MATHEMATICS

CURRICULUM OVERVIEW

Quality of Education
NOTTINGHAM ACADEMY

MATHEMATICS CURRICULUM- LONG TERM PLAN

CURRICULUM INTENT

At Nottingham Academy, our Mathematics curriculum aims to provide high-quality education for all students, ensuring inclusivity and opportunities for success. Our approach supports students to know more, remember more, and therefore be able to do more, fostering fluent mathematicians skilled in reasoning and problem-solving.

Our curriculum follows the national curriculum and employs a spiral approach at Key Stage 3, allowing students to revisit and retain concepts, with a strong emphasis on developing deep conceptual understanding. At Key Stage 4, we support students in making connections across mathematical ideas to develop fluency and competence in solving complex problems.

We prioritise clear teaching, modelling mathematical techniques, and encouraging precise use of mathematical language. Retrieval practice is integral, with activities embedded at each key stage to deepen understanding and retention. Our curriculum plan is flexible, varying to meet the ability levels and knowledge acquisition of our students, ensuring tailored support and challenge.

We emphasize the development of essential skills such as problem-solving, creativity, and teamwork, crucial for both academic success and numeracy for life. Celebrating student success through our reward system, we recognise resilience, engagement, and commitment, aligning with our core values.

Adaptations for students with SEND needs include differentiated instruction and tailored resources. We utilise visual aids, interactive activities, and technology to enhance understanding and engagement. Regular assessments and personalised feedback ensure all students excel and thrive in Mathematics.

KEY CONCEPTS

Geometry

- Understanding and using geometric properties and relationships.
- Solving problems involving shapes, angles, and measures.

Ratio

- Understanding and working with ratios and proportional relationships.
- Solving problems involving scale and multiplicative change.

Probability/Statistics

- Understanding and calculating probability.
- Collecting, analysing, and interpreting data.

Algebra

- Understanding and using algebraic notation.
- Solving equations and inequalities.

Number

- Understanding place value, ordering, and operations.
- Working with fractions, decimals, and percentages.

KEY CONCEPTS MAPPING

	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Year 7	Sequences Algebraic Notation Equality and Equivalence Place Value and Ordering Fraction, Decimal, and Percentage Equivalence		Solving Problems with the Four Operations Fractions and Percentages of Amounts Operations and Equations with Directed Numbers Addition and Subtraction of Fractions		Constructing and Measuring Using Geometry Developing Geometric Reasoning Developing Number Sense Sets and Probability Prime Numbers and Proof	
Year 8	Ratio and Scale Multiplicative Change Multiplying and Dividing Fractions Working in the Cartesian Plane Representing Data Tables and Probability		Brackets, Equations, and Inequalities Sequences Indices Fractions and Percentages Standard Index Form Number Sense		Angles in Parallel Lines and Polygons Area of Trapezia and Circles Line Symmetry and Reflection The Data Handling Cycle Measures of Location	
Year 9 (Foundation)	Understanding Primes, Factors & Multiples Algebraic Manipulation Basics Introduction to the Language of Statistics	Advanced Algebraic Manipulation Accuracy and Rounding Techniques Mensuration Concepts	Direct and Inverse Proportion Geometric Constructions & Calculations Starting the Data Handling Cycle	Percentage Change Calculations Financial Capability Development Fractions & Decimals Mastery	Solving Equations Probability Basics	2D and 3D Representations Understanding Indices and Standard Form Averages and Range Calculations
Year 9 (Higher)	Understanding Primes, Factors & Multiples Algebraic Manipulation Basics Fractions & Decimals Mastery	Advanced Algebraic Manipulation Accuracy & RoundingTechniques Geometric Constructions & Loci Introduction to the Language of Statistics	Understanding Straight Line Graphs Circles, Spheres & Pyramids Starting the Data Handling Cycle	Percentage Change Calculations Calculating Averages & Range Direct & Inverse Proportion	Algebraic Solution of Equations Pythagoras and Trigonometry	2D and 3D Representations Standard Form and Indices Financial Capability Probability
Year 10 (Foundation)	Sequences Straight Line Graphs Compound Units Entry Level Unit: Measures	Vectors Transformations Similar Figures Entry Level Unit: Properties of Numbers	Bivariate Data/Scatter Diagrams Entry Level Option: Statistics Graphs (including non-linear)	Equations Review and Extend Geometry Review and Extend Entry Level Option: Geometry	Fractions and Decimals Review and Extend Entry Level Option: Ratio Unit Data Handling Cycle Review and Extend	PPE + Prep and Revision PPE Reflection and Boost
Year 10 (Higher)	Bivariate Data and Scatter Graphs Transformations Similarity	Non-Linear Graphs Graphical Solutions of Equations Tree Diagrams	Surds Algebraic Solutions to Equations Part 2 Comparing Distributions (Measures of Spread, Interquartile Range)	Circle Theorems Non-Right-Angled Trigonometry Compound Units and Bounds	Data Collection and Sampling Probability Review and Extend Straight Line Graphs Review and Extend	PPE + Prep and Revision PPE Reflection and Boost

Year 11 (Foundation)	Use of a Calculator Entry Level Option: Unit 4 Operations Probability Review	Proofs and Formulae Entry Level Option: Calendar and Time	Time Series Right-Angled Triangle Review Entry Level Option: Money	Revision and Exams	
Year 11 (Higher)	Four Operations with Algebraic Fractions Review and Extend Solving Quadratic Equations Negative and Fractional Indices	Quadratic Inequalities to Include Graphing Inequalities Sequences Proof Vectors	Functions Transformation of Graphs Time Series Index Numbers	Revision for Final Exams	
Year 12	Algebra Quadratics and Cubics Inequalities and Simultaneous Equations Coordinate Geometry and Circles	Binomial Expansion Trigonometry Differentiation	Integration Vectors Sampling, Data Presentation, and Interpretation	Probability Statistical Distributions Kinematics	Exponentials and Logarithms Hypothesis Testing Forces and Newton's Laws
Year 13	Algebra and Functions Trigonometry Sequences and Series	Parametric Equations Binomial Expansion 2 Differentiation	Integration Vectors Correlation and Regression Probability	Integration Numerical Methods The Normal Distribution Kinematics Dynamics Moments	

