



# The Royal School

*Wolverhampton*

Curriculum 2024 - 2025

**MATHEMATICS**

&

**FURTHER MATHEMATICS**

# Curriculum 2024 - 2025 Mathematics

## Mathematics Curriculum (INTENT)

Whilst following the guidelines of the National Curriculum we aim to offer a broad based curriculum which will result in acquisition of knowledge, develop enjoyment and confidence of learning which will equip our pupils for work and leisure as active, confident and responsible members of society.

In particular we aim to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programme of study for key stage 4 is organised into apparently distinct domains, but pupils should develop and consolidate connections across mathematical ideas. They should build on learning from key stage 3 to further develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge wherever relevant in other subjects and in financial contexts.

The expectation is that the majority of pupils will move through the programme of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

Together, the mathematical content set out in the key stage 3 and key stage 4 programmes of study covers the full range of material contained in the GCSE Mathematics qualification. Wherever it is appropriate, given pupils' security of understanding and readiness to progress, pupils should be taught the full content set out in this programme of study.

## Mathematics Curriculum (IMPLEMENTATION)

In Mathematics we teach 4 lessons per week at KS3, 4 lessons per week at KS4 and 5 lessons per week at KS5. Our curriculum is structured in learning cycles. Each cycle lasts for 7 weeks and includes at least one assessment followed by a review where re-teaching or stretch and challenge opportunities, tailored to the needs of the pupils can take place. There are 5 learning cycles per year.

Each lesson follows The Royal lesson structure below:

- Date and learning question.
- Retrieval questions at the start of each lesson with answers to be self-assessed or peer assessed.
- Homework set at start of lesson.
- The learning journey shared including lesson objectives and success criteria.
- Challenge tasks set every lesson.
- Review learning objectives at end of lesson.

Our curriculum is implemented in many ways including taught lessons and extra curriculum activities such as UKMT challenges, national mathematics competitions, trips; as well as offering the opportunity to gain a GCSE further mathematics qualification during lesson 7.

### **Mathematics Curriculum (IMPACT)**

The impact of our curriculum can be evaluated in many ways using both quantitative and qualitative information indicating how ready pupils are for the next stage in their learning whether that be transition between key stages or leaving for universities, apprenticeships or work at the end of year 13.

