MOOR PARK HIGH SCHOOL: CURRICULUM

Key Stage 3 Long Term Planning

Year 11 2026-2027 INTENT:

Faculty Area: Mathematics

Autumn 1 – Graphs

Knowledge	***Gradients and Lines (2 weeks)***	***Non-Linear Graphs (2 weeks)***	***Using Graphs (2 weeks)***
Rationale	This block builds on earlier study of straight-line graphs in years 9 and 10. Students plot straight lines from a given equation, and find and interpret the equation of a straight line from a variety of situations and given information. There is the opportunity to revisit graphical solutions of simultaneous equations. Higher tier students also study the equations of perpendicular lines.	Students develop their knowledge of non-linear graphs in this block, looking at quadratic, cubic and reciprocal graphs, so they recognise the different shapes. They find the roots of quadratics graphically and will revisit this when they look at algebraic methods in the Functions block during Autumn 2, where they will also look at turning points. Higher tier students also look at simple exponential graphs and the equation of a circle. Note that the equation of the tangent to a circle is covered later when the circle theorem of tangent/radius is met. Higher students also extend their understanding of gradient to include instantaneous rates of change considering the gradient of a curve at a point.	This block revises conversion graphs and reflection in straight lines. Students also study other real-life graphs, including speed/distance/time, constructing and interpreting these. Higher tier students also investigate the area under a curve.
National Curriculum Content Covered (Bold indicates Higher GCSE content)	- move freely between different numerical, algebraic, graphical and diagrammatic representations - plot and interpret graphs - interpret the gradient of a straight line graph as a rate of change - use the form y=mx+c to identify parallel **{and perpendicular}** lines; find the equation of the line through two given points, or through one point with a given gradient - find approximate solutions to two simultaneous equations in two variables (linear/linear **{or linear/quadratic}**) using a graph	- move freely between different numerical, algebraic, graphical and diagrammatic representations - recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, the reciprocal function 1 **{the exponential function $y = k^x$ for positive values of k** **-** plot and interpret graphs (including reciprocal graphs **{and exponential graphs}**) - find approximate solutions using a graph - identify and interpret roots, intercepts of quadratic functions graphically **- {recognise and use the equation of a circle with centre at the origin;}**	- plot and interpret graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration **- {interpret the gradient at a point on a curve as the instantaneous rate of** **change; apply the concepts of instantaneous and average rate of change (gradients of tangents and chords) in numerical, algebraic and graphical contexts}** **- {calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts}**
Connections to Previous National Curriculum Content in KS3 (Statutory)	- work with coordinates in all four quadrants - recognise, sketch and produce graphs of linear functions using equations in x and y - interpret mathematical relationships both algebraically and graphically - reduce linear equations in two variables to the form $y = mx + c$ - calculate and interpret gradients and intercepts numerically, graphically and algebraically - model situations by translating them into algebraic expressions or formulae and using graphs - use linear graphs to estimate values and interpret relationships - find approximate solutions to problems from graphs - use graphs to find approximate solutions of simultaneous linear equations - solve linear equations in one variable - interpret and connect different representations of mathematical ideas	- recognise, sketch and produce graphs of linear and quadratic functions of one variable - use linear and quadratic graphs to estimate values and find approximate solutions to equations - find approximate solutions to contextual problems from graphs of a variety of functions, including exponential and reciprocal graphs - interpret mathematical relationships both algebraically and graphically - model situations or procedures by translating them into algebraic expressions or formulae and by using graphs	- interpret and construct graphs in real-life contexts - model situations or procedures by translating them into algebraic expressions or formulae and by using graphs - interpret mathematical relationships both algebraically and graphically - recognise and use transformations, including reflections, of graphical representations - use graphical methods to explore and solve problems - understand and interpret distance–time graphs and other real-life graph
Assessment	White Rose Maths skills checks at the end of each unit (3 during this period)		
Homework	Sparx Maths online homework		
Cultural Capital			
Literacy	Mathematical key terms/vocabulary for each unit.	Correct terminology used when answering questions.	Read and understand written questions.
CIAG	Data Analysts - https://www.youtube.com/watch?v=yqyIYh4bKKo		

