KS4 Maths Foundation Curriculum Overview

	Links to KS3	Topics covered at KS3 develop skills needed at KS4. A higher tier pupil will extend their learning in KS3 and explore more complex topics that link to topics covered at KS3. A foundation tier pupil will revisit & extend topics covered at KS3. They will examine in more depth topics they have met in previous years to secure their understanding of key topics.					
Intent	**Statement of Intent**	Our aim is for all students to acquire a deep long-term, secure and adaptable understanding of mathematics regardless of starting point or background. A Lydiard Park learner: · Will fluently and accurately recall, apply and explain facts and concepts using correct mathematical language. · Will solve problems and reason mathematically by having a curiosity to explore conjectures, test hypotheses and generalise results.					
	Timeline	**Term 1 - 7 Weeks**	**Term 2 - 7 Weeks**	**Term 3 - 7 Weeks**	**Term 4 - 6 Weeks**	**Term 5 - 5 Weeks**	**Term 6 - 6 Weeks**
Implementation (Year 10)	**Year Overview**	Pupils study required topics for foundation Edexcel GCSE maths. They cover number, algebra and geometry topics as well as probability. All of these topics revisit and build from work done at KS3 and develop more rigorous ways of working. An emphasis is put on written mathematical communication in preparation for writing exam answers.					
	SOW	**Angles** **Probability**	**Developing algebraic thinking**	**Direct & Inverse Proportion** **Pythagoras & Trigonometry**	**Compound Measures** **Vectors**	**Growth & Decay** **Sequences**	**Functions & Graphs** **Area & Volume**
	Assessment Type & Unit Focus	Assessment by mid topic tickets and end of topic tests. Angles - Review of using basic angle facts to solve problems. Use Corresponding, Alternate & Allied angles in parallel lines. Recognise congruent and similar shapes. Use scale factors to find missing measurements in similar shapes. Probability - Calculate theoretical probability and recognise when outcomes are equally likely or not. Calculate expected outcomes and relative frequency. Use listing combinations, sample space diagrams and calculation to find the probability of combined events. Use tree diagrams to solve problems involving independent events	Assessment by mid topic tickets and end of topic tests. Milestone assessment given to review progress so far. Algebra - Understand the difference between expressions, identities, equations. Manipulate expressions including expanding & factorising single brackets. Solve linear equations including equations involving unknowns on both sides, brackets & fractions. Rearrange & Substitute into formulae. Solve linear inequalities and recognise how the solution is different to an equation. Form expressions, equations & inequalities from a range of context including pictures. Expand and factorise quadratic expressions. Solve simple quadratic equations by factorising.	Assessment by mid topic tickets and end of topic tests. Direct & Inverse Proportion - Interpret and simplify ratios. Share in a ratio and solve more complex sharing in a ratio problems. Solve problems involving direct proportion including best value calculations. Solve problems involving inverse proportion including person-hour calculations. Recognise and use direct proportion in the context of scale drawings & map scales. Pythagoras & Trigonometry - Recall and apply Pythagoras' theorem. Recognise that right angled triangles are similar and understand that trigonometry is applying the constant of proportionality in the case of right angled triangles. Use trigonometry to find missing sides and angles. Read, use and solve problems involving bearings.	Assessment by mid topic tickets and end of topic tests. Milestone assessment given to review progress so far. Compound measures - Convert between metric measurements and know the most sensible metric units to use in given contexts. Use given facts to be able to convert between imperial units and to convert imperial to metric. Calculate speed and solve problems involving speed and time calculations. Use other compound measures including density, pressure, rates of flow & rates of pay. Vectors - Recognise and use Column vector notation to describe a movement. Identify parallel & co-linear vectors. Calculate resultant vectors using vector arithmetic and recognise the link with the vector movements.	Assessment by mid topic tickets and end of topic tests. Growth & Decay - Convert between fractions, decimals and percentages. Apply this in order to compare size and to carry out calculations. Calculate fractions and percentages of amounts including increases & decreases by a percentage or fraction. Calculate compound interest & decay/depreciation. Solve reverse percentage and fractions problems. Sequences - Use & generate position to term rules for linear sequences. Identify and use arithmetic, geometric, Fibonacci-style and quadratic sequences. Use sequence in real-life contexts and in problem solving.	Assessment by mid topic tickets and end of topic tests. Milestone assessment given to review progress in year 10. Functions & Graphs - Plot linear and quadratic graphs. Recognise the shape of quadratic, cubic, reciprocal graphs. Reason about & Identify the equation of horizontal & vertical lines. Calculate gradient and find the equation of diagonal lines. Use graphs in real life context and to solve simultaneous equations. Area & Volume - Recall how to calculate the area of triangles, rectangles, parallelograms & trapezia. Calculate the area and circumference of circles and shapes made of circles. Calculate the area and perimeter of compound shapes including shapes involving simple parts of circles. Recognise the nets of 3D shapes & calculate surface area of cuboids and prisms. Calculate the volume of a prism. Solve problems in context requiring area, volume and surface area calculations.

