

Mathematics Department Curriculum Map (Key Stage 3)

Overall Curriculum Intent

The Brian Clarke Church of England Academy is a place where students, regardless of their background, can access a high quality and challenging mathematics curriculum. We believe that all students can learn and succeed in mathematics given the appropriate learning experiences in and beyond the classroom. Every student is entitled to have the opportunity to master the key mathematical content and as such we have one curriculum for all. The curriculum is sequenced to focus on depth over breadth. We aim to spend more time teaching fundamental concepts to avoid the need to 're-teach'. Students are challenged to deepen their understanding of a topic rather than being accelerated through content.

Our curriculum approach is based around four key principles: conceptual understanding, language & communication, mathematical thinking and problem solving. We aim to develop a deep conceptual understanding through use of various representations (concrete, pictorial and abstract). Clear mathematical communication, verbally and written is essential for students to be able to use mathematical language and notation to express and clarify their thoughts with others. During their time at Brian Clarke, students will have the opportunity to develop habits of mind enabling them to think mathematically. In tandem with this we ensure pupils can develop procedural fluency with knowledge of key facts and techniques. With these key principles students will then be supported to use their learning accurately, efficiently and flexibly to reason mathematically and solve problems in familiar and unfamiliar contexts.

We believe that all students should leave school equipped with sufficient knowledge and the core mathematical skills they need for future learning. Through a detailed audit of the KS3 national curriculum and through the study of the principal strands (number, algebra, proportional reasoning, geometry & measures, probability and statistics) we have designed and sequenced a 5-year curriculum which allows students to link established ideas to learning of new concepts and supports them in understanding the coherent and connected nature of the subject. Our curriculum is cumulative so that concepts and skills learnt previously are applied and connected throughout the school year to consolidate learning; this continual recapping emphasises how each of the concepts interconnects with others in mathematics.

The curriculum at KS3 is designed to consolidate learning from the KS2 national curriculum whilst building on existing knowledge. Teaching methods consider the way learners have been taught prerequisite topics in the past and how we can successfully integrate these to enable a smooth transition between KS2 and KS3.

The purpose of our curriculum is to develop students into lifelong independent learners who can confidently analyse, deduce, and problem solve, not only within mathematics, but who can apply these skills across the curriculum and to the multifarious aspects of their wider lives. Our rewards program, extra-curricular and co-curricular enrichment opportunities will further encourage pupil's enthusiasm for mathematics.

