CURRICULUM MAP (Long term plan)

SUBJECT: Maths **YEAR GROUP : 10**

	Cycle 1 **Autumn**	**Cycle 2** **Spring**	**Cycle 3** **Summer**
Substantive knowledge – Essential knowledge & conceptual understanding of the National Curriculum	Data, algebra, number, geometry **1 – Processing and presenting data** **2 – Calculation skills and properties of number** **3 – Algebraic manipulations and quadratics** **4 – Fractions and decimals** **5 – Accuracy and bounds** **6 – 2D and 3D shapes** **7 - Trigonometry**	Geometry, number, ratio and proportion, algebra, indices **8 – Constructions and Loci** **9 – Percentage change** **10 – Ratio and proportion** **11 – Solving equations and quadratics** **12 – Indices and surds**	Geometry and Statistics and Probability **13 – Straight line graphs** **14 – Simultaneous equations** **15 – Inequalities** **16 – Further 2D and 3D shapes**
Disciplinary knowledge - what skills are practised?	**1 – Processing and presenting data** - Measures of central tendency from lists, frequency tables and grouped data. - Presenting data in charts (bar charts, frequency polygons, stem and leaf diagrams, pie charts, scatter diagrams, box plots and histograms) - Comparing and evaluating data - Data types and questionnaires. **2 – Calculation skills and properties of number** - Non calculator written methods for integers and decimals. - Understanding and recognising properties of numbers (factors, multiples, primes, powers and roots)	**8 – Constructions and Loci** - Construct perpendicular bisectors, angle bisectors - Construct SSS, ASA and SAS triangles - Construct loci for equidistant paths around a point, around a polygon, between 2 lines, between 2 points **9 – Percentage change** - Express numbers as a percentage of another - Calculate percentage of amounts and percentage changes - Calculate repeated percentage changes iteratively and with the formula - Calculate and understand growth and decay	**13 – Straight line graphs** - Read and plot coordinates in 4 quadrants - Plot straight line graphs from the equation using tables of values - Plot straight line graphs using gradient and a coordinate - Find equations of straight lines from 2 coordinates - Find the equations of parallel and perpendicular lines - Find solutions for 2 straight lines crossing **14 – Simultaneous equations** - Solve linear simultaneous equations graphically

	- Calculating and interpreting HCF and LCM **3 – Algebraic manipulations and quadratics** - Expanding and simplifying algebraic expressions. - Factorising algebraic expressions including quadratics - Simplify algebraic fractions - Rearrange formulae and equations - Use the laws of indices on algebraic expressions **4 – Fractions and decimals** - Order and compare fractions and decimals - Non-calculator written calculations with decimals, fractions and mixed numbers - Converts and compare fractions, decimals and percentages - Convert recurring decimals to fractions **5 – Accuracy and bounds** - Round integers and decimals to decimal places or significant figures. - Estimate calculations using rounding - Calculate error intervals and bounds for rounded numbers - Calculate error intervals and bounds for calculations using rounded numbers **6 – 2D and 3D shapes** - Calculate the areas and perimeters for polygons and circles - Calculate areas and perimeters of circle parts	- Calculate original amounts from percentage changes (revers percentage calculations) **10 – Ratio and proportion** - Share in a given ratio - Evaluate best buy solutions - Understand and solve problems using direct and inverse proportion - Use algebraic methods to solve proportion problems - Read and interpret proportion represented graphically **11 – Solving equations and quadratics** - Solve linear equations algebraically - Solve quadratic equations by factorising - Solve quadratic equations by completing the square - Solve quadratic equations using the quadratic formula - Plot quadratics graphically using tables of values - Sketch quadratics using roots and completed square format - Use quadratic graphs to approximate roots - Understand an appreciate when quadratics have no solutions **12 – Indices and surds** - Recognise powers and roots of common numbers - Evaluate numbers with powers including fractions and negatives - Recognise a surd - Simplify surds - Perform calculations with surds	- Solve simultaneous equations algebraically using the elimination method - Solve simultaneous equations using the substitution method - Solve one linear and one quadratic simultaneous equation - Form simultaneous equations and solve. **15 – Inequalities** - Solve linear inequalities algebraically - Solve quadratic inequalities algebraically - Read and represent a linear inequality on a number line - Interpret and represent a single or system of inequalities on a cartesian plane - Find integer solutions to inequalities **16 – Further 2D and 3D shapes** - Know the names of different triangles, quadrilaterals and other polygons - Know the properties of different polygons (including angle properties and edge properties) - Know the names and identify different solids (prisms, pyramids) - Interpret and represent 3D solids with plans and elevations - Interpret and draw 3D solids in isometric form - Interpret and draw nets for 3D solids - Interior and exterior angles in