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Autumn 2 – Algebra			
Knowledge	***Expanding and Factorising (2 weeks)***	***Changing the Subject (2 weeks)***	***Functions (2 weeks)***
Rationale	This block reviews expanding and factorising with a single bracket before moving on to quadratics. The use of algebra tiles to develop conceptual understanding is encouraged throughout. Context questions are included to revisit e.g. area and Pythagoras' theorem.	Students consolidate and build on their study of changing the subject in Year 9. The block begins with a review of solving equations and inequalities before moving on to rearrangement of both familiar and unfamiliar formulae. Checking by substitution is encouraged throughout. Higher tier students also study solving equations by iteration.	As well as introducing formal function notation, this block brings together and builds on recent study of quadratic functions and graphs. This is also an opportunity to revisit trigonometric functions, first studied at the start of Year 10.
National Curriculum Content Covered (Bold indicates Higher GCSE content)	- know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments **{and proofs}** - simplify and manipulate algebraic expressions by: factorising quadratic expressions of the form $x^2 + bx + c$, including the difference of two squares; **{factorising quadratic expressions of the form $ax^2 + bx + c$}** - know the difference between an equation and an identity; solve quadratic equations **{including those that require rearrangement}** algebraically by factorising, **{by completing the square and by using the quadratic formula}** - identify and interpret roots; deduce roots algebraically **{and turning points by completing the square}** - solve two simultaneous equations in two variables (linear/linear **{or linear/quadratic})** algebraically; find approximate solutions using a graph	- solve linear inequalities in one variable - know the difference between an equation and an identity; - argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments **{and proofs}** - translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution **- {find approximate solutions to equations numerically using iteration}**	- where appropriate, interpret simple expressions as functions with inputs and outputs; **{interpret the reverse process as the 'inverse function'; interpret the succession of two functions as a 'composite function'}** - solve two simultaneous equations in two variables (linear/linear **{or linear/quadratic})** algebraically; find approximate solutions using a graph - identify and interpret roots; deduce roots algebraically **{and turning points by completing the square}** - solve linear inequalities in one **{or two}** variable**{s}** , **{and quadratic inequalities in one variable};** represent the solution set on a number line, **{using set notation and on a graph}** - recognise, sketch and interpret graphs of quadratic functions - apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right-angled triangles **{and, where possible, general triangles}** in two **{and three}** dimensional figures
Connections to Previous National Curriculum Content in KS3 (Statutory)	- use and interpret algebraic notation, including: coefficients, powers and brackets - substitute numerical values into formulae and expressions - understand and use the concepts and vocabulary of expressions, equations, terms and factors - simplify and manipulate algebraic expressions to maintain equivalence by collecting like terms - simplify and manipulate algebraic expressions to maintain equivalence by multiplying a single term over a bracket - simplify and manipulate algebraic expressions to maintain equivalence by taking out common factors - simplify and manipulate algebraic expressions to maintain equivalence by expanding products of two or more binomials - understand and use standard mathematical formulae - model situations by translating them into algebraic expressions or formulae - use algebraic methods to solve linear equations in one variable - recognise, sketch and produce graphs of linear and quadratic functions - interpret mathematical relationships both algebraically and graphically - use linear and quadratic graphs to estimate values and find approximate solutions - find approximate solutions to contextual problems from given graphs	- substitute numerical values into formulae and expressions - understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors - understand and use standard mathematical formulae; rearrange formulae to change the subject - simplify and manipulate algebraic expressions to maintain equivalence - use algebraic methods to solve linear equations in one variable (including forms that require rearrangement)	- model situations or procedures by translating them into algebraic expressions or formulae and by using graphs - recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane - interpret mathematical relationships both algebraically and graphically - reduce a given linear equation in two variables to the standard form y = mx + c; calculate and interpret gradients and intercepts of graphs numerically, graphically and algebraically - use linear and quadratic graphs to estimate values of y for given values of x and vice versa - find approximate solutions to contextual problems from given graphs of a variety of functions
Assessment	White Rose Maths skills checks at the end of each unit (3 during this period)		
Homework	Sparx Maths online homework		
Cultural Capital			
Literacy	Mathematical key terms/vocabulary for each unit. Correct terminology used when answering questions. Read and understand written questions.		
CIAG	Software Engineer - https://youtu.be/Q9tUUP-phCw		

