The Abbey School Mathematics Subject Summary

Year 7

In year 7, pupils will consolidate their numerical and mathematical capability from Key Stage 2 and secure their understanding across varied applications. This is to ensure the best possible start for all pupils, reducing the school entry gap in knowledge of basic mathematical facts, concepts and vocabulary. We have high ambitions for all students and this expectation begins from the very first term in year 7.

Some new and unfamiliar topics will be introduced to students, with the Abbey Learning Journey theme of engagement and enjoyment spanning through the year, to begin developing confident and capable mathematicians. We consistently encourage students to take pride in their work and this stems from a well-structured and clear expectation at all levels, including work presentation, classroom engagement and cohesion across their subject lessons.

The Year 7 curriculum has been aligned to allow for a common sequence of learning for all pupils with an accessible knowledge base across the entire cohort. The use of common Big Questions offers cohesion across different teaching groups with the flexibility to promote stretch and challenge within topics, whilst ensuring secure knowledge of foundation concepts. The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress will be based on the security of pupils' understanding and their readiness to progress to the next stage.
The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning, and competence in solving increasingly sophisticated problems. Therefore, pupils will complete unit based and mixed assessments to ensure a consistent recapping of knowledge and encouragement of these connections. Planned consolidation time is built into the curriculum.

More time has been dedicated at the start of term 1 to basic numeracy, measuring and drawing skills to assess the gaps in learning due to COVID-19 and the introduction of mixed ability teaching groups. The content of other terms has been adapted to accommodate this time.

Term	Topic/ Theme	Concept	Big Questions
1 and 2	Introduction lessons.	Rolling numbers, Practical Skills, Calculator Skills	*What facts and skills do I need to begin my journey in Maths in The Abbey*
	Number skills	Addition and subtraction, Multiplication, Division, Money and time, Negative numbers, Factors, Multiples, Primes, Square Numbers,	*How do you calculate accurately with positive and negative numbers?* *What other types of numbers can I calculate with?*
	Expressions, functions and formulae	Functions, Simplifying expressions, Writing expression, Substituting into formulae, Writing formulae,	*What is algebra?*
	Displaying and analysing data	Displaying data, Grouping data, Line graphs and bar charts Mode, median, range, Averages and comparing data	*How can we represent the world we live in with graphs and charts?* *What is meant by 'average'?*
3 and 4	Decimals and measures	Decimals and rounding, Length, mass and capacity, Scales and measures, Working with decimals, Perimeter, Area, More units of measure,	*How do we calculate with decimals?* *How do we measure the size of a 2D shape?*
	Fractions	Comparing and simplifying fractions, Working with fractions, Fractions and decimals, Understanding percentages, Percentages of amounts	*What is afraction and how are they used?* *What is a percentage and how can we compare them to fractions and decimals?*
	Probability	The language of probability, Calculating probability, More probability calculations, Experimental probability, Expected outcomes	*What is probability and how does it involve moth?*
5 and 6	Ratio and proportion	Writing ratios, Using ratio, Direct proportion, Ratios, proportions and fractions, Proportions and percentages	*What is a ratio and how are they used?* *What is proportion and how is it useful?*
	Lines and angles	Measuring and drawing angles, Lines, angles and triangles, Drawing triangles accurately, Calculating angles, Angles in a triangle, Quadrilaterals	*What are the basic Geometry facts you need to know?*
	Sequences and graphs	Sequences, Position-to-term rules, Coordinates and midpoints, Straight-line graphs	*How can you describe a sequence?* *How do you plot a straight line graph?*
	Transformations	Congruency and enlargements, Symmetry, Reflection, Rotation, Translations and combined transformations	*How are shapes transformed?*

Year Group	Scheme of Work Summary
Year 8	In year 8, pupils will consolidate their numerical and mathematical capability from year 7 and extend their understanding across these topic areas. They will also be introduced to other new areas of study. The KS3 curriculum is based around the understanding of core concepts, sequenced through years 7 and 8 with regular opportunities to rehearse and apply the important mathematical facts and methods. This is extended with new learning or applications when secure. The Abbey Learning Journey theme of working with others really begins to become embedded in year 8 as pupils begin to feel more confident sharing thoughts, methodology and exploring the various pathways and preferred approaches to particular problems. As with year 7, the Year 8 curriculum has been aligned to allow for a common sequence of learning for all pupils with an accessible knowledge base across the entire cohort. This too, gives flexibility to promote stretch and challenge within topics, whilst ensuring secure knowledge of foundation concepts. The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress will be based on the security of pupils' understanding and their readiness to progress to the next stage. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. Therefore, pupils will complete unit based and mixed assessments to ensure a consistent recapping of knowledge and encouragement of these connections. Planned consolidation time is built into the curriculum.