	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Knowledge	Number 1.1 – Place Value	Number 1.2 – Number	Number 2.1 – Addition &	Number 2.2 – Multiplication &	Number 2.3 – Order of	Algebra 1 – Expressions and
Introduced	• Further place value of digits in	Properties	Subtraction	Division	Operations	Equations
	integers, decimals and	 Multiples and factors. 	 Using formal written methods 	 Using place value and 	 Applying the commutative law 	 Using letters to represent
	measures.	 Divisibility rules. 	to add and subtract integers &	multiplication facts to calculate	to efficiently and accurately re-	generalised numbers.
	 Column headers in exponent 	 Integer exponents and roots. 	decimals.	division of integers and	order calculations involving the	 Using algebraic notation.
	and fractional form.	 Prime numbers. 	 Efficient mental addition and 	decimals.	four operations.	 Understand and recognise that
	 Ordering and comparing 	 Writing integers as a product 	subtraction strategies for	 Understand and use formal 	 Order of operations with all 	a letter can be used to
	integer and decimal numbers	of prime factors.	integers and decimals.	methods of division (short	four operations, brackets and	represent a specific unknown
	and measures using inequality	 Using prime factors. 	 Bar models and fact families 	division algorithm).	exponents.	value or a variable.
	notation.	 Venn diagrams. 	for addition & subtraction.	• Dividing with decimal numbers.		 Understand that relationships
	 Representations of numbers 	 Lowest Common Multiple and 	• Perimeter of rectilinear shapes.	 Dividing by decomposition. 	<u>Number 2.4</u> – Directed Number	can be generalised using
	including using the infinite	Highest Common Factor,	 Perimeter problems with other 	 Using the distributive law for 	 Understanding negative 	algebraic statements.
	nature of the number line.	including from prime factors.	polygons.	division.	numbers, number lines and	 Substituting numeric values
	 Rounding numbers to the 			 Method selection through 	applications.	into algebraic expressions and
	nearest power of 10.		Number 2.2 – Multiplication &	money problems.	 Ordering and comparing 	evaluating
	 Multiplying & dividing integers 		Division		negative and positive numbers.	 Identify a variety of like terms
	and decimals by powers of 10.		Understand and use the		• Arithmetic procedures with	in an expression, including
	 Converting units of length and 		commutative and associative		negative numbers (using zero	products and indices.
	mass in context		properties of multiplication.		pairs and vectors on a number	• Simplify expressions by
			Using place value to calculate		line).	collecting like terms.
			multiplication of integers and		Order of operations involving	Manipulate expressions
			decimals.		negative numbers.	through adding, subtracting
			• Area model of multiplication.			and multiplying algebraic
			 Multiplying with decimal 			terms.
Kau	N4. Internet annen inde		numbers.		NO: Sum automatical differences	
Key	than loss than unit of massure lo	ex, ascending, descending, greater	N2: recurring, associative, commu-	tative, distributive, exchange,	N2: Sum, summand, difference,	A1: term, expression, equation,
conconts /idoas	factor factor pair lowest common	multiple, highest common factor	partition, distribute.		quotiont divisor dividend	simplify like terms coefficient
students must	nrime nrime factor decomposition	square number, cube number			negative vector origin	constant
master	square root cube root. Venn diagr	am set			negative, vector, origin.	constant.
muster	square root, cabe root, venir alagi	uni, set.				
	Command words: work out, evalua	ate, calculate, find, explain,	. Command words: work out, evaluate, calculate, find, explain.			Command words: work out.
						evaluate, calculate, find, explain.
Knowledge	 Read, write and compare integer 	s and decimals up to 10 million	• Place value (N1)		 Order of operations (KS2) 	 Using order of operations (N1)
revisited	(KS2)		• Formal written methods for addition, subtraction, multiplication		 Methods for addition, 	 Using simple formulae (KS2)
	 Multiply and divide by 10, 100, 10 	000 (KS2)	and division of integers (KS2)		subtraction, multiplication and	 Expressing missing number
	 Convert metric units of length an 	d mass (KS2)	 Multiply a decimal by a whole (KS2) 		division (N2)	problems algebraically (KS2)
	 Round whole numbers (KS2) 		 Divide with decimal answers (KS2 	2)	 Understand and use negative 	 Enumerate possible number
	 Use of <> = (KS2) 				numbers in context	combinations for two variables
	 Identify multiples and factors (KS 	2)			(temperature) (KS2)	in an equation (KS2)
	 Identify common multiples and fa 	actors (KS2)				
	 Squares, cubes and primes (KS2) 					
	 Sorting diagrams (KS2) 					
CELLC Links /	Drive a succhase Assolitation to the	the in data an equivation and a basis				
CEIAG LINKS/	Prime numbers – Applications to jo	bbs in data encryption and cyber				
Opportunities	security (Gatsby Benchmark 4)					

