

Curriculum Progression (Intent)

Long Term Intent Mathematics

Students will develop conceptual understanding, mathematical fluency and the ability to reason mathematically. They will be confident in applying their knowledge to solve complex problems and the appreciate the application of mathematics in the wider world.

Year 11 FOUNDATION

Names of Units from SPARX maths	Skill
Factors, Multiples and Primes	- Finding the lowest common multiple - Finding the highest common factor - Prime factor decomposition - Finding the HCF and LCM using prime factor decomposition
Fractions	- Ordering fractions and mixed numbers - Adding and subtracting mixed numbers - Multiplying with mixed numbers - Dividing with mixed numbers
Expressions	- Simplifying expressions using index laws - Simplifying algebraic fractions by cancelling common factors
Equations	- Solving equations with two or more steps - Solving equations with unknown on both sides - Solving equations with unknown in the denominator - Constructing and solving equations - Factorising to solve quadratic equations - Solving quadratic equations graphically - Solving simultaneous equations using elimination - Solving simultaneous equations using substitution - Solving simultaneous equations graphically - Constructing and solving simultaneous equations
Angles	- Combining angle facts - Angles on parallel lines - Using quadrilateral properties to find angles - Angles in polygons
Right-angled triangles	- Using Pythagoras' theorem in 2D - Applying Pythagoras' theorem in 2D - Finding unknown sides in right-angled triangles - Finding unknown angles in right-angled triangles - Using the exact values of trigonometric ratios - Angles of elevation and depression - Calculating bearings - Calculating with trigonometry and bearings

Surface area and Volume	• Finding the surface area and volume of cones and spheres • Finding the surface area and volume of frustums • Finding the surface area and volume of composite shapes
Statistical diagrams	• Drawing pie charts • Interpreting pie charts • Plotting scatter graphs • Interpreting scatter graphs • Using lines of best fit
Probability	• Probabilities of mutually exclusive events • Sample space diagrams • Expected results from repeated experiments • Venn diagrams with set notation • Using set notation • Tree diagrams for independent events • Tree diagrams for dependent events • Experimental probabilities
Inequalities	• Solving inequalities with unknown on both sides • Solving double inequalities • Constructing and solving inequalities
Vectors	• Adding and subtracting column vectors • Multiplying column vectors by a scalar • Identifying parallel vectors • Solving geometric problems using vectors
Percentages	• 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
Compound Measures	• Calculating with speed • Calculating with rates • Calculating with density • Calculating with pressure
Ratio and Proportion	• Combining ratios • Calculating with ratios and algebra • Changing ratios • Solving direct proportion word problems • Solving inverse proportion word problems • Currency conversion
Standard Form	• Multiplying and dividing numbers in standard form • Adding and subtracting numbers in standard form

	• Standard form with a calculator
Sequences	• Position-to-term rules for arithmetic sequences • Position-to-term rules for sequences of patterns • Position-to-term rules for geometric sequences • Special sequences
Linear Graphs	• Plotting straight line graphs • Finding equations of straight-line graphs • Interpreting equations of straight-line graphs • Equations of parallel lines • Finding the equation of a straight line from its gradient and a point • Finding the equation of a straight line from two points on the line

Year 11 Higher

Names of Units from SPARX maths	Skill
Surds	• Multiplying and dividing surds • Simplifying surds • Adding and subtracting surds • Expanding brackets with surds • Rationalising denominators containing a single term • Rationalising denominators containing two terms
Algebraic Fractions	• Simplifying algebraic fractions by factorising into one bracket • Simplifying algebraic fractions by factorising into two brackets • Adding and subtracting algebraic fractions • Multiplying algebraic fractions • Dividing algebraic fractions
Equations	• Factorising to solve quadratic equations • Solving quadratic equations by completing the square • Solving quadratic equations using the quadratic formula • Constructing and solving quadratic equations • Solving quadratic equations graphically • Solving simultaneous equations involving quadratics • Solving simultaneous equations involving quadratics graphically
Pythagoras' theorem and Trigonometry	• Using the exact values of trigonometric ratios • Using trigonometric graphs • The sine rule • The cosine rule • The area rule • Using Pythagoras' theorem in 3D

