

Mathematics

Curriculum Principles

By the end of their all-through education, a student of mathematics at Dixons Trinity Chapeltown will:

- know the fundamental skills in mathematics which allow students to understand how to use this knowledge in future learning and employment. These include money management; reading timetables; discovering and understanding patterns in data and being able to solve problems.
- recognise the beauty in sophisticated mathematical methods; be analytical thinkers and have a thirst for mathematical reasoning. On leaving Dixons Trinity Chapeltown, students will have developed fluency in procedures and be keen problem solvers.

Our unifying 'sentence' is: "The mathematics department at Dixons Trinity Chapeltown allowed students to question and explore the beauty of mathematics, leading to the development of resilient and analytical problem solvers."

In order to achieve a true understanding of mathematics, topics have been intelligently sequenced based on the following rationale:

- the overall aim of the all-through mathematics curriculum is to provide students with the knowledge they need to increase their cultural capital and be successful in their lives beyond the academy. With this in mind, throughout Primary, the schemes of work sequence topics in an order closely following that set out by the 'White Rose Maths Programme'. Adopting a spiral curriculum, in which topic areas are revisited and extended on a yearly basis, this sequence of learning promotes a deeper understanding of the mathematical concepts being taught, both in-line with the National Curriculum and in the wider domain.
- within the Primary classroom, all through, lessons roughly follow a six-part lesson format: Do Now, New Learning, Talk Task, Develop Learning, Independent Task, Plenary. In basecamp and lower peak, there is more emphasis on 'talk tasks' to develop deeper understanding whilst middle and upper peaks spend more time on practice and application to promote resilience and independence. Secondary lessons in middle peak synthesise knowledge learned in a lesson with an exam question and there is a greater emphasis on this in upper peak to provide students with applied practice, underpinned by real life contexts. In accordance with the curriculum overview, each peak throughout Primary and Secondary promotes a slight variation in pedagogy suitable to the students' developmental stage, whilst continuing to promote ambitious expectations for all pupils and educational equality throughout.
- the concept of interrupting the forgetting process permeates the all-through mathematics long term plan (LTP) and schemes of work (SOW). Interleaving and spaced learning are utilised in several ways. Across each year, new learning is split into units of work, each beginning with quick revision, then focussing on extension and application of similar learning the year before. As a result, students will consistently revisit topics (spaced learning) and interleave concepts throughout their mathematics career. In addition, in base camp and lower peak a daily mathematics meeting begins the learning each day. This focusses on revision of previous concepts using 'call and response' and targeted questioning in order to address students' gaps. In Secondary, every lesson begins with a 'Do Now', which promotes recall of integral knowledge, along with applied practice, from topics in the previous unit of work, allowing for spaced practice of up to six weeks. In addition, each topic taught has a mini-test and consolidation or extension re-test attached to assess understanding. Staff mark all re-tests and gaps in learning are addressed through global feedback, with opportunity for targeted additional practice. These tests ensure learning is revisited repeatedly. Spaced learning through retrieval practice and brain dumps in morning meetings and recall homework from knowledge organisers, are supplementary ways in which the forgetting process is interrupted, leading to true mastery of the mathematical curriculum.

The mathematics curriculum will address social disadvantage by addressing gaps in students' knowledge and skills:

- the spiral nature of the mathematics curriculum is designed with the most vulnerable student in mind, assuming a basic mathematical understanding from previous learning, each peak builds the students' knowledge. Middle peak in particular is used to ensure fluency in fundamental mathematics by closing any knowledge gaps evidenced in assessment, whilst also providing suitable extension.
- in Primary, students in need of intervention are targeted by close teacher observation and ongoing formative assessment. With a focus on students performing below age related expectations, frequent five minute interventions occur 1-to-1 with the main class teacher whilst other students complete the daily Maths Morning Meeting. These ensure gaps are closed as swiftly as possible.
- on entry, students in Y7 working below the nationally expected level are immediately targeted by in class interventions such as cold call, check ins and show call. Throughout the year, students being targeted through intervention prevention planning are altered according to mini-test scores, question level analysis from cycle assessments and in-class effective formative assessment. In order to meet the needs of all students, additional staff from the Tutor Trust, an Ofsted accredited charity, are employed to deliver additional small group tutoring to address knowledge gaps. Again, priority is given to disadvantaged students for this additional intervention.
- oracy skills are developed through the exploration of functional questions all through. At Primary, emphasis is given to 'talk tasks' and explaining mathematical reasoning. At Secondary level, using techniques such as Lemov's Reading Reconsidered ensures full understanding of the context of a question, including any assumed 'real life' knowledge, before tackling the mathematics behind it. In addition, in both Lower and Middle Peak, 'Rolling Numbers' and Times Table Rockstars encourage the drill like practice not every student is exposed to. Additionally, in Secondary, disadvantaged students are supported to succeed in mathematics through