Year 8

	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Knowledge	<u>Algebra 2</u> – Distributive Law	<u>Algebra 3</u> – Coordinates	Number 3.2 - Arithmetic	Number 4.2 – Fractions	Number 5 – Estimating and	Algebra 4 – Solving Linear
Introduced	• Use the distributive law to	 Coordinates (including non- 	Procedures with Fractions	• Fractions of an amount.	Rounding	Equations
	multiply out a bracket.	integer), in all four quadrants.	 Addition and subtraction of 	• Writing one number as a	 Rounding to a given number of 	 Equations and understanding
	 Use the distributive law to 	 Geometric problems involving 	fractions and mixed numbers.	fraction of another.	decimals places.	equality with numbers and
	factorise expressions with	coordinates.	 Multiplication with fractions 		 Significant figures and 	algebraic terms.
	common factors.	 Mid-point of a line segment. 	and mixed numbers.	Number 4.3 – Applying Ratios	rounding to significant figures.	 Solve a one-step linear
		 Equations of vertical and 	Reciprocals.	 Dividing into a ratio. 	 Estimate and check numerical 	equation with a single
	<u>Geometry 1</u> – Area and	horizontal lines.	 Division with fractions and 	 Working with ratios and 	calculations.	unknown on one side.
	Perimeter	• Graphs of $y = x$ and $y = -x$	mixed numbers.	quantities.	 Overestimates and 	 Solve a two-step (or more)
	 Properties of triangles and 			 Connecting ratios and rates 	underestimates.	linear equation with a single
	quadrilaterals.	<u>Number 3.1</u> – Fractions and	Number 4.1 – Ratios and	(e.g. conversions).	 Calculate possible errors using 	unknown, including equations
	Perimeter problems with	Decimals	Multiplicative Relationships		inequality notation.	where the unknown appears
	polygons and compound	• Structure of fractions,	Scaling and calculating	<u>Geometry 2</u> – Transformations		on both sides.
	snapes.	improper fractions and mixed	multipliers.	Iranslations.		• Solve a linear equation with a
	Area of rectangles, triangles,	numbers.	Connecting fractions and	• Introduction to congruence.		single unknown involving
	paranelograms, and trapezia.	Conversion between fractions	ratios.	Reflections.		Drackets in an enicient way.
	Algebra in parimeter and area	and decimals.	 Simplifying ratios. Double number lines and ratio 	Rotations.		
	• Algebra in perimeter and area	• Equivalent fractions and	Double number lines and ratio table representations	• Enlargements.		
	problems.	Order and compare fractions	table representations.			
		Order and compare mactions				
Кеу	A2: distributive law, multiply	A3: Coordinate axes, x-axis, y-	N3: Common denominator,	N4: Rate, per, conversion rate,	N5: Rounding, decimal place,	A4: Solve, linear equation,
vocabulary/	out, expand, factorise, factor,	axis, coordinate pair, quadrant,	reciprocal.	proportional.	significant figure, overestimate,	unknown, balance, inverse
concepts/ideas	algebraic factor, simplify, collect	origin, mid-point, line segment,			underestimate, estimate,	operation.
students must	like terms, fully factorised.	vertical, horizontal, graphically,	N4: Additive relationship,	G2: Transformation, translate,	approximation, rounding error,	
master	C1. Quadrilatoral isosaalas	algebraically.	multiplicative relationship,	column vector, reflect, mirror	error Interval.	
	G1. Quadrilateral, isosceles,	N2: Fraction numerator	table simplify (a ratio) simplest	ine, symmetry, rotate,		
	triangle square rectangle	denominator mixed number	form (of a ratio)	of rotation enlarge scale factor		
	parallelogram, rhombus, kite,	improper fraction, proper		centre of enlargement, vertex.		
	trapezium, perimeter, area.	fraction, terminating decimal.		invariant point.		
	parallel, perpendicular,	recurring decimal, equivalent				
	rectilinear, composite, diagonal,	fraction, simplify, simplest form.				
	base, perpendicular height.					
Knowledge	• Distributive law and numbers	• Describing positions on the full	 Place value (N1) 	• Solve problems with unequal	 Read, write, order and 	 Express missing number
revisited	(N2)	coordinate grid (KS2)	 HCF and LCM (N1) 	sharing and grouping using	compare numbers and	problems algebraically (KS2)
	 Letters as numbers (A1) 	 Find missing vertices of 	 Compare and order integers 	fractions and multiples (KS2)	determine the value of each	 Understand and use the
	 Expressions & Equations (A1) 	polygons on a coordinate grid	and decimals (N1)	 Solve problems with similar 	digit (KS2, N1)	conventions and vocabulary of
	 Convert units of length (N1) 	(KS2)	 Add and subtract fractions and 	shapes using scale factors (KS2)	 Round any whole number to a 	algebra including forming and
	 Addition, subtraction, 	 Equivalent fractions and 	mixed numbers (KS2)	Basic translations and	required degree of accuracy	interpreting algebraic
	multiplication and division	simplifying fractions (KS2)	Multiply with fractions (KS2)	reflections (KS2)	(KS2, N1)	expressions and equations (A1)
	strategies (N2)	Convert between decimals and	• Divide fraction by integer (KS2)	• Line symmetry (KS2)	Place value and multiplying and	Simplify algebraic expressions
	• Perimeter of polygons (KS2)	fractions (KS2)	Solve problems involving the	Rotation as turns and angles	aiviaing numbers by powers of	
	Area of rectangles,	Mixed numbers and improper	relative sizes of two quantities	(KS2)	desimal places (KS2, N1)	Ivianipulate algebraic
	parallelograms, triangles (KS2)	Tractions (KS2)	using integer multiplication		uecimai piaces (KS2, N1)	expressions using the
	Use standard units of area (xca)		and division facts (KS2)			uistributive law (AZ)
CELAC Links /	(KSZ)	and depending in the	Datio and proportion that it	ring (Cataby Danaharani A)		
Opportunities	(Gatsby Benchmark 4)	or design and decorating Jobs	Ratio and proportion – Use In Cate	ning (Galsby Benchmark 4)		
Spportunities	(Gacoby Denominal K 4)				1	