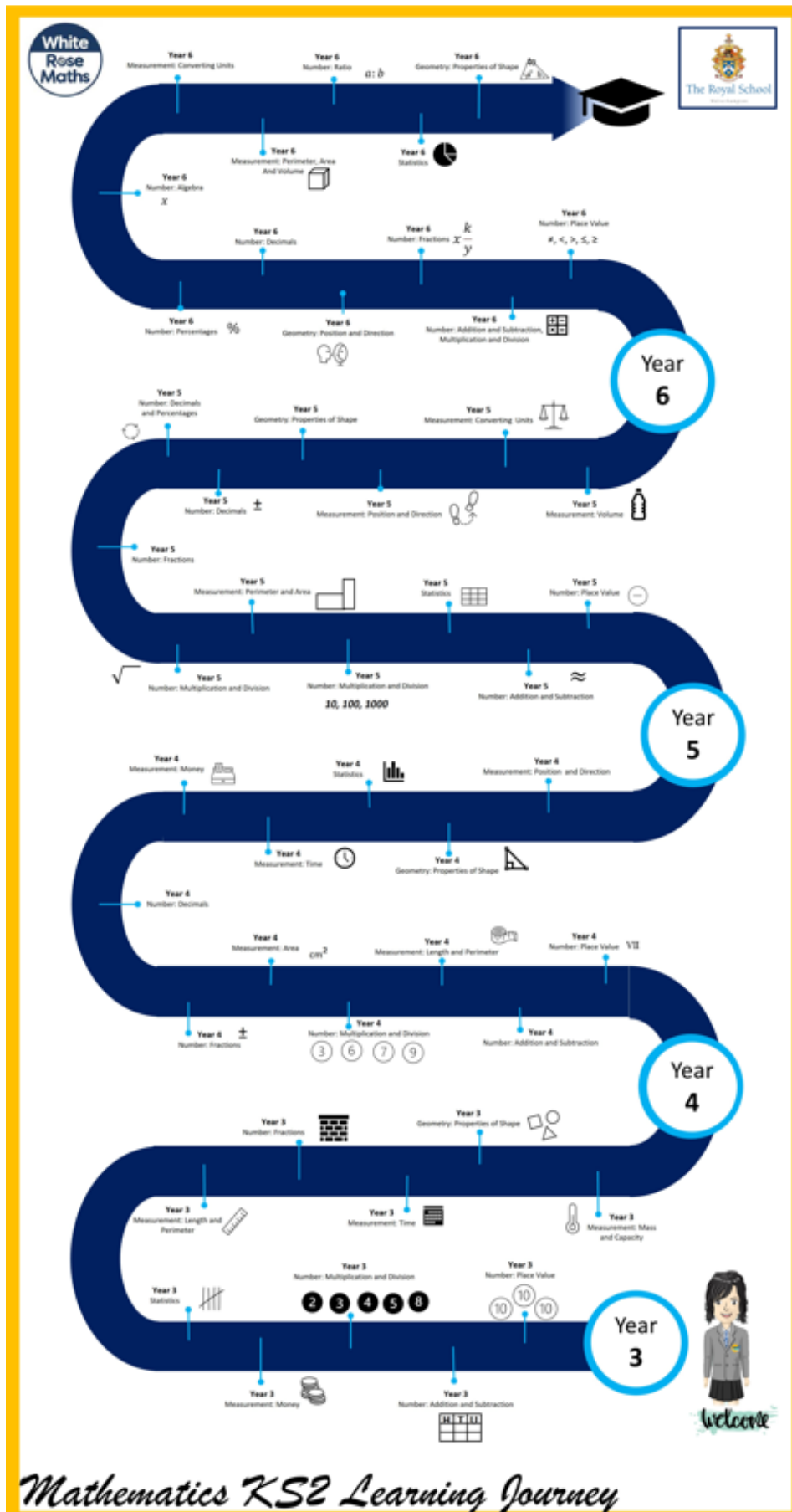
This includes an assessment of

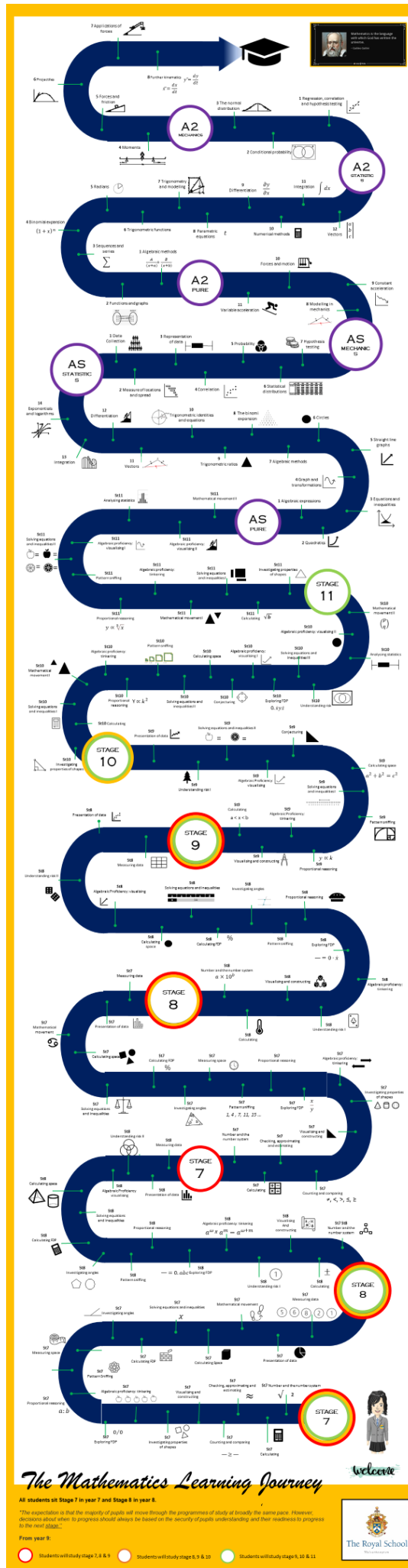
- The number of pupils achieving the national average at the end of their key stage indicating their readiness to move forward with the next stage of their learning journey.
- The number of pupils opting for Mathematics at A level
- The number of pupils opting for Further Mathematics at A Level
- The number of pupils participating extra curriculum activities

Further information that can be used to assess the impact of the curriculum includes:

- The number of pupils choosing mathematics to study at university
- The number of pupils gaining entry into their chosen career route including apprenticeships and employment with a mathematical focus.

# MATHEMATICS Learning Journey





## The Mathematics Learning Journey

All students sit Stage 7 in year 7 and Stage 8 in year 8.

\*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 should always be based on the security of pupils' understanding and their readiness to progress to the next stage.

From year 9:

- Students will study stage 7, 8 & 9
- Students will study stage 8, 9 & 10
- Students will study stage 9, 10 & 11

WELCOME



## MATHEMATICS KS3 Curriculum Mapping

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/840002/Secondary\\_national\\_curriculum\\_corrected\\_PDF.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/840002/Secondary_national_curriculum_corrected_PDF.pdf)

### The mathematics curriculum is designed in stages.

"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 should always be based on the security of pupils understanding and their readiness to progress to the next stage. *Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content.* Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on."

11-16 Pathway		
Below expected standard at end of KS2	Expected standard at end of KS2	
Stage 6	Stage 7	Year 7
Stage 7	Stage 8	Year 8
Stage 8	Stage 9	Year 9
Stage 9	Stage 10	Year 10
Stage 10 Lite	Stage 11	Year 11

### Mathematics Curriculum Map 2024-25 Overview

	Year 7 White Rose	Year 8 Kangaroo	Year 9 Kangaroo			Year 10 Kangaroo			Year 11 Kangaroo			Year 12 Edexcel	Year 13 Edexcel
LC1	Algebraic Thinking	St8	St9	St8	St7	St10	St9	St8	St11	St10 Lite / St10	St9	AS Pure	A2 Pure
													AS Stats
LC2	Place Value and Proportion	St8	St9	St8	St7	St10	St9	St8	St11	St10 Lite / St10	St9	AS Pure	A2 Pure
													AS Stats
LC3	Applications of Number and Fractional Thinking	St8	St9	St8	St7	St10	St9	St8	St11	St10 Lite / St10	St9	AS Pure	A2 Pure
													AS Stats AS Mech
LC4	Lines and Angles	St8	St9	St8	St7	St10	St9	St8	St11	St10 Lite / St10	St9	AS Pure	A2 Pure
													AS Mech
LC5	Reasoning with Number	St8	S9	St8	St7	St10	St9	St8	GCSE/BTEC exams followed by A level bridging work			A2 Pure	A level/BTEC exams followed by University bridging work

In Year 7 & Year 8, students will be placed into mixed attainment groups. Students will follow the Stage 7 scheme of work in Year 7 and then will progress onto the Stage 8 scheme of work in Year 8.

From Year 9 onwards, students will be put into sets to follow the red, amber, or green pathway. Students will either need to revisit stage 7 (red route), revisit or start stage 8 (amber route) or start stage 9 (green route). Students class QLA will depend on what topics students may revisit from Stage 8 and whether these are embedded in the SoW or whether these are taught in LC1 / LC2.

*Students can move between pathway if a strong understanding of topics is shown on a particular stage.*

### Maths Curriculum Map 2024-25

	Year 7 White Rose	Year 8 Kangaroo Maths	Year 9 Kangaroo Maths		
<b>LC 1</b>	<i>Sequences Understanding and use Algebraic Notation Equality and Equivalence</i>	St8 Number and the number system St8 Calculating St8 Visualising and constructing	St9 Calculating St9 Visualising and constructing	St8 Number and the number system St8 Calculating St8 Visualising and constructing	St7 Number and the Number System St7 Calculating
<b>LC 2</b>	<i>Place Value and Ordering Integers and Decimals Fractions, Decimal and Percentage Solving Problems with Addition and Subtraction</i>	St8 Understanding risk I St8 Algebraic Proficiency St8 Exploring FDP St8 Proportional Reasoning	St9 Algebraic proficiency: tinkering St9 Proportional reasoning	St8 Understanding risk I St8 Algebraic proficiency: tinkering St8 Exploring FDP St8 Proportional reasoning	St7 Checking, approximating & estimating St7 Counting and comparing St7 Visualising and constructing St7 Investigating properties of shapes St7 Algebraic proficiency: tinkering
<b>LC 3</b>	<i>Solving Problems with Multiplication and Division Fractions and Percentages Operations and Equations with Directed Number</i>	St8 Pattern Sniffing St8 Investigating angles St8 Calculating FDP St8 Solving equations and inequalities	St9 Pattern sniffing St9 Solving equations & inequalities I St9 Calculating space	St8 Pattern sniffing St8 Investigating angles St8 Calculating FDP St8 Solving equations & inequalities	St7 Algebraic proficiency: tinkering ( <i>Cont.</i> ) St7 Exploring FDP St7 Proportional reasoning St7 Pattern sniffing St7 Measuring space St7 Investigating angles
<b>LC 4</b>	<i>Addition and Subtraction of Fractions Constructing, Measuring and Using Geometric Notation Developing Geometric Reasoning</i>	St8 Solving equations and inequalities ( <i>Cont.</i> ) St8 Calculating Space St8 Algebraic proficiency: visualising	St9 Conjecturing St9 Algebraic proficiency: visualising	St8 Solving equations & inequalities ( <i>Cont.</i> ) St8 Calculating space St8 Algebraic proficiency: visualising	St7 Calculating FDP St7 Solving equations & inequalities St7 Calculating space St7 Mathematical movement
<b>LC 5</b>	<i>Developing Number Sense Sets and Probability Prime Numbers and Proof</i>	St8 Understanding risk II St8 Presentation of data St8 Measuring data  <i>[Revision, End of Year Test &amp; Feedback]</i>	St9 Solving equations & inequalities II St9 Understanding risk I St9 Presentation of data	St8 Understanding risk II St8 Presentation of data St8 Measuring data	St7 Presentation of data St7 Measuring data