prioritised invites to Maths Homework club and Y11 intervention. Run weekly, this provides focussed time with a teacher after school where students can have access to a computer in order to master the skills set in the homework.

- students with special educational needs or disabilities have additional support. Double staffing is used all through to target this cohort to help close any gaps. Such students also receive further intervention in class in the form of DIRT and targeted intervention to close their gaps. Students are also invited to attend maths homework club after school to support them to complete their Sparx Maths. All students access the same curriculum, and we have the highest expectations of all. We teach to the top with scaffolding and support for those who need it in order to allow all students to achieve and experience the very best of what has been thought and said.

We fully believe mathematics can contribute to the personal development of students at DTC:

- students will be encouraged to develop socially in mathematics lessons through the celebration of making mistakes and setting high expectations helps students to develop listening and speaking skills. Taking part in the weekly Maths Club and opportunities to be a Maths Ambassador also encourage teamwork and problem solving skills. Self-awareness is developed through self-assessment, which enables students to have an accurate understanding of their strengths and weaknesses, to accept them and the understand how to learn from them. Additionally, students are encouraged to tutor other students in Sparx Maths and TTRS clubs, developing further their social interaction skills in a professional manner.
- developing morality is evident in much of the mathematics curriculum where there is reference to real life contexts and students are encouraged to make decisions thus developing an understanding that certain choices may have different consequences and outcomes. One example where this applies is in percentages where comparing interest rates occurs and the role of 'loan sharks' can be discussed. Additionally, topics such as tracking and how the media use misleading statistical diagrams are also addressed.
- encouraging students to question how mathematics impacts the way the world works promotes the spiritual growth of our students. Referring to 'big issues' such as the gender pay gap, birth and death rates, gambling through probability and global warming within contextual questions allows students to have a concrete understanding of where mathematics fits into the bigger picture. Teaching a variety of strategies that allow creativity to blossom (i.e. construction and symmetry) and incorporating enrichment tasks during Maths Week such as money management and sport investigations allow students to develop more than just their problem solving skills in this subject.
- being a universal language, and having phenomena developed all over the world, lends mathematics to promoting cultural capital. Discussion when introducing many topics, such as place value, time, Fibonacci sequences, Pythagoras and Trigonometry to name a few, allows cultural influences to be explored.

At KS2, KS3 and KS4, our belief is that homework should be interleaved revision of powerful knowledge that has been modelled and taught in lessons. This knowledge is recalled and applied through a range of low-stakes quizzing and practice.

Opportunities are built in to make links to the world of work to enhance the careers, advice and guidance that students are exposed to:

- the mathematics curriculum provides students with opportunities to consider the world of work and how mathematics leads to successful careers. Each learning intention has a purpose attached for all students to see and, where relevant, the SoW refers to how the skill in question relates to specific careers or a future life context. For example, when teaching constructions, reference can be made to any form of design work or navigational career. Every unit of work also contains a careers spotlight where students are introduced to a variety of careers, which utilise the learning of the unit. Information about qualifications needed, salaries and career progression are also referenced.
- Additionally, map and scale reading skills developed as part of the Duke of Edinburgh Award, which all children participate in, further develops mathematical skill.

A true love of mathematics involves learning about various cultural domains. We teach beyond the specification requirements, but do ensure students are well prepared to be successful in GCSE examinations:

- built into each Secondary SOW is content that will benefit students in their understanding of the wider impact of mathematics. For example, in Y7 students will recap telling the time and its Babylonian origins, explore where our place value systems came from and be introduced to Fibonacci and the 'Golden Ratio'. In Y8, students will discover Venn diagrams and the nuances of interest rates through percentages. Y9 and Y10 offer an insight into the history of Pythagoras Theorem and the origins of Trigonometry. Whilst not strictly appearing on the GCSE specification, providing this additional information will allow students to build their cultural capital and deepen their understanding into the true beauty behind the mathematics they learn.
- in primary, students take part in TTRS day and in Y7 and Y8 students take part in Maths Week during Cycle 1. A variety of enrichment activities are provided to complement their mathematics lessons to allow students to further explore the domain of mathematics. Such activities include Roman Numerals, symmetry in Mandala patterns, code breaking, visits from external companies running problem solving activities and tasks such as 'setting up your life'.



