Maths

Maths Faculty

Vision

Our aim is to be a Centre of Excellence for Mathematics, where we are a provider of choice for learners at any stage of their mathematical journey. Our curriculum focuses on fostering a love of the learning of maths, giving students the opportunity to see success across a subject that encompasses a wide variety of skills and topics.

Context

Our students have a wide variety of attainment levels and aspirations that have developed from their Key Stage 2 experiences. Through the use of team planning and curriculum development, alongside mixed attainment, cross-curricular work and enrichment opportunities, we look to foster a confidence in our learners and ultimately raise their aspirations and achievements.

Disciplinary Knowledge

Students follow the National Curriculum through the White Rose Maths scheme of work at Key Stage 3, allowing for a smooth transition from our primary feeder schools. At Key Stage 4, students follow the White Rose Maths scheme for both Foundation and Higher tier learning. At Key Stage 5, A Level Maths students use a bespoke scheme of learning, following the AQA Specification for A Level Maths and MEI OCR (B) Specification for Further Maths.

Supra Curriculum

Enrichment opportunities are provided within lessons and also through national competitions such as UKMT as well as STEM links and further study through Level 2 Further Maths qualifications.

Students also have access to online learning platforms. In KS3 and 4 students use Sparx Maths (sparxmaths.uk) and at KS5 they additionally have Integral Maths (integralmaths.org.uk) to support and broaden their knowledge and understanding of mathematics.

Grove School: Curriculum

Key Stage 3
Maths

Year 7

This year will build on the foundations of knowledge and skills gained in Key Stage 2. It is a continuation of the White Rose Maths scheme of learning that is followed by our feeder primary schools. The students' Year 7 maths journey will start with an introduction to algebraic form to deepen their understanding and allow access to more complex algebraic disciplines being introduced later in the year. In addition to this, fractions, decimals and percentages will play a big role during the year, as will many other number topics. This will ensure that students have a stronger fundamental grounding in the subject, allowing them to explore more challenging and abstract topics in years 8 and 9.

Year 8

A continuation of the White Rose Maths scheme of learning, the year will build on the foundations of Year 7. In addition to building on the skills developed in fundamental numbers skills from previous year, students will also begin to explore more spatial and abstract maths topics such as exploring the cartesian plane, geometrical theories and rules as well as the collection, use and application of data.

Year 9

This year will build on the foundations of knowledge and skills gained in previous years. This will include topics such as proof, finance and Pythagoras' Theorem. All students will gain a secure grounding in the key concepts of number, algebra, geometry, ratio, and statistics, which underpin their future learning in Key Stage 4 and are crucial in building the more complex GCSE knowledge and concepts around.