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Implementation (Year 11)	**Year Overview**	Pupils study required topics for foundation Edexcel GCSE maths. They cover statistics as well as number, algebra and geometry topics. All of these topics build from work done at KS3 and develop more rigorous ways of working. An emphasis is put on written mathematical communication in preparation for writing exam answers. Time is allocated for revision at the end of the course when students will revisit topics using exam paper practise booklet.				
	SOW	**Average** **Number work, Indices & Standard form**	**Construction & Proof** **Statistical charts & techniques**	**Geometric transformations**	**Solving equations**	**Revision**
	Assessment Type & Unit Focus	Assessment by mid topic tickets and end of topic tests. Milestone assessment given to assess progress in year 10. Averages - Recall calculating averages of discrete data. Interpret data given in a table and as grouped data. Recognise how this links with a list of data and how to apply this to find the mean, median, mode and range for grouped data and large sets of data given in a table. Solve average problems and use averages to compare sets of data. Number work, Indices & Standard form - Calculate with negative numbers and be able to substitute into formulae correctly with negative numbers. Recall and use BIDMAS correctly in calculations. Identify and use the laws of indices. Read, write and calculate with standard form. Round numbers to an appropriate degree of accuracy. Use rounding to carry out estimation. Be able to interpret the accuracy of an estimation and know whether it is an under or over-estimate.	Assessment by mid topic tickets and end of topic tests. Mock exams take place in November. Construction & Proof - Recall constructing triangles using protractors and compasses. Construct angle and perpendicular bisectors. Identify the locus of a point for a range of given conditions. Recognise and use similarity and congruence. Find missing values in similar shapes. Statistical charts and techniques - Interpreting data given in bar charts, pie charts, pictograms & stem and leaf diagrams. Read and interpret scatter graphs. Recognise the limitations of the use of line of best fit to interpolate (or extrapolate) data.	Assessment by mid topic tickets and end of topic tests. Geometric Transformations - Describe single transformations of 2D shapes. Draw single transformations of 2D shapes including enlargements with a given centre of enlargement. Reason about & identify invariant points after transformations. Investigate the effect of combined transformations	Assessment by mid topic tickets and end of topic tests. Mock exams take place in March. Solving Equations - Recall how to solve equations including equations involving unknowns on both sides, brackets and fractions. Recall how to change the subject of formulae. Solve linear simultaneous equations using elimination. Solve linear inequalities and recognise how the solution is different from equations.	Pupils work through topic booklets of past paper questions to revise individual topics. They complete past papers to help them prepare for the exams. Teachers selection the topics to study based on analysis of the mock papers.
	Topic Texts	Pupils read and analyse texts that link maths with careers and money and general interest texts about the history of maths.				
Impact	**Year Tracking**	Year 11 RP1	Year 10 RP1/ Year 11 RP2	Year 10 RP2/ Year 11 RP3		Year 11 RP4	Year 10 RP3
	literacy and Numeracy links	**Literacy** skills are developed through a focus on key words and precise language in maths. For each topic, key words are defined and recorded. Pupils then use them when talking and learning about a topic. Pupils are encouraged to talk and write about maths using precise terminology. There is a focus on written communication in maths. **Numeracy** skills are reviewed when the topics require it. Throughout the 2 year course there are topics require a non-calculator approach and the appropriate techniques are taught and reviewed during these topics. All students practise basic number facts as part of their homework. Foundation pupils revisit important number topics such as working with negative numbers in term 1 of year 11.					
	How It Is Used / Skills Set Developed / Outcomes	Pupils continue to develop their use of formal mathematical knowledge to interpret and solve problems. They model situations mathematically and express the results using a range of formal mathematical representations. They learn to select appropriate concepts, methods and techniques to apply to problems. They start to recognise the application of mathematics in real world settings and develop the skills to be able to process numerical information.					
	Links to KS5	Pupils study techniques to analyse data and links with other subjects that require these skills are made. Many A level causes require an understanding of statistical analysis.					
	Careers in the Curriculum	The use of maths in a range of career settings is drawn out when covering relevant topics. In year 10 pupils get the opportunity to attend a maths trip looking at the application of maths to different careers.					