

Mathematics
Key Stage 3 Curriculum Map

Woolwich Polytechnic School for Boys

YEAR 7 CURRICULUM EXPECTATIONS

KEY KNOWLEDGE	KEY SKILLS
By the end of Year 7, pupils know and understand: • Number and proportionality: place value, ordering and equivalence across integers, decimals, fractions and percentages; operations with positive and negative numbers; powers, roots, BIDMAS, factors, multiples, primes, reciprocals and the unitary method. • Algebra: notation, terms, coefficients and like terms; expressions and substitution; inverse operations and equations; the distributive law, expansion and factorisation. • Geometry and measure: metric units and time; properties and symmetry of 2D shapes; coordinates; perimeter, area and angle facts. • Statistics: mean, median, mode and range; frequency and two-way tables; tally charts, pictograms and bar charts. • Probability and connections: the probability scale, sample spaces and mutually exclusive events; links between numerical, algebraic, geometric and statistical representations.	By the end of Year 7, pupils can: • Calculation fluency: calculate accurately with integers, decimals, fractions, percentages and negative numbers using efficient mental, written and calculator methods. • Representation and algebra: compare, order, round and estimate; convert between fractions, decimals and percentages; simplify and substitute; solve equations; expand and factorise. • Geometry and measure: convert units, calculate time, use coordinates, find perimeter and area, measure and draw angles, and apply angle facts to find unknowns. • Data and probability: collect, present and interpret data; calculate and interpret averages; determine and express theoretical probabilities. • Problem solving and reasoning: select strategies for familiar and unfamiliar multi-step problems; explain and justify methods; check answers; identify and correct errors.

YEAR 7



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	AUTUMN 1 Units 1a - 1g	AUTUMN 2 Units 2a - 2f	SPRING 1 Units 3a - 3e	SPRING 2 Units 4a - 4d	SUMMER 1 Units 5a - 5f	SUMMER 2 Units 6a - 6c
KNOWING WHAT	Place value in integers and decimals; powers of ten. Four operations, including calculations with negative numbers. Powers, roots and the agreed order of operations. Algebraic notation, terms, coefficients and like terms.	Substitution, inverse operations and the structure of equations. Units of time, clocks, timetables and calendars. Metric units of length, mass and capacity. Properties and symmetry of 2D shapes; the meaning of perimeter.	Area of rectangles, triangles and compound shapes. Cartesian coordinates in all four quadrants. Factors, multiples, primes, HCF, LCM and prime factorisation. Fraction notation, equivalence and comparison.	Simplest form, improper fractions and mixed numbers. Common denominators and the structure of fraction addition and subtraction. The distributive law, expansion and factorisation. Angle types, notation and measurement.	Angle facts for a straight line, a point, vertically opposite angles and triangles. Mean, median, mode and range. Frequency and two-way tables; tally charts, pictograms and bar charts. Proportionality, the unitary method, reciprocals and fraction operations.	Fractions of amounts and fraction–decimal–percentage equivalence. Percentages and one quantity as a percentage of another. Probability language, the probability scale, sample spaces and mutually exclusive events. Connections across the Year 7 number, algebra, geometry, statistics and probability curriculum.
KNOWING HOW	Order, compare and round integers and decimals. Use mental and written methods for integer and decimal calculations; interpret remainders. Calculate with negative numbers and apply BIDMAS accurately. Simplify single-variable, multi-variable and non-linear expressions.	Substitute into expressions and formulae, including negative values. Solve one-step and two-step linear equations using inverse operations. Convert units and calculate time durations. Classify shapes and calculate the perimeter of simple and compound shapes.	Calculate areas from grids and dimensions. Read, plot and complete shapes using coordinates. Apply divisibility tests; find HCF and LCM; produce prime factorisations. Generate equivalent fractions and compare or order fractions.	Simplify, order and convert between mixed numbers and improper fractions. Add and subtract fractions and mixed numbers. Expand single brackets, simplify and factorise into one bracket. Estimate, measure and draw angles accurately using a protractor.	Find unknown angles and justify solutions using angle facts. Calculate and interpret averages and range in context. Collect, present and interpret data using suitable tables and charts. Solve proportional problems and multiply or divide fractions and mixed numbers.	Retrieve and apply Year 7 knowledge in cumulative assessment and problem solving. Find fractions of amounts with and without a calculator. Convert and order fractions, decimals and percentages; calculate percentages. Calculate theoretical probabilities and express them as fractions, decimals and percentages.
PLANNED ASSESSMENT	Unit tests for 1a–1g. Ongoing formative assessment through retrieval, questioning, classwork and homework.	Unit tests for 2a–2f. Formal cumulative assessment followed by consolidation and responsive teaching.	Unit tests for 3a–3e. Ongoing formative assessment through retrieval, questioning, classwork and homework.	Unit tests for 4a–4d. Formal cumulative assessment followed by consolidation and responsive teaching.	Unit tests for 5a–5f. Ongoing formative assessment through retrieval, questioning, classwork and homework.	End-of-year assessment, followed by unit tests for 6a–6c. Activity Week includes collaborative mathematical problem solving.

