St Cuthbert Mayne School Curriculum Map 2023-2024

Department: Maths

Year 9

Department Intent and overview We believe that with the right teaching, all children can make exceptional progress and are capable of achieving a strong pass or better at GCSE. To achieve this goal requires high quality teaching supported by a well-structured curriculum in the context of strong whole school systems. In every lesson, you'll be doing maths within the first few seconds with our 'Do Now' tasks. You will develop your skills in Number, Algebra, Geometry, Ratio and Proportion, and Probability and Statistics as outlined in the National Numeracy Strategy. There are ten teachers in the department – we are a mix of young and old, new and experienced. There are ten teachers in the department – we are a mix of young and old, new and experienced. We are led by Mr Harvey and ably assisted by Miss Stronkova (2i/c) and Mr Whitehead (Maths Lead practitioner). We are passionate about our subject and seeking the best for the students we teach. There is always an opportunity for students to get extra help with their Maths studies from any of the teachers in the department and we run regular Maths café lunchtime sessions. We follow the ESW Multi Academy trust SOW for years 7 and 8. It has been identified that students come to secondary having had years of teaching on written methods, place value etc. This sort of KS2 prerequisite knowledge will be identified on the scheme so the teacher is aware of it then can build upon this knowledge for a smoother transition between primary and secondary education.

Key Stage 3 Curriculum Summary

Autumn Term 1

Topic/ Unit	1 Surds	2 & 3. Probability Trees	4 & 5 Quadratics	6 Number	
Knowledge (Content covered)	Surds: Simplify, collect, calculations using surds, **Prior knowledge links** Met in Year 7 in context of Pythagoras and roots of non square numbers. knowledge of rules of algebra form Y8	Probability Trees Intro via probability and adding / multiplying decimals Frequency trees **Prior knowledge links** Y8C4 Basic probability Won't have met combining by multiplying yet but will have met adding probabilities of mutually exclusive events students will have met frequency trees so emphasise the difference between them.	Quadratics factorising, Identifying roots. Sketching quadratics. What is a root **Prior knowledge links** Solving quadratics by factorising Y8 Cycle 4 and Y8 Cycle 3 Plotting quadratic graphs Y8 Cycle 3	Rounding. Bounds: Calculations involving bounds **Prior knowledge links** Inequality notation from KS2. Rounding in Y7 Cycle 1	
Skills	• Can calculate exactly with surds • Can simplify surd expressions involving the four operations • Can rationalise denominators	• Form & complete a probability tree diagram (independent and conditional) • calculate the probability of successive independent events using P(A) x P(B) • Know the probability of P(A or B) =P(A) + P(B) • Understand selection with or without replacement **(Higher)** • Understand and interpret terms such	• Can sketch the graph of a quadratic equation and include the coordinates of: ○ The roots ○ The y intercept ○ The turning point (by symmetry) The following objectives are more challenging - seek guidance from your HOD if you are unsure about	• Can round numbers to a given number of significant figures • Can use inequality notation to specify simple error intervals due to truncation or rounding • Can apply and interpret limits of accuracy including upper and lower bounds	

		as exactly one/at least one/more than and how these are represented within in the diagram • Use tree diagrams to calculate combined probabilities for both independent and dependent events • Use the terminology of NOT within probability to efficiently calculate a probability	doing them with your group. • Can write quadratic equations and expressions (of the form x^2+bx+c) in completed square form • Can relate the completed square form and graphical form of a quadratic equation • Can recall and use the quadratic formula to solve a quadratic equation		
Assessment	Y10HC2 Surds MA1.docx Y10HC2 Surds MA2.docx	Y9C1 Probability tree replacement MA1.docx Y9C1 Probability tree replacement MA2.docx Y9C1 Probability tree non replacement MA1.docx Y9C1 Probability tree mixed MA1.docx	Y9C2 Quadratic sketching MA1.docx Y9C2 Quadratic sketching MA2.docx Y9C2 Completed square form MA1.docx Y9C2 Completed square form MA2.docx	Y9C1 Bounds MA1.docx Y9C1 Bounds in calculations MA1.docx	
Gatsby 4	Used in building for house making	Used by the military for operations research in the form of decision trees.	Used widely by engineers, for example automotive engineers to design braking systems.	Used by shopkeepers to determine price points.	