Curriculum Overview

All children are entitled to a curriculum and to the powerful knowledge that will open doors and maximise their life chances. Below is a high-level overview of the critical knowledge children will learn in this particular subject, at each key stage from Reception through to Year 11, in order to equip students with the cultural capital they need to succeed in life. The curriculum is planned vertically and horizontally giving thought to the optimum knowledge sequence for building secure schema.

Review of topics is a continual process; in Primary, daily Maths meetings recapping knowledge covered in previous units occurs and in Secondary, every lesson has a Do Now that recaps knowledge covered in the last unit covered. All through, these reviews are an opportunity to close gaps of specific students identified through intervention planning and continual effective formative assessment.

		Knowledge, skills and understanding to be gained at each stage*		
		Cycle 1	Cycle 2	Cycle 3
EYF5	New learning	Match, Sort and Compare Match objects/pictures, identify a set, sort objects by type, explore sorting, create sorting rules, Talk about Measure and Patterns Compare amounts, compare size, compare mass, compare capacity, explore simple patterns, copy and continue simple patterns, create simple patterns It's me 1,2,3 Find 1, 2 and 3, subitise 1, 2 and 3, represent 1, 2 and 3, 1 more, 1 less, composition of 1, 2 and 3 Circles and Triangles Identify and name circles and triangles, compare circles and triangles, shapes in the environment, describe position 1,2,3,4,5 Find 4 and 5, subitise 4 and 5, represent 4 and 5, 1 more, 1 less, composition of 4 and 5, composition of 1-5 Shapes with 4 sides Identify and name shapes with 4 sides, combine shapes with 4 sides, shapes in the environment, my day and night	Alive in 5 Zero, find 0 to 5, subitise 0 to 5, represent 0 to 5, 1 more, 1 less, composition, conceptual subitising to 5 Mass and Capacity Compare mass, find a balance, explore capacity, compare capacity Growing 6,7,8 Find 6, 7 and 8, 1 more, 1 less, composition of 6, 7 and 8, make pairs (odd and even), double to 8 (find a double; make a double), combine 2 groups, conceptual subitising Length and height Explore length, compare length, explore height, compare height, talk about time, order and sequence time Building 9 and 10 Find 9 and 10, compare numbers to 10, represent 9 and 10, conceptual subitising to 10, 1 more, 1 less, composition to 10, bonds to 10 (2 parts), make arrangements of 10, Bonds to 10 (3 parts), doubles to 10 (find a double; make a double), explore odd and even Explore 3D shapes Recognise and name 3D shapes, find 2D shapes within 3D shapes, use 3D shapes for tasks and in environment, identify more complex patterns, copy and continue patterns, patterns in the environment	To 20 and Beyond Build numbers beyond 10 (10-13), continue patterns beyond 10 (10-13), Build numbers beyond 10 (14-20), continue patterns beyond 10 (14-20), verbal counting beyond 20, verbal counting patterns How Many Now? Add more, how many did I add?, take away, how many did I take away? Manipulate, compose, decompose Select shapes for a purpose, rotate shapes, manipulate shapes, explain shape arrangements, compose shapes, decompose shapes, copy 2D shape pictures, find 2D shapes within 3D shapes Sharing and Grouping Explore sharing, sharing, explore grouping, grouping, even and odd sharing, play with and build doubles Visualise, Build and Map Identify units of repeating patterns, create and explore pattern rules, replicate and build scenes and constructions, visualise from different positions, describe positions, give instructions to build, explore mapping, represent maps with models, create own maps of familiar places, create own maps and plans from stories Make Connections Deepen understanding, patterns and relationships Consolidation
	New learning	Place Value Within 10, sort and count objects, recognise numbers as words, count on from any number, 1 more, count back within 10, 1 less, compare groups by matching, fewer/more/same, less than/greater than/equal to, compare numbers, order objects and numbers, number line Addition and Subtraction Within 10, parts and wholes, write number sentences, fact families – addition facts, numbers bonds within 10, numbers bonds to 10, addition (add together, add more), find a part, fact families – 8 facts, subtract by taking away, subtract on a number line, add or subtract 1 or 2 Geometry Recognise and name 2D and 3D shapes, sort 3D shapes, sort 2D shapes, Patterns with 2D and 3D shapes	Place Value Within 20, count, understand 10/11/12/13/14/15/16/17/18/19/20, 1 more/1 less, number line to 20, estimate on a number line to 20, compare numbers to 20, order numbers to 20 Addition and Subtraction Within 20, add by counting on, add ones using number bonds, find and make bonds to 20, doubles, near doubles, subtract ones using number bonds, counting back, finding the difference, related facts, missing number problems Place Value Within 50, count from 20 to 50, 20/30/40 and 50, count by making	Multiplication and Division Count in 2s, 5s, 10, recognise and add equal groups, make arrays, make doubles, equal groups (grouping and sharing) Fractions Recognise and find half and object/shape, recognise and find half a quantity, recognise and find quarter of an object/quantity, Geometry Describe turns, position (left/right), position (above/below), ordinal numbers, Place Value Within 100, count from 50 to 100, tens to 100, partition into tens and ones, number line to 100, 1 more/1 less, compare numbers of same number of tens, compare any 2 numbers, Money