DISCIPLINARY LITERACY- KEYWORDS & TERMINOLOGY

	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Year 7	**Algebraic Thinking** sequence, linear, increasing, decreasing, graphically, term multiply, non-linear, divide, prediction, substitute, function	**Place Value and Proportion** integer, place value, estimate, ascending, descending, inequality, averages, proportion, equivalent,	**Applications of Number** factor, multiple, perpendicular, divisor, dividend, quotient, operation, evaluate, substitute,	**Directed Number and Fractional Thinking** negative numbers, numerator, denominator, convert, addition, subtraction, commutative, rearrange, expression, equation,	**Lines and Angles** line segment, angle, direction, accuracy, polygon, parallel, construct, compass protractor, frequency, adjacent, interior, exterior, transversal	**Reasoning with Number** place values, partitioning, rounding, estimate, significant figure, interpret,
Year 8	**Proportional Reasoning** direct proportion, linear, ratio, variable, constant, multiplier, convert, enlargement, similar, scale, reciprocal,	**Representations** quadrant, coordinate, axis, horizontal, vertical, origin, gradient, intercept, incline, symmetrical, equidistant, correlation, interpolate, extrapolate, discrete, continuous	**Algebraic Techniques** variable, term, coefficient, expression, simplify, substitute, expand, factorise, inverse, quadratic, power, exponent, solve, identity, sequence	**Developing Number** base, index, power, exponent, standard form, ordinary form	**Developing Geometry** adjacent, bisect, parallel, perpendicular, polygon, interior, exterior, obtuse, acute,	**Reasoning with Data** hypothesis, investigation, sample, biased, tally, proportion, bivariate, consistent, distribution, frequency, estimate, outlier,
Year 9 (Foundation)	**Understanding Primes, Factors & Multiples** odd, even, prime, factor, multiple, square, cube, root, prime, integer, index, base, power, prime factor, product, lowest common multiple, highest common factor **Algebraic Manipulation Basics** simplify, term, expression, coefficient, expand, product, binomial, quadratic, integer, formula, substitute, variable, kinematics. **Introduction to the Language of Statistics** quantitative, qualitative, discrete, continuous, primary, secondary, population, sample, sampling frame, census, questionnaire, open question, closed question, respondents, opinion scale, interview, pilot survey, confidentiality	**Advanced Algebraic Manipulation** factorise, expression, binomial, quotient, quadratic, coefficient, difference, square, perfect, term, rearrange, subject, formula, term, equation, kinematics. **Accuracy and Rounding Techniques** decimal place, significant figures, rounding, accuracy, square root, estimate, approximate, bounds, upper bound, lower bound, inequality. **Mensuration Concepts** Circumference, perimeter, diameter, radius, arc, sector, pi, angle, area, surface area, volume, prism, cylinder, cross-section, capacity, length, width, height, pyramid, cone, sphere, composite, Pythagoras, theorem, squared, square root, hypotenuse, angle, inverse	**Direct and Inverse Proportion** cancel, highest common factor, simplest form, express, units, divide, ratio, share, parts, direct proportion, unitary method, unit cost, proportionality symbol, proportionality constant, conversion graphs, inverse proportion, context, real-life problems. **Geometric Constructions & Calculations** perpendicular, bisector, line segment, vertices, vertex, points, parallel lines, acute, reflex, obtuse, equidistant, polygon, triangle, equilateral, isosceles, right-angle, scalene, regular, inscribe, quadrilateral, rhombus, square, rectangle, parallelogram, kite, trapezium, arrowhead, loci, locus, construct, scale, degrees, sum, about a point, corresponding, alternate, supplementary, co-interior, allied, parallel, vertically opposite, equal, exterior, interior, sum, regular, **Starting the Data Handling Cycle** hypothesis, investigation, outlier, anomalous data, cleaning data, sample, random sample, unbiased, biased, tally chart, grouped data, frequency, bar chart, dual bar chart, composite bar chart, pie chart	**Percentage Change Calculations** percentage, fraction, decimal, amount, quantity, multiplier, increase, decrease, compound interest, depreciation **Financial Capability Development** total, debit, credit, balance, expense, bill, percentage, interest, annual, deposit, principal, rate, compound, multiplier, tax, value added, VAT, original, income, salary, wage, exemption, overtime, currency, convert, exchange, value, cost, proportion, unit, unitary. **Fractions & Decimals Mastery** fraction, decimal, percentage, convert, improper, mixed numbers, negative, calculate, express, terminating, place value, divide, division, decimal	**Solving Equations** equation, term, variable, unknown, solve, balance, inverse, number line, greater than, smaller than, or equals to, represent, satisfies. **Probability Basics** probability scale, certain, likely, unlikely, impossible, evens, random, equally likely, outcomes events, biased, unbiased, two-way table, frequency tree, Venn diagram	**2D and 3D Representations** vertices, edges, planes, faces, surface, parallel, perpendicular, cube, cuboid, prism, cylinder, pyramid, cone, sphere, plan, front, side, elevation, perspective, isometric, solid, area, surface area, units, dimensions, open, closed, perpendicular height, net, **Understanding Indices and Standard Form** Integer, index, indices, roots, square root, cube root, negative, power, standard form, order, convert, powers of 10 **Averages and Range Calculations** hypothesis, investigation, outlier, anomalous data, cleaning data, sample, random sample, unbiased, biased, tally chart, grouped data, frequency, bar chart, dual bar chart, composite bar chart, pie chart.

Year 9 (Higher)	**Understanding Primes, Factors & Multiples** odd, even, prime, factor, multiple, square, cube, root, prime, integer, index, base, power, prime factor, product, lowest common multiple, highest common factor, Venn diagram **Algebraic Manipulation Basics** algebraic, simplify, quotient, product, expression, indices, index laws, binomials, expand, quadratic, cubic. **Fractions & Decimals Mastery** improper fraction, mixed number, proper fraction, denominator, whole number, integer, numerator, equivalent fraction, simplify, unit fraction, multiplicative, proportion, multiply, tenths, hundredths, percentage, convert, compare, decimal, ascending, descending, subtraction, place value, addition, division	**Advanced Algebraic Manipulation** factorise, expression, binomial, quotient, quadratic, coefficient, difference, square, perfect, term, rearrange, subject, formula, term, equation, kinematics **Rounding Techniques** decimal place, significant figures, rounding, accuracy, square root, estimate, approximate, **Geometric Constructions & Loci** perpendicular, bisector, line segment, vertices, vertex, points, parallel lines, acute, reflex, obtuse, equidistant, polygon, triangle, equilateral, isosceles, right-angle, scalene, regular, inscribe, quadrilateral, rhombus, square, rectangle, parallelogram, kite, trapezium, arrowhead, loci, locus, construct, scale. **Introduction to the Language of Statistics** quantitative, qualitative, discrete, continuous, primary, secondary, population, sample, sampling frame, census, questionnaire, open question, closed question, respondents, opinion scale, interview, pilot survey, confidentiality	**Understanding Straight Line Graphs** table, equation, substitution, linear, plot, quadrant, gradient, intercept, sketch, graphical **Circles, Spheres & Pyramids** arc, perimeter, Pythagoras' theorem, unit, length, distance, ratio, radius, diameter, sector, volume, surface area, cone, sphere, prism, hemi-sphere, pyramid, tetrahedron **Starting the Data Handling Cycle** hypothesis, investigation, outlier, anomalous data, cleaning data, sample, random sample, unbiased, biased, tally chart, grouped data, frequency, bar chart, dual bar chart, composite bar chart, pie chart.	**Percentage Change Calculations** decimal, fraction, percentage, multiply, equivalent, denominator, quantity, multiplier, convert, increase, decrease, inverse operations, simple interest, compound interest, depreciation, growth, decay. **Calculating Averages & Range** hypothesis, investigation, outlier, anomalous data, cleaning data, sample, random sample, unbiased, biased, tally chart, grouped data, frequency, bar chart, dual bar chart, composite bar chart, pie chart. **Direct & Inverse Proportion** simplify, units of measure, share, ratio, proportion, recipe, proportionality symbol, proportionality constant, formulate, equations, direct proportion, inverse proportion, construct, interpret, graphical representation.	**Algebraic Solution of Equations** solve, linear, equation, balance method, brackets, interpret, coefficient, quadratic. **Pythagoras and Trigonometry** hypotenuse, Pythagoras' theorem, diagonal, trigonometry, trigonometric ratios, exact values, adjacent, opposite, sine, cosine, tangent, length, angle,	**2D and 3D Representations** cylinder, perpendicular, trigonometry, Pythagoras, angle, vertical height, plan, front, side, elevation, face, perspective, isometric solid, bearing, scale drawing. **Standard Form and Indices** exponent, quotient, product, reciprocal, fraction, index law, roots, index notation, estimate, power of ten, standard index from, power, decimal place, add, subtract, multiply, divide. **Financial Capability** total, debit, credit, balance, expense, bill, percentage, interest, annual, deposit, principal, rate, compound, multiplier, tax, value added, VAT, original, income, salary, wage, exemption, overtime, currency, convert, exchange, value, cost, proportion, unit, unitary. **Probability** probability scale, certain, likely, unlikely, impossible, evens, random, equally likely, outcomes events, biased, unbiased, two-way table, frequency tree, Venn diagram
Year 10 (Foundation)	**Sequences** sequence, formula, term, nth term, generate, term to term, position to term, rule, formula, square, triangular, cube. **Straight line graphs** table, equation, substitution, linear plot, quadrant, gradient, intercept, substitute, sketch, graphical **Compound units** unit of measure, conversion, conversion factor, algebraic, speed, distance, time, rates of pay, unit pricing, density, mass, volume, pressure, force, area, direct proportion, inverse proportion, multiplier, linear, convert, compound unit, multiplicative factor.	**Vectors** column vector, direction, scalar, size, magnitude, equal, addition, subtraction, resultant, parallel **Transformations** reflection, symmetry, enlargement, similar figures, centre, coordinate, rotation, transformation, translation, invariant point **Similar Figures** side, angle, similar, scale factor, enlargement, centre, fractional, surface area, length, area, exact value, pi	**Bivariate Data** scatter graph, axis, accuracy, variable, correlation, linear, causation, causal relationship, line of best fit, mean point, interpolate, extrapolate, estimate, range, outlier, anomaly, y-intercept, gradient. **Graphs – including non-linear.** value, substitute, input, output, plot, accuracy, polynomial, cubic, quadratic, reciprocal, roots, symmetry, turning point, intercept, x-axis, function, factorise, sketch	**Equations Review and Extend** equation, term, variable, unknown, solve, balance, inverse, number line, greater than, smaller than, or equals to, represent, satisfies, simultaneous equations, variables, elimination, substitution. **Geometry Review and Extend** vertices, vertex, points, parallel lines, acute, reflex, obtuse, polygon, triangle, equilateral, isosceles, right-angle, scalene, regular, inscribe, quadrilateral, rhombus, square, rectangle, parallelogram, kite, trapezium, arrowhead, loci, locus, construct, scale, degrees, sum, about a point, corresponding, alternate, supplementary, co-interior, allied, parallel, vertically opposite, equal, exterior, interior, sum, regular	**Fractions and Decimals Review and Extend** fraction, decimal, percentage, convert, improper, mixed numbers, negative, calculate, express, terminating, place value, divide, division, decimal. **Data Handling Cycle Review and Extend** quantitative, qualitative, discrete, continuous, ordinal, bivariate, class interval, primary, secondary, population, sampling frame, sample, census, random sample, biased, unbiased, judgement sampling, opportunity sampling, cluster sampling, systematic sampling quota sampling, stratum, strata, experiment, data collection sheet, explanatory variable, independent variable, response variable, valid, reliable, questionnaire, closed question, open question, pilot survey, interview, outlier, cleaning data, hypothesis, investigation, confidentiality, convenience, non-response, constraints	