	- Calculate surface areas of 3D solids - Calculate volumes of cuboids, prisms, pyramids and spheres. **7 - Trigonometry** - Calculate lengths of right angled triangles using Pythagoras - Calculate lengths of triangles with right angled trigonometry (Sine, Cos, Tan) - Calculate angles in right angled triangles using Sine, Cos, Tan - Learn and apply the exact values for right angled trigonometry	- Rationalise the denominator of a surd	
Key questions (What is the learning about?)	Can students use the functions on the calculator effectively? Do the students understand when to use Pythagoras theorem? Can the students recite or derive the exact values for sinq, cosq and tanq for q = 0, 30, 45, 60 and 90 degrees? Can students understand the upper and lower bounds of a rounded number and how these can in turn affect a larger calculation? Can students understand the data distribution in a histogram and link it to other data representations? Can students interpret statistical measures in context and compare summary data?	Are students able to control construction equipment and use them effectively? Are students able to reverse a percentage change and understand the common misconception of removing a percentage? Are students able to show working to support solutions even when carried out on a calculator? Are students able to set up algebraic proportion equations?	Are students able to manipulate algebraic equations with accuracy? Have the students a secure understanding of the link between graphical and algebraic simultaneous equation solutions? Are students fluent with the formats for representing inequalities?
Assessment	Live marking during the lesson with misconceptions addressed during the lesson. End of topic PPC for each topic followed by individual marking and targeted fix it tasks	Live marking during the lesson with misconceptions addressed during the lesson. End of topic PPC for each topic followed by individual marking and targeted fix it tasks	Live marking during the lesson with misconceptions addressed during the lesson. End of topic PPC for each topic followed by individual marking and targeted fix it tasks

	EOTT	EOTT	Mock examinations
Literacy (L),**Numeracy** (N), **Oracy** (O) **opportunities**	Word problems presented to students each lesson where they have to understand the mathematical vocabulary to solve the problems. Answers to questions posed by the teachers are answered using mathematical language with reasoning where appropriate developing key vocabulary and confidence in talking mathematically. Peer on peer support when answering questions in class. Key words are displayed at the beginning of each lesson and in their knowledge organisers for the topic.		
Cross Curricular Opportunities	Reference to links with geography for data processing and presenting.	Ratio and proportion has strong links with Design and Technology.	Links to Design and Technology and Art.
Super Curriculum (personal development)	**UKMT Challenge** **Sparx Maths**	**UKMT Challenge** **Sparx Maths**	**UKMT Challenge** **Sparx Maths**
Careers	HT 1 GPS Data Collection Using excel for data webinar Describing data for business Graphs and charts in business HT 2 Pythagoras in the real world Trigonometry in the real world Pythagoras in construction	HT1 Loci in the real world Government taxation Interest rates and the stock market HT2 Proportion in design Understanding proportion in real life	HT1 Real life application of straight line graphs HT2 Maths in architecture
Equality and Diversity Gender Disability Religion Race Sexuality	Diverse representation used with slides presented to students. Maths display boards has a Mathematician of the Month and also Famous Mathematicians from Around the World. ● University of Nottingham videos about women in maths ● Isaac Newton institute looking at diversity in mathematics ● University of Nottingham Undergraduate students for women in maths		
Local Community Links	N/A	N/A	N/A
British Values Democracy The rule of Law Individual Liberty Mutual Respect and Tolerance of others SMSC Character Education	Across the school, we encourage respect including teaching the value of listening to others views and opinions on problem solving. Students know it is okay to make mistakes and know this is how we learn; we encourage students to find their specific errors and then learn from these leading to deeper learning. In classrooms, we look for opportunities for pupils to use mini-whiteboards to promote self-esteem and build self-confidence. Collaborative learning in the classroom is encouraged in the form of listening and learning from each other which develops their mathematical voice and logical reasoning skills. We participate in team maths challenges for increased pupil involvement.		

	We explicitly teach areas of Maths in lots of different subjects across the school to show students the importance of Maths in different roles, for example: statistics in Geography and Science; finance in Citizenship; chronology in History and proportion in Food Tech.