Dream Reach Achieve

Whittington Green School – Maths

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CURRICULUM INTENT: Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Aims

The national curriculum for mathematics aims to ensure that all pupils:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programme of study for key stage 3 is organised into apparently distinct domains, but pupils should build on key stage 2 and connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge in science, geography, computing and other subjects.

Decisions about progression should be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content in preparation for key stage 4. Those who are not sufficiently fluent should consolidate their understanding, including through additional practice, before moving on.

Spoken Language

The national curriculum for mathematics reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. They must be assisted in making their thinking clear

to themselves as well as others and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

Working mathematically
Through the mathematics content, pupils should be taught to:

Develop fluency

- consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots
- select and use appropriate calculation strategies to solve increasingly complex problems
- use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships
- substitute values in expressions, rearrange and simplify expressions, and solve equations
- move freely between different numerical, algebraic, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals, and equations and graphs]
- develop algebraic and graphical fluency, including understanding linear and simple quadratic functions
- use language and properties precisely to analyse numbers, algebraic expressions, 2-D and 3-D shapes, probability and statistics.

Reason mathematically

- extend their understanding of the number system; make connections between number relationships, and their algebraic and graphical representations
- extend and formalise their knowledge of ratio and proportion in working with measures and geometry, and in formulating proportional relations algebraically
- identify variables and express relations between variables algebraically and graphically
- make and test conjectures about patterns and relationships; look for proofs or counter-examples
- begin to reason deductively in geometry, number and algebra, including using geometrical constructions
- interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning
- explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally.

Solve problems

- develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems
- develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics
- begin to model situations mathematically and express the results using a range of formal mathematical representations
- select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems.

Number
Pupils should be taught to:

- understand and use place value for decimals, measures and integers of any size

- order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥
- use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property
- use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative
- use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals
- recognise and use relationships between operations including inverse operations
- use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations
- interpret and compare numbers in standard form $A \times 10^n$ $1 \leq A < 10$, where n is a positive or negative integer or zero
- work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and $\frac{7}{2}$ or 0.375 and $\frac{3}{8}$)
- define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%
- interpret fractions and percentages as operators
- use standard units of mass, length, time, money and other measures, including with decimal quantities
- round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures]
- use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation $a < x \leq b$
- use a calculator and other technologies to calculate results accurately and then interpret them appropriately
- appreciate the infinite nature of the sets of integers, real and rational numbers.

Algebra

Pupils should be taught to:

- use and interpret algebraic notation, including:
  - ab in place of a × b
  - 3y in place of y + y + y and 3 × y
  - a^2 in place of a × a, a^3 in place of a × a × a; a^2 b in place of a × a × b
  - $\frac{a}{b}$ in place of a ÷ b
  - coefficients written as fractions rather than as decimals
  - brackets
- substitute numerical values into formulae and expressions, including scientific formulae
- understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors
- simplify and manipulate algebraic expressions to maintain equivalence by:
  - collecting like terms
  - multiplying a single term over a bracket
  - taking out common factors
  - expanding products of two or more binomials
- understand and use standard mathematical formulae; rearrange formulae to change the subject

- model situations or procedures by translating them into algebraic expressions or formulae and by using graphs
- use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement)
- work with coordinates in all four quadrants
- recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane
- interpret mathematical relationships both algebraically and graphically
- reduce a given linear equation in two variables to the standard form y = mx + c; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically
- use linear and quadratic graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations
- find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs
- generate terms of a sequence from either a term-to-term or a position-to-term rule
- recognise arithmetic sequences and find the *n*th term
- recognise geometric sequences and appreciate other sequences that arise.

Ratio, proportion and rates of change

Pupils should be taught to:

- change freely between related standard units [for example time, length, area, volume/capacity, mass]
- use scale factors, scale diagrams and maps
- express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1
- use ratio notation, including reduction to simplest form
- divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio
- understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction
- relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions
- solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics
- solve problems involving direct and inverse proportion, including graphical and algebraic representations
- use compound units such as speed, unit pricing and density to solve problems.

