



Department Mathematics

Program of Study: Key stage 3 to Key stage 5

Prospect School Mathematics Curriculum Intent

It is our duty to inspire young people to see the true beauty of mathematics in the wider world by bringing mathematics alive, thereby making it exciting, relevant and easy

This vision is underpinned by our **core principles** of Aspire, Believe, Achieve, which builds on the aims of the National Curriculum to deliver opportunity and development for all. At Prospect School we believe:

1. Everyone can be a mathematician; students are able to experience a personal and inclusive pathway
2. We have a commitment to developing inquisitive minds, continually questioning, strengthening and extending students conceptual knowledge
3. Students should relish and enjoy the challenge and exploration of the mathematical world
4. Mathematics is everywhere – it is a universal language
5. Students celebrate and explore different approaches,
6. Mathematics is a creative discipline; the answer is only the start!

A Prospect student will, therefore, develop the following **characteristics**:

1. Be inquisitive
2. Be a resilient problem solver - have the confidence to try and try again
3. Make connections and find patterns, within mathematics and across the entire curriculum
4. Be open to different approaches, recognise the strengths and weaknesses of these and how these change in different situations
5. Have a sense of accomplishment and pride - find satisfaction in solutions

6. Be fluent and aim for complete mastery
7. Be confident mathematical communicators; explain, justify and reason
8. Appreciate both the relevance of maths and its abstract beauty

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history’s most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Key Concepts

Pattern	Dimension	Quantity	Uncertainty	Shape	Change
Pattern is seen as a wide-ranging concept that covers patterns encountered all around us, such as those in musical forms, nature, traffic patterns, etc. It is argued that our ability to recognize, interpret, and create patterns is the key to dealing with the world around us.	Dimension includes “big ideas” related to one, two, and three dimensions of “things” (using spatial and numerical descriptions), projections, lengths, perimeters, planes, surfaces, location, etc. Facility with each dimension requires a sense of “benchmarks” and estimation, direct measurement and derived measurement skills.	Quantity is described as an outgrowth of people’s need to quantify the world around us, using attributes such as: length, area, and volume of rivers or land masses; temperature, humidity, and pressure of our atmosphere; populations and growth rates of species; motions of tides; revenues or profits of companies, etc.	Uncertainty covers “big ideas” related to probability, subjective probability, and relevant statistical methods. Few things in the world are 100% certain; therefore the ability to attach a number that represents the likelihood of an instance is a valuable tool whether it has to do with the weather, the stock-market, or the decision to board a plane. It also covers “big ideas” such as variability, sampling, error, or prediction, and related statistical topics such as data collection, data displays, and graphs.	Shape is a category describing real images and entities that can be visualized (e.g., houses and buildings, designs in art and craft, safety signs, packaging, snowflakes, knots, crystals, shadows and plants), as well as highly abstract “things” greater than three dimensions.	Change describes the mathematics of how the individual organisms grow, populations vary, prices fluctuate, objects travelling speed up and slow down. Change and rates of change help provide a narration of the world as time marches on. Additive, multiplicative, exponential patterns of change can characterize steady trends; periodic changes suggest cycles and irregular change patterns connect with chaos theory

Key Themes

Number	Algebra	Ratio, proportion and rates of change	Geometry and measures	Probability	Statistics
<p>Pupils will be taught:</p> <ul style="list-style-type: none"> • Place value • Positive and negative integers • Number facts e.g. Primes • Four operations • Inverse operations • Powers and roots • Standard form • Fractions, decimals and percentages • use standard units of mass, length, time, money and other measures • round numbers • use approximation • use a calculator and other technologies • appreciate the infinite nature of the sets of integers 	<p>Pupils will be taught:</p> <ul style="list-style-type: none"> • Algebraic notation • Algebraic language • brackets • substitute • simplify and manipulate algebraic expressions • Rearrange formulae • Form algebraic expressions • solve linear equations • solve quadratic equations • work with coordinates in all four quadrants • Graphs e.g. linear, quadratic • Interpret graphs • Parallel and perpendicular lines • Sequences • Index laws • Simultaneous equations 	<p>Pupils will be taught:</p> <ul style="list-style-type: none"> • Conversions of units • Scale factors • express one quantity as a fraction of another • use ratio notation • divide into a ratio • proportion • percentage change • direct and inverse proportion • speed, unit pricing and density • Compound (and simple) interest • Growth and decay 	<p>Pupils will be taught:</p> <ul style="list-style-type: none"> • 2D shapes • Perimeter • Area • 3D shapes • Surface Area • Volume • Construction • Transformations • Congruency and similarity • Angle geometry • Pythagoras' Theorem • Trigonometric ratios • Trigonometry with non-right-angled triangles • Vectors • Circle theorems 	<p>Pupils will be taught:</p> <ul style="list-style-type: none"> • Probability language • Sample space • Theoretical probability • Experimental probability • Relative Frequency • Venn diagrams and sets • Methods of presenting probability events e.g. tree diagrams • Conditional probability 	<p>Pupils will be taught:</p> <ul style="list-style-type: none"> • Types of data • Data collection methods • Data analysis e.g. mean • Data presentation e.g. tables and graphs • Analyse results and interpret data in relation to real work contexts