	• Trigonometry in 3D shapes
Circle Geometry	• Angles subtended at the centre or the circumference of a circle • Angles in segments and cyclic quadrilaterals • Circle theorems for chords and tangents • Alternate segment theorem
Statistical Diagrams	• Drawing histograms with equal class widths • Drawing histograms with unequal class widths • Interpreting histograms • Calculating averages from histograms
Probability	• Conditional probabilities from tables • Conditional probabilities from Venn diagrams • Using the conditional probability formula • Conditional probabilities from tree diagrams • Using the product rule for counting
Inequalities	• Graphs of linear inequalities • Solving quadratic inequalities
Functions	• Substituting into functions • Substituting into composite functions • Finding composite functions • Finding inverse functions
Transformations	• Translating graphs • Reflecting graphs • Transforming graphs
Iteration	• Using recurrence relations • Substituting into iterative formulae • Finding approximate solutions to equations using iteration
Algebraic Proof	• Writing algebraic proofs
Similarity	• Finding the perimeter and area of similar shapes • Finding the surface area and volume of similar shapes
Geometric Proof	• Solving geometric problems using vectors • Geometric proofs with vectors • Geometric proofs with angle facts • Geometric proofs with congruence and similarity • Proving the circle theorems
Graphs	• Estimating gradients of non-linear graphs using tangents • Calculating distances from velocity-time graphs • Estimating areas under non-linear graphs • Equations of circles and tangents

Names of Units from SPARX maths	Skill
Percentages	• Growth interest calculations • Growth and decay
Surface Area and Volume	• Finding the surface area and volume of pyramids • Finding the surface area and volume of cones • Finding the surface area and volume of spheres • Finding the surface area and volume of frustums • Finding the surface area and volume of composite shapes
Simultaneous Equations	• Solving simultaneous equations using elimination • Solving simultaneous equations using substitution • Solving simultaneous equations graphically • Constructing and solving simultaneous equations
Formulae	• Changing the subjects of formulae with two or more steps • Changing the subject when the subject appears more than once
Trigonometry	• Understanding sin, cos and tan • Finding unknown sides in right-angles triangles • Finding unknown angles in right-angled triangles • Using the exact values or trigonometric ratios • Angles of elevation and depression calculating with trigonometry and bearings
Constructions	• Constructing loci
Linear Graphs	• Equations of parallel lines • Finding the equation of a straight line from its gradient and a point • Finding the equation of a straight line from two points on the line • Equations of parallel and perpendicular lines (Higher only)
Real-life graphs	• Plotting linear real-life graphs • Using and finding equations of linear real-life graphs • Sketch graphs of water flows
Set Notation	• Venn diagrams with set notation • Using set notation
Tree Diagrams	• Tree diagrams for independent events

	• Tree diagrams for dependent events
Compound Measures	• Calculating with density • Calculating with pressure
Ratio	• Combining ratios • Calculating with ratios and algebra • Changing ratios
Graphs	• Velocity-time graphs • Plotting velocity-time graphs
Sequences	• Position-to-term rules for arithmetic sequences • Position-to-term rules for sequences of patterns • Position-to-term rules for geometric sequences • Special sequences (Higher only)
Handling Data	• Sampling and bias • Capture-recapture (Higher only)
Proportion	• Interpreting direction proportion equations • Interpreting inverse proportion equations • Graphs of direct and inverse equations
Transformations	• Combining transformations • Enlargement by positive or negative scale factor (Higher only)
Rounding	• Finding error intervals • Finding error intervals for truncated numbers • Finding bounds for calculations (Higher only)
Indices	• Index rules with positive indices • Index rules with negative indices • Simplifying expressions using index laws • Estimating roots and powers (Higher only) • Fractions indices (Higher only)
Recurring Decimals (Higher only)	• Converting fractions to recurring decimals • Converting recurring decimals to fractions
Brackets	• Expanding double brackets • Factorising quadratic expressions • Factorising the difference of two squares • Factorising to solve quadratic equations • Expanding triple brackets (Higher only) • Completing the square (Higher only) • Finding the turning point of a quadratic graph by completing the square (Higher only)

Handling Data and Statistical Diagrams	• Interpreting frequencies tables with grouped data • Finding averages from grouped data • Drawing stem-and-leaf diagrams • Interpreting stem-and-leaf diagrams • Drawing line graphs • Interpreting line graphs • Drawing and interpreting frequency polygons • Drawing cumulative frequency graphs (Higher only) • Interpreting cumulative frequency graphs (Higher only) • Drawing and interpreting box plots (Higher only)
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Year 9

