

Year 9 Mathematics – Gold Progression Grid

Overview

Students in Maths in year 9 start the GCSE content

1. Number
2. Algebra
3. Data and Averages
4. Fractions, Ratio and Percentages
5. Angles and Trigonometry
6. Area and Volume

Year 9 learning is built upon the mathematical foundations established in prior years and extended to prepare students for their GCSE at the end of KS4.

Students complete and keep a self-evaluation sticker for each topic in their exercise books to reflect on their learning and set themselves measurable targets to work on.

Overview	Knowledge: What will they Learn?	Literacy - Key Terminology	Extension	Assessment
Autumn Term 1 Unit 1 Number (7 weeks)	- Written methods of calculation - Negative numbers - Decimal calculations - Rounding and Estimating - Indices – mainly with a numerical base (see Unit 2 for algebraic indices) - squares, cubes, roots - including positive, fractional and negative indices; - laws of indices	- Factors - Multiples - Negative - Positive - Square - Cube - Prime - Decimal - Integer - Significant figures - Round / Rounding	- Apply laws of indices with algebraic bases. - Rationalise denominators involving binomial surds. - Perform calculations using fractional and negative	End of topic checkout

	• BIDMAS • Factors, multiples, primes, HCF, LCM, product of primes • Standard Form • Simple Surds - simplify surds eg $\sqrt{12} = 2\sqrt{3}$ - multiply simple surds eg $\sqrt{3} \times \sqrt{5} = \sqrt{15}$ - add and subtract simple surds eg $\sqrt{3} + 4\sqrt{3} = 5\sqrt{3}$ - rationalise simple surds eg $1/\sqrt{5}$	• Multiply • Divide • Root • Product • Factor tree • Index / Indices • Base • Power • Brackets • Common factors • Place value • Accuracy • Rational • Surds • Irrational • Recurring decimals • Fractional • Standard form • Rationalise	indices in complex contexts. • Solve multi-step problems involving standard form and estimation bounds.	
Autumn Term 2 • Unit 2 Algebra Basics (5 weeks)	• Know the difference between a term, expression, equation, formula and an identity; • Collect like terms • Substitution • Multiply and divide algebraic terms using laws of indices • Expand and factorise a single bracket • Solve linear equations including creating • Change the subject of a simple formula • Sequences	• Variables • Constants • Expression • Equation • Formula • Identity • Index / Indices • Negative indices • Fractional indices • Like terms • Power • Linear • Quadratic • Factor	• Expand and factorise quadratic expressions. • Solve quadratic equations by factorising. • Solve simultaneous equations algebraically. • Form algebraic proofs involving	• End of topic checkout

	- types of sequence - arithmetic, quadratic, Fibonacci, geometric - use an nth term - nth term of arithmetic sequences - nth term of quadratic sequences	• Simplify • Collect terms • Expand brackets • Factorise • Substitute • Solve equations • Rearranging formulae • Subject of the formula • Arithmetic sequences • Quadratic sequences • Geometric sequences • Fibonacci sequences • nth term • Position-to-term rule • Term-to-term rule • Consecutive terms	sequences and expressions	
Progress check	Grade boundaries for assessing progress are determined at the end of each term, taking into account the difficulty of the paper sat and the flight path of the individual student • Above Expected: Students meet all bullet points within the what they will learn column for the relevant units, and can apply skills to unfamiliar problems with minimal scaffolding. • Expected:			

	Students meet most bullet points within the what they will learn column for the relevant units, with occasional support needed for multi-step problems. - Below Expected: Students meet two or fewer bullet points within the what they will learn column for the relevant units, and require regular scaffolding to access the curriculum. - Cause for concern: Students produce insufficient work to meet any of the what they will learn descriptors and/or demonstrate significant gaps in number fluency that prevent progress.			
Spring Term 1 Unit 3 Data & Averages (5 weeks)	- Use two way tables (and frequency trees) - Averages and range of listed data - Compare data - Stem and Leaf Diagrams - Averages from a frequency table - Frequency polygons - Time series graphs - Scatter graphs and correlation - Pie charts, bar charts	- Mean - Median - Mode - Range - Average - Discrete data - Continuous data - Qualitative data - Quantitative data - Data - Scatter graph - Line of best fit - Correlation - Sample - Population - Stem and leaf - Frequency - Estimate	- Interpret cumulative frequency graphs and box plots. - Compare distributions using median and interquartile range. - Estimate mean from grouped data. - Analyse misleading statistical representations.	- End of topic checkout - Mid Year Exam
Spring Term 2	- Reciprocals - Fraction calculations - Ratios	- Direct proportion - Inverse proportion - Ratio	Solve problems involving	End of topic checkout

Unit 4 Fractions, ratio and Percentages (6 weeks)	- simplifying - 1:n - sharing in a ratio - combining ratios - ratios to fractions • Proportion - not algebraic. For example best buys, exchange rates, recipes, scale models • Fraction, decimal, percentage relationships • Recurring decimal to a fraction • Percentages including multipliers, reverse percentages	• Simplify ratio • Scale factor • Fractions • Share • Map scales • Sum • Difference • Total • Proportion • Cost • Unitary method • Unit • Conversion • Exchange rates • Reciprocals • Fraction • Numerator • Denominator • Mixed number • Improper fraction • Proper fraction • Combined ratio • Percentages • Multiplier • Reverse percentages	algebraic proportion. • Use compound percentage change and exponential growth models. • Solve reverse percentage problems in multi-step financial contexts. • Work with repeated percentage change and compound interest.	
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Summer Term 1 Unit 5 Angles and Trigonometry (4 weeks)	2D shape properties - Basic angle rules - Angles in parallel lines - Angles in polygons - Pythagoras - Trigonometry - right angled triangles 3D trigonometry	- Quadrilateral - Angle - Polygon - Interior angles - Exterior angles - Proof - Tessellation - Symmetry - Parallel lines - Corresponding angles - Alternate angles - Co-interior angles - Vertices - Edge - Face - Sides - Pythagorean Theorem - Sine	- Solve 3D trigonometry problems. - Prove geometric relationships using algebra and angle reasoning	- End of topic checkout - End of Year assessment

		• Cosine • Tangent • Trigonometry • Opposite • Hypotenuse • Adjacent • Ratio • Elevation • Depression • Segment • Length		
Summer Term 2 • Unit 7 Area and Volume (5 weeks)	• Perimeter and area of triangle, trapezium, parallelogram, compound shapes • Circles - parts of, circumference and area including semi circles, compound shapes • Sectors of circles - arc length and area • Surface area of prisms • Surface area of spheres, cones and pyramids • Volume of prisms & cylinders • Volume of spheres, cones and pyramids • Convert between units of length, area and volume • Upper and lower bounds • Error intervals	• Triangle • Rectangle • Parallelogram • Trapezium • Area • Perimeter • Formula • Length • Width • Prism • Compound shapes • Measurement • Polygon • Cuboid • Volume • Nets • Isometric drawings • Symmetry • Vertices • Edge • Face • Circle	• Calculate volume and surface area of frustums. • Solve similarity problems involving area and volume scale factors. • Apply upper and lower bounds in multi-step measurement problems involving composite solids.	• End of topic checkout

		• Segment • Arc • Sector • Cylinder • Circumference • Radius • Diameter • Pi • Composite shapes • Sphere • Cone • Capacity • Hemisphere • Frustum • Bounds • Accuracy • Surface area		
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- Cause for concern:

Students produce insufficient work to meet any of the what they will learn descriptors and/or demonstrate significant gaps in number fluency that prevent progress.