Year 9

	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Knowledge	<u>Algebra 5</u> – Sequences	Number 6 – Percentages and	<u>Geometry 3.2</u> – 3D Shapes	Statistics 1.1 – Discrete Data and	<u>Statistics 1.2</u> – Summary	<u>Geometry 5</u> – Constructions
Introduced	 Numerical and pictorial 	Proportion	 Surface area of 3D shapes 	Representations	Statistics	 Circles as the locus of a point
	sequences and patterns.	 Graphs and scaling diagrams to 	• Prisms	 Types of data, collecting data 	 Measures of central tendency 	equidistant from a fixed point.
	 Term-term rules. 	represent multiplicative	 Volume and capacity of prisms 	and sampling.	and spread from un-grouped	 Use intersecting circles to
	 Position-to-term rule. 	relationships.		 Frequency tables. 	discrete data – mean, median,	construct triangles and
	 Properties of arithmetic 	• Describe one number as a	<u>Geometry 4</u> – Properties of	 Pictograms, line graphs and bar 	mode, range.	rhombuses from given lengths.
	sequences.	percentage of another.	Angles and Polygons	graphs.	 Using summary statistics to 	 Properties of a rhombus to
	 Nth term rules. 	 Find a percentage of a 	 Draw and measure angles, use 	 Representing data and reading 	compare and analyse data.	help with constructions.
	 Determine whether a number 	quantity.	standard angle vocabulary.	data in pie charts.	 Calculate summary statistics 	 Perpendicular bisector of a line
	is a term in an arithmetic	Calculate percentage changes	Geometrical proof using	Choose appropriate statistical	from frequency tables.	segment.
	sequence.	(increases and decreases).	properties of angles around a	measures and representations.	 Calculating summary statistics 	 Perpendicular to a given line
		Recognise and use direct	point, angles adjacent on a	• Compare data represented in	when changes are made to the	through a given point.
	<u>Algebra 6</u> - Graphical	proportionality with numbers,	straight line, vertically opposite	charts.	data.	• Angle bisector.
	representations	algebra and in a range of	angles, interior angle sum of a			
	 Express patterns and 	contexts.	triangle.		Number / - Standard Form	<u>Geometry 6</u> – Similarity,
	relationships between	Recognise and use inverse	Properties of special		Be able to write any integer	Congruence and Pythagoras
	coordinates graphically and	proportionality.	quadrilaterals and regular		using powers of 10.	Theorem
	algebraically.	Coometry 2.1 Circles	polygons.		Writing large numbers in standard form	Properties of similar snapes.
	Understand that there are two	<u>Geometry 3.1</u> – Circles	Properties of angles and parallol linos		Stanuaru iorrii.	Properties of congruent
	key elements to any linear	Aroa of a circle	• Interior and exterior angles in		• Whiting large humbers in standard form	Snapes.
	relationship: rate of change	Area or a circle Find radius/diamotor given	Interior and exterior angles in polygops		 Pocognising numbers written 	Criteria for congruent triangles.
	and intercept point.	• Filiu radius/uldineter given	polygons.		in standard form	• Using Pythagoras theorem to identify and find missing sides
	• Whiting and using inteal	Designed of and area of			 Changing numbers that are 	of right-angled triangles
	y = mr + c	• Perificient and area of			almost in standard form	Lico and apply Pythagoras'