Names of Units from SPARX maths	Skill
Fractions & Percentages	• Converting between fractions, decimals and percentages • Ordering fractions, decimals and percentages • Finding fractions of amounts without a calculator • Finding fractions of amounts with a calculator • Finding percentages of amounts without a calculator • Finding percentages of amounts with a calculator • Percentage change without a calculator • Percentage change with a calculator • Finding original values in percentage calculations • Finding the percentage an amount has been changed by • Simple interest calculations
Probability	• Expected results from repeated experiments • Calculating experimental probabilities • Frequency trees
Standard Form	• Multiplying and dividing numbers in standard form • Adding and subtracting numbers in standard form • Standard form with a calculator
Inequalities	• Solving inequalities with the unknown on both sides • Solving double inequalities • Constructing and solving inequalities

Quadratic Equations	- Factorising quadratic equations of the form $x^2+bx+cx^2+bx+c$ - Factorising the difference of two squares - Factorising to solve quadratic equations of the form $x^2+bx+c=0$
Formulae	- Changing the subjects of formulae with one step - Changing the subjects of formulae with two or more steps
Constructions	- Constructing bisectors of angles - Constructing perpendicular bisectors and lines
Circles	- Finding the arc length of sectors - Finding the area of sectors - Finding the surface area of cylinders - Finding the volume of cylinders
Rounding	- Finding error intervals - Truncating decimals - Finding error intervals for truncated numbers
3D Shapes	Plans and elevations
Pythagoras	- Using Pythagoras' theorem in 2D - Applying Pythagoras' theorem in 2D
Ratio and Proportion	- Writing and simplifying ratios - Sharing amounts in a given ratio - Solving direct proportion word problems - Solving inverse proportion word problems - Currency conversion
Linear Graphs	- Plotting straight line graphs - Finding equations of straight line graphs - Interpreting equations of straight line graphs
Compound Measures	- Calculating with speed - Calculating with rates
Motion-time graphs	Plotting distance-time graphs

	• Interpreting distance-time graphs • Calculating speed from distance-time graphs • Plotting distance-time graphs using speeds
Quadratic graphs	• Plotting graphs of quadratic functions • Interpreting graphs of quadratic functions • Solving quadratic equations graphically
Angles and bearings	• Combining angle facts • Angles on parallel lines • Using quadrilateral properties to find angles • Angles in polygons • Measuring and drawing bearings • Calculating bearings
Similarity and congruence	• Understanding similarity • Finding unknown sides in similar shapes • Understanding congruence • Congruent triangles • Constructing triangles
Handling data and statistical diagrams	• Types of data • Presenting data and making conclusions • Comparing populations using diagrams • Choosing suitable averages and solving problems • Plotting scatter graphs • Interpreting scatter graphs • Using lines of best fit • Interpreting frequency tables with grouped data • Finding averages from grouped data • Drawing and interpreting frequency polygons
Vectors	• Understanding column vectors • Adding and subtracting column vectors • Multiplying column vectors by a scalar(U564) • Identifying parallel vectors

Year 8

Names of Units from SPARX maths	Skill
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Percentages	- Finding percentages of amounts without a calculator - Finding percentages of amounts with a calculator - Percentage change without a calculator - Percentage change with a calculator
Money	Value for money
Indices	- Index rules with positive indices - Index rules with negative indices - Simplifying expressions using index laws - Simplifying algebraic fractions by cancelling common factors
Equations	- Solving equations of the form $(x+a)/b=c$ - Solving linear equations involving brackets - Solving equations with the unknown in the denominator - Solving equations with the unknown on both sides - Constructing and solving equations
Sequences	- Term-to-term rules for numerical sequences - Term-to-term rules for sequences of patterns - Substituting into position-to-term rules - Position-to-term rules for arithmetic sequences - Position-to-term rules for sequences of patterns
Ratio	- Writing and simplifying ratios - Writing ratios in the form $1:n$ - Converting between ratios, fractions and percentages - Using equivalent ratios to find unknown amounts - Sharing amounts in a given ratio - Drawing and interpreting scale diagrams
Rounding	- Rounding integers using significant figures - Rounding decimals using significant figures - Estimating calculations
Coordinates	- Calculating midpoints - Mixed problems: Coordinates and midpoints