		Knowledge, skills and understanding to be gained at each stage*		
		Cycle 1	Cycle 2	Cycle 3
		Consolidation groups of tens, groups of tens and ones, partition into tens and ones, number line to 50, estimate on a number line to 50, 1 more/1 less Length and height Compare lengths and heights, measure length using cubes, measure (cm) Mass and Volume Heavier and lighter, measure mass, compare mass, full and empty, compare volume, measure capacity, compare capacity	groups of tens, groups of tens and ones, partition into tens and ones, number line to 50, estimate on a number line to 50, 1 more/1 less Length and height Compare lengths and heights, measure length using cubes, measure (cm) Mass and Volume Heavier and lighter, measure mass, compare mass, full and empty, compare volume, measure capacity, compare capacity	Recognising coins and notes, count in coins Time Before and after, days of the week, months, hours, minutes, seconds, time to hour and half hour
YEAR 2 Manipulation and making links	New learning	Place Value Numbers to 20, count objects to 100 by making 10s, recognise tens and ones, place value chart, partition to 100, write to 100 in words, numbers to 100 expanded form, 10s on a number line, estimate on a number line, compare/order objects and numbers, counts in 2s, 5s and 10s, count in 3s, Addition & subtraction Bonds to 10, fact families bonds within 20, related facts, bonds to 100 (tens), add and subtract 1s, add by making 10, add three 1 digit numbers, add to next 10, add/subtract across 10, subtract from a 10, subtract 1 digit from 2 digit (across a 10), 10 more/10 less, add/subtract 10s, add/subtract two 2 digit numbers (not across 10, across a 10), mixed addition and subtraction, compare number sentences, missing number problems Simple geometry Recognise 2D/3D shapes, 2D (sides, vertices), draw 2D shapes, lines of symmetry in shapes, sort 2D shapes, 3D (faces, edges, vertices), sort 3D shapes, 2D/3D shape patterns	Money Count pence/pounds/notes/coins, make same amount, compare amounts, calculate (to £1), make £1, find change, two step problems Multiplication and Division Recognise and make equal groups, add equal groups, multiplication sentences, arrays, grouping, sharing, 2 times tables, doubling and halving, odd and even numbers, 10 times tables, divide by 10, 5 times tables, divide by 5 Length and Height Measure (cm/m), compare and calculate lengths and heights (cm, m), 4 operations with lengths and heights Mass, Capacity and temperature Compare mass, measure in g/kg, four operations with mass, compare volume and capacity, measure in ml/l, four operations with volume and capacity, temperature	Fractions Equal and unequal parts, recognise half, find half, recognise quarter, find quarter, recognise a third, find a third, find a whole, unit fractions, non-unit fractions, equivalence of half/two quarters, recognise 3 quarters, count in fractions up to a whole, Time O'clock, half past, quarter past/to, tell time past the hour/to the hour, tell time to 5 mins, minutes in an hour, hours in a day, Statistics Tally charts, tables, block diagrams, draw and interpret pictograms (1-1), draw and interpret pictograms (2, 5 and 10) Geometry Position, describe movement, describe turns, shape patterns with turns Consolidation
YEAR 3 Building independence and autonomy	New learning	Place Value Represent and partition numbers to 100, 1000. Estimate and compare numbers to 1000. Order numbers to 1000, count in 50s Addition and Subtraction Add and subtract 1s, 10s, 100s; crossing 10s, crossing 100s, subtraction with no exchange, add 2 and 3 digit numbers, inverse operations Multiplication and Division A Equal groups, arrays, multiples of 2, 5 and 10, sharing and grouping, multiply and divide by 3, multiply and divide by 4, multiply and divide by 8; 2,4 and 8 times tables	Multiplication and Division B Multiples of 10, related calculations, multiply 2 digit by 1 digit (with and without exchange), divide 2 digit by 1 digit (with and without exchange), divide with remainders Length and Perimeter Measure in m and cm, measure in mm, equivalent lengths (m and cm), equivalent lengths (cm and mm), compare/add/subtract lengths, calculate perimeter Fractions A Compare and order unit fractions, fractions on a line, equivalent fractions. Mass and capacity Measure (g and kg), compare mass, add and subtract mass, measure capacity and volume (ml, l), compare capacity and volume, add and subtract capacity and volume	Fractions B Add, subtract, partition the whole, unit fractions of a set of objects, fractions of amounts Money Pounds and pence, converting, adding and subtracting, finding change Time Roman numerals to 12, time to 5 mins, time to min, reading digital time, am and pm, years/months/days, days/hours, duration, minutes/seconds, problem solving with time Shape Turns and angles, right angles, compare angles, measure and draw accurately, horizontal, vertical, perpendicular, parallel, 2D shapes, polygons, 3D shapes Statistics