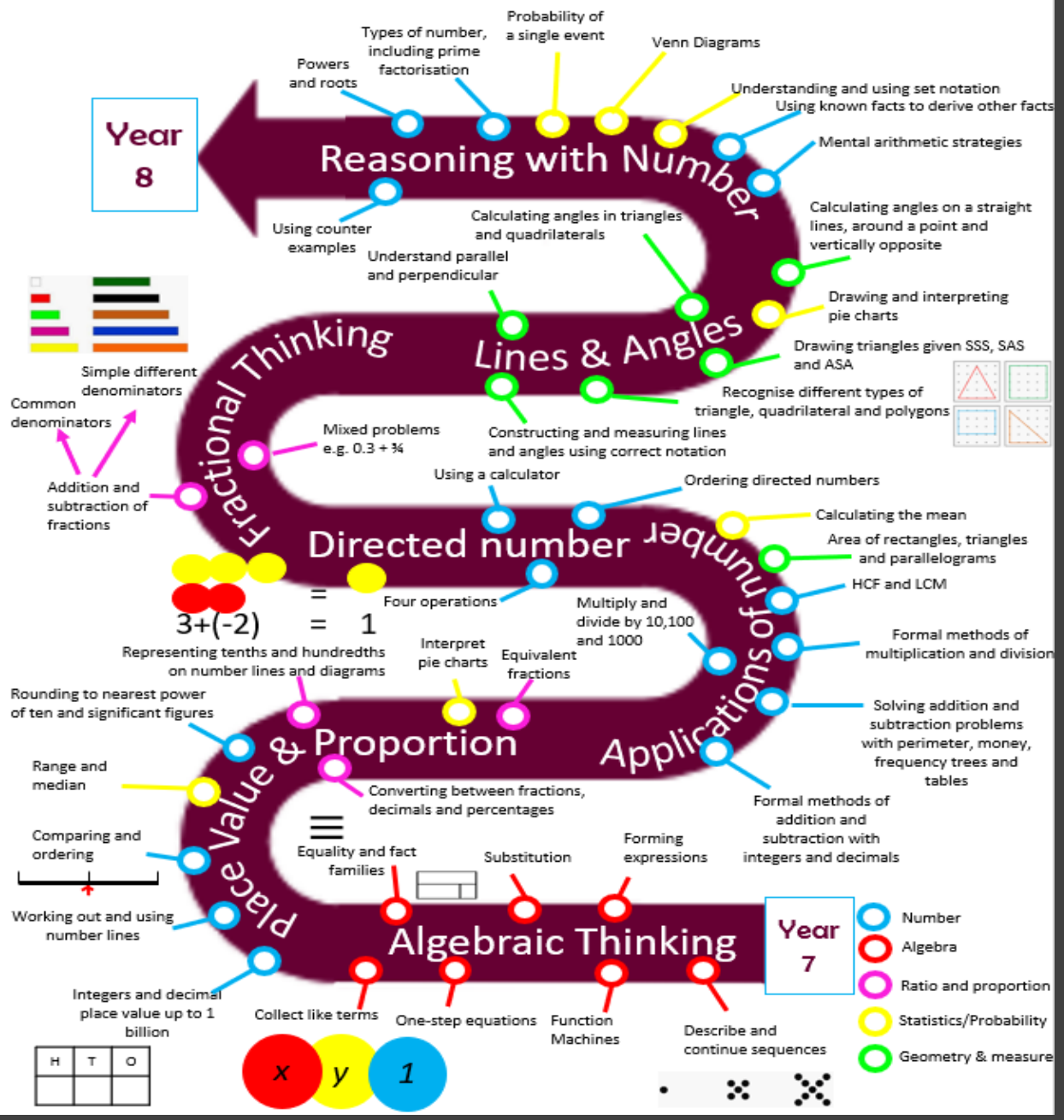
Knowledge from KS2 feeds into year 7

- Write and order numbers up to 10 million
- Use negative numbers in context
- Round any whole number to a required degree of accuracy
- Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000
- Perform mental calculations, including with mixed operations and large numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- Divide up to 4 digit numbers by up to 2 digit numbers and interpret remainders as whole number remainders or fractions

- Use equivalence to order, add and subtract fractions
- Multiply proper fractions and mixed numbers by whole numbers
- Divide a proper fraction by a whole number
- Identify the value of the digits up to 3 decimal places
- Multiply 1 digit numbers with up to 2 decimal places by whole numbers
- Solve problems involving decimals up to 3 decimal places
- Use written division in cases where the answer has up to 2 decimal places
- solve problems involving the calculation of percentages
- solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts

- compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes
- Convert between metric units
- Appreciate that shapes can have the same area but different perimeters
- Calculate volume of cubes and cuboids
- Calculate area and perimeter of shapes including parallelograms, triangles and rectangles.
- Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles

YEAR 7 MATHS LEARNING JOURNEY



Scheme of Learning YEAR OVERVIEW

The Big Picture

Year Group 7

Y7 Mathematics is a challenging transition to the study of secondary Mathematics. They will experience "mastery" alongside more traditional teaching methods to gain a deeper understanding, more confidence and competence in their mathematics.

Intent

Units to be covered: Algebraic thinking, place value and proportion, applications of number, direct number, fractional thinking, lines and angles and reasoning with number.

Each term is split into two halves with a common theme, each half is split into further blocks that ensure students spend enough time to get a deep understanding of the topic covered. Blocks have been designed with interleaving as a key element enabling students to revisit previous work, develop knowledge and understanding and further extend their skills. Number work is emphasized throughout the blocks alongside estimation. Calculator skills have been incorporated throughout the curriculum, thus enabling all students to access the materials presented. Any student will be able to follow the main content of all lessons with higher levels being accesses as and when a class/student requires it.