Year 10 Kangaroo Maths			Year 11 Kangaroo Maths		
St10 Investigating properties of shapes St10 Calculating St10 Solving equations & inequalities I	St9 Calculating St9 Visualising and constructing	St8 Number and the number system St8 Calculating St8 Visualising and constructing	St11 Investigating properties of shapes St11 Calculating St11 Solving equations and inequalities I	St10 Lite Investigating properties of shapes St10 Lite / St10 Calculating St10 Lite / St10 Solving equations & inequalities I St10 Lite Mathematical Movement I	St9 Calculating St 9 Algebraic proficiency: tinkering St9 Proportional reasoning
St10 Mathematical Movement I St10 Algebraic proficiency: tinkering St10 Proportional reasoning St10 Pattern Sniffing	St9 Algebraic proficiency: tinkering St9 Proportional reasoning	St8 Understanding risk I St8 Algebraic proficiency: tinkering St8 Exploring FDP St8 Proportional reasoning	St11 Solving equations and inequalities I (Cont.) St11 Mathematical movement I St11 Algebraic proficiency: Proportional reasoning St11 Pattern sniffing	St10 Lite / St10 Algebraic proficiency: tinkering St10 Lite Proportional reasoning St10 Lite / St10 Pattern Sniffing St10 Lite / St10 Calculating space	St9 Proportional reasoning (Cont.) St9 Pattern sniffing St9 Solving equations and inequalities I St9 Calculating space
St10 Solving equations & inequalities II St10 Calculating space St10 Conjecturing	St9 Pattern sniffing St9 Solving equations & inequalities I St9 Calculating space	St8 Pattern sniffing St8 Investigating angles St8 Calculating FDP St8 Solving equations & inequalities	St11 Solving equations and inequalities II St11 Algebraic proficiency: visualising I St11 Analysing statistics St11 Algebraic proficiency: visualising II St11 Mathematical movement	St10 Lite / St10 Exploring FDP St10 Lite / St10 Algebraic proficiency: visualising I St10 Lite Solving equations & inequalities II St10 Lite / St10 Analysing statistics St10 Lite Mathematical movement II	St9 Calculating space (Cont.) St9 Algebraic proficiency: visualising St9 Solving equations and inequalities II
St10 Algebraic proficiency: visualising I St10 Exploring FDP St10 Solving equations & inequalities III	St9 Conjecturing St9 Algebraic proficiency: visualising	St8 Solving equations & inequalities (Cont.) St8 Calculating space St8 Algebraic proficiency: visualising	Gap Filling from Mocks		
St10 Understanding risk St10 Analysing statistics St10 Algebraic proficiency: visualising II St10 Mathematical movement II	St9 Solving equations & inequalities II St9 Understanding risk I St9 Presentation of data	St8 Understanding risk II St8 Presentation of data St8 Measuring data	GCSE/BTEC exams followed by A level bridging work		

	<b>Resit – November Entries</b>
<b>LC 1</b>	Summer 2023 Exam Paper November 2022 Exam Paper Summer 2020 Exam Paper November 2020 Exam Paper Summer 2019 Exam Paper November 2019 Exam Paper Summer 2018 Exam Paper November 2018 Exam Paper
<b>LC 2</b>	FF01 – Types of Numbers FF02 – Using Number FF03 – Basic Probability FF04 – Ratio FF05 - Measures
<b>LC 3</b>	FF06 – Rounding and Estimation FF07 – Perimeter, Area and Volume FF08 – Proportion FF09 – Simplify and Solve FF10 – Percentages
<b>LC 4</b>	FF11 – Angle Properties FF12 – Representing Data FF13 – Solve and Graph FF14 – Averages and Spread FF15 - Transformations
<b>LC 5</b>	GCSE/BTEC exams followed by A level bridging work



Year 12 – AS Level		Year 13 – A2 Level	
Pure Unit 2: Coordinate geometry Pure Unit 3: Further algebra	Stats Unit 1: Statistical sampling Stats Unit 2: Data presentation and interpretation	Pure: Sequences and Series Pure: Binomial Expansion Pure: Radians	Pure: Functions and Modelling Pure: Differentiation
Pure Unit 3: Further algebra Pure Unit 6: Differentiation Pure Unit 7: Integration	Stats Unit 2: Data presentation and interpretation Stats Unit 3: Probability Stats Unit 4: Statistical Distributions	Pure: Trigonometric Identities Pure: Trigonometric Modelling Pure: Parametric Equations	Pure: Numerical Methods Pure: Integration
Pure Unit 7: Integration Pure Unit 4: Trigonometry	Stats Unit 5: Statistical hypothesis testing Mech Unit 6: Quantities and units in mechanics Mech Unit 7: Kinematics 1	Pure: Vectors Mech: Moments Mech: Forces and Friction Mech: Projectiles	Pure: Integration Stats: Regression, Correlation and Hypothesis Testing
Pure Unit 4: Trigonometry Pure Unit 5: Vectors Pure Unit 8: Exponentials and logarithms	Mech Unit 7: Kinematics 1 Mech Unit 8: Forces and Newton's laws Mech Unit 9: Kinematics 2	Mech: Application of Forces Mech: Further Mechanics	Stats: Conditional Probability Stats: The Normal Distribution
Pure Unit 1: Proof Pure Unit 2: Algebraic and partial fractions	Pure Unit 4: Series and sequences Pure Unit 5: The binomial theorem	<b>Revision</b>	
		<b>A level/BTEC exams followed by University bridging work</b>	

Year 12 – FM AS Level		Year 13 – FM A2 Level	
<p>Core1: Roots of Polynomials Core: Matrices Core1: Linear Transformations</p>	<p>Core1: Complex Numbers</p>	<p>FPure1: Vectors FPure1: Conic Sections</p>	<p>FMech1: Momentum and Impulse FMech1: Work, Energy and Power</p>
<p>Core1: Proof by Induction Core: Vectors</p>	<p>Core1: Series Core1: Volumes of Revolution</p>	<p>FPure1: Inequalities FPure1: The <math>t</math>-formulae</p>	<p>FMech1: Elastic Strings and Springs</p>
<p>Core2: Methods in Calculus Core2: Polar Coordinates Core2: Hyperbolic Functions</p>	<p>Core2: Complex Numbers Core2: Series</p>	<p>FPure1: Taylor Series FPure1: Methods in Calculus</p>	<p>FMech1: Elastic Collisions in One Dimension</p>
<p>Core2: Methods in Differential Equations Core2: Modelling with Differential Equations</p>	<p>Core2: Series Core2: Volumes of Revolution</p>	<p>FPure1: Numerical Methods FPure1: Reducible Differential Equations</p>	<p>FMech1: Elastic Collisions in Two Dimensions</p>
<p><b>Mocks</b> <b>Review Core material in preparation for Year 13</b></p>	<p><b>Mocks</b> <b>Review Core material in preparation for Year 13</b></p>	<p>A level/BTEC exams followed by University bridging work</p>	