Area	• Finding the area of parallelograms • Finding the area of trapeziums • Converting units of area
Circles	• Finding the area of parallelograms • Finding the area of trapeziums • Converting units of area
Standard Form	• Using standard form with positive indices • Using standard form with negative indices
Venn Diagrams	• Venn diagrams • Probabilities from Venn diagrams • Finding the HCF and LCM using prime factor decomposition
3D Shapes	• Properties of 3D shapes • Nets of 3D shapes
Surface Area and Volume	• Finding the surface area from a net • Finding the surface area of cubes and cuboids • Finding the surface area of prisms • Finding the volume of cubes and cuboids • Finding the volume of prisms • Converting units of volume
Linear Graphs	• Plotting horizontal, vertical and diagonal lines • Plotting straight line graphs • Finding equations of straight line graphs
Transformations	• Translation • Reflection • Finding the area of parallelograms

Angles	- Finding the area of trapeziums - Converting units of area
Statistical Diagrams	- Drawing pie charts - Interpreting pie charts - Drawing line graphs - Interpreting line graphs - Drawing stem-and-leaf diagrams - Interpreting stem-and-leaf diagrams - Finding averages from diagrams
Inequalities	- Reading and drawing linear inequalities on number lines - Solving single inequalities
Brackets	Expanding double brackets
Algebraic Fractions	- Calculating with fractions - Calculating with mixed numbers - Simplifying algebraic fractions by factorising - Adding and subtracting algebraic fractions
Recurring Decimals	- Using recurring decimal notation - Converting fractions to recurring decimals

Year 7

Names of Units from SPARX maths	Skill
Number Sense and Calculations	To be able to add and subtract. To be able to multiply To be able to divide To be able to calculate with negative numbers. To be able to apply the order of operations
Expressions & Equations	To understand algebraic notation To be able to form expressions. To be able to simplify expressions. To be able to substitute with one/ multiple operations. To be able to substitute into algebraic and real-life formulae.

	To be able to solve 1 and 2 step equations
Time and Measures	To be able to convert the units of time. To be able to use clocks. To be able to calculate with time. To be able to use timetables. To be able to use calendars. To be able to read and plot coordinates. To be able to solve shape problems involving coordinates. Estimating and measuring length, mass and capacity. Converting units of length, mass and capacity. Using appropriate units.
2D – Shapes	To be able to deduce, use and understand line properties. To be able to deduce, use and understand shape properties. To be able to understand symmetry .
Perimeter and Area	To be able to find perimeters using grids. To be able to find the perimeter of rectangles and simple shapes . To be able to find the perimeter of compound shapes. To be able to Find areas using grids. To be able to find the area of rectangles To be able to Find the area of compound shapes To be able to Find the area of triangles To be able to Find the area of compound shapes containing triangles
Coordinates	To be able to read and plot coordinates To be able to solve shape problems involving coordinates
Factors, Multiples and Primes	To be able to Find the lowest common multiple To be able to Find factors and using divisibility tests To be able to Find the highest common factor To be able to Find prime numbers To be able to do Prime factor decomposition
Fractions	To be able to Find fractions of shapes. To be able to Construct fractions To be able to Find equivalent fractions To be able to Find equivalent fractions To be able to Simplify fractions To be able to Order fractions

	To be able to Convert between mixed numbers and improper fractions To be able to add and subtract fractions including mixed numbers
Brackets	To be able to distributive law To be able to expand and simplify single brackets To be able to factorise into one bracket
Angles	To be able to recognise types of angles To be able to estimate, measure and draw angles
Handling data and statistical diagrams	To be able to calculate the mean, median and range. To be able to find the mode. To be able to draw and interpret frequency tables, tally charts, two way tables, pictograms, bar charts. To be able to collect and record data To be able to present data and make conclusions To be able to find averages from frequency tables To be able to choose suitable averages and solve problems
Proportion	To be able to solve proportion problems
Fractions, Decimals and Percentages	To be able to multiply and divide fractions including mixed numbers. To be able to find fractions of amounts with and without a calculator To be able to convert between FDP To be able to order and convert between FDP To be able to write numbers as percentages of other numbers
Probability	To be able to use probability phrases To be able to write probabilities as FDP To be able to understand mutually exclusive events To be able to create and use sample space diagrams.