Implementation

There will be 6 blocks of approx. 6 weeks each. Each lesson will involve a WRM flashback task.
Independence and study skills will be fostered through: challenging questions and problems, group and pair work, modelling, homework and after each assessment.
Lessons will be based around multiple representations; Concrete, Pictorial, Abstract to give a deeper understanding of concepts. Reasoning will be developed through the exploration of mathematical patterns and images with a variety of problem solving methods for just one question.
Learning to move forward and uncover mathematical ideas from mistakes and misconceptions via true/false, spot the mistake and other reasoning tasks where students are required to make a judgement and justify their answers.
Knowledge organisers will be provided for each block to enable students to recall keywords, facts, formulas and/or formal methods.
WOW moments will occur when students solve complex problems, when the barrier wall disappears and they have a moment of satisfying clarity (no matter how brief) or spotting a relationship that was previously unseen.
Numeracy and calculator skills will be embedded.

Key assessments:

Formal assessments will take place every term.

Sparx tasks set as homework to consolidate learning.

Low-stakes testing as required
Live marking will occur during lessons as required

Autumn Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

Spring Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

Summer Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

Impact

Students will have increased understanding and confidence in maths and be able to apply new skills to a variety of new and challenging mathematical problems. Students will know more and remember more. There will be an increase in attainment, evidenced in regular, formal and interleaved assessments.

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
Autumn	**Algebraic Thinking**						**Place Value and Proportion**					
	Sequences		Understand and use algebraic notation		Equality and equivalence		Place value and ordering integers and decimals			Fraction, decimal and percentage equivalence		
Spring	**Applications of Number**						**Directed Number**			**Fractional Thinking**		
	Solving problems with addition & subtraction		Solving problems with multiplication and division			Fractions & percentages of amounts	Four operations with directed number			Addition and subtraction of fractions		
Summer	**Lines and Angles**						**Reasoning with Number**					
	Constructing, measuring and using geometric notation			Developing geometric reasoning			Developing number sense		Sets and probability		Prime numbers and proof	

