Year 9 Maths Overview

Unit	Duration (lessons)	Learning Objectives/Outcomes
Data Handling	20	• To interpret and discuss the data in a variety of ways • To design and criticise a questionnaire • To interpret and design a variety of charts and graphs • To calculate and understand averages and measures of spread
Number	4	• To recall and apply multiplication facts to 10 x 10 • To understand and use four operations with positive and negative integers • To be able to recall integer squares and cubes
Algebra	16	• To write and manipulate algebraic expressions • To expand and factorise algebraic expressions • To substitute positive and negative numbers into algebraic formula • To use systematic trial and improvement to find approximate solutions of equations
Number	8	• To convert equivalent fractions and write in simplest form • To convert between fractions, decimals and percentages • To find fractions and percentages of amounts • To use a variety of methods to calculate percentage increases and decreases
Number	4	• To use percentages to solve problems including; compound interest, depreciation, VAT and income tax calculations • To calculate an original amount when given the transformed amount after a percentage change • To use compound interest
Inverse operations	4	• Multiply and divide numbers using the commutative, associative, and distributive laws and factorisation where possible, or place value adjustments • Understand 'reciprocal' as multiplicative inverse, knowing that any non-zero number multiplied by its reciprocal is 1 (and that zero has no reciprocal, because division by zero is not defined) • Find reciprocals • Use one calculation to find the answer to another • Solve word problems

		• Use inverse operations • Understand that the inverse operation of raising a positive number to a power n is raising the result of this operation to the power $^{1}/_{n}$ • Understand and use unit fractions as multiplicative inverses • Solve word problems • Use reverse percentage calculations • Use calculators for reverse percentage calculations by doing an appropriate division
Accuracy	4	• Round numbers to a given power of 10 • Round to the nearest integer and to a given number of significant figures • Round to a given number of decimal places • Estimate answers to calculations, including using rounding
Angles and triangles	8	• Recall and use properties of angles o angles at a point o angles at a point on a straight line, including right angles o perpendicular lines o vertically opposite angles • Distinguish between scalene, isosceles, equilateral, and right-angled • triangles • Understand and use the angle properties of triangles • Use the angle sum of a triangle is 180° • Understand and use the angle properties of intersecting lines • Understand and use the angle properties of parallel lines • Mark parallel lines on a diagram • Use the properties of corresponding and alternate angles • Understand and use the angle properties of quadrilaterals • Give reasons for angle calculations • Explain why the angle sum of a quadrilateral is 360° • Understand the proof that the angle sum of a triangle is 180° • Understand a proof that the exterior angle of a triangle is equal to the sum of the interior angles at the other two vertices • Recall and use these basic properties of angles in more complex problems

Polygons	4	• Calculate and use the sums of the interior angles of polygons • Use geometrical language appropriately and recognise and name pentagons, hexagons, heptagons, octagons and decagons • Use the angle sum of irregular polygons • Calculate and use the angles of regular polygons • Use the sum of the interior angles of an n-sided polygon • Use the sum of the exterior angles of any polygon is 360° • Use the sum of the interior angle and the exterior angle is 180° • Find the size of each interior angle or the size of each exterior angle or the number of sides of a regular polygon • Understand tessellations of regular and irregular polygons • Tessellate combinations of polygons • Explain why some shapes tessellate and why other shapes do not
Nets, Plans & Elevations	4	• Use 2-D representations of 3-D shapes • Use isometric grids • Draw nets and show how they fold to make a 3-D solid • Understand and draw front and side elevations and plans of shapes made from simple solids • Given the front and side elevations and the plan of a solid, draw a sketch of the 3-D solid
Use of Calculators	4	• Enter a range of calculations, including those involving time and money • Know how to enter complex calculations • Understand and interpret the calculator display • Understand that premature rounding can cause problems when undertaking calculations with more than one step • Use calculator functions including +, −, ×, ÷, x^2, $\sqrt{x}$, memory, x^y, $x^{1/y}$ and brackets
Ratio	4	• Divide a quantity in a given ratio • Solve a ratio problem in a context • Use ratios • Write ratios in their simplest form
Factors and multiples	4	• Identify factors, multiples and prime numbers from a list of numbers • Find the prime factor decomposition of positive integers • Find the common factors and common multiples of two numbers • Find the Highest Common Factor (HCF) and the Lowest Common Multiple (LCM) of two numbers

Probability Measures	2	• Distinguish between events which are; impossible, unlikely, even chance, likely, and certain to occur • Mark events and/or probabilities on a probability scale of 0 to 1 • Write probabilities in words or fractions, decimals and percentages
Relative Probability	2	• Understand and use estimates or measures of probability, including relative frequency • Use theoretical models to include outcomes using dice, spinners, coins • Find the probability of successive events, such as several throws of a single dice • Estimate the number of times an event will occur, given the probability and the number of trials • Compare experimental data and theoretical probabilities • Compare relative frequencies from samples of different sizes
Mutually exclusive outcomes	4	• List all outcomes for single events, and for two successive events, systematically • Use and draw sample space diagrams
Mutually exclusive and independent events	4	• Add simple probabilities • Identify different mutually exclusive outcomes and know that the sum of the probabilities of all these outcomes is 1 • Use 1 – p as the probability of an event not occurring where p is the probability of the event occurring • Find a missing probability from a list or table • Draw a probability tree diagram based on given information • Use a tree diagram to calculate conditional probability • Use conditional probabilities • Understand selection with or without replacement
Perimeter area and volume (i)	4	• Measure shapes to find perimeter or area • Find the perimeter of rectangles and triangles • Calculate perimeter and area of compound shapes made from triangles, rectangles and other shapes • Recall and use the formulae for the area of a triangle and a rectangle • Calculate areas of compound shapes • Find the area of a trapezium • Find the area of a parallelogram • Find the surface area of simple shapes (prisms) using the formulae for triangles and rectangles, and other shapes • Calculate volumes of right prisms, including triangular prisms, and shapes made from cubes and cuboids • Recall and use the formula for the volume of a cuboid

Parts of a circle	4	• Recall the definition of a circle and identify (name) and draw the parts of a circle • Understand related terms of a circle • Draw a circle given the radius or diameter
Perimeter area and volume (ii) Including Circles $C = \pi d$ & $A = \pi r^2$	8	• Find circumferences of circles and areas enclosed by circles • Recall and use the formulae for the circumference of a circle and the area enclosed by a circle • Use $\pi \approx 3.142$ or use the π button on a calculator • Find the perimeters and areas of semicircles and quarter circles • Calculate the lengths of arcs and the areas of sectors of circles • Answers in terms of π may be required • Find the surface area of a cylinder • Find the volume of a cylinder • Use volume to solve problems
Interpreting Data	8	• Interpret: o composite bar charts o comparative and dual bar charts o pie charts o stem and leaf diagrams o scatter graphs o frequency polygons o box plots o cumulative frequency diagrams o histograms • Recognise simple patterns, characteristics and relationships in line graphs and frequency polygons • Calculate the mean of a small data set, using the appropriate key on a scientific calculator • Σx and Σfx or the calculation of the line of best fit
Histograms	4	• Find the median from a histogram or any other information from a histogram, such as the number of people in a given interval • From histograms: o complete a grouped frequency table o define the frequency density