		Knowledge, skills and understanding to be gained at each stage*		
		Cycle 1	Cycle 2	Cycle 3
YEAR 4 Building independence and autonomy	New learning	Place Value Represent and partition numbers to 1000, represent and partition numbers to 10,000, find 1, 10, 100, 1000 more or less, estimate on a number line, compare and order to 10,000, roman numerals, round to nearest 10, 100 or 1000 Addition and Subtraction Add and subtract 1s, 10s, 100s and 1000s, add two 4 digit numbers (no exchange, one exchange, more than one exchange); subtract two 4 digit numbers (no exchange, one exchange, more than one exchange), estimate and check answers Measurement Area, make and compare areas Multiplication and Division A Multiples of 3, multiply and divide by 6, 6 times tables and division facts, multiply and divide by 9, 9 times tables and division facts, multiply and divide by 7, 7 times tables and division facts, 11 times tables and division facts, 12 times tables and division facts, divide by 1 and itself, multiply 3 numbers	Multiplication and Division B Factor pairs, multiply by 10 and 100, divide by 10 and 100, related facts, informal methods of multiplication, multiply 2 digit by 1 digit, multiply 3 digit by 1 digit, divide 2 digit by 1 digit, divide 3 digit by 1 digit, correspondence Length and Perimeter Measure (km, m), perimeter (grid, rectangle, rectilinear shapes), missing lengths of rectilinear shapes, calculate perimeter, perimeter of regular polygons, perimeter of polygons Fractions Partition mixed numbers, number lines with mixed numbers, compare and order mixed numbers, improper fractions, convert mixed numbers to improper fractions, convert improper fractions to mixed numbers, equivalent fractions, add/subtract two or more fractions, add/subtract fractions and mixed numbers, subtract from whole amounts, subtract from mixed numbers Decimals A Tenths as fractions, tenths and decimals, place value charts, number lines, divide a 1 digit number by 10, divide a 2 digit number by 10, hundredths as fractions and decimals, divide a 1 or 2 digit number by 100	Decimals B Make a whole with tenths/hundredths, partition decimals, compare decimals, order decimals, round to nearest whole number, halves and quarters as decimals Money Write money in decimals, convert between £ and p, compare, estimate, calculate, solve problems Time Years/months/weeks/days, hours/minutes/seconds, convert between analogue and digital, convert to and from 24h clock Consolidation Shape Angles as turns, identify angles, compare and order, triangles, quadrilaterals, polygons, lines of symmetry, Statistics Interpret charts comparison/sum/difference, interpret line graphs, draw line graphs Position and Direction Describe position using co-ordinates, plot co-ordinates, draw 2D shapes on a grid, translate on a grid, describe translation on a grid
YEAR 5 Formalisation and consolidation	New learning	Place Value Roman numerals to 1000, numbers to 10,000/100,000/1,000,000, powers of 10, 10/100/1,000/10,000/100,000 more or less, partition numbers to 1,000,000 Number lines, compare and order to 100,000/1,000,000, round to nearest 10/100/1000, round within 10,000, round within 1,000,000 Addition and Subtraction Mental strategies, add/subtract whole numbers with more than 4 digits, round to check, inverse operations (addition/subtraction), multi-step addition and subtraction problems, compare calculations, find missing numbers Multiplication and Division A Multiples, common multiples, factors, common factors, prime numbers, square numbers, cube numbers, multiply by 10/100/1000, divide by 10/100/1000, multiples of 10/100/1000 Fractions A Equivalent fractions, convert improper fractions and mixed numbers, compare fractions less than 1, order fractions less than 1, compare and order fractions greater than 1, add and subtract with the same denominator, add fractions within 1,	Multiplication and Division B Multiply a 4 digit number by 1 digit number, Multiply a 2, 3 and 4 digit numbers by a 2 digit number, multiplication problems, short division, divide a 4 digit number by a 1 digit number, divide with remainders, solve multiplication and division problems Fractions B Multiply a unit and non-unit fraction by an integer, calculate fractions of a quantity, fractions of amounts, finding the whole, fractions as operators, Decimals and Percentages Decimals to 2dp, equivalent fractions and decimals (tenths, hundredths), thousandths as fractions and decimals, place value chart, order and compare decimals (same number of dps), order and compare to 3 dps, round to nearest whole number, round to 1dp, understand percentages, percentages as fractions and decimals, equivalent fractions, decimals and percentages Perimeter and Area Perimeter of rectangles, perimeter of rectilinear shapes, perimeter of polygons, area of rectangles, area of compound shapes, estimate area Statistics	Shape Degrees, classify angles, estimate angles, measure angles up to 180, draw lines and angles accurately, calculate angles around a point and on a straight line, lengths and angles in shapes, regular and irregular polygons, 3D shapes Position and Direction Read and plot co-ordinates, problem solving with co-ordinates, translation (and with co-ordinates), lines of symmetry, reflection (horizontal and vertical lines) Decimals Add and subtract decimals within 1 (known facts), complements to 1, add and subtract decimals across 1, add and subtract decimals with same number of dps, subtract decimals with different dps, decimal sequences, multiply/divide by 10, 100 and 1000, multiply/divide decimals (missing values) Negative Numbers Understand negative numbers, count through zero in 1s, count through zero in multiples, compare and order negative numbers, find the difference Conversion Kilograms and kilometres, millimetres and millilitres, convert units of length, convert between metric and imperial,