Knowledge from year 7 feeds into year 8

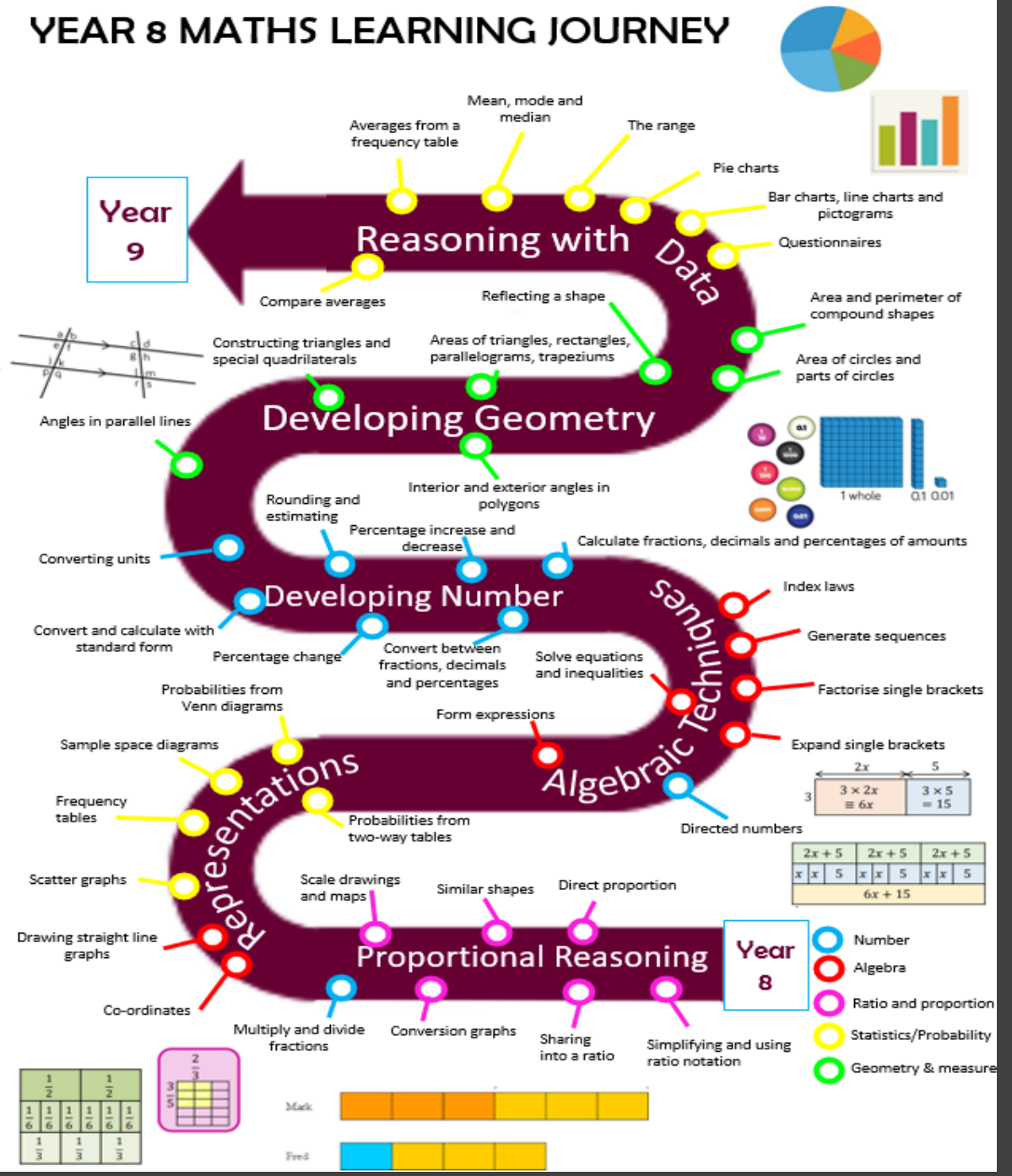
- Integers and place value up to one billion
- Place numbers on a number line
- Compare and order numbers
- Rounding to a power of 10 and significant figures
- Formal methods of addition, subtraction, multiplication and division
- HCF and LCM
- Directed numbers
- Prime factorisation
- Powers and roots
- Converting between fractions, decimals and percentages
- Representing fractions and decimals on a number line
- Equivalent fractions
- Addition an subtraction of fractions

- Describe and continue sequences
- Use function machines
- Form expressions
- Substitution
- Collect like terms
- Solve one step equations

- Range and median
- Mean
- Pie charts
- Set notation
- Venn diagrams
- Probability of a single event

- Area of rectangles, triangles and parallelograms
- Constructing and measuring lines and angles
- Calculating angles in triangles and quadrilaterals
- Calculating angles on a straight lines, around a point and vertically opposite
- Recognise different types of triangle, quadrilateral and polygons

YEAR 8 MATHS LEARNING JOURNEY



Scheme of Learning YEAR OVERVIEW

The Big Picture

Year Group 8

Y8 Mathematics is the revisiting of topics within new contexts whilst extending and further developing mathematical thinking and skills. They will experience "mastery" alongside more traditional teaching methods to gain a deeper understanding, more confidence and competence in their mathematics.

Intent

Units to be covered: Proportional Reasoning, Representations, Algebraic techniques, Developing number, Developing geometry and Reasoning with data

Each term is split into two halves with a common theme, each half is split into further blocks that ensure students spend enough time to get a deep understanding of the topic covered. Blocks have been designed with interleaving as a key element enabling students to revisit previous work, develop knowledge and understanding and further extend their skills. Number work is emphasized throughout the blocks alongside estimation. Calculator skills have been incorporated throughout the curriculum, thus enabling all students to access the materials presented. Any student will be able to follow the main content of all lessons with higher levels being accesses as and when a class/student requires it.

