to, pros & cons)
Inferring properties of populations or distributions from a sample
Vocabulary: reliability & validity
<b>Half Term 4</b>

Identify and interpret gradients and intercepts of linear functions
Use $y=mx+c$ to write the equation of a given straight line
Use the form $y = mx + c$ to identify parallel lines
Equation of a line through one point with a given gradient
Equation of a line through two given points
Bisection of a given angle
Drawing diagrams from written description
Constructing/drawing triangles accurately
Simple index numbers in context (including RPI, CPI & GDP)
Calculate simple index numbers
<b>Use weighted index numbers in context</b>
<b>Use chain based index numbers</b>
<b>Calculate chain based index numbers</b>
Interpret data related to rates of change over time (including percentage change, births, deaths, house prices, and unemployment) when given in graphical form
Make predictions using rates of change formulae, e.g. crude birth rate & <b>standardised birth rate</b>
<b>Half Term 5</b>
Apply limits of accuracy to simple calculations
Interpret limits of accuracy (e.g. the answer to a calculation to a sensible level of accuracy)
<b>Identify &amp; calculation with upper and lower bounds</b>
Mass, density & volume
Other compound units such as rates of pay and pressure.
<b>Use the form <math>y = mx + c</math> to identify perpendicular lines</b>
Factorising quadratic expressions of the form $ax^2 + bx + c$
<b>Solve quadratic equations that require rearrangement algebraically by factorising</b>
Area of a circle
Calculate areas of composite shapes (which can include circles or sectors)
Stratified sampling
Use summary statistical data to make estimates of population characteristics.
Use probability values to calculate expected frequency of a specified characteristic within a sample or population
Relative and absolute risk
Probability of combined events

Understand the difference between independent and conditional events
Use tree diagrams to find probabilities from two or more events
Determine line of best fit by drawing through a calculated double mean point ( $\bar{x}$ , $\bar{y}$ )
<b>Determine line of best fit by using the equation of the regression line</b>
Interpretation of gradient and intercept of a line of best fit in context
<b>Half Term 6</b>
<b>Calculate with fractional indices</b>
<b>Rationalise denominators which contain surds</b>
Graphs of linear functions
Graphs of quadratic functions
Graphs of simple cubic functions
The graph of the reciprocal function
<b>Graphs of exponential functions <math>y = kx</math> for positive values of <math>k</math></b>
The properties of the different graphs and how they relate to their equations
Volume of a right prism (including cylinders)
Determine factors that may lead to bias in an investigation
<b>The 'random response' technique for sensitive questions</b>
Key features to be considered when planning data collection: leading questions, avoiding biased sources, time factors, open/closed questions, different types of interview technique.
Design of suitable questions and data collection sheets
Pilots for questionnaires and pre-tests for experiments
Techniques used to deal with problems arising with collected data (e.g. missing data, incorrect formats, non-responses, incomplete responses, etc)
Data cleaning
<b>Control groups &amp; matched pairs</b>
The effect on the mean, mode and median of changes in the data (e.g. adding/removing an item)
The effect of transformations of the data on the mean, mode and median
The rationale for selecting appropriate types of average in context
Compare different data sets using appropriate measures of central tendency