Autumn Term 2

Topic/ Unit	7 Volume	8 Volume	9 & 10 Algebra and Simultaneous Equations	11 & 12 Simultaneous Equations	
Knowledge (Content covered)	Volume cuboids & Prisms (Recap Area first) Volume of Cylinders **Prior knowledge links** ● Volume of cuboids and prisms in Y8 Cycle 3 ● Surface area of cuboids and prisms in Y8 Cycle 4	Pyramids, Cones, Frustrum, spheres Working backwards to find height etc given the volume. Working with Mass, density and volume **Prior knowledge links** ● Volume in previous week and Y8 Cycle 3 ● No prior teaching of density	Basic algebra: Collect terms, Expanding brackets. Rearrange formula Form and solve equations **Prior knowledge links** ● Forming, solving and substitution are in each cycle in year 8. This is the first experience of simultaneous equations.	Simultaneous equations Linear only Simultaneous equations Setting up and solving. Problems in context. **Prior knowledge links** ● Simultaneous equations in weeks 1&2 of this cycle ● Straight line graphs in Y8 Cycle 2. ● Quadratic graphs in Y8 Cycle 3.	
Skills	● Can find the volume of 3D shapes including pyramids, spheres and cones **(Higher)** ● Can find the volume of composite 3D shapes ● Can find side lengths and other measurements by working backwards from the volume formula ● Can apply Pythagoras' theorem to find lengths in cones or pyramids	● Can solve problems involving the density formula. ● Can solve density problems where the volume has to be calculated first. ● Can combine densities.	● Solve contextual simultaneous problems with positive integer solutions ● Solve simultaneous equations involving ○ positive integer coefficients and/or solutions ○ negative integer coefficients and/or solutions ○ fractional integer coefficients and/or solutions ○ Re-arranging prior to solving ● Form and Solve simultaneous equations in different contexts (money, area, ...)	● Can find the solution of linear simultaneous equations graphically.	
Assessment	Y9C1 Volume Cones Spheres Pyramids MA1.docx	Y9C1 Density MA1.docx Y9C1 Density MA2.docx	Y9C1 Easy Sim equations MA1.docx Y9C1 Easy Sim equations MA2.docx	Y9C1 Graphical simultaneous equations MA1.docx	

	Y9C1 Volume Cones Spheres Pyramids Y9C1 Reverse volume questions MA1.docx		Y9C1 Worded simultaneous equations Y9C1 Worded simultaneous equations	Y9C1 Graphical simultaneous equations Y9C1 Algebraic simultaneous equations Y9C1 Algebraic simultaneous equations	
Gatsby 4	Used by doctors and medical personnel to administer the correct amount of drugs and blood through IV drips and injection.	Used by journalists as a visual representation of data to enhance their article.	Used in computer modelling of fluids and other materials by scientists and engineers.	Used in financial analysis to determine price points, manage budgets, calculate the value of assets etc.	

Spring Term 1

Topic/ Unit	13 Straight lines	14 Vectors	15 Inequalities	16 & 17 Trigonometry	
Knowledge (Content covered)	Plot straight line graph Rearrange and plot graph Solve Simultaneous equations : graphically & algebraically **Prior knowledge links** Y8 C2	Vectors introduction Link to translations **Prior knowledge links**	Representing linear inequalities. Number line and graphically Solving linear inequalities **Prior knowledge links**	Pythagoras recap and Trig Lengths **Prior knowledge links** First exposure to trigonometry. Pythagoras (introduced in Y7 Cycle 1 and interleaved regularly)	
Skills	• Can plot and name horizontal and vertical lines • Can recognise a line as solution sets for an equation • Can determine if a point lies on a line given the equation • Can plot lines of the form y=mx+c using gradient intercept method or a table. • Can plot lines given in the form y=a(bx+c) by expanding the brackets first (link with linear brackets) • Can identify gradient or intercept from the equation. • Can identify simple integer gradients via a step method and relate this to y=mx+c • Can calculate more complex gradients by drawing a triangle and using the formula change in y/change in x	• Can describe translations as 2D vectors and use column and diagrammatic representation. • Can add, subtract vectors and multiply them by a scalar. • Can apply Pythagoras to find the length of a vector. • Can apply Trigonometry to find the angle between a vector and either coordinate axis. • Can add and subtract vectors in algebraic form to represent movements around 2D shapes.	• Can solve linear inequalities of the forms ax+b<c and a<bx+c<d. • Understands that the solution to a linear inequality is a range of values and not a single value. • Can list integer values that satisfy a given inequality. • Can represent a linear inequality on a number line (and write an inequality given the number line representation). • Can form and solve an inequality from a worded question	• Can find missing sides of right angled triangles using trigonometry • Can solve trigonometry and Pythagoras problems that involve using ratio or fractions to find lengths.	