		Knowledge, skills and understanding to be gained at each stage*		
		Cycle 1	Cycle 2	Cycle 3
		add fractions with a total greater than 1, add to a mixed numbers, add two mixed numbers, subtract fractions, subtract from a mixed number (including breaking the whole), subtract 2 mixed numbers	Draw line graphs, read and interpret line graphs, read and interpret tables, timetables	convert units of time, calculate with timetables Volume Cubic centimetres, compare volume, estimate volume, estimate capacity
YEAR 6 Formalisation and consolidation	Application and extension of key skills	Place Value Numbers to 1,000,000, numbers to 10,000,000, read and write numbers to 10,000,000, powers of 10, number lines to 10,000,000, compare and order any integer, round any integer, negative numbers Addition, subtraction, multiplication and division Add and subtract integers, common factors, common multiples, rules of divisibility, primes to 100, square and cube numbers, multiply up to a 4 digit number by a 2 digit number, solve multiplication problems, short division, division using factors, long division, long division with remainders, division problems, multi-step problems, order of operations, mental calculation and estimation, reason from known facts Fractions A Equivalent fractions and simplifying, equivalence on a number line, compare and order (denominator/numerator), add and subtract simple fractions, add and subtract any two fractions, add mixed numbers, subtract mixed numbers, multi-step problems Fractions B Multiply fractions by integers and fractions, divide fractions by integers, mixed questions with fractions, fractions of an amount (including find the whole) Converting units Metric measures, convert metric measures, calculate metric measures, miles and kilometres, imperial measures	Ratio Ratio and fractions, scale drawing, use scale factors, ratio problems, proportion problems (recipes) Algebra 1 and 2 step function machines, form expressions, substitution, formulae, form equations, solve 1 and 2 step equations, find pairs of values, solve problems with 2 unknowns. Decimals Place value within 1, place value integers and decimals, round decimals, add and subtract decimals, multiply/divide by 10, 100 or 1000, multiply/divide decimals by integers, Fractions, Decimals and Percentages Decimal and fraction equivalence, fractions and division, percentages, fractions to percentages, equivalent fractions/decimals/percentages, order fractions/decimals/percentages, percentages of amounts (one step/multi step), percentages missing values Area, Perimeter and Volume Shapes with same area, area and perimeter, area of a triangle (including right angled), area of a parallelogram, volume of a cuboid Statistics Line graphs, dual bar charts, read and interpret pie charts, pie charts with percentages, draw pie charts, mean	Shape Measure and classify angles, calculate angles, area in a triangle (including missing angles), angles in a quadrilateral, angles in polygons, circles, draw shapes accurately, nets of 3D shapes Position and Direction The first quadrant, read and plot points in four quadrants, solve problems with co-ordinates, translations, reflections Consolidation and Transition
YEAR 7 Formalisation and consolidation	New learning	Unit 1: Algebra Order of operations, algebraic notation, simplifying including expanding and factorising single brackets, negative numbers, substituting, forming expressions, solving 1, 2 and 3-step equations, common sequences, nth term Unit 2: Number Place value, inequalities, comparing numbers, +/− methods, decimals, money calculations	Unit 2: Number (cont) Factors & multiples, HCF & LCM, product of prime factors, $\times/\div$ methods, decimals, estimation, rounding, perimeter and area including compound shapes, time Unit 3: Geometry Reading scales, powers of 10, unit conversions, identify, draw & measure angles, properties of 2D shapes, angle facts, tessellation	Unit 4: Fractions Fractions of amounts, converting improper fractions and mixed numbers, simplifying including algebraic fractions, equivalent fractions, four operations including algebraic fractions, comparing, ordering Unit 5: Percentages Fraction/decimal/% conversions, ordering fractions/decimals/%, % of (calculator and non-calculator), expressing %, % increase and decrease