Year 10 (Higher)	**Bivariate Data and Scatter Graphs** scatter graph, correlation, axis, accuracy, linear, variable, causation, causal relationship, line of best fit, mean point, interpolate, extrapolate, estimate, range, outlier, anomaly, y-intercept, gradient, line of best fit, Spearman's rank correlation coefficient, ranks, Pearson's product correlation coefficient, non-linear correlation, **Transformations** reflection, symmetry, enlargement, similar figures, centre, coordinate, rotation, transformation, translation, invariant point **Similarity** side, angle, similar, scale factor, enlargement, centre, fractional, surface area, length, area, exact value, pi, ratio, volume, square, square root, cube, cube root	**Non-linear Graphs** value, substitute, input, output, plot, accuracy, polynomial, cubic, quadratic, reciprocal, roots, symmetry, turning point, intercept, x-axis, function, factorise, sketch, asymptote, infinity, sine, cosine, tangent, radius, origin, diameter, circle, tangent. **Graphical Solutions of Equations** equation, simultaneous, solve, set up, linear, graphically, quadratic, graphs, roots, approximate, roots, intersection, iteration, **Tree Diagrams** tree diagram, mutually exclusive, sum, successive events, independent, conditional probability, given that	**Surds** root, square root, surd, prime factor decomposition, irrational number, rational number, denominator, simplify surd, rationalise. **Algebraic Solutions to Equations** solve, linear, equations, balance method, unknown, brackets, interpret, coefficient, quadratic, re-arrange, complete the square, exact values, degree of accuracy, quadratic formula, factorise, simultaneous equations, variables, elimination, substitution, non-linear. **Comparing Distributions (Measures of Spread)** histogram, frequency polygon, mid-point, frequency, continuous, cumulative frequency diagram, predict, cumulative frequency step polygon, discrete, class interval, symmetrical, positive skew, negative skew, shape of distribution, frequency, frequency density, class width, scale, axis, box plot, outlier, range, interquartile range, upper quartile, lower quartile, median	**Circle Theorems** centre, arc, segment, tangent, semicircle, curve, radius, circumference, quadrant, diameter, sector, circle, isosceles **Non-right-angled Trigonometry** area, perpendicular height, formula, non-right-angled triangle, Sine rule, Cosine rule, missing angles, cylinder, trigonometry, Pythagoras, vertical height, bearing, scale drawing. **Compound Units** unit of measure, conversion, conversion factor, algebraic, speed, distance, time, rates of pay, unit pricing, density, mass, volume, pressure, force, area, direct proportion, inverse proportion, multiplier, linear, convert, compound unit, multiplicative factor, bounds, upper bound, lower bound, inequality	**Data Collecting and Sampling** quantitative, qualitative, discrete, continuous, ordinal, bivariate, class interval, primary, secondary, population, sampling frame, sample, census, random sample, biased, unbiased, judgement sampling, opportunity sampling, cluster sampling, systematic sampling quota sampling, stratum, strata, experiment, data collection sheet, explanatory variable, independent variable, response variable, valid, reliable, questionnaire, closed question, open question, pilot survey, interview, outlier, cleaning data, hypothesis, investigation, confidentiality, convenience, non-response, constraints, capture/recapture, control groups **Probability Review and Extend** probability scale, certain, likely, unlikely, impossible, evens, random, equally likely, outcomes, events, unbiased, biased, experimental, theoretical, frequency, trial, estimated probability, risk, absolute, relative, outcome, sample space diagram, Venn diagram, classify, sort, overlap, mutually exclusive, exhaustive, independent, conditional, tree diagram, mutually exclusive, sum, successive events, independent, conditional probability, given that. **Straight Line Graphs Review and Extend** table, equation, substitution, linear, plot, quadrant, gradient, intercept, sketch, graphical, parallel, perpendicular, reciprocal	
Year 11 (Foundation)	**Use of a Calculator** fraction, decimal, percentage, pi, standard form, shift, sine, cosine, tangent, power, square, cube, root, negative, brackets, order of operations, round **Probability Review** probability scale, certain, likely, unlikely, impossible, evens, random, equally likely, outcome, event, unbiased, biased, experimental, theoretical, frequency, trial, estimated probability, risk, absolute, relative, sample space diagram, Venn diagram, classify, sort, overlap, mutually exclusive, exhaustive, independent, conditional, tree diagram, successive events, dependent, given that	**Proof and Formulae** expression, formulae, substitute, rearrange, power, indices, root, rearrange, subject.	**Time Series** time series, trend line, rising trend, falling trend, level trend, general trend, variation, seasonal variation, moving average. **Right-angled Triangle Review and Extend** hypotenuse, Pythagoras' theorem, diagonal, trigonometry, trigonometric ratios, exact values, adjacent, opposite, sine, cosine, tangent, length, angle, area	**Exam Preparation** calculate, express, show, solve, factorise, sketch, rearrange, estimate, simplify, construct	**Exam Preparation** prove, plot, verify, hence, draw, state, reason, determine, justify, reliable.	

Year 11 (Higher)	**Four Operations with Algebraic Fractions Review and Extend** algebraic fraction, numerator, denominator, simplify, factorise, add, subtract, multiply, divide, reciprocal, cancel, expand, collect like terms. **Solving Quadratic Equations** factorise, quadratic, equation, solve, coefficient, quadratic formula, exact form, decimal place, significant figure, completing the square, roots, difference of two squares. **Negative and Fractional Indices** Indices, index, base, power, fractional, negative, root, reciprocal, evaluate	**Quadratic Inequalities to Include Graphing Inequalities** solve, integer, inequality, graph, number line, coordinate, equation, straight line, function, plot, table, axis, horizontal, vertical, factorise, roots, region, shade, dashed, solid, satisfy. **Sequences** nth term, term to term, position to term, formula, generate, sequence, arithmetic, subscript notation, quadratic, triangular, square, cube, Fibonacci, geometric. **Proof** polygon, parallel, rectilinear, triangle, isosceles, equilateral, scalene, square, rectangle, parallelogram, rhombus, kite, trapezium, bisect, proof, angle, interior, exterior, proof, show that, prove algebraically, consecutive, odd, even, factorise. **Vectors** vector, scalar, resultant, column vector, parallel, collinear, proof, multiple, factorise	**Functions** function, inverse, composite, sketch, translation, reflection, polynomial, quadratic, cubic, plot, turning point, reciprocal, asymptote, exponential. **Transformation of Graphs** roots, y-intercept, quadratic, solution, turning point, completing the square form, exponential, growth, decay, rapid, infinity, trends, asymptote. **Time Series** time series, trend line, rising trend, falling trend, level trend, general trend, variation, seasonal variation, moving average, mean seasonal variation, predicted value, average seasonal effect. **Index Numbers** index number, base year price, retail price index, gross domestic product, recession, weighted index numbers, chain base index number, crude birth rate, crude death rate, standardised birth rate, crude death rate, standardised death rate	**Exam Preparation** calculate, express, show, solve, factorise, sketch, rearrange, estimate, simplify, construct.	**Exam Preparation** prove, plot, verify, hence, draw, state, reason, determine, justify, reliable.	
Year 12	**Algebra** Proof, Deduction, Counter example, Indices, Surd, Rationalise, Factorise, Expand, Substitute, Index Laws. **Quadratics and Cubics** Quadratic, roots, discriminant, completing the square, Cubic, fully factorise, Repeated root, polynomial, algebraic division, sketch. **Inequalities and Simultaneous Equations** Intersect, elimination, substitution, variables, inequality, simultaneous, factorise, less than, more than, roots. **Coordinate Geometry and Circles** Gradient, Midpoint, Length between two points, Centre of circle, radius, Pythagoras, equation of a line, negative reciprocal, parallel, perpendicular.	**Binomial Expansion** Binomial, expansion, formula, Factorial, Pascals Triangle, power, term, **Trigonometry** Sine, Cosine, Tangent, Period, Degree, Radian, Graph, CAST diagram, maximum, minimum **Differentiation** Gradient, Stationary Point, Maximum, Minimum, Differentiate, second derivative, optimisation, rate of change, increasing function, decreasing function	**Integration** Integral, constant of integration, limits, finite, infinite, roots, area, under the curve **Area under a curve, Limits** **Vectors** Vector, Magnitude, Direction, Scalar, Projection, unit vector, resultant **Sampling, Data Presentation, and Interpretation** Simple Random, Stratified, Systematic, Cluster, Opportunity, Quota, Histogram, Scatter Graph, box plot, interpolation, mean, standard deviation.	**Probability** Venn Diagram, Tree Diagram, Notation, probability, independent, mutually exclusive, frequency, sample space **Statistical Distributions** Cumulative, Distribution, Probability, Trials, mean, standard deviation, binomial, independent. **Kinematics** Initial velocity, velocity, displacement, acceleration, speed, initial speed, distance, time, SUVAT.	**Exponentials and Logarithms** e, Natural Log, Logarithm, exponential, growth, decay, inverse, exponent **Hypothesis Testing** Accept/Reject, Null Hypothesis, Alternate, Hypothesis, sufficient evidence/insufficient evidence. **Forces and Newton's Laws** Force, Acceleration, Tension, Gravity, momentum, motion	