Term	Topic/ Theme	Concept	Big Questions
1 and 2	Number	Calculations, Divisibility and division, Calculating with negative integers, Powers and roots, Multiples and factors, Planned consolidation	*How do you calculate accurately with positive and negative numbers? What other types of numbers can* I *calculate with?*
	Area and volume	Area of a triangle, parallelogram and trapezium, Area of a circle, Volume of cubes and cuboids, 3D solids, Surface area, Measures, Planned consolidation	*How do the measure the size of a 20 shape or 30 solid?*
	Statistics, graphs and charts	Pie charts, Using tables, Stem and leaf diagrams, Comparing data, Scatter graphs, Misleading graphs, Planned consolidation	*How do we display and interpret data with graphs and charts*
	Expressions and equations	Algebraic powers, Expressions and brackets, Factorising expressions, One-step equations, Two-step equations, Planned consolidation	*How do* I *simplify algebra? How do you solve an equation?*
3 and 4	Real-life graphs; Straight-line graphs	Conversion graphs, Distance-time graphs, Line graphs, Real-life graphs, Curved graphs Sequences, Straight line graphs, Direct proportion on graphs, Planned consolidation	*How can we represent real fife in* o *graph? What are the different ways of platting a graph?*
	Decimals and ratio	Ordering decimals and rounding, Place Value Calculations, Calculations with decimals, Ratio and proportion with decimals, Planned consolidation The language of probability, Calculating probability, Experimental probability, Expected outcomes, Planned consolidation	*What is place value and why is it important? How do we calculate with decimals and ratio?*
	Lines and angles		*How can we calculate angles without measuring?*
5 and 6	Calculating with fractions	Ordering fractions, Adding, subtracting, Multiplying, dividing, **Mixed** numbers, Planned consolidation	*How do you calculate with fractions?*
	Percentages, decimals and fractions	Fractions & decimals, Equivalent proportions, Percentages of amounts, Planned consolidation	*How and why do* I *convert between any fraction, decimal and percentage? What is* o *multiplier and how do they work?*

Year 9

In year 9, pupils will consolidate their numerical and mathematical capability from Key Stage 3 and extend their understanding across all topic areas. Each topic is scheduled to take approximately 15-24 hours (4-6 weeks) so across 6 terms, 6-7 topics will be completed. The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress will be based on the security of pupils' understanding and their readiness to progress to the next stage.

Although the GCSE curriculum begins in Year 9, the content is the found in both the KS3 and KS4 curriculum specifications. It is an opportunity to secure the core aspects from KS3, but applied as KS4 curriculum content. We also explore the more advanced areas of the KS3 curriculum we have not covered in large detail, now that pupils are more secure in their foundation knowledge. This supports the students in their Abbey Learning Journey, with resilience and persistence required as pupils encounter unfamiliar contexts and challenge the depth of their understanding so far.

Pupils will follow either the higher or foundation tier. In year 9, both tiers align and follow a similar content structure to allow for a common sequence with common Big Questions and expand a broad knowledge base across the entire cohort. This offers rigour to explore the full breadth of the National Curriculum, whilst ensuring secure knowledge of foundation concepts. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. Therefore, pupils will complete unit based assessment, and mixed assessments in the form of past papers to ensure a consistent recapping of knowledge and encouragement of these connections.