Implementation

There will be 6 blocks of approx. 6 weeks each. Each lesson will involve a WRM flashback task.
Independence and study skills will be fostered through: challenging questions and problems, group and pair work, modelling, homework and PLC after each half termly assessment.
Lessons will be based around multiple representations; Concrete, Pictorial, Abstract to give a deeper understanding of concepts. Reasoning will be developed through the exploration of mathematical patterns and images with a variety of problem solving methods for just one question.
Learning to move forward and uncover mathematical ideas from mistakes and misconceptions via true/false, spot the mistake and other reasoning tasks where students are required to make a judgement and justify their answers.
Knowledge organisers will be provided for each block to enable students to recall keywords, facts, formulas and/or formal methods.
WOW moments will occur when students solve complex problems, when the barrier wall disappears and they have a moment of satisfying clarity (no matter how brief) or spotting a relationship that was previously unseen.
Numeracy and calculator skills will be embedded.

Key assessments:

Formal assessments will take place every term.

Sparx tasks set as homework to consolidate learning.

Low-stakes testing as required
Live marking will occur during lessons as required

Autumn Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

Spring Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

Summer Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

Impact

Students will have increased understanding and confidence in maths and be able to apply new skills to a variety of new and challenging mathematical problems. Students will know more and remember more. There will be an increase in attainment, evidenced in regular, formal and interleaved assessments.

WRM – Year 8 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
Autumn	**Proportional Reasoning**						**Representations**					
	Ratio and scale		Multiplicative change		Multiplying and dividing fractions		Working in the Cartesian plane			Representing data		Tables & Probability
Spring	**Algebraic techniques**						**Developing Number**					
	Brackets, equations and inequalities				Sequences	Indices	Fractions and percentages			Standard index form		Number sense
Summer	**Developing Geometry**						**Reasoning with Data**					
	Angles in parallel lines and polygons			Area of trapezia and circles		Line symmetry and reflection	The data handling cycle				Measures of location	

Knowledge from year 8 feeds into year 9

- Multiply and divide fractions
- Directed numbers
- Calculate fractions, decimals and percentages of an amount
- Convert FDP
- Percentage increase and decrease
- Percentage change
- Reverse percentages
- Rounding ad estimating
- Standard form
- Converting units

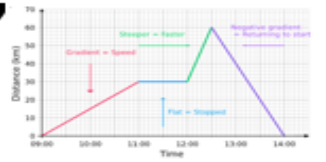
- Co-ordinates
- Straight line graphs
- Form expressions
- Expand brackets
- Factorise
- Solve equations and inequalities
- Generate sequences
- Index laws

- Simplify and use ratio notation
- Share into a ratio
- Direct proportion
- Similar shapes
- Conversion graphs
- Scale drawings and maps

- Scatter graphs
- Frequency tables
- Sample space diagrams
- Venn diagrams
- Two-way tables
- Probabilities
- Questionnaires
- Bar charts, line charts and pictograms
- Pie charts
- The range
- Mean, median and mode
- Averages from a frequency table

- Angles in parallel lines
- Constructing triangles and quadrilaterals
- Interior and exterior angles
- Areas of triangles, rectangles, parallelograms, trapeziums
- Reflection
- Area of circles and sectors
- Area and perimeter of compound shapes

YEAR 9 MATHS LEARNING JOURNEY



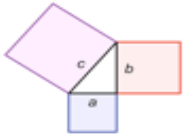
Year 10

Represent inequalities
Draw and interpret graphs
Tree diagrams (H)
Single event probabilities
Convert compound units (H)
Flow problems
Density
Distance-time graphs
Speed, distance, time
Ratio and algebra problems (H)
Ratio and best buy problems
Inverse proportion (Graphs = H)
Direct proportion
Similar shapes and triangles
Enlargement (negative scale factor = H)

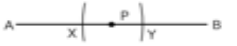
Representations
Graphs of simultaneous equations (H)
Events and outcomes

Reasoning with Proportion

Reasoning with Geometry
Conjectures with angles and shapes
Rotational symmetry
Translation
Series of transformations (H)
Solving angle problems, including with algebra
Angles in parallel lines
Exchange rates
Simple and compound interest
Bills and bank statements
Repeated percentage change (H)
Reverse percentages
Rotation
Pythagoras' Theorem
Pythagoras in 3D (H)