YEAR 7



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YEAR 8 CURRICULUM EXPECTATIONS

KEY KNOWLEDGE	KEY SKILLS
By the end of Year 8, pupils know: • Equivalence and proportional relationships among fractions, decimals, percentages and ratios, including percentage change, scale and money. • Number structure involving powers, roots, index laws, standard form, significant figures, estimation and recurring decimals. • Algebraic structure across sequences, formulae, equations, inequalities, expansion, factorisation and algebraic fractions. • Coordinate and graphical representations, including midpoints, transformations and equations of straight lines. • Geometrical and measurement relationships involving angles, shapes, circles, area, surface area, volume and unit conversion. • Statistical set and number concepts, including averages, diagrams, Venn diagrams, factors, primes, HCF and LCM.	By the end of Year 8, pupils can: • Calculate fluently with integers, decimals, fractions, percentages, ratios, powers and standard form using appropriate methods. • Select and combine methods to solve multi-step numerical, financial and proportional problems. • Generate sequences; solve equations and inequalities; expand, factorise and simplify algebraic expressions and fractions. • Plot and interpret coordinates and straight-line graphs; calculate midpoints and perform transformations accurately. • Apply angle facts and formulae to solve problems involving circles, area, surface area and volume. • Construct and interpret tables, statistical and Venn diagrams; justify conclusions, estimate, check and correct solutions.