# Maths Assessment Calendar 2024-2025

	Year 7	Year 8	Year 9	Year 10	Year 11 & Resit	Year 12 & FM	Year 13 & FM
	MM	MM	MM	PM	PM	PM	PM
LC1	Assessment w/c 14 Oct (LC1 W6)	Comp Assessment w/c 14 Oct (LC1 W6)	Assessment w/c 7 Oct (LC1 W5)	Comp Assessment w/c 7 Oct (LC1 W5)	Peer Assessment w/c 7 Oct (LC1 W5)	Suitability Assessment w/c 23 Sep (LC1 W3)	Assessment w/c 30 Sep (LC1 W4)
	Data Drop w/c 21 Oct (LC1 W7)	Data Drop w/c 21 Oct (LC1 W7)	Data Drop w/c 21 Oct (LC1 W7)	Data Drop w/c 14 Oct (LC1 W6)	Data Drop w/c 14 Oct (LC1 W6)	Data Drop w/c 7 Oct (LC1 W5)	Data Drop w/c 14 Oct (LC1 W6)
LC2	Comp Assessment w/c 25 Nov (LC2 W4)	Assessment w/c 25 Nov (LC2 W4)	Comp Assessment w/c 18 Nov (LC2 W3)	Comp Assessment w/c 18 Nov (LC2 W3)	Mock Week w/c 11 Nov (LC2 W2)	Peer Assessment w/c 18 Nov (LC2 W3)	Mock Week w/c 4 Nov (LC2 W1)
	Data Drop w/c 2 Dec (LC2 W5)	Data Drop w/c 2 Dec (LC2 W5)	Data Drop w/c 2 Dec (LC2 W5)	Data Drop w/c 9 Dec (LC2 W6)	Data Drop w/c 9 Dec (LC2 W6)	Data Drop w/c 9 Dec (LC2 W6)	Data Drop w/c 9 Dec (LC2 W6)
LC3	Comp Assessment w/c 3 Mar (LC3 W7)	Comp Assessment w/c 3 Mar (LC3 W7)	Comp Assessment w/c 3 Mar (LC3 W7)	Peer Assessment w/c 3 Mar (LC3 W7)	Mock Week w/c 24 Feb (LC3 W6/7)	Mock Week w/c 13 Jan (LC3 W1)	Mock Week w/c 20 Jan (LC3 W2)
	Data Drop w/c 10 Mar (LC4 W1)	Data Drop w/c 10 Mar (LC4 W1)	Data Drop w/c 10 Mar (LC4 W1)	Data Drop w/c 17 Mar (LC4 W2)	Mock Drop w/c 17 Mar (LC4 W2)	Mock Data Drop w/c 3 Feb (LC3 W4)	Mock Data Drop w/c 10 Feb (LC3 W5)
LC4	Revision Card Assessment w/c 31 Mar (LC4 W4)	Revision Card Assessment w/c 31 Mar (LC4 W4)	Revision Card Assessment w/c 24 Mar (LC4 W3)	Mock Week w/c 28 April (LC4 W6/7)		Peer Assessment w/c 7 Apr (LC4 W4)	
				Mock Drop w/c 2 Jun (LC5 W3)			
LC5	End of Stage Assessment w/c 23 Jun (LC5 W6)	End of Stage Assessment w/c 23 Jun (LC5 W6)	End of Stage Assessment w/c 16 Jun (LC5 W4)	End of Stage Assessment w/c 16 Jun (LC5 W4)	GCSE Exams	Mock Week w/c 16 Jun (LC5 W5)	A Level Exams
	Data Drop w/c 30 Jun (LC5 W7)	Data Drop w/c 16 Jun (LC5 w5)	Data Drop w/c 16 Jun (LC5 w5)			Data Drop w/c 30 Jun (LC5 W7)	

## KS3 Assessment Criteria

	<b>Grade 9, 8, 7</b>	<b>Grade 6, 5</b>	<b>Grade 4, 3, 2</b>
<b>Y7</b>	White Rose	White Rose	White Rose
<b>Y8</b>	Stage 8	Stage 8	Stage 8
<b>Y9</b>	Stage 9	Stage 8	Stage 7

<b>WB – Working below end of year expectations</b>	<b>WT – Working towards end of year expectations</b>	<b>WAT – Working at end of year expectations</b>	<b>WA– Working above end of year expectations</b>
<b>Below 20%</b>	<b>20% - 44%</b>	<b>45% - 69%</b>	<b>Above 70%</b>



# WRM – Year 7 Scheme of Learning



	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
<b>Autumn</b>	<b>Algebraic Thinking</b>						<b>Place Value and Proportion</b>					
	Sequences		Understand and use algebraic notation		Equality and equivalence		Place value and ordering integers and decimals			Fraction, decimal and percentage equivalence		
<b>Spring</b>	<b>Applications of Number</b>						<b>Directed Number</b>			<b>Fractional Thinking</b>		
	Solving problems with addition & subtraction		Solving problems with multiplication and division		Fractions & percentages of amounts		Operations and equations with directed number			Addition and subtraction of fractions		
<b>Summer</b>	<b>Lines and Angles</b>						<b>Reasoning with Number</b>					
	Constructing, measuring and using geometric notation			Developing geometric reasoning			Developing number sense		Sets and probability		Prime numbers and proof	



## Autumn 1: Algebraic thinking

### Week 1 to 2: Exploring Sequences

Rather than rushing to find rules for  $n^{\text{th}}$  term, this week is spent exploring sequences in detail, using both diagrams and lists of numbers. Technology is used to produce graphs so students can appreciate and use the words “linear” and “non-linear” linking to the patterns they have spotted. Calculators are used throughout so number skills are not a barrier to finding the changes between terms or subsequent terms. Sequences are treated more formally later this unit. National curriculum content covered:

- move freely between different numerical, algebraic, graphical and diagrammatic representations
- make and test conjectures about patterns and relationships
- use a calculator and other technologies to calculate results accurately and then interpret them appropriately
- generate terms of a sequence from a term-to-term rule
- recognise arithmetic sequences
- recognise geometric sequences and appreciate other sequences that arise