Year 13	**Algebra and Functions** Domain, Range, Inverse, one to one, Function, many to one, stretch, translation, reflection, **Trigonometry** Arc, Radius, Small angle, reciprocal trig, double angle, equate coefficients, R Formula, sec, cot, cosec. **Sequences and Series** Arithmetic, Geometric, Common ratio, Difference, First term, last term, sum, sigma	**Parametric Equations** Parametric, Cartesian, parameter, variable, dy/dt, dx/dt, substitute, eliminate. **Binomial Expansion 2** Indices, Factorise, Modulus, Binomial, Expansion, negative indices, formula. **Differentiation** Differentiate, Variable, dy/dx, chain rule, product rule, quotient rule, parametric differentiation.	**Integration** Integration by substitution, integration by parts, formula, differential equation, integral, limits, reverse chain rule **Vectors** Vector, Magnitude, direction, scalar, projection, resultant vector **Correlation and Regression** Correlation, Product Moment Correlation, Coefficient, **Probability** Given, Probability Laws, conditional, mutually exclusive, independent, trials, mean, variance	**Integration** Differential equation, integration, partial fraction. **Numerical Methods** Roots, Iterative, Iteration, Notation, Cobweb and Staircase Diagram, Converge, Diverge, Newton Raphson, Trapezium Rule **The Normal Distribution** Mean, standard deviation, standard normal, z values, sample means. **Kinematics** Velocity, displacement, acceleration, time, initial velocity, resolving forces, projectiles. **Dynamics** F=ma, tension, friction, inertia, force, mass, acceleration **Moments** Moment, force, rotate, pivot, perpendicular distance	

ADAPTATIONS FOR SEND STUDENTS IN MATHEMATICS LESSONS

GENERAL MATHEMATICS SEND STRATEGIES

READING SUPPORT

- **Glossaries of Key Terms:** Provide glossaries with definitions and examples of key mathematical terms to help students understand and use mathematical language accurately.
- **Annotated Examples:** Offer annotated examples of mathematical problems, highlighting and explaining each step and the terminology used.
- **Manipulatives and Diagrams:** Incorporate manipulatives, diagrams, and charts to help students better understand complex concepts and relationships.
- **Reading Aloud and Think-Alouds:** Model reading aloud and think-aloud strategies where teachers verbalise their thought processes while solving problems, demonstrating how to approach and interpret mathematical texts.
- **Highlighting and Annotating:** Encourage students to highlight and annotate mathematical texts or problem descriptions to identify important information and make connections.
- **Pre-Teaching Vocabulary:** Pre-teach critical vocabulary before introducing new concepts, ensuring students have a foundational understanding of the terms they will encounter.

EXAM PREPARATION

- **Structured Revision:** Break down revision into manageable sections, use visual organizers.
- **Practice Papers:** Provide past papers with guided practice sessions, use feedback to focus on weak areas.

ADDITIONAL SUPPORT

Intervention Sessions and Homework Help: Offer after-school intervention sessions where students can receive additional support and clarification on challenging topics. Provide homework help sessions to ensure students understand and complete their assignments accurately. These sessions can be tailored to individual needs, focusing on areas where students require the most support.

SEND WITHIN MATHEMATICS KEY CONCEPTS

Geometry

Strategy:

- Utilise diagrams, interactive tools, and hands-on activities.

Example: When teaching about angles, use protractors and interactive software that allows students to manipulate angles. Have students measure angles in various shapes using physical protractors and then replicate the activity using virtual tools. Create hands-on activities where students can form different types of angles using straws or sticks.

Ratio

Strategy:

- Simplify language, use real-life contexts, and provide step-by-step guidance.

Example: When explaining ratios, use a real-life example like mixing paint colours. Simplify the language by saying, "For every 2 cups of red paint, we need 3 cups of blue paint." Provide a visual representation and guide students through each step of mixing different quantities to achieve the correct ratio.

Probability/Statistics

Strategy:

- Use real-life examples, manipulatives, and step-by-step problem-solving.

Example: To explain probability, use a real-life example such as rolling dice or drawing cards from a deck. Show visual aids like probability trees or tables to represent possible outcomes. Walk students through the process of calculating probabilities step-by-step, such as finding the probability of drawing an ace from a deck of cards by showing each step of the calculation.

Algebra

Strategy:

- Use visual aids and manipulatives, break down steps, and provide clear examples.

Example: When teaching solving equations, use coloured blocks or algebra tiles to represent variables and constants. Show each step visually, such as physically moving blocks to isolate the variable. Provide a clear, step-by-step written example alongside the visual demonstration.

Number

Strategy:

- Use concrete examples, manipulatives, and repetitive practice for retention.

Example: For teaching addition of fractions, use fraction circles or bars to represent different fractions. Show how to add fractions with the same and different denominators using these manipulatives. Provide plenty of practice problems with immediate feedback to reinforce the concept.

LONG TERM PLAN- A CURRICULUM OVERVIEW

	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Year 7	**Understanding Sequences:** Students will explore sequences in detail, focusing on developing a deep understanding of basic algebraic forms. **Algebraic Foundations:** Students will understand algebraic notation, equality, and equivalence. **Place Value and Equivalence:** Students will explore place value, ordering, and the links between fractions, decimals, and percentages to convert fluently.		**Applying Fundamental Maths Skills:** Students will apply fundamental math skills and deepen understanding of directed numbers. **Fraction Operations:** Students will gain experience with fractions of any denominator and learn to add and subtract fractions.		**Extending Knowledge in Geometry and Probability:** Students will extend their knowledge in geometry and probability. **Introduction to Sets and Types of Numbers:** Students will learn about sets, systematic listing strategies, and types of numbers to form and test conjectures.	
Year 8	**Developing Proportional Reasoning:** Students will develop proportional reasoning and enhance understanding of mathematical representations. **Multiplication, Division, and Algebraic Rules:** Students will learn multiplication and division by both integers and fractions and algebraic rules for straight lines. **Introduction to Bivariate Data and Probability:** Students will be introduced to bivariate data and probability through sample spaces and tables.		**Expanding Brackets and Factorising:** Students will explore expanding brackets and linear factorising. **Complex Sequences and Indices:** Students will look at sequences with more complex algebraic rules and laws of indices. **Relationships Between Fractions, Percentages, and Decimals:** Students will understand relationships between fractions, percentages, and decimal equivalents.		**Angles and Areas:** Students will learn about angles in parallel lines and the areas of trapezia and circles. **Symmetry and Data Collection:** Students will explore line symmetry, reflection, and data collection methods. **Understanding Measures of Location:** Students will understand measures of location and when to use each average.	

