

Mathematics
Key Stage 3 Curriculum Map

Woolwich Polytechnic School for Boys

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

Mathematics 11F
Key Stage 4 Curriculum Map

Woolwich Polytechnic School for Boys

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
UNIT	Factors, Multiples and Primes Fractions Expressio ns and Equations	Angles and Right-angled triangles Surface area and volume Statistical diagrams	Probability Inequalities and Vectors Percentage change	Compound measures, Ratio and proportion Standard form and Sequences Linear graphs	Summer Exams	
KEY CONTENT	Find the lowest common multiple. Find the highest common factor. Order fractions, mixed numbers. Add, subtract mixed numbers. Multiply and divide with mixed numbers. Simplify expressions using index laws. Simplify algebraic fractions by cancelling common factors. Construct and solve equations. Factorise to solve quadratic equations.	Angles in polygons. Apply Pythagoras' theorem in 2D. Find unknown sides and angles in right-angled triangles. Use exact values of trigonometric ratios. Find the surface area of cube, cuboids, cylinder and composite shapes. Find the volume of cube, cuboid, cylinder, and composite shapes. Draw and interpret pie charts. Plot and interpret scatter graphs. Use lines of best fit.	Solving inequalities with the unknown on both sides Solving double inequalities Constructing and solving inequalities Adding and subtracting column vectors Multiplying column vectors by a scalar Identifying parallel vectors Percentage change with a calculator Finding original values in percentage calculations Finding the percentage an amount has been changed by Compound interest calculations Growth and decay(U988)	Calculate with speed, rates, density and pressure. Combine and change ratios. Calculate with ratios and algebra. Solve direct and indirect word problems. Multiply, divide, add and subtract numbers in standard form. Position-to-term rules for arithmetic sequences, geometric sequences and sequences of patterns. Find and interpret equations of straight-line graphs. Find the equation of a straight line from two points on the line.		
PLANNED ASSESSMENT	End of topic units Exam practice questions	Fluency	January PPE's	Exam Fluency practice		

Mathematics 11H
Key Stage 4 Curriculum Map

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	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
UNIT	Surds Algebraic fractions Equations	Pythagoras theorem and trigonometry Circle geometry Statistical diagrams	Probability Inequalities Functions	Transformations, Iteration and Algebraic proof Similarity and Geometric proof Graphs	EXAMS	EXAMS
KEY CONTENT	Multiply, divide, add and subtract surds. Simplify surds. Expand brackets with surds. Rationalise denominators containing a single term. Rationalise denominators containing two terms. Simplify algebraic fractions by factorising into one and two bracket. Add, subtract, multiply and divide algebraic fractions. Solve quadratic equations graphically, using the quadratic formula and by completing the square. Solve simultaneous equations involving quadratics.	Use the exact values of trigonometric ratios. Use trigonometric graphs. Apply the sine, cosine and area rule. Use pythagoras' theorem and trigonometry in 3D. Angles subtended at the centre or circumference of a circle. Circle theorems for chords and tangents. Alternate segment theorem. Angles in segments and cyclic quadrilaterals. Draw histograms with equal class widths. Draw histograms with unequal class widths. Interpret histograms. Calculate averages from histograms	Conditional probabilities from tables and Venn diagram Conditional probabilities from tree diagrams. Product rule for counting. Graphs of linear inequalities. Solving quadratic inequalities. Substitute into functions. Substitute into composite functions. Find composite functions Find inverse functions	Translate, reflect and transform graphs. Find approximate solutions to equations using iteration. Writing algebraic proofs. Find the surface area and volume of similar shapes. Geometric proofs with vectors. Geometric proofs with angle facts Estimate gradients and areas under non-linear graphs. Calculate distances from velocity-time graphs.		
PLANNED ASSESSMENT	Unit Topic Tests (Units 1–3), Retrieval Assessment, GCSE Style questions	Fluency practice	January PPE	March mocks Practicing of exam papers	Summer exams	