	• Can identify y-intercept • Can write the equation of a line given the graph				
Assessment	Y8C2 straight lines MA1.docx Y8C2 straight lines MA2.docx Y8C2 gradients and y=mx+c MA1.docx Y8C2 gradients and y=mx+c MA2.docx	Y9C2 Vector basics MA1.docx Y9C2 Vector basics MA2.docx Y9C2 Vectors Pythagoras and Trig MA1.docx	Y9C3 Inequalities MA1.docx Y9C3 Inequalities MA2.docx Y9C3 Inequalities for the brave MA1.docx	Y9C2 Trigonometry basics MA1.docx Y9C2 Trig and Pythag MA1.docx Y9C2 Trig and Pythag MA2.docx	
Gatsby 4		Pilots and air traffic controllers use vectors to calculate velocities.	Inequalities are used by computer programmers to find optimal solutions within the given restraints.	Used by cartoonists and animators for proportion and movement.	

Spring Term 2

Topic/ Unit	18 Trigonometry	19 Data Handling	20 & 21 Quadratics	22 Percentage & Multipliers	
Knowledge (Content covered)	Pythagoras and Trig Lengths and angles. **Prior knowledge links** First exposure to trigonometry. Pythagoras (introduced in Y7 Cycle 1 and interleaved regularly)	Group data Include: Mean from table, Cumulative frequency and box plots Sequences Linear **Prior knowledge links** Students can work with data in tables. Averages and spread (Y8C1)	Quadratics factorising and the quadratic formula. Subn practice for weaker groups Memorise higher groups **Prior knowledge links**	Basic % of an amount. % change. Compound interest via table Calculating tax brackets Percentage multipliers (find, increase, decrease and reverse) **Prior knowledge links**	
Skills	● Can find missing sides of right angled triangles using trigonometry ● Can find missing angles of right angled triangles using trigonometry ● Can apply trigonometry to problems in context. ● Can solve trigonometry and Pythagoras problems that involve using ratio or fractions to find lengths. ● Can use Pythagoras and trigonometry to solve problems in context.	● Can convert between a table and ordered raw data ● Can find mean, median, mode and range from a frequency distribution ● Can find mean, median, mode and range from KS2 statistical diagrams ● Can distinguish between averages and measures of spread ● Can compare data sets using statistical measures	● Can select the most appropriate method of solution for an equation (ongoing objective) ● Can form and solve quadratic equations ○ in the context of volume ○ in the context of area	● Can use a percentage multiplier to ○ Find a percentage ○ Increase by a percentage ○ Decrease by a percentage ○ Reverse a percentage change **(previously a higher topic but now foundation)** ● Can interpret the effect of a multiplier in terms of percentage change. ● Can use percentage multipliers to solve questions in context. ● Can write one quantity as a percentage of another (including finding % profit and loss) ● Can recall and explain the formula	

				for repeated percentage change (new value = original value x multiplier$^{\text{time period}}$) ● Can solve percentage change problems including ○ interest (compound and simple) ○ depreciation ○ population change ○ decay	
Assessment	Y9C2 Trigonometry basics MA1.docx Y9C2 Trig and Pythag MA1.docx Y9C2 Trig and Pythag MA2.docx	Y8C2 frequency distributions MA1.docx	Y9C3 Form and solve quadratics MA1.docx	Y9C3 Percentage multipliers MA1.docx Y9C3 Percentage multipliers MA2.docx Y9C3 Percentage multipliers MA3.docx Y9C3 Reverse percentage MA1.docx	
Gatsby 4	Used by cartoonists and animators for proportion and movement.	Used in Banking	Used by astronomers to describe the orbits of planets, solar systems and galaxies.	Used by ecologists to calculate suspected population levels of flora and fauna.	

Summer Term 1

Topic/ Unit	23 Number / Algebra	24 Similarity	25 & 26 Pythagoras and Trig	27 Number	
Knowledge (Content covered)	Algebra recap collect term Factorising, expanding brackets. Form and solve equations **Prior knowledge links**	Similarity All scale factors (link to ratio, area and volume; Enlargement) **Prior knowledge links**	Pythagoras and Trig Recap 3D Pythagoras and Trig **Prior knowledge links**	Standard form: all 4 operations Rules of indices **Prior knowledge links** **Use of square numbers in Pythagoras - Y8 Cycle 1**	
Skills	• Can choose between balancing, factorising and the quadratic formula to solve quadratic and linear equations. • Can solve a quadratic that requires rearranging into the form $x^2+bx+c=0$	• Can find the scale factor of an enlargement • Can use rays to find a centre of enlargement and fully describe an enlargement • Can enlarge 2D shapes on a grid using a scale factor and a centre of enlargement. • Can use integer and fractional scale factors (both on higher and foundation tier GCSE).	• Can identify right angled triangles in 3D shapes. • Can apply Pythagoras in 3D to find missing lengths • Can apply trigonometry in 3D to find missing sides and angles • Can apply trigonometry to solve problems involving surface area and volume.	• Can recall square up to 15^2 and cube numbers up to 5^3 and understand the inverse. • Can use the multiplication and division rule for simplifying indices(integer and algebraic). • Understand negative indices as division (in preparation for standard form). • Can raise a bracket to a power e.g $(x^3)^5=x^{15}$ • Recognise and apply $a^0=1$ • Can convert large numbers to standard form and vice versa. • Can convert small numbers to standard form and vice versa. • Can recognise when a number is written in standard form • Can order and compare numbers in standard form. • Can use standard form functions on	