Key Stage 3

YEAR: 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Key Content: Number and Algebra							Key Content: Number and Algebra							Key Content: Geometry and measures						Key Content: Number and algebra Statistics						Key Content: Geometry and measures Number and Algebra						Key Content: Geometry and measures Number and Algebra						
Big Question: Investigating the number system Pattern sniffing							Big Question: Solving calculation problems Generalising arithmetic							Big Question: Exploring shape Reasoning and measures						Big Question: Discovering equivalence Reasoning with fractions Solving number problems Investigating statistics						Big Question: Visualising shape Exploring change Proportional reasoning						Big Question: Proportional reasoning Describing position Measuring and estimating						
Key Concepts							Key Concepts							Key Concepts						Key Concepts						Key Concepts						Key Concepts						
Key Themes							Key Themes							Key Themes						Key Themes						Key Themes						Key Themes						
Assessment Method: Baseline assessment Hegarty							Assessment Method: Exam Hegarty							Assessment Method: Unit assessment Hegarty						Assessment Method: Unit assessment Hegarty						Assessment Method: Unit assessment Hegarty						Assessment Method: Hegarty Exam						

YEAR: 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Key Content: Number and Algebra							Key Content: Number and Algebra							Key Content: Geometry and measures						Key Content: Number and algebra Statistics						Key Content: Geometry and measures Number and Algebra						Key Content: Geometry and measures Number and Algebra						
Big Question: Investigating the number system Pattern sniffing							Big Question: Solving calculation problems Generalising arithmetic							Big Question: Exploring shape Reasoning and measures						Big Question: Discovering equivalence Reasoning with fractions Solving number problems Investigating statistics						Big Question: Visualising shape Exploring change Proportional reasoning						Big Question: Proportional reasoning Describing position Measuring and estimating						
Key Concepts							Key Concepts							Key Concepts						Key Concepts						Key Concepts						Key Concepts						
Key Themes							Key Themes							Key Themes						Key Themes						Key Themes						Key Themes						
Assessment Method: Baseline assessment Hegarty							Assessment Method: Exam Hegarty							Assessment Method: Unit assessment Hegarty						Assessment Method: Unit assessment Hegarty						Assessment Method: Unit assessment Hegarty						Assessment Method: Hegarty Exam						

YEAR: 9

Support

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Key Content Number & Geometry							Key Content Number & Algebra								Key Content Ratio and Proportion & Algebra					Key Content Algebra & Geometry					Key Content Ratio and Proportion & Algebra					Key Content Geometry & Probability and statistics								
Focus Calculations Shape							Focus Calculations Simplifying								Focus FDP Sequences					Focus Solving linear equations Area and Volume					Focus Scaling Graphing					Focus Visualising Probability Statistics								
Key Concepts							Key Concepts								Key Concepts					Key Concepts					Key Concepts					Key Concepts								
Key Themes							Key Themes								Key Themes					Key Themes					Key Themes					Key Themes								
Assessment Method: Baseline assessment Hegarty							Assessment Method: Exam Hegarty								Assessment Method: Unit assessment Hegarty					Assessment Method: Unit assessment Hegarty					Assessment Method: Unit assessment Hegarty					Assessment Method: Hegarty Exam								

Core

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Key Content Number & Geometry							Key Content Geometry, Algebra & Ratio and Proportion								Key Content Ratio and Proportion, Number & Algebra					Key Content Geometry & Ratio and Proportion					Key Content Algebra & Geometry					Key Content Probability & Statistics								
Focus Calculations Shape							Focus Shape Simplifying FDP								Focus FDP Sequences Solving					Focus Measuring Scaling					Focus Graphing Visualising					Focus								
Key Concepts							Key Concepts								Key Concepts					Key Concepts					Key Concepts					Key Concepts								
Key Themes							Key Themes								Key Themes					Key Themes					Key Themes					Key Themes								
Assessment Method: Baseline assessment Hegarty							Assessment Method: Exam Hegarty								Assessment Method: Unit assessment Hegarty					Assessment Method: Unit assessment Hegarty					Assessment Method: Unit assessment Hegarty					Assessment Method: Hegarty Exam								

Extension

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Key Content Number, Geometry & Algebra							Key Content Algebra, Ratio and Proportion							Key Content Geometry					Key Content Algebra				Key Content Algebra					Key Content Probability & Statistics										
Focus Calculations Visualising Simplifying							Focus Simplifying and solving Scaling Sequences							Focus Measuring Proving					Focus Graphing				Focus Solving					Focus										
Key Concepts							Key Concepts							Key Concepts					Key Concepts				Key Concepts					Key Concepts										
Key Themes							Key Themes							Key Themes					Key Themes				Key Themes					Key Themes										
Assessment Method: Baseline assessment Hegarty							Assessment Method: Exam Hegarty							Assessment Method: Unit assessment Hegarty					Assessment Method: Unit assessment Hegarty				Assessment Method: Unit assessment Hegarty					Assessment Method: Hegarty Exam										