		Knowledge, skills and understanding to be gained at each stage*		
		Cycle 1	Cycle 2	Cycle 3
YEAR 8 Formalisation and consolidation	CEAIG	Careers in animation (Unit 1: linear sequences) Careers in interior design (Unit 2: perimeter)	Careers in astronomy (Unit 3: angles) and	Careers in catering (Unit 4: fractions of amounts) and accountancy (Unit 5: % increase/decrease)
	New learning	Unit 1: Probability and Statistics Averages, probability scale, sample space and listing outcomes, single event probability, probability 'not', frequency trees, pictograms, bar graphs, line graphs, pie charts Unit 2: Number Index laws, powers and roots, Pythagoras' theorem, standard form, prime factorisation for HCF and LCM, set notation, Venn diagrams including problem solving	Unit 3: Algebra Inequalities, complex simplifying including algebraic fractions, formulae, transposing formulae, solving equations involving brackets and with variables on both sides, forming and solving from worded and geometric problems, expanding binomials, factorising quadratics, fractional sequences, problem solving with linear sequences, plotting linear functions from a table Unit 4: 2D Geometry Constructions including triangles, angle facts involving parallel lines, conversions of units including squared and cubed units, composite shapes, area of specific quadrilaterals, circumference and area of circles and part circles	Unit 5: Proportional Reasoning % increase/decrease, percentage change, repeated percentage change, simple and compound interest, reverse percentage, rates and ratio, speed/distance/time, density/mass/volume, pressure/force/area Unit 6: 3D Geometry Properties of 3D shapes, nets, plans and elevations, volume of prisms, pyramids and cones, surface area
	CEAIG	Careers in medicine (Unit 1: statistical diagrams) and ecology (Unit 2: index laws)	Careers in cryptoanalysis (Unit 3: forming and solving) and fashion design (Unit 4: area)	Careers in space travel (Unit 5 : speed, distance, time) and architecture (Unit 6 : plans and elevations)
YEAR 9 Application and extension	New learning	Unit 1: Statistics Representing data, comparing data sets, scatter graphs, time series and moving averages, MMR from tables, frequency diagrams including polygons and simple histograms, identifying errors from statistical diagrams Unit 2: Graphs and Proportion Coordinates, mid-points, linear graphs, equation of a straight line, direct/inverse proportion, scales and scale drawing	Unit 3: Algebraic Expressions Arithmetic and geometric sequences nth term, algebraic fractions, transposing formulae involving factorisation, binomials, polynomials, factorising quadratics to solve them, difference of two squares, form and solve inequalities Unit 4: 2D Geometry Perpendicular and angle bisectors, loci problems, mixed angle fact problems, angles in polygons, congruence and similarity, similar shapes lengths/areas/volumes, arc lengths, sector areas, geometric proof	Unit 5: Algebra - Graphs Solve linear functions graphically, form and solve inequalities graphically, simultaneous equations, simultaneous equations graphically, quadratic/cubic/reciprocal/exponential graphs Unit 6: Geometry – Triangles and Transformations Pythagoras, 3D Pythagoras, trigonometry introduction, trigonometric functions, trigonometric graphs, transformations including enlargement by negative and fractional scale factors