Year 9 (Foundation)	**Understanding Primes, Factors & Multiples:** Students will explore the properties of prime numbers, factors, and multiples, understanding their roles in various mathematical contexts. **Algebraic Manipulation Basics:** Students will begin learning the foundational techniques of manipulating algebraic expressions, focusing on simplifying and rearranging equations. **Introduction to the Language of Statistics:** Students will be introduced to basic statistical terms and concepts, learning how to interpret and use statistical language in various contexts. **Formative Assessment, Reflection and Boost** Students will be assessed throughout this half-term via topic or low stakes tests. The feedback cycle will ensure they reflect on their learning and will be provided with targeted boost tasks to address any gaps in their knowledge.	**Advanced Algebraic Manipulation:** Students will continue to develop their skills in algebraic manipulation, working on more complex expressions and equations. **Accuracy and Rounding Techniques:** Students will learn methods for rounding numbers and ensuring accuracy in their calculations, understanding the importance of precision. **Mensuration Concepts:** Students will explore the measurement of geometric shapes, including the calculation of area, perimeter, and volume for various figures. **Summative Assessment, Reflection, and Boost** This period will be used for assessing overall understanding, reflecting on learning progress, and providing targeted interventions to address identified gaps.	**Direct and Inverse Proportion:** Students will understand the concepts of direct and inverse proportion and how they apply to different mathematical and real-world problems. **2D and 3D Representations:** Students will explore how to represent and interpret 2D and 3D shapes, understanding their properties and relationships. **Starting the Data Handling Cycle:** Students will begin learning about the data handling cycle, focusing on sampling, forming hypotheses, and representing data accurately. **Formative Assessment, Reflection and Boost** Students will be assessed throughout this half-term via topic or low stakes tests. The feedback cycle will ensure they reflect on their learning and will be provided with targeted boost tasks to address any gaps in their knowledge.	**Percentage Change Calculations:** Students will explore how to calculate percentage increases and decreases, applying these skills to various problems. **Financial Capability Development:** Students will learn essential financial skills, such as budgeting, interest calculations, and understanding financial documents. **Fractions & Decimals Mastery:** Students will enhance their understanding of fractions and decimals, focusing on conversions and calculations involving these forms. **Summative Assessment, Reflection, and Boost** This period will be used for assessing overall understanding, reflecting on learning progress, and providing targeted interventions to address identified gaps.	**Solving Equations:** Students will develop their equation-solving skills, learning methods to find unknown values in various types of equations. **Probability Basics:** Students will learn fundamental probability concepts, including data lessons on frequency trees and two-way tables to represent probabilities. **Formative Assessment, Reflection and Boost** Students will be assessed throughout this half-term via topic or low stakes tests. The feedback cycle will ensure they reflect on their learning and will be provided with targeted boost tasks to address any gaps in their knowledge.	**Geometric Constructions & Calculations:** Students will learn the basics of geometric constructions, using tools to create accurate diagrams and performing calculations related to these shapes. **Understanding Indices and Standard Form:** Students will learn about indices and standard form, focusing on the rules for manipulating and simplifying expressions involving powers. **Averages and Range Calculations:** Students will calculate various measures of central tendency and spread, such as mean, median, mode, and range, understanding their applications. **Summative Assessment, Reflection, and Boost** This period will be used for assessing overall understanding, reflecting on learning progress, and providing targeted interventions to address identified gaps.

Year 9 (Higher)	**Understanding Primes, Factors & Multiples:** Students will explore the properties of prime numbers, factors, and multiples, and understand their roles in various mathematical contexts. **Algebraic Manipulation Basics:** Students will begin learning the foundational techniques of manipulating algebraic expressions, focusing on simplifying and rearranging equations. **Fractions & Decimals Mastery:** Students will enhance their understanding of fractions and decimals, focusing on conversions and calculations involving these forms. **Formative Assessment, Reflection and Boost** Students will be assessed throughout this half-term via topic or low stakes tests. The feedback cycle will ensure they reflect on their learning and will be provided with targeted boost tasks to address any gaps in their knowledge.	**Advanced Algebraic Manipulation:** Students will continue to develop their skills in algebraic manipulation, working on more complex expressions and equations. **Accuracy & Bounds Techniques:** Students will learn methods for determining the accuracy of calculations and using bounds to estimate values. **Geometric Constructions & Loci:** Students will learn the basics of geometric constructions and loci, using mathematical equipment to create accurate diagrams and solving related problems. **Introduction to the Language of Statistics:** Students will be introduced to basic statistical terms and concepts, learning how to collect, interpret, and use statistical data. **Summative Assessment, Reflection, and Boost** This period will be used for assessing overall understanding, reflecting on learning progress, and providing targeted interventions to address identified gaps.	**Understanding Straight Line Graphs:** Students will explore the properties and equations of straight-line graphs, learning how to plot and interpret them. **Circles, Spheres & Pyramids:** Students will study the properties and measurements of circles, spheres, and pyramids, including surface area and volume calculations. **Starting the Data Handling Cycle:** Students will begin learning about the data handling cycle, focusing on sampling, forming hypotheses, and representing data accurately. **Formative Assessment, Reflection and Boost** Students will be assessed throughout this half-term via topic or low stakes tests. The feedback cycle will ensure they reflect on their learning and will be provided with targeted boost tasks to address any gaps in their knowledge.	**Percentage Change Calculations:** Students will explore how to calculate percentage increases and decreases, applying these skills to various problems. **Calculating Averages & Range:** Students will calculate various measures of central tendency and spread, such as mean, median, mode, and range, understanding their applications. **Direct & Inverse Proportion:** Students will understand the concepts of direct and inverse proportion and how they apply to different mathematical and real-world problems. **Summative Assessment, Reflection, and Boost** This period will be used for assessing overall understanding, reflecting on learning progress, and providing targeted interventions to address identified gaps.	**Algebraic Solution of Equations:** Students will develop their equation-solving skills, learning methods to find unknown values in various types of equations. **Pythagoras and Trigonometry:** Students will explore the principles of Pythagoras' theorem and trigonometry, applying them to solve problems involving right-angled triangles. **Formative Assessment, Reflection and Boost** Students will be assessed throughout this half-term via topic or low stakes tests. The feedback cycle will ensure they reflect on their learning and will be provided with targeted boost tasks to address any gaps in their knowledge.	**2D and 3D Representations:** Students will explore how to represent and interpret 2D and 3D shapes, understanding their properties and relationships. **Standard Form and Indices:** Students will learn about standard form and indices, specifically focusing on basic index laws and the application of standard form. **Financial Capability:** Students will learn essential financial skills, such as budgeting, interest calculations, and understanding financial documents. **Probability:** Students will learn fundamental probability concepts, including GCSE statistics lessons on frequency trees and two-way tables to represent probabilities. **Summative Assessment, Reflection, and Boost** This period will be used for assessing overall understanding, reflecting on learning progress, and providing targeted interventions to address identified gaps.

Year 10 (Foundation)	**Sequences** Students will understand and generate sequences, recognising arithmetic and geometric sequences. **Straight Line Graphs** Students will learn about the properties and equations of straight-line graphs, plotting and interpreting them. **Compound Units** Students will work with compound units such as speed, density, and pressure, solving problems involving these units. **Additional Entry Level Unit: Unit Measures** Students will focus on basic measurements and conversions within the context of everyday situations. **Low Stakes Assessment, Reflection, and Boost** Students will be assessed for understanding, encouraged to reflect learning, and provided targeted boosts to address any gaps in their knowledge.	**Vectors** Students will learn about vector notation, addition, subtraction, and multiplication of vectors by scalars, and apply vectors to solve geometric problems. **Transformations** Students will explore various transformations including translations, rotations, reflections, and enlargements, understanding their properties and effects on shapes. **Similar Figures** Students will understand the properties of similar figures, including how to use proportions to solve problems involving similar shapes. **Additional Entry Level Unit: Properties of Numbers** Students will focus on basic properties of numbers, including factors, multiples, primes, and divisibility rules. **Summative Assessment, Reflection, and Boost** This period will be used for assessing overall understanding, reflecting on learning progress, and providing targeted interventions to address identified gaps.	**Bivariate Data/Scatter Diagrams** Students will learn to plot and interpret scatter diagrams, understanding concepts of correlation and using lines of best fit to make predictions. **Additional Entry Level Unit: Statistics** Students will focus on basic statistical concepts including data collection, representation, and interpretation. **Graphs (including non-linear)** Students will explore various types of graphs, including non-linear graphs such as quadratics and exponentials, learning to plot, interpret, and analyse them. **Low Stakes Assessment, Reflection, and Boost** Students will be assessed for understanding, encouraged to reflect learning, and provided targeted boosts to address any gaps in their knowledge. .	**Equations Review and Extend** Students will review and extend their understanding of solving equations, including linear, simultaneous, and quadratic equations, applying various methods and techniques. **Geometry Review and Extend** Students will review and extend their knowledge of geometry, including properties of shapes, theorems, and geometric problem-solving. **Additional Entry Level Unit: Geometry** Students will focus on basic geometric concepts, including identifying and classifying shapes, understanding symmetry, and basic geometric constructions. **Summative Assessment, Reflection, and Boost** This period will be used for assessing overall understanding, reflecting on learning progress, and providing targeted interventions to address identified gaps.	**Fractions and Decimals Review and Extend** Students will review and extend their understanding of fractions and decimals, including operations, conversions, and applications. **Additional Entry Level Unit: Ratio** Students will focus on understanding and applying ratios in various contexts, including simplifying ratios and solving problems involving proportional relationships. **Data Handling Cycle Review and Extend** Students will review and extend their knowledge of the data handling cycle, including data collection, representation, analysis, and interpretation. **Low Stakes Assessment, Reflection, and Boost** Students will be assessed for understanding, encouraged to reflect learning, and provided targeted boosts to address any gaps in their knowledge. .	**PPE Prep and Revision** Students will engage in preparation activities for Pre-Public Examinations (PPEs), reviewing key concepts across all topics covered during the year. This will include practice papers, revision sessions, and targeted revision based on individual needs. **PPEs, Reflection and Boost** Students will sit their PPEs, followed by focused boost sessions to address any areas of weakness identified during the exams. This will include personalised feedback and targeted interventions to help students improve their understanding and performance.