### Weeks 3 to 4: Understanding and using algebraic notation

The focus of these three weeks is developing a deep understanding of the basic algebraic forms, with more complex expressions being dealt with later. Function machines are used alongside bar models and letter notation, with time invested in single function machines and the links to inverse operations before moving on to series of two machines and substitution into short abstract expressions. National curriculum content covered:

- move freely between different numerical, algebraic, graphical and diagrammatic representations
- use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships
- recognise and use relationships between operations including inverse operations

- model situations or procedures by translating them into algebraic expressions
- substitute values in expressions, rearrange and simplify expressions
- use and interpret algebraic notation, including:
  - $ab$  in place of  $a \times b$
  - $3y$  in place of  $y + y + y$  and  $3 \times y$
  - $a^2$  in place of  $a \times a$
  - $ab$  in place of  $a \times b$
  - $\frac{a}{b}$  in place of  $a \div b$
- generate terms of a sequence from a term-to-term rule
- produce graphs of linear functions of one variable

### Weeks 5 and 6: Equality and equivalence

In this section students are introduced to forming and solving one-step linear equations, building on their study of inverse operations. The equations met will mainly require the use of a calculator, both to develop their skills and to ensure understanding of how to solve equations rather than spotting solutions. This work will be developed when two-step equations are met in the next place value unit and throughout the course. The unit finishes within consideration of equivalence and the difference between this and equality, illustrated through collecting like terms.

National curriculum content covered:

- use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships
- simplify and manipulate algebraic expressions to maintain equivalence by collecting like terms
- use approximation through rounding to estimate answers
- use algebraic methods to solve linear equations in one variable





## Autumn 2: Place Value and Proportion

### Weeks 1 to 3: Place Value and Ordering

In this unit, students will explore integers up to one billion and decimals to hundredths, adapting these choices where appropriate for your groups e.g. standard index form could additionally be introduced to student following the Higher strand. Using and understanding number lines is a key strategy explored in depth, and will be useful for later work on scales for axes. When putting numbers in order, this is a suitable point to introduce both the median and the range, separating them from other measures to avoid getting them mixed up. Rounding to the nearest given positive power of ten is developed, alongside rounding to one significant figure. Decimal places will come later, again to avoid too similar concepts being covered at the same time. Topics from last term such as sequences and equations, will be interleaved into this unit.

National curriculum content covered:

- Consolidate their understanding of the number system and place value to include decimals
- understand and use place value for decimals, measures and integers of any size
- order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols  $=$ ,  $\neq$ ,  $<$ ,  $>$
- work interchangeably with terminating decimals and their corresponding fractions
- round numbers to an appropriate degree of accuracy
- describe, interpret and compare observed distributions of a single variable through: the median and the range
- interpret and compare numbers in standard form

### Weeks 4 to 6: Fraction, Decimal and Percentage Equivalence

Building on the recent work on decimals, the key focus for this three weeks is for students to gain a deep understanding of the links between fractions, decimals and percentages so that they can convert fluently between those most commonly seen in real-life. The Foundation strand will focus will be on multiples of one tenth and one quarter whilst the Higher strand will look at more complex conversions. Whilst looking at percentage is, pie charts will be introduced. In addition, various forms of representation of any fraction will be studied, focusing on equivalence, in an appropriate depth to the current attainment of students; this will be revisited later in the year. The focus is very much on a secure understanding of the most common fractions under one, but fractions above one will be touched upon, particularly in the Higher strand.

National curriculum content covered:

- consolidate their understanding of the number system and place value to include decimals, fractions
- move freely between different numerical representations [for example, equivalent fractions, fractions and decimals]
- extend their understanding of the number system; make connections between number relationships
- express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1
- define percentage as 'number of parts per hundred', interpret percentages as a fraction or a decimal
- compare two quantities using percentages
- work with percentages greater than 100%
- interpret pie charts



# Spring 1: Application of Number

## Weeks 1 & 2: Solving problems with addition & subtraction

The focus for these two weeks is building on the formal methods of addition and subtraction students have developed at Key Stage 2. All students will look at this in the context of interpreting and solving problems, for those for whom these skills are secure, there will be even more emphasis on this. Problems will be drawn from the contexts of perimeter, money, interpreting bar charts and tables and looking at frequency trees; we believe all these are better studied alongside addition and subtraction rather than separately. Calculators should be used to check and/or support calculations, with significant figures and equations explicitly revisited.

National curriculum content covered:

- use formal written methods, applied to positive integers and decimals
- recognise and use relationships between operations including inverse operations
- derive and apply formulae to calculate and solve problems involving: perimeter
- construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts and pictograms for categorical data, and vertical line (or bar) charts for ungrouped numerical data

operation to solve a problem will also be a focus. There will also be some exploration of the order of operations, which will be reinforced alongside much of this content next term when studying directed number.

National curriculum content covered:

- use formal written methods, applied to positive integers and decimals
- select and use appropriate calculation strategies to solve increasingly complex problems
- recognise and use relationships between operations including inverse operations
- use the concepts and vocabulary factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple
- change freely between related standard units [time, length, area, volume/capacity, mass]
- derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, and trapezia (H)
- substitute numerical values into formulae and expressions, including scientific formulae
- use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement)
- describe, interpret and compare observed distributions of a single variable through: the mean

## Weeks 3 to 5: Solving problems with multiplication & division

The rest of the term is dedicated to the study of multiplication and division, so allowing for the study of forming and solving of two-step equations both with and without a calculator. Unit conversions will be the main context as multiplication by 10, 100 and 1000 are explored. As well as distinguishing between multiples and factors, substitution and simplification can also be revised and extended. Again, the emphasis will be on solving problems, particularly involving area of common shapes and the mean. Choosing the correct

## Week 6: Fractions and percentages of amounts

This short block focuses on the key concept of working out fractions and percentages of quantities and the links between the two. This is studied in depth in Year 8

National curriculum content covered:

- use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions
- interpret fractions and percentages as operators



## Spring 2: Directed Number and Fractional Thinking

### Weeks 1 to 3: Directed number

Students will only have had limited experience of directed number at primary school, so this block is designed to extend and deepen their understanding of this. Multiple representations and contexts will be used to enable students to appreciate the meaning behind operations with negative integers rather than relying on a series of potentially confusing "rules". As well as exploring directed number in its own right, this block provides valuable opportunities for revising and extending earlier topics, notably algebraic areas such as substitution and the solution of equations; in particular students will be introduced to two-step equations for the first time in this block.

National curriculum content covered:

- select and use appropriate calculation strategies to solve increasingly complex problems
- use the four operations, including formal written methods, applied to integers, both positive and negative
- recognise and use relationships between operations including inverse operations
- use square and square roots
- use a calculator and other technologies to calculate results accurately and then interpret them appropriately
- substitute numerical values into formulae and expressions, including scientific formulae
- understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors
- simplify and manipulate algebraic expressions to maintain equivalence
- understand and use standard mathematical formulae

#### Interleaving/Extension of previous work

- use conventional notation for the priority of operations
- forming and solving linear equations, including two-step equations

### Weeks 4 to 6: Fractional thinking

This block builds on the Autumn term study of "key" fractions, decimals and percentages. It will provide more experience of equivalence of fractions with any denominators, and to introduce the addition and subtraction of fractions. Bar models and concrete representations will be used extensively to support this. Adding fractions with the same denominators will lead to further exploration of fractions greater than one, and for the Core strand adding and subtracting with different denominators will be restricted to cases where one is a multiple of the other.