	y = mx + c.	part or whole circles			almost in standard romi.	• Use and apply i ymagoras
		purt or whole encles.				range of contexts.
Koy	AE: Soquence term	NE: Porcontago percent reverse	62: soctor prism cylinder	\$1: discroto, continuous	S1: moon modion mode range	CE: Are bisector construction
vocabulary/	nth-term term-term rule	no. Percentage, percent, reverse percentage increase decrease	surface area volume canacity	qualitative quantitative sample	S1. Illean, median, mode, range.	line line segment locus
concepts/ideas	position-term rule, arithmetic.	profit, loss, decimal multiplier.	Surface area, volume, capacity.	population, class, frequency.	N7 [.] Standard form, standard	nerpendicular diagonal.
students must	linear.	direct proportion, inverse	G4: Parallel, perpendicular.	population, class, requercy.	index form.	perpendicular, alagonal.
master		proportion, constant of	transversal, corresponding.			G6: Congruent, similar.
	A6: Gradient, intercept, parallel,	proportionality, compound	alternate, supplementary,			Pythagoras' Theorem,
	rate of change, graphical	measure.	congruent, interior angle,			hypotenuse, proportion,
			exterior angle, regular polygon,			rotational symmetry.
		G3: Circumference, diameter,	irregular polygon.			
		radius, arc.		!		
Knowledge	Generate and describe linear	• The percent symbol (%) and	• Estimate, calculate and	• Bar charts, pictograms, pie	• Mean average (KS2)	Similar shapes and scale
revisited	number sequences (KS2)	definition (KS2)	compare volume and capacity	charts, line graphs (KS2)	 Place values and 	factors (G6)
	 Use simple formulae (KS2) 	 Write percentages as fractions 	of cubes/cuboids (KS2)		multiplying/dividing by powers	 Compare and classify
	 Algebraic expressions (A1) 	and decimals (KS2)	 Recognise angles where they 		of 10 (KS2, N1)	geometric shapes based on
	 Expanding brackets (A1) 	 Measures and scaling (KS2, N1) 	meet at a point, are on a		 Exponents and roots (N1) 	their properties and sizes and
	 Describe positions on the full 	 Solve problems involving the 	straight line, or are vertically		 Ordering and comparing 	find unknown angles in any
	coordinate grid (KS2, A2)	calculation of and the use of	opposite, and find missing		integers and decimals (N1)	triangles, quadrilaterals, and
	 Find pairs of numbers that 	percentages for comparison	angles (KS2)			regular polygons (KS2)
	satisfy an equation with two	(KS2)	Compare and classify			Compare and classify
	unknowns (KS2, A2)	Similar shapes and scale	geometric shapes based on			geometric shapes based on
		factors (KS2, G2)	their properties and sizes and			their properties and sizes and

	• Use/recognise horizontal and vertical line graphs and y = x, y = -x (A2)	 Perimeter (KS2, N2, G1) Area of rectangles, parallelograms, triangles and trapeziums (KS2, G1) Areas of composite shapes (G1) 	find unknown angles in any triangles, quadrilaterals, and regular polygons (KS2)		 find unknown angles in any triangles, quadrilaterals, and regular polygons (KS2) Solve problems involving similar shapes where the scale factor is known or can be found (KS2) Concept of congruence (G2) Enlargements and scale factors (G2)
CEIAG Links/ Opportunities				Interpreting data – data analyst, ecologist, meteorologist, scientist (Gatsby Benchmark 4)	Loci – landscape gardener and construction jobs (Gatsby Benchmark 4)