Year 10 (Higher)	**Bivariate Data and Scatter Graphs** Students will learn to plot and interpret scatter graphs, understand correlation, and use lines of best fit for predictions. **Transformations** Students will explore various transformations, including translations, rotations, reflections, and enlargements, understanding their properties and effects on shapes. **Similarity** Students will understand the properties of similar figures, including using proportions to solve problems involving similar shapes. **Surds** Students will work with surds, including simplifying, rationalizing, and performing operations with surds. **Low Stakes Assessment, Reflection, and Boost** Students will be assessed for understanding, encouraged to reflect learning, and provided targeted boosts to address any gaps in their knowledge.	**Non-Linear Graphs** Students will explore various types of non-linear graphs, including quadratics and exponentials, learning to plot, interpret, and analyse them. **Graphical Solutions of Equations** Students will solve equations graphically, including finding points of intersection and interpreting solutions from graphs. **Tree Diagrams** Students will use tree diagrams to calculate probabilities of combined events, understanding the principles of conditional probability. **Summative Assessment, Reflection, and Boost** This period will be used for assessing overall understanding, reflecting on learning progress, and providing targeted interventions to address identified gaps.	**Algebraic Solutions to Equations Part 2** Students will solve more complex algebraic equations, including quadratics and simultaneous equations, using algebraic methods. **Comparing Distributions (Measures of Spread, Interquartile Range)** - Purple Students will compare data distributions using measures of spread, including calculating and interpreting the interquartile range. **Low Stakes Assessment, Reflection, and Boost** Students will be assessed for understanding, encouraged to reflect learning, and provided targeted boosts to address any gaps in their knowledge.	**Circle Theorems** Students will learn and apply various circle theorems to solve problems involving angles, chords, tangents, and sectors. **Non-Right-Angled Trigonometry** Students will use the sine and cosine rules to solve problems involving non-right-angled triangles, including finding missing sides and angles. **Compound Units and Bounds** Students will work with compound units such as speed, density, and pressure, and understand the concept of bounds in measurements. **Summative Assessment, Reflection, and Boost** This period will be used for assessing overall understanding, reflecting on learning progress, and providing targeted interventions to address identified gaps.	**Data Collection and Sampling** Students will learn methods of data collection and sampling, understanding the importance of unbiased samples and different sampling techniques. **Probability Review and Extend** Students will review and extend their understanding of probability, covering more advanced concepts and applications. **Straight Line Graphs Review and Extend** Students will review and extend their knowledge of straight-line graphs, including plotting, interpreting, and solving linear equations graphically. **Low Stakes Assessment, Reflection, and Boost** Students will be assessed for understanding, encouraged to reflect learning, and provided targeted boosts to address any gaps in their knowledge. .	**PPEs Preparation and Revision** Students will engage in preparation activities for Pre-Public Examinations (PPEs), reviewing key concepts across all topics covered during the year. This will include practice papers, revision sessions, and targeted revision based on individual needs. **PPEs, Reflection and Boost** Students will sit their PPEs, followed by focused boost sessions to address any areas of weakness identified during the exams. This will include personalised feedback and targeted interventions to help students improve their understanding and performance. .

Year 11 **(Foundation)**	**Use of a Calculator** Students will develop proficiency in using a calculator for various mathematical operations, ensuring accuracy and efficiency in calculations. **Additional Entry Level Unit: Four Operations** Students will focus on the four basic operations (addition, subtraction, multiplication, and division) using a calculator. **Probability Review** Students will review key concepts in probability, including calculating probabilities of single and combined events, understanding probability scales, and using probability notation. **Low Stakes Assessment, Reflection, and Boost** This period will be used for assessing understanding, reflecting on learning, and providing targeted boosts to address any gaps.	**Proofs and Formulae** Students will explore mathematical proofs and formulae, understanding how to derive and apply them in various contexts. **Additional Entry Level Unit: Calendar and Time** Students will focus on understanding and using calendars and time, including reading and interpreting time in different formats. **PPEs and Revision** Students will engage in revision activities and sit their Pre-Public Examinations (PPEs), covering all topics studied so far. This will help them identify areas of strength and weakness. **Summative Assessment, Reflection, and Boost** This period will be used for assessing overall understanding, reflecting on learning progress, and providing targeted interventions to address identified gaps.	**Time Series** Students will learn about time series data, understanding how to collect, represent, and interpret data over time, identifying trends and patterns. **Right-Angled Triangle Review** Students will review concepts related to right-angled triangles, including Pythagoras' theorem and trigonometric ratios. Students will also review solving problems involving right-angled triangles. **Additional Entry Level Unit: Money** Students will focus on understanding and managing money, including calculations involving currency, budgeting, and financial decision-making. **Low Stakes Assessment, Reflection, and Boost** This period will be used for assessing understanding, reflecting on learning, and providing targeted boosts to address any gaps.	**Revision and Exams** Students will engage in comprehensive revision activities covering all topics studied throughout the year. This will include practice papers, revision sessions, and targeted revision based on individual needs. Students will sit their final exams during this period.	

Year 11 (Higher)	**Four Operations with Algebraic Fractions Review and Extend** Students will review and extend their understanding of the four operations (addition, subtraction, multiplication, and division) with algebraic fractions. **Solving Quadratic Equations** Students will solve quadratic equations using various methods, including factorising, completing the square, and the quadratic formula. **Negative and Fractional Indices** Students will work with expressions involving negative and fractional indices, understanding and applying the laws of indices. **Low Stakes Assessment, Reflection, and Boost** This period will be used for assessing understanding, reflecting on learning, and providing targeted boosts to address any gaps.	**Quadratic Inequalities and Graphing Inequalities** Students will solve quadratic inequalities and learn to graph these inequalities on a coordinate plane. **Sequences** Students will study different types of sequences, including arithmetic and geometric sequences, understanding how to generate terms and find general formulas. **Proof** Students will learn various methods of mathematical proof, including direct proof, proof by contradiction, and proof by induction. **Vectors** Students will understand and use vectors, including vector notation, addition, subtraction, and scalar multiplication, and apply vectors to solve geometric problems. **Summative Assessment, Reflection, and Boost** This period will be used for assessing overall understanding, reflecting on learning progress, and providing targeted interventions to address identified gaps.	**Functions** Students will explore the concept of functions, including domain and range, composite functions, and inverse functions. **Transformations of Graphs** Students will study transformations of graphs, including translations, reflections, stretches, and compressions, and understand their effects on different types of functions. **Time Series** Students will analyse time series data, understanding how to collect, represent, and interpret data over time, identifying trends and patterns. **Index Numbers** Students will learn about index numbers, including their calculation and use in comparing data over time, such as in economic indicators. **Low Stakes Assessment, Reflection, and Boost** This period will be used for assessing understanding, reflecting on learning, and providing targeted boosts to address any gaps.	**Revision for Final Exams** Students will engage in comprehensive revision activities covering all topics studied throughout the year. This will include practice papers, revision sessions, and targeted revision based on individual needs.	