	New learning			
	CEAIG	Careers in data analysis (Unit 1 : MMR from tables) and land surveyance (Unit 2: scales)	Careers in computer game design (Unit 3: sequences) and network coverage (Unit 4: loci)	Careers in meteorology (Unit 5: construct and solve inequalities) and surveyance and cartography (Unit 6: Pythagoras)
YEAR 10 Application and extension	New learning	Unit 1: Probability and Statistics Probability of combined events, AND/OR rules in probability, theoretical/experimental probabilities and expected frequency. grouped data, compare data sets, compound measures, SDT graphs Unit 2: Algebra - Graphs Lengths of line segments, equation of a straight line not from a graph, parallel/perpendicular lines, sketching quadratic functions, area under curves, gradient of curves	Unit 3: 3D Geometry and Limits Estimate complex calculations including roots and in context, error intervals, plans and elevations, 3D shapes surface area and volume, cones and spheres, limits of accuracy, upper/lower bounds, percentage error Unit 4: Statistics and Probability Product rule for counting, sampling methods, capture re-capture, bias, probability from Venn diagrams, combined and conditional probability, cumulative frequency, interquartile range, box plots	Unit 5: Number Complex index laws including equations, calculating with standard form, simple and compound interest, growth/decay, estimating roots, surds, ratio problems, converting recurring decimals and fractions Unit 6: 2D Geometry Loci problems, bearings, similarity and scale factors, column vectors, vector geometry, 3D trigonometry, exact trigonometric values, sine and cosine rules, sine rule for area Bespoke revision LTP for Foundation path
	CEAIG	Careers in medicine (Unit 1: probability) and politics (Unit 2: algebraic argument)	Careers in graphic design (Unit 3: 3D shapes) and market research (Unit 4: sampling) and	Careers in banking (Unit 5: growth and decay) and nautical navigation (Unit 6: bearings)



		Knowledge, skills and understanding to be gained at each stage*		
		Cycle 1	Cycle 2	Cycle 3
YEAR 11	Application and extension	Unit 1: Algebra Solving harder quadratic equations through factorising and the quadratic formula, complex algebraic fractions, non-linear simultaneous equations including graphically, function notation Unit 2: Number and Algebra: Iteration and recursion, graphing proportion, circle theorems including proof, algebraic and geometric proof, circle functions and tangents, quadratic nth term, transformation of functions, quadratic inequalities Bespoke revision LTP for each class	Bespoke revision LTP for each class	

*A powerful, knowledge-rich curriculum teaches both **substantive knowledge** (facts; knowing that something is the case; what we think about) and non-declarative or **procedural knowledge** (skills and processes; knowing how to do something; what we think with). There are no skills without bodies of knowledge to underpin them. In some subjects, a further distinction can be made between substantive knowledge (the domain specific knowledge accrued e.g. knowledge of the past) and disciplinary knowledge (how the knowledge is accrued e.g. historical reasoning). Please refer to the DAT Curriculum Principles, published on our website, for further information about how we have designed our all-through curriculum.