National curriculum content covered:

- move freely between different numerical, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals]
- express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1
- order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols  $=$ ,  $\neq$ ,  $<$ ,  $\leq$ ,  $>$ ,  $\geq$
- select and use appropriate calculation strategies to solve increasingly complex problems
- use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative
- work interchangeably with terminating decimals and their corresponding fractions

#### Interleaving/Extension of previous work

- finding the range and the median
- substitution into algebraic formulae
- forming and solving linear equations, including two-step equations



# Summer 1: Lines and Angles

## Weeks 1 to 3: Construction, measurement and notation

Students will build on their KS2 skills using rulers, protractors and other measuring equipment to construct and measure increasingly complex diagrams using correct mathematical notation. This will include three letter notation for angles, the use of hatch marks to indicate equality and the use of arrows to indicate parallel lines. Pie charts will be studied here to gain further practice at drawing and measuring angles.

National curriculum content covered:

- use language and properties precisely to analyse 2-D shapes
- begin to reason deductively in geometry including using geometrical constructions
- draw and measure line segments and angles in geometric figures, including interpreting scale drawings
- describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right-angles, regular polygons, and other polygons that are reflectively and rotationally symmetric
- use the standard conventions for labelling sides and angles
- construct and interpret pie charts for categorical, ungrouped and grouped numerical data
- Identify and construct triangles

### Interleaving/Extension of previous work

- revisit four operations

## Weeks 4 to 6: Geometric reasoning

This block covers basic geometric language, names and properties of types of triangles and quadrilaterals, and the names of other polygons. Angles rules will be introduced and used to form short chains of reasoning. The higher strand will take this further, investigating and using parallel line rules.

National curriculum content covered:

- use language and properties precisely to analyse 2-D shapes,
- begin to reason deductively in geometry including using geometrical constructions
- describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right-angles, regular polygons, and other polygons that are reflectively and rotationally symmetric
- use the standard conventions for labelling sides and angles
- derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies
- apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles
- apply angle facts, triangle similarity and properties of quadrilaterals to derive results about angles and sides, and use known results to obtain simple proofs
- understand and use the relationship between parallel lines and alternate and corresponding angles (H)
- derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons (H)

### Interleaving/Extension of previous work

- forming and solving linear equations
- revisiting addition and subtraction, including decimals



# Summer 2: Reasoning with Number

## Weeks 7 to 8: Developing Number Sense

Students will review and extend their mental strategies with a focus on using a known fact to find other facts. Strategies for simplifying complex calculations will also be explored. The skills gained in working with number facts will be extended to known algebraic facts.

National curriculum content covered:

- consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots
- select and use appropriate calculation strategies to solve increasingly complex problems
- begin to reason deductively in number and algebra

### Interleaving/Extension of previous work

- Generating and describing sequences
- Substitution into expressions
- Order of operations

- generate theoretical sample spaces for single and combined events with equally likely and mutually exclusive outcomes and use these to calculate theoretical probabilities
- appreciate the infinite nature of the sets of integers, real and rational numbers

### Interleaving/Extension of previous work

- FDP equivalence
- Forming and solving equations
- Adding and subtracting fractions

## Weeks 11 to 12: Prime Numbers and Proof

Factors and multiples will be revisited to introduce the concept of prime numbers, and the Higher strand will include using Venn diagrams from the previous block to solve more complex HCF and LCM problems. Odd, even, prime, square and triangular numbers will be used as the basis of forming and testing conjectures. The use of counterexamples will also be addressed.

National curriculum content covered:

- use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property
- use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5
- make and test conjectures about patterns and relationships; look for proofs or counterexamples
- begin to reason deductively in number and algebra

### Interleaving/Extension of previous work

- Generating and describing sequences
- Factors and multiples

## Weeks 9 to 10: Sets and Probability

FDP equivalence will be revisited in the study of probability, where students will also learn about sets, set notation and systematic listing strategies.

National curriculum content covered:

- record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale
- understand that the probabilities of all possible outcomes sum to 1
- enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams



## Secondary Mathematics Scheme of Work: Stage 8

Unit	Lessons	Key 'Build a Mathematician' (BAM) Indicators	Essential knowledge
Numbers and the number system	7	<ul style="list-style-type: none"> <li>Apply the four operations with negative numbers</li> <li>Convert numbers into standard form and vice versa</li> <li>Apply the multiplication, division and power laws of indices</li> <li>Convert between terminating decimals and fractions</li> <li>Find a relevant multiplier when solving problems involving proportion</li> <li>Solve problems involving percentage change, including original value problems</li> <li>Factorise an expression by taking out common factors</li> <li>Change the subject of a formula when two steps are required</li> <li>Find and use the nth term for a linear sequence</li> <li>Solve linear equations with unknowns on both sides</li> <li>Plot and interpret graphs of linear functions</li> <li>Apply the formulae for circumference and area of a circle</li> <li>Calculate theoretical probabilities for single events</li> </ul>	<ul style="list-style-type: none"> <li>Know how to write a number as a product of its prime factors</li> <li>Know how to round to significant figures</li> <li>Know the order of operations including powers</li> <li>Know how to enter negative numbers into a calculator</li> <li>Know that <math>a^0 = 1</math></li> <li>Know percentage and decimal equivalents for fractions with a denominator of 3, 5, 8 and 10</li> <li>Know the characteristic shape of a graph of a quadratic function</li> <li>Know how to measure and write bearings</li> <li>Know how to identify alternate angles</li> <li>Know how to identify corresponding angles</li> <li>Know how to find the angle sum of any polygon</li> <li>Know that circumference = <math>2\pi r = \pi d</math></li> <li>Know that area of a circle = <math>\pi r^2</math></li> <li>Know that volume of prism = area of cross-section <math>\times</math> length</li> <li>Know to use the midpoints of groups to estimate the mean of a set of grouped data</li> <li>Know that probability is measured on a 0-1 scale</li> <li>Know that the sum of all probabilities for a single event is 1</li> </ul>
Calculating	14		
Visualising and constructing	9		
Understanding risk I	6		
Algebraic proficiency: tinkering	10		
Exploring fractions, decimals and percentages	5		
Proportional reasoning	11		
Pattern sniffing	4		
Investigating angles	7		
Calculating fractions, decimals and percentages	6		
Solving equations and inequalities	6		
Calculating space	8		
Algebraic proficiency: visualising	11		
Understanding risk II	8		
Presentation of data	4		
Measuring data	6		
Total:	122	Stage 8 BAM Progress Tracker Sheet	