				a calculator ● Can solve multiplication and division calculations involving standard form. ● Can solve addition and subtraction calculations involving standard form. ● Can substitute values in standard form into expressions and formula	
Assessment	Y9C2 Choosing a method for solving MA1.docx Y9C2 Choosing a method for solving MA2.docx	Y9C4 Positive Enlargement MA1.docx Y9C4 Positive Enlargement MA2.docx Y9C4 Fractional Enlargement MA1.docx Y9C4 Fractional Enlargement MA2.docx		Y8C1 Indices Y8C1 Converting Standard form Y8C1 Converting Standard form Y8C1 Calculating Standard form Y8C1 Calculating Standard form	
Gatsby 4	Calculating the braking distance of cars	Electronic drafters must use enlargement and scale factors to create accurate blueprints	Automotive designers use 3D pythagoras and trigonometry to design cars.	Used by astronomers to describe the orbits of planets, solar systems and galaxies.	

Summer Term 2

TopicUnit	29 Transformations	30 Measures	31 & 32 Transformations	33 Venn Diagrams	
Knowledge (Content covered)	Transformations: translation and reflection (y=x) Transformations: rotation and combining transformations **Prior knowledge links**	Convert: metric & imperial Reading scales: suitable units Work with S/D/T convert km/h to m/s. **Prior knowledge links** **KS2 knowledge links Students were introduced to the units of speed at KS2 (and will probably have met them in their science lessons since)**	Enlargement – positive integer and fractional scale factors **Prior knowledge links**	Venn diagrams and set notation: link to probability; HCF/LCM **Prior knowledge links**	

Skills	• Can translate shapes given a vector
	• Can combine translations and relate this to vector addition
	• Can reflect 2D shapes given a mirror line
	  ○ a drawn mirror line
	  ○ the equation of a mirror line (y=c, x=c, y=x+c)
	• Can rotate 2D shapes using a centre of rotation, angle and direction
	• Can describe fully translations, reflections and rotations.
	• Can combine two or more transformations and represent them with a single transformation
	• Can identify points that are invariant and explain what this
		• Can recall the formula relating average speed, distance and time.
		• Understand that speed is a measure of distance over a fixed time.
		• Understand that distance and time have a proportional relationship.
		• Can convert between units of distance, speed and time.
		• Can draw and interpret a distance time graph
		• Can find and interpret the gradient of a distance time
			• Can find the scale factor of an enlargement
			• Can use rays to find a centre of enlargement and fully describe an enlargement
			• Can enlarge 2D shapes on a grid using a scale factor and a centre of enlargement.
			• Can use integer and fractional scale factors (both on higher and foundation tier GCSE).
				• Can sort a set of data into a Venn diagram.
				• Can create a Venn diagram containing the number of items in each set.
				• Can use correct set notation and precise language to identify areas on a Venn diagram.
				• Can solve probability problems involving Venn diagrams
				• Review prior learning on probability (tree diagrams and basic probability)	

	means.	graph as speed. • Can find the average speed for a journey with at least two different sections (using total distance/total time)			
Assessment	Y9C4 Rotation MA1.docx Y9C4 Rotation MA2.docx Y9C4 Reflection MA1.docx Y9C4 Reflection MA2.docx Y9C4 Translation MA1.docx Y9C4 Translation MA2.docx Y9C4 Mixed transformations MA1.docx Y9C4 Combining transformations MA1.docx	Y9C4 Kinematics	Y9C4 Positive Enlargement MA1.docx Y9C4 Positive Enlargement MA2.docx Y9C4 Fractional Enlargement MA1.docx Y9C4 Fractional Enlargement MA2.docx	Y9C3 Venn diagrams MA1.docx Y9C3 Venn diagrams MA2.docx Y9C3 Venn probability MA1.docx	
Gatsby 4	An essential skill for computer game designers.	An essential skill for Pilots and air traffic controllers .	Electronic drafters must use enlargement and scale factors to create accurate blueprints.	Careers advisors use Venn diagrams to determine appropriate career choices.	