Exam board: Edexcel - Foundation Tier

Term	Topic/ Theme	Concept	Big Questions
1	Number, Decimals, Rounding and Roots	Written number methods revised and extended. Numbers, powers, decimals, HCF, LCM and rounding.	*How do you calculate with ANY number?* *How and why do we estimate?* *How do you use primes and powers?*
2	Basic algebraic manipulation	Expressions, substituting into simple formulae, expanding and factorising	*How can we use and interpret expressions, equations and sequences?* *What is a formulae and how do we use them in Science?*
3	Data Representation and Averages	Drawing and interpreting graphs, tables and charts Averages and range, sampling, collecting data, analysing data	*How can you extend your knowledge of displaying data from year 7 and 8?* *How can you use your knowledge of averages for tables and charts?*
4	Fractions and Percentages	Problem solving with fractions and percentages.	*How do we perform the 4 operations withfractions?* *How can you use and apply your knowledge of percentages to the real world?*
5	Equations, inequalities and sequences	Solving equations and inequalities. Arithmetic sequence notation and context.	*How can we use and interpret expressions, equations and sequences?*
6	Angles, polygons and parallel lines	Calculating angles with reasoning including geometry, parallel lines and polygons.	*How do you calculate any angle and justify your answer?*

Higher Tier

Term	**Topic/ Theme**	**Concept**	Big Questions
1	Number, Decimals, Rounding and Roots	Written number methods revised and extended. Numbers, powers, decimals, HCF, LCM and rounding. Reciprocals, indices, surds and standard form	*How do you calculate with ANY number?* *How and why do we estimate?* *How do you use primes and powers?*
2	Algebraic manipulation	Expressions, substituting into simple formulae, expanding and factorising, equations, sequences and inequalities, simple proof.	*How can we solve ANY equation?* *How do I use a formula?* *How can I find the100th number of any linear sequence?* *How can we expand and factorise quadratic expressions?*
3	Data Representation	Averages and range, collecting data, representing data	*How can you extend your knowledge of displaying data from year 7 and 8?* *How can you use your knowledge of averages for tables and charts?*
4	Fractions and Percentages	Fractions, percentages, ratio and proportion	*How do we perform the 4 operations withfractions?* *How can you use and apply your knowledge of percentages to the real world?* *How can your ratio knowledge from year 7 and 8 help you solve problems?*
5	Graphs	Real-life and algebraic linear graphs, quadratic and cubic graphs, the equation of a circle, plus rates of change and area under graphs made from straight lines	*How do you plot, use and interpret a linear graph?* *How do you plot, use and interpret a non-linear graph?*
6	Polygons and Trigonometry	Angles, polygons, parallel lines; Right-angled triangles: Pythagoras and trigonometry application.	*How do you calculate any angle and justify your answer?* *How do we co/cu/ate sides and angles from right angled triangles?*

Year 10

In year 10, pupils will continue to consolidate their numerical and mathematical capability from Key Stage 3 and extend their understanding across all topic areas. They will develop their mathematical knowledge through repeated practice, consolidation, knowledge links, and extend into solving problems and evaluating the outcomes. Each topic is scheduled to take approximately 15-24 hours (4-6 weeks) so across 6 terms, 6-7 topics will be completed. The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress will be based on the security of pupils' understanding and their readiness to progress to the next stage.

Pupils will follow either the higher or foundation tier. In year 10, both tiers begin to develop further into their own content structure, diverging into specific knowledge and problem exploration. This allows flexibility to promote extension and challenge within specific topics, whilst ensuring secure knowledge of underlying concepts. Knowledge Organisers highlight the core areas, recognisable from KS3 but applied to GCSE contexts and interwoven with other skills and knowledge.

Pupils will be assessed every term and will complete unit-based assessment, and mixed assessments in the form of past papers to ensure a consistent recapping of knowledge and encouragement of these connections.

The Abbey Journey theme is supported as many pupils begin to consider their next steps their place in the wider world. Using organically placed references to finance, careers and wider mathematical applications, pupils can begin to strengthen their understanding within their own communities and wider avenues.