## Maths Calendar

Based on 7 maths lessons per fortnight, with at least 35 'quality teaching' weeks per year

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Numbers and the number system 8M2 BAM	Calculating 8M1 BAM		Visualising and constructing			Understanding risk I 8M13 BAM		Algebraic proficiency: tinkering 8M3 BAM, 8M7 BAM, 8M8 BAM				
Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	Week 21	Week 22	Week 23	Week 24	Week 25	Week 26
Assessment and enrichment	Exploring FDP 8M4 BAM	Proportional reasoning 8M5 BAM				Pattern sniffing 8M9 BAM	Investigating angles		Calculating FDP 8M6 BAM		Solving equations 8M10 BAM	
Week 27	Week 28	Week 29	Week 30	Week 31	Week 32	Week 33	Week 34	Week 35	Week 36	Week 37	Week 38	Week 39
Assessment	Calculating space 8M12 BAM		Algebraic proficiency: visualising 8M11 BAM			Understanding risk II		Pres'n of data	Measuring data		Assessment	





## Secondary Scheme of Work: Stage 9

Unit	Lessons	Key 'Build a Mathematician' (BAM) Indicators	Essential knowledge
Calculating	14	<ul style="list-style-type: none"> <li>Calculate with roots and integer indices</li> </ul>	<ul style="list-style-type: none"> <li>Know how to interpret the display on a scientific calculator when working with standard form</li> <li>Know the difference between direct and inverse proportion</li> <li>Know how to represent an inequality on a number line</li> <li>Know that the point of intersection of two lines represents the solution to the corresponding simultaneous equations</li> <li>Know the meaning of a quadratic sequence</li> <li>Know the characteristic shape of the graph of a cubic function</li> <li>Know the characteristic shape of the graph of a reciprocal function</li> <li>Know the definition of speed</li> <li>Know the definition of density</li> <li>Know the definition of pressure</li> <li>Know Pythagoras' theorem</li> <li>Know the definitions of arc, sector, tangent and segment</li> <li>Know the conditions for congruent triangles</li> </ul>
Visualising and constructing	9	<ul style="list-style-type: none"> <li>Manipulate algebraic expressions by expanding the product of two binomials</li> </ul>	
Algebraic proficiency: tinkering	10	<ul style="list-style-type: none"> <li>Manipulate algebraic expressions by factorising a quadratic expression of the form <math>x^2 + bx + c</math></li> </ul>	
Proportional reasoning	14	<ul style="list-style-type: none"> <li>Understand and use the gradient of a straight line to solve problems</li> </ul>	
Pattern sniffing	7	<ul style="list-style-type: none"> <li>Solve two linear simultaneous equations algebraically and graphically</li> </ul>	
Solving equations and inequalities I	8	<ul style="list-style-type: none"> <li>Plot and interpret graphs of quadratic functions</li> </ul>	
Calculating space	10	<ul style="list-style-type: none"> <li>Change freely between compound units</li> </ul>	
Conjecturing	7	<ul style="list-style-type: none"> <li>Use ruler and compass methods to construct the perpendicular bisector of a line segment and to bisect an angle</li> </ul>	
Algebraic proficiency: visualising	17	<ul style="list-style-type: none"> <li>Solve problems involving similar shapes</li> </ul>	
Solving equations and inequalities II	10	<ul style="list-style-type: none"> <li>Calculate exactly with multiples of <math>\pi</math></li> </ul>	
Understanding risk	8	<ul style="list-style-type: none"> <li>Apply Pythagoras' theorem in two dimensions</li> </ul>	
Presentation of data	8	<ul style="list-style-type: none"> <li>Use geometrical reasoning to construct simple proofs</li> </ul>	
		<ul style="list-style-type: none"> <li>Use tree diagrams to list outcomes</li> </ul>	
Total:	122	Stage 9 BAM Progress Tracker Sheet	

## Maths Calendar

Based on 7 maths lessons per fortnight, with at least 35 'quality teaching' weeks per year

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Calculating 9M1 BAM				Visualising and constructing 9M8 BAM			Algebraic proficiency: tinkering 9M2 BAM, 9M3 BAM			Proportional reasoning 9M7 BAM		
Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	Week 21	Week 22	Week 23	Week 24	Week 25	Week 26
Assessment and enrichment		Pattern sniffing		Solving equations and inequalities I			Calculating space 9M10 BAM, 9M11 BAM			Conjecturing 9M9 BAM, 9M12 BAM		Algebra: visualising
Week 27	Week 28	Week 29	Week 30	Week 31	Week 32	Week 33	Week 34	Week 35	Week 36	Week 37	Week 38	Week 39
Assessment	Algebra: visualising (continued) 9M4 BAM, 9M6 BAM			Solving equations and inequalities II 9M5 BAM			Understanding risk 9M13 BAM			Presentation of data		Assessment





## Secondary Scheme of Work: Stage 10

Unit	Lessons	Key 'Build a Mathematician' (BAM) Indicators	Essential knowledge
Investigating properties of shapes	12	<ul style="list-style-type: none"> <li>Manipulate fractional indices</li> <li>Solve problems involving direct and inverse proportion</li> <li>Convert between recurring decimals and fractions</li> <li>Solve equations using iterative methods</li> <li>Manipulate algebraic expressions by factorising a quadratic expression of the form <math>ax^2 + bx + c</math></li> <li>Solve quadratic equations by factorising</li> <li>Link graphs of quadratic functions to related equations</li> <li>Interpret a gradient as a rate of change</li> <li>Recognise and use the equation of a circle with centre at the origin</li> <li>Apply trigonometry in two dimensions</li> <li>Calculate volumes of spheres, cones and pyramids</li> <li>Understand and use vectors</li> <li>Analyse data through measures of central tendency, including quartiles</li> </ul>	<ul style="list-style-type: none"> <li>Know the convention for labelling the sides in a right-angle triangle</li> <li>Know the trigonometric ratios, <math>\sin\theta = \text{opposite/hypotenuse}</math>, <math>\cos\theta = \text{adjacent/hypotenuse}</math>, <math>\tan\theta = \text{opposite/adjacent}</math></li> <li>Know exact values of <math>\sin\theta</math> and <math>\cos\theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ</math> and <math>90^\circ</math></li> <li>Know the exact value of <math>\tan\theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ</math> and <math>60^\circ</math></li> <li>Know that <math>a^{1/n} = \sqrt[n]{a}</math></li> <li>Know that <math>a^{-n} = 1/a^n</math></li> <li>Know the information required to describe a transformation</li> <li>Know the special case of the difference of two squares</li> <li>Know how to set up an equation involving direct or inverse proportion</li> <li>Know set notation</li> <li>Know the conventions for representing inequalities graphically</li> <li>Know the formulae for the volume of a sphere, a cone and a pyramid</li> <li>Know the formulae for the surface area of a sphere, and the curved surface area of a cone</li> <li>Know the circle theorems</li> <li>Know the characteristic shape of the graph of an exponential function</li> <li>Know the meaning of roots, intercepts and turning points</li> <li>Know the definition of acceleration</li> <li>Know how to construct a box plot</li> <li>Know the conditions for perpendicular lines</li> </ul>
Calculating	8		
Solving equations and inequalities I	9		
Mathematical movement I	6		
Algebraic proficiency: tinkering	12		
Proportional reasoning	7		
Pattern sniffing	4		
Solving equations and inequalities II	6		
Calculating space	10		
Conjecturing	12		
Algebraic proficiency: visualising I	12		
Exploring fractions, decimals and percentages	6		
Solving equations and inequalities III	8		
Understanding risk	6		
Analysing statistics	12		
Algebraic proficiency: visualising II	6		
Mathematical movement II	4		
Total:	140	Stage 10 BAM Progress Tracker Sheet	