Geometry and measures

Pupils should be taught to:

- derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders)
- calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes
- draw and measure line segments and angles in geometric figures, including interpreting scale drawings
- derive and use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line

- describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric
- use the standard conventions for labelling the sides and angles of triangle ABC, and know and use the criteria for congruence of triangles
- derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies
- identify properties of, and describe the results of, translations, rotations and reflections applied to given figures
- identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids
- apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles
- understand and use the relationship between parallel lines and alternate and corresponding angles
- derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons
- apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs
- use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles
- use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D
- interpret mathematical relationships both algebraically and geometrically.

Probability

Pupils should be taught to:

- record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale
- understand that the probabilities of all possible outcomes sum to 1
- enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams
- generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.

Statistics

Pupils should be taught to:

- describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers)
- construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data
- describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.

Year 7					
Term/Unit	Topic Overview / Content	Learning Expectation / Concepts and Skills	Recall and review of past learning	National Curriculum target	Keywords
Autumn Term 1	**Sequences**	Describe and continue a sequence given diagrammatically Predict and check the next term(s) of a sequence Represent sequences in tabular and graphical forms Continue numerical linear sequences Continue numerical non-linear sequences Find missing numbers within sequences (H)	• Four operations on numbers • Order of operations	• move freely between different numerical, algebraic, graphical and diagrammatic representations • make and test conjectures about patterns and relationships; • use a calculator and other technologies to calculate results accurately and then interpret them appropriately • generate terms of a sequence from a term-to-term rule • recognise arithmetic sequences and find the nth term • recognise geometric sequences and appreciate other sequences that arise.	• Sequence • Term • Position • Rule • Linear • Non-linear • Difference • Arithmetic • Geometric
	Understand and use algebraic notation	Given a numerical input, find the output of a single function machine Use inverse operations to find the input given the output Find the function machine given a simple expression Substitute values into single operation expressions	• Four operations on numbers • Square and cube of a number • Order of operations	• move freely between different numerical, algebraic, graphical and diagrammatic representations • recognise use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships • recognise and use relationships between operations including inverse operations	• Function • Input • Output • Operation • Inverse • Commutative • Substitute • Expression) • Evaluate • Linear • Sequence

		Find numerical inputs and outputs for a series of two function machines Substitute values into two-step expressions Generate sequences given an algebraic rule Represent one and two step functions graphically		• model situations or procedures by translating them into algebraic expressions • substitute values in expressions, rearrange and simplify expressions • use and interpret algebraic notation, including ab in place of a × b $3y$ in place of y + y + y and 3 × y a^2 in place of a × a, $\frac{a}{b}$ in place of a ÷ b • generate terms of a sequence from a term- to-term rule • produce graphs of linear functions of one variable	
	Equality and equivalence	Understand the meaning of equality Understand and use fact families, numerically and algebraically Solve one-step linear equations involving +/- and using inverse operations Solve one-step linear equations involving ×/÷ and using inverse operations Understand the meaning of like and unlike terms	• Four operations on numbers • Algebraic expressions • Formulae	• use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships • simplify and manipulate algebraic expressions to maintain equivalence by collecting like terms • use approximation through rounding to estimate answers • use algebraic methods to solve linear equations in one variable	• Equality • Equation • Equals • Solution • Solve • Inverse • Term • Like • Coefficient • Expression