Exam board: Edexcel - Foundation Tier

Term	Topic/ Theme	Concept	Big Questions
1	Perimeter, area and volume	Perimeter, area and volume problems with compound shapes and unit conversions.	*What are the area formulae that you need to know?* *How does calculating the surface area and volume of a prism relate to your area knowledge?*
2	Algebraic linear graphs	Drawing and interpretation of algebraic and linear graphs.	*How do you plot, use and interpret a linear graph?* *How can we represent real life in a graph?*
3	Ratio and Proportion	Ratio problem solving including simplifying ratios, dividing quantities, unitary ratios and multiplicative relationships. Direct and inverse proportion.	*How can I use ratio knowledge to solve practical, real life problems?* *How does understanding proportion help us to solve problems?*
4	Multiplicative reasoning Right Angled Triangles	Multiplicative relationships. Pythagoras and trigonometry application	*How are multipliers used in real life?* *What does it mean for a unit to be 'compound'?* *What does direct and indirect proportion look like on a graph and what does it mean?* *How do we calculate sides and angles from right angled triangles?*
5	Probability	Experimental and theoretical probabilities with Venn diagrams and Tree diagrams.	*How do I describe and calculate probability for events?* *How can we use diagrams to help us solve probability problems?*
6	Transformations Constructions and Loci	Transformations Plans and elevations, Constructions, Loci and Bearings.	*What are the 4 types of transformation and how do we describe them?* *How else can we use vectors?* *How do we describe and draw 30 solids?* *How do we use mathematical tools to draw accurately?*

Higher Tier

Term	Topic/ Theme	Concept	Big Questions
1	Area and Volume	Perimeter, area and volume, plane shapes and prisms, circles, cylinders, spheres, cones; Accuracy and bounds	*What are the area formulae that you need to know?* *How does calculating the surface area and volume of a prism relate to your area knowledge?* *How do the properties of circles help us measure objects with curved surfaces?*
2	Quadratic Equations and Inequalities	Solving quadratics algebraically and graphically, solving linear and quadratic simultaneous equations and inequalities.	*What does it mean to 'solve a quadratic'?* *How do we use algebraic manipulation to solve simultaneous equations?* *How does solving inequalities differ from solving equations?*
3	Probability Similarity and congruence	Experimental and theoretical probabilities with Venn diagrams and Tree diagrams. Similarity and congruence in 2D and 3D, including formal proof.	*How do I describe and calculate probability for events?* *How can we use diagrams to help us solve probability problems?* *How do congruence and similarity differ?* *How does the scale factor affect the area and volume of similar shapes?*

4	Multiplicative reasoning	Direct and inverse proportion, relating to graph form for direct, compound measures, repeated proportional change.	*How are multipliers used in real life?* *What does it mean for a unit to be 'compound'?* *What does direct and indirect proportion look like on a graph and what does it mean?*
5	Statistics	Statistics and sampling, cumulative frequency and histograms	*How do we visually represent the spread of data?* *How do biologists predict the number of tigers left in the world?*
6	Transformations and constructions	Transformations; Constructions: triangles, nets, plan and elevation, loci, scale drawings and bearings.	*What are the 4 types of transformation and how do we describe them?* *How do we describe and draw 30 solids? How do we use mathematical tools to draw accurately?*

Year 11

In year 11, pupils will complete the final topics of the GCSE course, consolidating their numerical and mathematical capability and extending their understanding across all topic areas. They will develop their mathematical knowledge through repeated practice, consolidation, knowledge links, and extend into solving problems and evaluating the outcomes. Each topic is scheduled to take approximately 15-24 hours (4-6 weeks) so across 4 terms, 6-7 topics will be completed. The expectation is that most pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress will be based on the security of pupils' understanding and their readiness to progress to the next stage.

Pupils will follow either the higher or foundation tier and in year 11, continue to develop into their own content structure, diverging into specific knowledge and problem exploration. This allows flexibility to extend and challenge within specific topics, whilst ensuring secure knowledge of underlying concepts. Pupils will be assessed every term, with unit based assessment, and mixed assessments in the form of past papers to ensure a consistent recapping of knowledge and encouragement of these connections.

The Abbey Learning Journey theme is further supported as pupils adjust fully to the idea of public examinations and the opportunity to highlight their learning and progress in Mathematics. We encourage students to take responsibility for their own study, through supportive strategies and reassurance and in turn, we witness the final transition through to independent young people with a well-rounded sense of their next steps and a sense of leadership of their own journey.