## Maths Calendar

Based on 8 maths lessons per fortnight, with at least 35 'quality teaching' weeks per year

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Investigating properties of shapes 10M10 BAM			Calculating 10M1 BAM		Solving equations and inequalities I 10M4 BAM		Math movement I	Algebraic proficiency: tinkering 10M5 BAM			Proportional reasoning 10M2 BAM	
Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	Week 21	Week 22	Week 23	Week 24	Week 25	Week 26
Assessment and enrichment		Patterns	Solving inequalities		Calculating space 10M11 BAM			Conjecturing			Algebraic proficiency: visualising I 10M8 BAM	
Week 27	Week 28	Week 29	Week 30	Week 31	Week 32	Week 33	Week 34	Week 35	Week 36	Week 37	Week 38	Week 39
Assessment	Exploring FDP 10M3 BAM		Solving equations II 10M6 BAM, 10M7 BAM		Understanding risk		Analysing statistics 10M13 BAM		Visualising II 10M9 BAM	Movement II 10M12 BAM	Assessment	







## Secondary Scheme of Work: Stage 10 Lite

Unit	Lessons	Key 'Build a Mathematician' (BAM) Indicators	Essential knowledge
Investigating properties of shapes	12	<ul style="list-style-type: none"> <li>Solve problems involving direct and inverse proportion</li> <li>Solve quadratic equations by factorising</li> <li>Apply trigonometry in two dimensions</li> <li>Calculate volumes of spheres, cones and pyramids</li> <li>Understand and use vectors</li> </ul>	<ul style="list-style-type: none"> <li>Know the convention for labelling the sides in a right-angle triangle</li> <li>Know the trigonometric ratios, <math>\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}</math>, <math>\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}}</math>, <math>\tan\theta = \frac{\text{opposite}}{\text{adjacent}}</math></li> <li>Know the exact values of <math>\sin\theta</math> and <math>\cos\theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ</math> and <math>90^\circ</math></li> <li>Know the exact value of <math>\tan\theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ</math> and <math>60^\circ</math></li> <li>Know the information required to describe a transformation</li> <li>Know the special case of the difference of two squares</li> <li>Know set notation</li> <li>Know the formulae for the volume of a sphere, a cone and a pyramid</li> <li>Know the formulae for the surface area of a sphere, and the curved surface area of a cone</li> <li>Know the meaning of roots, intercepts and turning points</li> </ul>
Calculating	2		
Solving equations and inequalities I	6		
Mathematical movement I	5		
Algebraic proficiency: tinkering	4		
Proportional reasoning	7		
Pattern sniffing	2		
Calculating space	9		
Exploring fractions, decimals and percentages	5		
Algebraic proficiency: visualising	3		
Solving equations and inequalities II	7		
Analysing statistics	2		
Mathematical movement II	5		
Total:	69		

## Maths Calendar

Based on 8 maths lessons per fortnight

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Investigating properties of shapes 10M10 BAM			Calc	Solving equations I	Movement I	Tinkering	Proportional reasoning 10M2 BAM		Pattern	Calculating space 10M11 BAM		Exploring FDP
Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	Week 21	Week 22	Week 23	Week 24	Week 25	Week 26
Assessment		Visualising	Solving equations II 10M6 BAM		Stats	Movement II 10M12 BAM		The Final Countdown				
Week 27	Week 28	Week 29	Week 30	Week 31	Week 32	Week 33	Week 34	Week 35	Week 36	Week 37	Week 38	Week 39





## Secondary Mathematics Scheme of Work: Stage 11

Unit	Lessons	Key 'Build a Mathematician' (BAM) Indicators	Essential knowledge
Investigating properties of shapes	16	<ul style="list-style-type: none"> <li>Simplify surds, including rationalising the denominator of a surd expression</li> <li>Manipulate quadratic expressions by completing the square</li> <li>Deduce roots and turning points of quadratic functions</li> <li>Understand the concept of an instantaneous rate of change</li> <li>Sketch translations and reflections of given functions</li> <li>Solve quadratic inequalities in one variable</li> <li>Use the sine and cosine rules to solve problems</li> </ul>	<ul style="list-style-type: none"> <li>Know that <math>\sqrt{a \pm b} \neq \sqrt{a} \pm \sqrt{b}</math>, <math>\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}</math> and <math>\sqrt{a \times b} = \sqrt{a} \times \sqrt{b}</math></li> <li>Know the formula for solving quadratic equations</li> <li>Know function notation</li> <li>Know graphs of exponential and trigonometric functions</li> <li>Know the sine rule, <math>\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}</math></li> <li>Know the cosine rule, <math>a^2 = b^2 + c^2 - 2bc \cos A</math></li> <li>Know area of triangle = <math>\frac{1}{2}ab \sin C</math></li> <li>Know that histograms should be plotted using frequency density when groups are of unequal widths</li> </ul>
Calculating	6		
Solving equations and inequalities I	12		
Mathematical movement I	3		
Algebraic proficiency: tinkering	5		
Proportional reasoning	5		
Pattern sniffing	4		
Solving equations and inequalities II	6		
Algebraic proficiency: visualising I	7		
Analysing statistics	5		
Algebraic proficiency: visualising II	3		
Mathematical movement II	4		
Total:	76		

## Maths Calendar

Based on 8 maths lessons per fortnight

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Investigating properties of shapes 11M7 BAM				Calculating 11M1 BAM		Solving equations and inequalities I 11M2 BAM, 11M3 BAM		Movement I	Tinkering	Prop'l reasoning	Patterns	
Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	Week 21	Week 22	Week 23	Week 24	Week 25	Week 26
Assessment		Solving equations II 11M6 BAM		Visualising I 11M5 BAM		Analysing statistics	Visualising II 11M4 BAM	Movement II	The Final Countdown			
Week 27	Week 28	Week 29	Week 30	Week 31	Week 32	Week 33	Week 34	Week 35	Week 36	Week 37	Week 38	Week 39