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Spring 1 – Reasoning			
Knowledge	***Multiplicative Reasoning (2 weeks)***	***Geometric Reasoning (2 weeks)***	***Algebraic Reasoning (2 weeks)***
Rationale	Students develop their multiplicative reasoning in a variety of contexts, from simple scale factors through to complex equations involving direct and inverse proportion. They link inverse proportion with the formulae for pressure and density. There is also the opportunity to review ratio problems.	Students consolidate their knowledge of angles facts and develop increasingly complex chains of reasoning to solve geometric problems. Higher tier students revise the first four circle theorems studied in Year 10 and learn the remaining theorems. Students also revisit vectors and the key topics of Pythagoras' theorem and trigonometry.	Students develop their algebraic reasoning by looking at more complex situations. They use their knowledge of sequences and rules to made inferences, and Higher tier students move towards formal algebraic proof. Forming and solving complex equations, including simultaneous equations, is revisited. Higher tier students also look at solving inequalities in more than one variable.
National Curriculum Content Covered (Bold indicates Higher GCSE content)	- compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity - understand that X is inversely proportional to Y is equivalent to X is proportional to $\frac{1}{Y}$ - **{construct and}** interpret equations that describe direct and inverse proportion - extend and formalise their knowledge of ratio and proportion, including trigonometric ratios, in working with measures and geometry, and in working with proportional relations algebraically and graphically	- reason deductively in geometry, number and algebra, including using geometrical constructions - **{apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results}** - interpret and use bearings - apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; **{use vectors to construct geometric arguments and proofs}**	- make and test conjectures about the generalisations that underlie patterns and relationships; look for proofs or counter-examples; begin to use algebra to support and construct arguments **{and proofs}** - deduce expressions to calculate the n^{th} term of linear **{and quadratic}** sequences - solve two simultaneous equations in two variables (linear/linear **{or linear/quadratic})** algebraically; find approximate solutions using a graph - solve linear inequalities in one **{or two}** variable{s}, **{and quadratic inequalities in one variable};** represent the solution set on a number line, **{using set notation and on a graph}**
Connections to Previous National Curriculum Content in KS3 (Statutory)	- use scale factors, scale diagrams and maps - express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1 - use ratio notation, including reduction to simplest form - divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio - understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction - relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions - solve problems involving direct and inverse proportion, including graphical and algebraic representations - use compound units such as speed, unit pricing and density to solve problem	- apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs - understand and use angle properties - reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language - solve spatial problems, applying angle properties, Pythagoras' theorem and trigonometry in right-angled triangles	- understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors - simplify and manipulate algebraic expressions to maintain equivalence - use algebraic methods to solve linear equations in one variable (including forms that require rearrangement) - find approximate solutions of simultaneous equations - generate terms of a sequence from either a term-to-term or a position-to-term rule - recognise arithmetic sequences and find the nth term - interpret mathematical relationships both algebraically and graphically
Assessment	White Rose Maths skills checks at the end of each unit (3 during this period)		
Homework	Sparx Maths online homework		
Cultural Capital			
Literacy	Mathematical key terms/vocabulary for each unit.	Correct terminology used when answering questions.	Read and understand written questions.
CIAG	Film Maker - https://www.youtube.com/watch?v=C7tQW5ieGHg		

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Spring 2 – Revision and Communication – These units are suggested ones only. It is up to the class teacher to use this time appropriately for targeted revision for their class based on QLA analysis from mock exam data and classroom assessment			
Knowledge	***Transforming and Constructing (2 weeks)***	***Listing and Describing (2 weeks)***	***Show that (2 weeks)***
Rationale	Students revise and extend their learning from Key Stage 3, exploring all the transformations and constructions, relating these to symmetry and properties of shapes when appropriate. There is an emphasis on describing as well as performing transformations as using the language promotes deeper thinking and understanding. Higher tier students extend their learning to explore the idea of invariance and look at trigonometric graphs as a vehicle for exploring graph transformations.	This block is another vehicle for revision as the examinations draw closer. Students look at organisation of information, with Higher tier students extending this to include the product rule for counting. Links are made to probability and other aspects of Data Handling such as describing and comparing distributions and scatter diagrams. Plans and elevations are also revised. You can adapt the exact content to suit the needs of your class.	This is another block designed to be adapted to suit the needs of your class. Examples of communication in various areas of mathematics are provided in order to highlight gaps in knowledge that need addressing in the run up to the examinations. "Show that" is used to encourage students to communicate in a clear mathematical fashion, and this skill should be transferred to their writing of solutions to any type of question.
National Curriculum Content Covered (Bold indicates Higher GCSE content)	• describe translations as 2D vectors • reason deductively in geometry, number and algebra, including using geometrical constructions • interpret and use fractional **{and negative}** scale factors for enlargements **• {describe the changes and invariance achieved by combinations of rotations, reflections and translations}** • recognise, sketch and interpret graphs of **{the trigonometric functions (with arguments in degrees) for angles of any size}** **• {sketch translations and reflections of the graph of a given function}**	• explore what can and cannot be inferred in statistical and probabilistic settings, and express their arguments formally • calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions **• {calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams}** • apply systematic listing strategies, **{including use of the product rule for counting}** • construct and interpret plans and elevations of 3D shapes	• know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments **{and proofs}** • apply the concepts of congruence and similarity • make and use connections between different parts of mathematics to solve problems **• {change recurring decimals into their corresponding fractions and vice versa}** • apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; **{use vectors to construct geometric arguments and proofs}**
Connections to Previous National Curriculum Content in KS3 (Statutory)	Applicable depending on the topics covered	Applicable depending on the topics covered	Applicable depending on the topics covered
Assessment	White Rose Maths skills checks at the end of each unit (3 during this period)		
Homework	Sparx Maths online homework		
Cultural Capital			
Literacy	Mathematical key terms/vocabulary for each unit. Correct terminology used when answering questions. Read and understand written questions.		
CIAG	Climate Scientist - https://youtu.be/HZND8Fas8Uw		