		Understand the meaning of equivalence Simplify algebraic expressions by collect like terms, using the ≡ symbol			
	Place value and ordering integers and decimals	Recognise the place value of any number in an integer up to one billion Understand and write integers up to one billion in words and figures Round integers to the nearest power of ten Compare two numbers using $=, \neq, <, >, \leq, \geq$ Order a list of integers Understand places value for decimals Position decimals on a number line Compare and order any number up to one billion Round a number to 1 significant figure Find the range for a set of numbers Find the median for a set of numbers Write 10, 100, 1000 etc. as powers of ten (H) Write positive integers in the form A x 10^n (H) Investigate negative powers of ten (H) Write decimals in the form A x 10^n(H)	• Whole numbers • Even, Odd and Consecutive numbers • Addition • Subtraction • Multiplication • Division	• consolidate their understanding of the number system and place value to include decimals • understand and use place value for decimals, measures and integers of any size • order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use symbols $=, \neq, \leq, \geq$ • work interchangeably with terminating decimals and their corresponding fractions • round numbers to an appropriate degree of accuracy • describe, interpret and compare observed distributions of a single variable through: the median and the range • interpret and compare numbers on standard form	• Approximate • Integer • Interval • Median • Negative • Place holder • Place value • Range • Significant figure
	Fraction, decimal and	Represent tenths and hundredths as diagrams	• Idea of fractions • Multiples	• consolidate their understanding of the number system and	• Fraction • Decimal

	percentage equivalence	Represent tenths and hundredths on number lines Interchange between fractional and decimal number lines Convert between fractions and decimals – tenths and hundredths Convert between fractions and decimals – fifths and quarters Convert between fractions and decimals – eighths and thousandths (H) Convert fluently between simple fractions, decimals and percentages Identify and use simple equivalent fractions Understand fractions as division Use and interpret Pie charts Convert fluently between fractions, decimals and percentages Explore fractions above one, decimals and percentages (H)	• Place value of a whole number • Four operations on whole numbers • Rounding whole numbers • Solve equations with fractions, including fractional coefficients	place value to include decimals, fractions • move freely between different numerical representations [for example, equivalent fractions, fractions and decimals] • extend their understanding of the number system; make connections between number relationships • express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1 • define a percentage as 'number of parts per hundred', interpret percentages as a fraction or a decimal • compare two quantities using percentages • work with percentages greater than 100% • interpret pie charts	• Percentage • Place value • Placeholder • Interval • Tenth • Hundredth • Sector • Recurring
Spring Term 2	**Solving problems with addition and subtraction**	Use formal methods for addition of integers Use formal methods for addition of decimals Use formal methods for subtraction of integers Use formal methods for subtraction of decimals	• Four operations on numbers • Decimals • Perimeter problems to revisit equations and simplifying	• use formal written methods, applied to positive integers and decimals • recognise and use the relationships between operations including inverse operations	• Commutative • Associative • Inverse • Placeholder • Perimeter • Polygon • Balance • Debit

		Choose the most appropriate method: mental strategies, formal written or calculator Add and subtract number given in standard form (H) Solve financial maths problems Solve problems in the context of perimeter Solve problems involving tables and timetables Solve problems with frequency trees Solve problems with bar charts and line charts	• Tables to include distance charts and simple timetables • Revisit rounding • Choosing when to use mental, written or calculator methods • Order of operations to be revisited with negative numbers	• derive and apply formulae to calculate and solve problems involving: perimeter • construct and interpret appropriate table, charts, and diagrams, including frequency tables, bar charts and pictograms for categorical data, and vertical line (or bar) charts for ungrouped data	
	Solving problems with multiplication and division	Properties of multiplication and division Understand and use factors Understand and use multiples Multiply and divide integers and decimals by powers of 10 Use formal methods to multiply integers Use formal methods to multiply decimals Use formal methods to divide integers Use formal methods to divide decimals Understand and use order of operations	• Four operations on numbers • Decimals • Perimeter problems to revisit equations and simplifying • Tables to include distance charts and simple timetables • Revisit rounding • Choosing when to use mental, written or calculator methods • Order of operations to be revisited with negative numbers	• use formal written methods, applied to positive integers and decimals • select and use appropriate calculation strategies to solve increasingly complex problems • recognise and use the relationships between operations including inverse operations • use the concepts and vocabulary factors (or divisors), multiples, highest common factor, lowest common multiple • change freely between related standard units [time, length, area, volume/capacity, mass] • derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms and trapezia (H)	• Array • Multiples • Factor • Mili • Centi • Kilo • Quotient • Dividend • Divisor