Year 12					
	Algebra: Students will understand and carry out proof by deduction, counterexample, and exhaustion, grasping the concept of mathematical proof. Students will comprehend and use the laws of indices in various contexts. Students will understand and use surds, including rationalising the denominator, enhancing their algebraic manipulation skills. Students will manipulate algebraic expressions, developing a deeper understanding of algebra. **Quadratics and Cubics:** Students will solve and sketch quadratic equations, understanding their graphical representations. Students will understand quadratic functions and roots using the discriminant, determining the nature of solutions. Students will factorise cubics using long division, solving higher-degree polynomial equations. Students will sketch cubic graphs, visualising their characteristics and behaviours. **Inequalities and Simultaneous Equations:** Students will set up and solve inequalities, including quadratic inequalities,	**Binomial Expansion:** Students will use the Binomial Expansion formula to expand multiple brackets, understanding the application of binomial coefficients and their properties. **Trigonometry:** Students will understand and use the Sine and Cosine Rules to solve problems involving triangles. Students will use trigonometric identities to prove other identities, enhancing their algebraic and trigonometric manipulation skills. Students will sketch trigonometric graphs, including applying transformations such as shifts, stretches, and reflections. Students will solve trigonometric equations, understanding their solutions and graphical representations. **Differentiation:** Students will find the gradient of a curve at any point, understanding the concept of the derivative. Students will differentiate functions of the form y=f(x), developing their calculus skills. Students will find second-order derivatives and use them to determine the	**Integration:** Students will integrate functions of the form f(x), understanding the process and applications of antiderivatives. Students will calculate definite integrals with specified limits, using these to find exact values for areas and other quantities. Students will calculate the area under a graph using integration, applying these skills to solve real-world problems. **Vectors:** Students will understand and use vectors, including their representation, magnitude, and direction. Students will perform calculations with vectors, including addition, subtraction, and scalar multiplication. Students will model real-life problems using vectors, applying vector operations to practical scenarios. **Sampling, Data Presentation, and Interpretation:** Students will understand populations and different sampling methods, recognising the importance of sample representativeness. Students will understand the advantages and disadvantages of each sampling method, evaluating their	**Probability:** Students will solve probability problems, applying various techniques to determine the likelihood of events. Students will understand and use the laws of probability, including addition and multiplication rules, to solve complex problems. **Statistical Distributions:** Students will understand probability distributions and how they can be displayed, including probability mass functions and cumulative distribution functions. Students will understand the Binomial Distribution and its notation, recognising situations where it is appropriate to use this distribution. Students will understand when to use the binomial cumulative function, calculating probabilities for multiple trials in binomial settings. **Kinematics:** Students will understand and draw motion graphs, interpreting the motion of objects from graphical representations. Students will use and understand the constant acceleration equations, applying them to solve problems involving uniformly accelerated motion.	**Exponentials and Logarithms:** Students will understand and use exponentials in various mathematical contexts. Students will understand and use logarithms, including the laws of logarithms, to simplify and solve equations. Students will solve equations involving e and ln, applying these to complex mathematical problems. Students will model exponential growth and decay in real-life situations, understanding their practical applications. Students will use logarithm graphs to find connections between two variables, interpreting the relationship between data sets. **Hypothesis Testing:** Students will use and understand hypothesis testing for a binomial distribution, including setting up null and alternative hypotheses and making conclusions based on sample data. **Forces and Newton's Laws:** Students will understand the units of measurement used in mechanics, ensuring accurate and consistent application. Students will understand and apply the effects of forces, analysing how different forces impact objects in various contexts. Students will understand and use Newton's laws of motion, applying these to solve problems involving the motion of objects.

	understanding their solutions and graphical representations. Students will set up and solve simultaneous equations, including systems where one equation is linear and the other is quadratic, developing problem-solving skills. **Coordinate Geometry and Circles:** Students will understand and use the equation of a straight line and the formula for calculating the gradient. Students will explore what happens to the gradient when lines are parallel or perpendicular, applying these concepts to various problems. Students will understand and use the equation of a circle, including completing the square to find the centre and radius. Students will understand the notation for graph transformations, including stretches, translations, and reflections, and apply these to different functions.	concavity and points of inflection of a graph. Students will use differentiation to analyse the characteristics of graphs, including identifying maxima, minima, and points of inflection. Students will apply differentiation to solve optimisation problems, finding the maximum or minimum values of functions in various contexts.	appropriateness in various contexts. Students will represent data using box plots, histograms, scatter diagrams, and cumulative frequency graphs. Students will understand and calculate measures of central tendency (mean, median, mode) and measures of dispersion (standard deviation, IQR) from lists or tables of values. Students will understand correlation and regression in scatter diagrams, interpreting the strength and direction of relationships between variables.	Students will use integration and differentiation for non-uniform acceleration, analysing motion where acceleration varies with time.	

Year 13	**Algebra and Functions:** Students will understand and carry out proof by contradiction, developing logical reasoning and proof techniques. Students will understand mapping and functions, including how to express and manipulate composite functions. Students will find inverse functions, understanding their properties and applications. Students will understand modulus functions and their graphs, analysing their characteristics and transformations. Students will understand composite transformations of graphs, including the order in which they occur. Students will split fractions into partial fractions, simplifying complex rational expressions. **Trigonometry:** Students will use formulas for arcs and sectors, applying these to solve problems involving circular shapes. Students will equate functions to their small angle approximations, simplifying trigonometric expressions. Students will understand and use inverse trigonometric functions and	**Parametric Equations:** Students will sketch parametric equations of curves, understanding their graphical representations. Students will understand and use parametric and Cartesian equations, converting between the two forms and applying them to solve problems. **Binomial Expansion 2:** Students will use the Binomial expansion formula, understanding its validity and constraints. Students will use Binomial expansion for approximations, applying these techniques to simplify expressions. Students will use binomial expansions to assist with partial fractions, enhancing their algebraic manipulation skills. **Differentiation:** Students will understand points of inflection, identifying where curves change concavity. Students will understand and use the Chain Rule, applying it to differentiate composite functions. Students will use differentiation with exponential, logarithmic, and trigonometric functions, solving complex problems. Students will understand and use the Product and Quotient Rules,	**Integration:** Students will use the inverse chain rule for integration, applying it to various functions. Students will use integration with exponential, logarithmic, and trigonometric functions, solving complex integrals. Students will understand and use integration laws, applying fundamental principles to solve integrals. Students will understand and carry out parametric integration, converting and integrating parametric equations. Students will integrate by substitution, simplifying integrals using substitution methods. Students will integrate by parts, solving integrals involving products of functions. Students will use integration with partial fractions, breaking down complex fractions and integrating them. **Vectors:** Students will understand and use vectors in three dimensions, representing and calculating vector quantities in 3D space. Students will perform calculations with vectors, including addition, subtraction, and scalar	**Integration:** Students will use integration with partial fractions, breaking down complex rational expressions and integrating them. Students will understand and solve differential equations, applying integration techniques to find solutions to various types of differential equations. **Numerical Methods:** Students will understand the location of roots, identifying where functions cross the x-axis. Students will understand and use iterative methods to find approximate solutions to equations. Students will sketch iterations, visualizing the iterative process graphically. Students will understand and use the Newton-Raphson method to find accurate approximations of roots. Students will understand and use the trapezium rule to approximate the area under a curve. **The Normal Distribution:** Students will understand and use the normal distribution, applying it to various statistical problems. Students will use the normal approximation to a binomial distribution, simplifying complex probability problems. Students will understand and carry out hypothesis testing for normal distributions, analysing sample data to make inferences about populations. **Kinematics:** Students will understand and use the principles of projectiles, analysing the motion of objects in two dimensions. Students will perform calculations involving non-uniform acceleration, applying calculus techniques to solve kinematic problems. **Dynamics:** Students will understand how to resolve forces, breaking down forces into their components.	

	their graphs, analysing their properties. Students will understand and use the functions cosec, cot, and sec, including the properties and graphs of these functions. Students will understand and use trigonometric addition formulas, including the R addition formula. Students will model real-life problems using trigonometric functions, applying these to various practical contexts. **Sequences and Series:** Students will recognize different types of sequences, understanding their characteristics and patterns. Students will understand arithmetic sequences and use their formulas to find terms and sums. Students will understand geometric sequences and series, using their formulas to solve problems. Students will model problems using sequences and series to solve real-life situations, applying mathematical concepts to practical scenarios.	differentiating products and quotients of functions. Students will understand connected rates of change, solving related rates problems. Students will understand parametric differentiation, differentiating parametric equations. Students will carry out implicit differentiation, solving equations where the dependent and independent variables are mixed.	multiplication in three dimensions. **Correlation and Regression:** Students will understand regression, analysing relationships between variables. Students will understand and use the Product Moment Correlation Coefficient (PMCC) with scatter graphs, interpreting correlation strength and direction. Students will understand and carry out hypothesis testing with PMCC, determining the significance of correlations. **Probability:** Students will know and use the conditional probability formula, applying it to various probability problems. Students will model with probability to solve real-life problems, using probability concepts in practical scenarios.	Students will understand and use friction in models, analysing its effect on motion. Students will understand and use Newton's laws of motion to solve problems involving dynamics. **Moments:** Students will understand the concept of moments, analysing the turning effect of forces. Students will perform calculations involving reaction forces and friction, solving equilibrium problems involving moments.	