Key Stage 4

YEAR: 10

Foundation

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Number, factors and Multiples Decimals and rounding Fractions Basic Algebra							Sequences Co-ordinates and linear graphs Ratio and Proportion Percentages Perimeter and Area							Circumference and Area Volume Collecting and representing data						Statistical measures Probability Indices Standard form Measures						Angles Properties of polygons 2D representation of 3D shapes Sketching graphs						Real life graphs Direct and inverse proportion Pythagoras' theorem Trigonometry						
Key Concepts							Key Concepts							Key Concepts						Key Concepts						Key Concepts						Key Concepts						
Key Themes							Key Themes							Key Themes						Key Themes						Key Themes						Key Themes						
Assessment Method: Topic Tests							Assessment Method: Topic Tests							Assessment Method: Topic Tests						Assessment Method: Topic Tests						Assessment Method: Topic Tests Mock exam						Assessment Method: Topic Tests						

Higher

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Number, factors and Multiples Decimals and rounding Fractions Basic Algebra Indices Equations Sequences Co-ordinates and linear graphs							Co-ordinates and linear graphs Ratio and Proportion Percentages Perimeter and Area							Circumference and Area Volume Collecting and representing data Statistical measures						Probability Surds Standard form Measures						Angles, scale diagrams and bearings Properties of polygons 2D representation of 3D shapes Sketching graphs						Real life graphs Direct and inverse proportion Pythagoras' theorem Trigonometry						
Key Concepts							Key Concepts							Key Concepts						Key Concepts						Key Concepts						Key Concepts						
Key Themes							Key Themes							Key Themes						Key Themes						Key Themes						Key Themes						
Assessment Method: Topic Tests							Assessment Method: Topic Tests							Assessment Method: Topic Tests						Assessment Method: Topic Tests						Assessment Method: Topic Tests Mock Exam						Assessment Method: Topic Tests						

Key Stage 5

YEAR: 12

CORE MATHS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Topic 1 – Social Media Topic 2 – Society							Topic 2 – Society Topic 3 - Sport							Topic 4 – Clothing Industry							Topic 5 - Financs						Topic 6 – Creative arts						Topic 7 - Health					
Key Themes							Key Themes							Key Themes							Key Themes						Key Themes						Key Themes					
Assessment Method: Unit assessment							Assessment Method: Unit assessment							Assessment Method: Unit assessment							Assessment Method: Unit assessment						Assessment Method: Unit assessment Mock exam						Assessment Method: Unit assessment					

A LEVEL MATHS

Teacher 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39			
Algebra and functions							Vectors in 2D Co-ordinate geometry							Co-ordinate geometry Trigonometry							Trigonometry Modelling in mechanics Equations of motion							Forces and motion							Algebraic methods Trigonometry						
Key Themes							Key Themes							Key Themes							Key Themes							Key Themes							Key Themes						
Assessment Method: Topic tests							Assessment Method: Topic tests							Assessment Method: Topic tests							Assessment Method: Topic tests							Assessment Method: Topic tests Mock exam							Assessment Method: Topic tests						

Teacher 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39			
Further algebra Differentiation							Differentiation Integration Data collection							Data collection Statistical representation and interpretation							Statistical representation and interpretation Probability Statistical distributions Hypothesis testing							Hypothesis testing							Functions and graphs Sequences and series						
Key Themes							Key Themes							Key Themes							Key Themes							Key Themes							Key Themes						
Assessment Method: Topic tests							Assessment Method: Topic tests							Assessment Method: Topic tests							Assessment Method: Topic tests							Assessment Method: Topic tests Mock exam							Assessment Method: Topic tests						

FURTHER MATHS A LEVEL

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39			
Decision maths: Algorithms Graphs and Networks Algorithms on Graphs							Core Pure 1: Complex numbers Argand diagrams Series							Core Pure 1: Roots of polynomials Volumes of revolution Matrices							Core Pure 1: Linear transformations Proof by induction Vectors							Core Pure 1: Vectors Mechanics: Momentum and Impulse Work, power and energy							Mechanics: Momentum and Impulse Work, power and energy						
Key Themes							Key Themes							Key Themes							Key Themes							Key Themes							Key Themes						
Assessment Method: Topic tests							Assessment Method: Topic tests							Assessment Method: Topic tests							Assessment Method: Topic tests							Assessment Method: Topic tests Mock exam							Assessment Method: Topic tests						

FURTHER MATHS A LEVEL

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Decision Maths: Route inspection Linear programming Simplex algorithm							Decision Maths: Critical path analysis							Core Pure 2: Series Methods in calculus Volumes of revolution Polar co-ordinates							Core Pure 2: Hyperbolic functions Methods in differential equations Modelling with differential equations																	
Core Pure 2: Complex numbers							Mechanics: Elastic strings and springs Elastic collisions in one dimension Elastic collisions in two dimensions																															
Key Themes							Key Themes							Key Themes							Key Themes																	
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Assessment Method: Topic tests Mock exam							Assessment Method: Topic tests							Assessment Method: Topic tests Mock exam							Assessment Method: Topic tests																	