		Solve problems using the area of rectangles and parallelograms Solve problems using the area of triangles Solve problems using the area of trapezia Solve problems using the mean Explore multiplication and division in algebraic expressions (H)		• substitute numerical values into formulae and expressions, including scientific formulae • use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) • describe, interpret and compare observed distributions of a single variable through; the mean	
	Fractions and percentages of amounts	Find a fraction of a given amount Use a given fraction to find the whole and/or other fractions Find a percentage of a given amount using mental methods Find a percentage of a given amount using a calculator Solve problems with fractions greater than 1 and percentages greater than 100% (H)	• Four operations on numbers • Decimals • Perimeter problems to revisit equations and simplifying • Tables to include distance charts and simple timetables • Revisit rounding • Choosing when to use mental, written or calculator methods • Order of operations to be revisited with negative numbers	• use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions • interpret fractions and percentages as operators	• Fraction • Equivalent • Whole • Percentage • Place Value: • Convert
	Four operations	Understand and use representations of directed numbers	• Include inequality number lines	• select and use appropriate calculation strategies to solve increasingly complex problems	• Subtract • Negative • Commutative

	with directed number	Order directed numbers using lines and appropriate symbols Add directed numbers Subtract directed numbers Multiplication of directed numbers Multiplication and division of directed numbers Evaluate algebraic expressions with directed numbers Use a calculator for directed number calculations Solve two-step equations Use order of operations with directed numbers Roots of positive numbers (H) Explore higher powers and roots (H)	• Revisit sequences, substitution and equations	• use the four operations, including formal written methods, applied to integers, both positive and negative • recognise and use the relationships between operations including inverse operations • use square and square roots • use a calculator and other technologies to calculate results accurately and then interpret them appropriately • substitute numerical values into formulae and expressions, including scientific formulae • understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors • simplify and manipulate algebraic expressions to maintain equivalence • understand and use standard mathematical formulae	• Product • Inverse • Squareroot • Square • Expression
	Addition and subtraction of fractions	Understand representations of fractions Convert between mixed numbers and fractions Add and subtract fractions with the same denominator Add and subtract fractions where denominators share a simple common multiple	• Include inequality number lines • Revisit sequences, substitution and equations	• move freely between different numerical, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals] • express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1 • order positive and negative integers, decimals and fractions; us e the number line as a model	• Numerator • Denominator • Equivalent • Mixed numbers • Improper fractions • Substitute • Place value

		Add and subtract fractions with any denominators Add and subtract improper fractions and mixed numbers Use fractions in algebraic contexts Use equivalence to add and subtract decimals and fractions Add and subtract fractions from integers expressing the answer as a single fraction Add and subtract simple algebraic fractions (H)		for ordering of the real number; use symbols $=, \neq, \leq, \geq$ • select and use appropriate calculation strategies to solve increasingly complex problems • use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative • work interchangeably with terminating decimals and their corresponding fractions	
Summer Term 3	**Constructing, measuring and using geometric notation**	Understand and use letter and labelling conventions including those for geometric figures Draw and measure line segments including geometric figures Understand angles as a measure of turn Classify angles Measure angles up to 180° Draw angles up to 180° Draw and measure angles between 180° and 360° Recognise types of triangles Recognise types of quadrilaterals	• Revisit simplifying and perimeter in e.g. polygons • Form and solve equations in geometric settings • Revisit mental and formal methods of addition and subtraction, including decimals	• use language and properties precisely to analyse 2-D shapes • begin to reason deductively in geometry including using geometrical constructions • draw and measure line segments and angles in geometric figures, including interpreting scale drawings • describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right-angles, regular polygons and other polygons that are reflectively and rotationally symmetric • use the standard conventions for labelling sides and angles • construct and interpret pie charts for categorical,	• Polygon • Scalene triangle • Isosceles triangle • Right-angled triangle • Frequency • Sector • Rotation • Protractor • Compass