YEAR 8



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	AUTUMN 1 Units 1 - 4	AUTUMN 2 Units 5 - 8	SPRING 1 Units 9 - 12	SPRING 2 Units 13 - 16	SUMMER 1 Units 17 - 20	SUMMER 2 EOY + Units 21 - 24
KNOWING WHAT	Fraction, decimal and percentage equivalence; percentages of amounts and percentage change. Decimal operations and the principles used to compare value for money. Roots, powers, positive and negative indices, index laws and common algebraic factors. The structure of linear equations, including brackets, unknowns on both sides and denominators.	Term-to-term and position-to-term rules for arithmetic and pattern sequences. Equivalent ratios, sharing, scale diagrams and links between ratio, fractions and percentages. Significant figures and the role of rounding in estimation. Coordinates, line segments and the midpoint of two points.	Area formulae for compound shapes, parallelograms and trapeziums; units of area. Circle vocabulary and the formulae for circumference and area. Standard form with positive and negative powers of ten. Sets, Venn diagrams, factors, multiples, primes, HCF, LCM and prime factor decomposition.	Properties and nets of three-dimensional shapes. Surface area of cubes, cuboids and prisms. Volume of cubes, cuboids and prisms; units of volume. Horizontal, vertical and diagonal lines; straight-line equations and graphs.	Translations and reflections on coordinate grids. Angle facts involving lines, points, triangles, quadrilaterals, parallel lines and polygons. Pie charts, line graphs, stem-and-leaf diagrams and averages from diagrams. Linear inequalities, inequality notation and number-line representations.	Expansion and factorisation of single and double brackets, including quadratic expressions. Operations with fractions and mixed numbers. The structure and manipulation of algebraic fractions. Recurring decimal notation and the relationship between fractions and recurring decimals.
KNOWING HOW	Convert between fractions, decimals and percentages; calculate fractions, percentages and percentage change. Calculate accurately with decimals and compare financial options. Apply index laws and simplify expressions and algebraic fractions by cancelling common factors. Construct and solve linear equations in a range of forms.	Generate and use term-to-term and position-to-term rules. Simplify ratios, share amounts, find unknown quantities and interpret scale diagrams. Round to significant figures and estimate calculations. Plot coordinates, calculate midpoints and solve coordinate problems.	Calculate compound areas and convert area units. Substitute into circle formulae and calculate circumference and area. Convert between ordinary numbers and standard form and calculate with powers of ten. Complete and interpret Venn diagrams and use prime factors to find HCF and LCM.	Identify and describe 3D shapes and construct or interpret their nets. Calculate surface areas from nets and formulae. Calculate volumes of cubes, cuboids and prisms and convert volume units. Plot straight-line graphs and determine their equations.	Translate and reflect shapes accurately using coordinates. Combine angle facts to solve multi-step problems. Draw, interpret and compare statistical diagrams and calculate averages from them. Represent and solve single linear inequalities.	Retrieve and apply Year 8 knowledge in cumulative assessment and problem solving. Expand, simplify and factorise algebraic expressions. • Calculate with numerical and algebraic fractions. Use written division and recurring notation to convert fractions to recurring decimals.
PLANNED ASSESSMENT	Unit tests for Units 1-4. End-of-half-term cumulative assessment after Unit 4, supported by ongoing formative assessment.	Unit tests for Units 5-8. Autumn assessment after Unit 7, followed by Unit 8 and responsive consolidation	Unit tests for Units 9-12. Ongoing formative assessment through retrieval, questioning, classwork and homework.	Unit tests for Units 13-16. Spring assessment after Unit 15, followed by Unit 16 and responsive consolidation.	Unit tests for Units 17-20. Ongoing formative assessment through retrieval, questioning, classwork and homework.	Revision and end-of-year assessment at the start of Summer 2, followed by unit tests for Units 21-24.

YEAR 8



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YEAR 9 CURRICULUM EXPECTATIONS

KEY KNOWLEDGE	KEY SKILLS
By the end of Year 9, pupils know: • Number and proportional structures involving fractions, decimals, percentages, percentage change, reverse percentages, simple interest, ratio and rates. • Number representation and accuracy involving standard form, positive and negative indices, rounding, truncation, error intervals and calculator notation. • Algebraic structure across formulae, inequalities, linear and quadratic expressions, factorisation, equations and their graphical representations. • Geometrical and measurement relationships involving Pythagoras, angles, bearings, circles, sectors, cylinders, transformations, similarity, congruence, vectors and constructions. • Statistical and probabilistic models involving expected frequency, tree diagrams, scatter graphs, grouped data, averages and frequency polygons. • The role of modelling, assumptions, units, exact and approximate values, bounds, proof and critical interpretation in validating mathematical results.	By the end of Year 9, pupils can: • Calculate fluently with percentages, standard form, indices, ratio and rates, selecting exact, approximate or calculator methods appropriately. • Form, rearrange, simplify, factorise and solve formulae, inequalities and linear or quadratic equations using accurate algebraic notation. • Plot and interpret linear, quadratic, distance-time and scatter graphs and connect their features to algebraic forms and real contexts. • Solve multi-step problems involving reverse percentages, direct and inverse proportion, speed, rates, currency, scale and similarity. • Apply geometrical facts and theorems to calculate measures and solve problems involving bearings, transformations, vectors and constructions. • Model and analyse probability and data, justify conclusions, test assumptions, check units and bounds, evaluate limitations and communicate reasoning precisely.