MATHEMATICS AT PRIMARY PHASE- AT A GLANCE

Year 1

- Place value (within 10)
- Addition and subtraction (within 10)
- Place value (within 20)
- Shape
- Addition and subtraction (within 20)
- Place value (within 50)
- Length and height
- Mass and volume
- Multiplication and division
- Fractions
- Place value (within 100)
- Position and direction
- Time
- Money

Year 2

- Number and place value
- Addition and subtraction
- Multiplication and division
- Money including four operations.
- Shape
- Length and height
- Mass, capacity, and temperature
- Consolidation
- Fractions
- Statistics including four operations.
- Position and direction
- Time

Year 3

- Number and place value
- Addition and subtraction
- Multiplication and Division
- Length and Perimeter including addition and subtraction.
- Statistics including four operations.
- Revisit four operations
- Fractions
- Revisit four operations
- Revisit fractions
- Mass and Capacity
- Money including addition and subtraction.
- Time
- Shape

Year 4

- Number and place value
- Addition and subtraction
- Multiplication and Division
- Length and perimeter (Addition and subtraction)
- Area (multiplication and division)
- Fractions
- Decimals
- Decimals
- Money including four operations.
- Time
- Statistics including four operations.
- Shape
- Position and direction

Year 5

- Number and Place Value including negative numbers.
- Addition and Subtraction
- Multiplication and Division
- Fractions
- Fractions, Decimals, and Percentages
- Perimeter and Area including four operations.
- Perimeter, Area, and Volume including four operations.
- Statistics
- Properties of shape
- Position and Direction
- Decimals
- Converting units

Year 6

- Number and place value
- Number and place value including negative numbers.
- Addition and Subtraction
- Multiplication and Division
- Position and Direction
- Fractions
- Decimals
- Converting Units
- Fractions, Decimals, and Percentages
- Ratio and Proportion
- Perimeter, Area, and Volume including the four operations.
- Algebra including properties of shape.
- Statistics including angles.
- Revisit ratio and proportion
- Revisit Statistics including angles.
- Revisit Position and direction
- Themed project (consolidation)

M ATHEMATICS KEY CONCEPTS

Algebra	Ratio	Number	Geometry	Probability/Statistics

NOTTINGHAM ACADEMY MATHEMATICS & NATIONAL CURRICULUM COMPLIANCE- KS3

1. Number	2. Algebra	3. Ratio, Proportion and Rates of Change
Nottingham Academy Curriculum Alignment: • Year 7: Term 1: Place Value and Ordering • Year 7: Term 1: Fraction, Decimal, and Percentage Equivalence • Year 7: Term 2: Solving Problems with the Four Operations • Year 7: Term 2: Fractions and Percentages of Amounts • Year 7: Term 2: Operations and Equations with Directed Numbers • Year 7: Term 2: Addition and Subtraction of Fractions • Year 7: Term 3: Developing Number Sense • Year 7: Term 3: Prime Numbers and Proof • Year 8: Term 1: Multiplying and Dividing Fractions • Year 8: Term 2: Fractions and Percentages • Year 8: Term 2: Standard Index Form • Year 8: Term 2: Number Sense • Year 9 Foundation: Half Term 5: Fractions and Decimals Review and Extend	**Nottingham Academy Curriculum Alignment:** • Year 7: Term 1: Sequences • Year 7: Term 1: Algebraic Notation • Year 7: Term 1: Equality and Equivalence • Year 7: Term 2: Operations and Equations with Directed Numbers • Year 8: Term 1: Working in the Cartesian Plane • Year 8: Term 2: Brackets, Equations, and Inequalities • Year 8: Term 2: Sequences • Year 8: Term 2: Indices • Year 9 Foundation: Half Term 1: Sequences • Year 9 Foundation: Half Term 1: Straight Line Graphs • Year 9 Foundation: Half Term 3: Graphs (including non-linear) • Year 9 Foundation: Half Term 4: Equations Review and Extend	**Nottingham Academy Curriculum Alignment:** • Year 8: Term 1: Ratio and Scale • Year 8: Term 1: Multiplicative Change • Year 9 Foundation: Half Term 1: Compound Units • Year 9 Foundation: Half Term 2: Vectors

4. Geometry and Measures	5. Probability	6. Statistics
Nottingham Academy Curriculum Alignment: • Year 7: Term 3: Constructing and Measuring • Year 7: Term 3: Using Geometry • Year 7: Term 3: Developing Geometric Reasoning • Year 8: Term 3: Angles in Parallel Lines and Polygons • Year 8: Term 3: Area of Trapezia and Circles • Year 8: Term 3: Line Symmetry and Reflection • Year 9 Foundation: Half Term 2: Transformations • Year 9 Foundation: Half Term 2: Similar Figures • Year 9 Foundation: Half Term 4: Geometry Review and Extend	**Nottingham Academy Curriculum Alignment:** • Year 7: Term 3: Sets and Probability • Year 8: Term 1: Tables and Probability • Year 9 Foundation: Half Term 3: Bivariate Data/Scatter Diagrams • Year 9 Foundation: Half Term 5: Data Handling Cycle Review and Extend	**Nottingham Academy Curriculum Alignment:** • Year 8: Term 1: Representing Data • Year 8: Term 3: The Data Handling Cycle • Year 8: Term 3: Measures of Location • Year 9 Foundation: Half Term 3: Bivariate Data/Scatter Diagrams • Year 9 Foundation: Half Term 5: Data Handling Cycle Review and Extend

NOTTINGHAM ACADEMY MATHEMATICS & NATIONAL CURRICULUM COMPLIANCE- KS4

1. Number	2. Algebra	3. Ratio, Proportion and Rates of Change
Nottingham Academy Curriculum Alignment: • Year 10 Higher: Half Term 3: Surds • Year 11 Higher: Half Term 1: Four Operations with Algebraic Fractions Review and Extend • Year 11 Higher: Half Term 1: Negative and Fractional Indices	**Nottingham Academy Curriculum Alignment:** • Year 10 Higher: Half Term 1: Bivariate Data and Scatter Graphs • Year 10 Higher: Half Term 1: Transformations • Year 10 Higher: Half Term 1: Similarity • Year 10 Higher: Half Term 2: Non-Linear Graphs • Year 10 Higher: Half Term 2: Graphical Solutions of Equations • Year 10 Higher: Half Term 3: Algebraic Solutions to Equations Part 2 • Year 10 Higher: Half Term 5: Straight Line Graphs Review and Extend • Year 11 Higher: Half Term 1: Solving Quadratic Equations • Year 11 Higher: Half Term 2: Quadratic Inequalities to Include Graphing Inequalities • Year 11 Higher: Half Term 2: Sequences • Year 11 Higher: Half Term 2: Proof • Year 11 Higher: Half Term 3: Functions	**Nottingham Academy Curriculum Alignment:** • Year 10 Higher: Half Term 4: Non-Right-Angled Trigonometry • Year 10 Higher: Half Term 4: Compound Units and Bounds • Year 11 Higher: Half Term 2: Vectors
4. Geometry and Measures	**5. Probability**	**6. Statistics**
Nottingham Academy Curriculum Alignment: • Year 10 Higher: Half Term 1: Similarity • Year 10 Higher: Half Term 2: Transformations • Year 10 Higher: Half Term 3: Comparing Distributions (Measures of Spread, Interquartile Range) • Year 10 Higher: Half Term 4: Circle Theorems • Year 11 Higher: Half Term 3: Transformation of Graphs • Year 11 Higher: Half Term 3: Time Series	**Nottingham Academy Curriculum Alignment:** • Year 10 Higher: Half Term 2: Tree Diagrams • Year 10 Higher: Half Term 5: Probability Review and Extend	**Nottingham Academy Curriculum Alignment:** • Year 10 Higher: Half Term 1: Bivariate Data and Scatter Graphs • Year 10 Higher: Half Term 3: Comparing Distributions (Measures of Spread, Interquartile Range) • Year 10 Higher: Half Term 5: Data Collection and Sampling • Year 11 Higher: Half Term 3: Time Series • Year 11 Higher: Half Term 3: Index Numbers