		Identify perpendicular and parallel lines Construct triangles using SSS, SAS and ASA Construct more complex polygons Draw and interpret Pie charts Identify polygons up to a decagon		ungrouped and grouped numerical data • identify and construct triangles	
	Developing geometric reasoning	Understand and use the sum of angles at a point Understand and use the sum of angles on a straight line Understand and use the equality of vertically opposite angles Know and apply the sum of angles in a triangle Know and apply the sum of angles in a quadrilateral Solve angle problems using properties of triangles and quadrilaterals Find and use the angle sum of any polygon Investigate angles in parallel lines Understand and use parallel line angle rules Use known facts to obtain simple proofs	• Revisit simplifying and perimeter in e.g. polygons • Form and solve equations in geometric settings • Revisit mental and formal methods of addition and subtraction, including decimals	• use language and properties precisely to analyse 2-D shapes • begin to reason deductively in geometry including using geometrical constructions • describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right-angles, regular polygons and other polygons that are reflectively and rotationally symmetric • use the standard conventions for labelling sides and angles • derive and illustrate properties of triangles, quadrilaterals, circles and other plane figures [for example, equal lengths, and angles] using appropriate language and technologies • apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles • apply angle facts, triangle similarity and properties of quadrilaterals to derive results	• Vertically Opposite • Interior Angles • Sum • Convex Quadrilateral • Concave Quadrilateral • Polygon • Scalene triangle • Isosceles triangle • Right-angled triangle

				about angles and sides, and use known results to obtain simple proofs • understand and use the relationship between parallel lines and alternate and corresponding angles (H) • derive and use the sum of angles in a triangle and use it to derive the angle sum of any polygon, and to derive properties of regular polygons (H)	
	Developing number sense	Know and use mental addition and subtraction strategies for integers Know and use mental multiplication and division strategies for integers Know and use mental arithmetic strategies for decimals Know and use mental arithmetic strategies for fractions Use factors to simplify calculations Use estimation as a method for checking mental calculations Use known number facts to derive other facts Use known algebraic facts to derive other facts Know when to use a mental strategy, formal written method or a calculator	• Revisit FDP equivalence, and simple FDP addition and subtraction • Revisit factors and multiples, both numerically and algebraically	• consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots • select and use appropriate calculation strategies to solve increasingly complex problems • begin to reason deductively in number and algebra	• Commutative • Associative • Dividend • Divisor • Expression • Equation • Quotient

	Sets and probability	Identify and represent sets Interpret and create Venn diagrams Understand and use the intersection of sets Understand and use the union of sets Understand and use the compliment of sets (H) Generate sample spaces for single events Calculate the probability of a single event Understand and use the probability scale Know that the sum of probabilities of all outcomes is 1	• Revisit FDP equivalence, and simple FDP addition and subtraction • Revisit factors and multiples, both numerically and algebraically	• record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale • understand that probabilities of all possible outcomes sum to 1 • enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams • generate theoretical sample spaces for single and combined events with equally likely and mutually exclusive outcomes and use these to calculate theoretical probabilities	• Set • Element • Intersection • Union • Mutually Exclusive • Probability • Bias • Fair • Random
	Prime numbers and proof	Find and use multiples Identify factors of numbers and expressions Recognise and identify prime numbers Recognise square and triangular numbers Find common factors of a set of numbers including HCF Find common multiples of a set of numbers including LCM Write a number as a product of its prime factors Use a Venn diagram to calculate the HCF and LCM (H)	• Revisit FDP equivalence, and simple FDP addition and subtraction • Revisit factors and multiples, both numerically and algebraically	• use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including the product notation and the unique factorisation property • use integer powers and associated real roots (square, cube, and higher), recognise powers of 2, 3, 4, 5 • make and test conjectures about patterns and relationships; look for proofs or counterexamples • begin to reason deductively in number and algebra	• Multiples • Factor • Prime • Conjecture • Counterexample • Expression • HCF • LCM