YEAR 9



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	AUTUMN 1 Units 1 - 5	AUTUMN 2 Units 6 - 10	SPRING 1 Units 11 - 15	SPRING 2 Units 16 - 19	SUMMER 1 Units 20 - 24	SUMMER 2 EOY + Units 25 - 29
KNOWING WHAT	Fraction, decimal and percentage equivalence, ordering and amounts. Percentage change, reverse percentages and simple interest. Experimental probability, expected frequency, frequency trees and tree diagrams. Standard form calculations and calculator notation. The structure of formulae and changing the subject.	Single and double linear inequalities and their solution sets. Straight-line graphs in the forms y = mx + c and ax + by = c. Quadratic graphs, roots, intercepts and turning points. Quadratic factorisation, the difference of two squares and solutions. Index laws with positive and negative powers.	Truncation, rounding and error intervals. Plans and elevations as representations of three-dimensional objects. Pythagoras' theorem and the hypotenuse of a right-angled triangle. Ratio, sharing and multiplicative comparison. Direct and inverse proportion and currency conversion.	The relationships between speed, distance and time. Rates, unit rates, total cost and rates of pay. Distance-time graphs and the meaning of gradient in context. Arc length, sector area, and the surface area and volume of cylinders.	Angle relationships involving parallel lines, quadrilaterals and polygons. Three-figure bearings and geometrical conventions. Translations, reflections, rotations and positive enlargements. Similarity, scale factors and proportional sides. Congruence, triangle conditions and accurate construction.	Correlation, lines of best fit and the limitations of scatter graphs. Types of data, suitable representations, averages and population comparisons. Grouped frequency tables, estimated averages and frequency polygons. Column vectors, scalar multiplication and parallel vectors. Loci, perpendicular and angle bisectors, and standard constructions.
KNOWING HOW	Convert, order and calculate with fractions, decimals and percentages. Solve percentage-change and reverse-percentage problems and calculate simple interest. Calculate and interpret experimental probabilities and expected frequencies using trees. Calculate with standard form and use calculator displays correctly. Rearrange one-step and multi-step formulae.	Construct, solve and represent single and double inequalities. Plot and interpret straight-line graphs and determine their equations. Plot quadratic graphs and solve equations graphically. Factorise and solve quadratic equations algebraically. Apply index laws to simplify numerical and algebraic expressions.	Truncate values and determine appropriate error intervals. Draw and interpret plans, front elevations and side elevations. Use Pythagoras' theorem to calculate missing lengths in 2D contexts. Simplify ratios, share quantities and solve ratio problems. Solve direct and inverse proportion problems and convert currencies.	Calculate speed, distance and time in multi-step contexts. Calculate unit rates, costs, elapsed time and rates of pay. Plot and interpret distance-time graphs and calculate speed from gradient. Calculate arc lengths, sector areas, cylinder surface areas and volumes.	Combine angle facts and calculate angles in polygons and parallel-line diagrams. Measure, draw and calculate bearings in contextual problems. Perform and describe mixed transformations, including enlargements. Use similarity to determine unknown sides and solve scale problems. Identify congruent triangles and construct triangles accurately.	Retrieve and apply Year 9 knowledge in cumulative assessment and problem solving. Plot and interpret scatter graphs and use lines of best fit cautiously. Select, present and compare data and estimate averages from grouped data. Add, subtract and scale column vectors and identify parallel vectors. Carry out accurate constructions and solve construction problems.
PLANNED ASSESSMENT	Unit tests for Units 1-5, supported by ongoing formative assessment through retrieval, questioning, classwork and homework.	Unit tests for Units 6-10. Autumn assessment after Unit 8, followed by Units 9-10 and responsive consolidation.	Unit tests for Units 11-15, supported by ongoing formative assessment and targeted feedback.	Unit tests for Units 16-19. Spring assessment after Unit 18, followed by Unit 19 and responsive consolidation.	Unit tests for Units 20-24, supported by cumulative retrieval and preparation for the end-of-year assessment.	Revision and end-of-year assessment at the start of Summer 2, followed by unit tests for Units 25-29.

YEAR 9