Exam board: Edexcel - Foundation Tier

Term	Topic/ Theme	Concept	Big Questions
1	Fractions, Standard form and Indices	Mixed fractions, reciprocals, standard form, zero and negative indices	*How can we apply fraction knowledge to mixed numbers?* *What is standard form and how does it relate to index notation?*
	Right Angled Triangles•	Pythagoras and trigonometry application.	*How do we calculate sides and angles from right angled triangles?*
2	Quadratic Equations	Quadratic equations and quadratic graphs	*What existing knowledge do revisit to extend my Algebra skills?* *How do I 'expand' in algebra and use this to form quadratic expressions?* *What does it mean to 'solve a quadratic'? What is the best way?*
	Transformations	Transformations	*What are the 4 types of transformation and how do we describe them?* *How else can we use vectors?*
3	Perimeter, area and volume 2	Circles, cylinders, cones and spheres	*What existing knowledge do revisit to extend my Geometry skills?* *What are the circle formulae and how can we apply them to other shapes?* *How can you use your algebra knowledge to apply the formulae for canes, pyramids, and spheres?*
	Congruence, similarity•	Congruence, similarity and vectors	*How do congruence and similarity differ?*
4	Graphs and Equations	Rearranging equations, graphs of cubic and reciprocal functions and simultaneous equations	*What are the different graphs I can identify and plot?* *How do I solve equations, including simultaneous equations?* *How do I prove a mathematical statement?*
	Constructions and Loci*	Plans and elevations, Constructions, Loci and Bearings.	*How do we describe and draw 30 solids?* *How do we use mathematical tools to draw accurately?*

5	Revision and Exams	Revision and Exams	
6	Revision and Exams	Revision and Exams	

Higher Tier

Term	Topic/ Theme	Concept	Big Questions
1	Advanced Trigonometry	Sine and cosine rules, *ab* sin C, trigonometry and Pythagoras' Theorem in 3D, trigonometric graphs, and accuracy and bounds.	*How do we apply trigonometry knowledge to any triangle? How can our knowledge of trigonometry help solve 3D problems? How does your knowledge of exact values support representing trigonometric functions graphically?*
2	Equations and Graphs Circle theorems	Quadratics, expanding sketching graphs, graphs of circles, cubes and quadratics, quadratic inequalities. Circle theorems.	*What methods do we have for graphing any equations, and how can they help find solutions? How can we graph an inequality?* *What are the circle theorems and haw are they applied?*
3	Manipulating algebra	Changing the subject of formulae (more complex), algebraic fractions, solving equations arising from algebraic fractions, rationalising surds, proof.	*How can we apply our knowledge of algebraic manipulation to expressions involving powers and fractions? What is afunction and how do they allow you* to *explore more advanced algebraic concepts? Why are the representations of even and an odd numbers the key* to *a great number of proofs?*
4	Congruence, similarity• Direct and indirect proportion:	Similarity and congruence in 2D and 3D, including formal proof Using statements of proportionality, reciprocal and exponential graphs, rates of change in graphs, functions, transformations of graphs.	*How do congruence and similarity differ? How does the scalefactor affect the area and volume of similar shapes* *How do I use and plot statements of proportionality? How do I use an exponential function? What can we discern from the gradient and area under different graphs?*
5	Vectors Revision and Exams	Vectors and geometric proof. Revision and Exams	*How can vectors be used* ta *solve complex geometrical problems?*
6	Vectors Revision and Exams	Vectors and geometric proof. Revision and Exams	*How can vectors be used* ta *solve complex geometrical problems?*

Year 12/13

A Level

A Level Maths will extend students' knowledge of Algebra and Geometry from GCSE and explore the ways in which Mathematics can be applied in the real world. New topics such as coordinate geometry, differentiation, and integration are highly algebraic and an excellent introduction to Maths at a higher level. Students will branch further into Core Maths with topics such as logarithms and exponentials, radian measures

and higher-level trigonometry. Mechanics and Statistics introduce students to mathematical modelling of everyday experiences, understanding how the physical world operates and how to use maths to predict what will happen in the future.

We aim to promote studying Mathematics beyond school and into higher education in a range of degree level subjects through introducing students to new concepts and exploring how Advanced Mathematics goes beyond the textbook and opens a wide range of opportunities. The Abbey Learning Journey promotes creativity, independence and lifelong learning within the sixth form, and these are all crucial traits of successful A level Maths students.