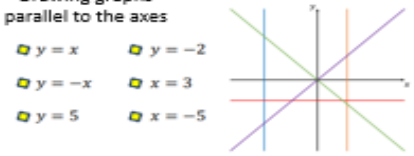


Reasoning with Number
Percentage increase, decrease and change
Standard form
HCF and LCM
FDP equivalence
Calculating with fractions
Surds (H)
Congruent triangles
Construct a triangle
Construct an angle bisector
Construct a perpendicular from a point and to a point
Construct a perpendicular bisector
Locus from points and lines



Constructing in 2 and 3 dimensions
Volume of prisms and cylinders
Draw and measure angles
Surface area of prisms and cylinders
Plans and elevations
Nets of 3D shapes
Names of 2D and 3D shapes
Scale drawings

Reasoning with Algebra
Factors, multiples and primes
Perpendicular lines (H)
Real life graphs
Understand and use y = mx + c
Conjectures about algebra
Conjectures about number
Rearrange formulae
Solve equations/inequalities with the unknown on both sides
Solve one and two step equations and inequalities
Gradients and intercepts
Drawing graphs parallel to the axes



Year 9

- Number
- Algebra
- Ratio and proportion
- Statistics/Probability
- Geometry & measure

Scheme of Learning YEAR OVERVIEW

The Big Picture

Year Group 9

Y9 Mathematics continues to revisit topics within new contexts whilst extending and further developing mathematical thinking and skills. They will experience "mastery" alongside more traditional teaching methods to gain a deeper understanding, more confidence and competence in their mathematics.

Intent

Units to be covered: Reasoning with algebra, Constructing in 2 and 3 dimensions, Reasoning with number, Reasoning with geometry, Reasoning with proportion, Representations.

Each term is split into two halves with a common theme, each half is split into further blocks that ensure students spend enough time to get a deep understanding of the topic covered. Blocks have been designed with interleaving as a key element enabling students to revisit previous work, develop knowledge and understanding and further extend their skills. Number work is emphasized throughout the blocks alongside estimation. Calculator skills have been incorporated throughout the curriculum, thus enabling all students to access the materials presented. Any student will be able to follow the main content of all lessons with higher levels being accesses as and when a class/student requires it.

Implementation

There will be 6 blocks of approx. 6 weeks each. Each lesson will involve a WRM flashback task.
Independence and study skills will be fostered through: challenging questions and problems, group and pair work, modelling, homework and PLC after each unit and past paper assessment.
Lessons will be based around multiple representations; Concrete, Pictorial, Abstract to give a deeper understanding of concepts. Reasoning will be developed through the exploration of mathematical patterns and images with a variety of problem solving methods for just one question. Formal structure to answering GCSE questions will be explored.
Learning to move forward and uncover mathematical ideas from mistakes and misconceptions via true/false, spot the mistake and other reasoning tasks where students are required to make a judgement and justify their answers.
Knowledge organisers will be provided for each block to enable students to recall keywords, facts, formulas and/or formal methods.
WOW moments will occur when students solve complex problems, when the barrier wall disappears and they have a moment of satisfying clarity (no matter how brief) or spotting a relationship that was previously unseen.
Numeracy and calculator skills will be embedded.

Key assessments:

Formal assessments will take place every term.

Sparx tasks set as homework to consolidate learning.

Low-stakes testing as required
Live marking will occur during lessons as required

Autumn Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

Spring Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

Summer Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

Impact

Students will have increased understanding and confidence in maths and be able to apply new skills to a variety of new and challenging mathematical problems. Students will know more and remember more. There will be an increase in attainment, evidenced in regular, formal and interleaved assessments.

WRM – Year 9 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
Autumn	**Reasoning with Algebra**						**Constructing in 2 and 3 Dimensions**					
	Straight line graphs		Forming and solving equations		Testing conjectures		Three-dimensional shapes			Constructions and congruency		
Spring	**Reasoning with Number**						**Reasoning with Geometry**					
	Numbers		Using percentages		Maths and money		Deduction		Rotation and translation		Pythagoras' Theorem	
Summer	**Reasoning with Proportion**						**Representations and Revision**					
	Enlargement and similarity		Solving ratio & proportion problems		Rates		Probability		Algebraic representation		Revision	

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Key Stage 4
Maths

Grove School: Curriculum

Year 10

This year will build on the foundations of maths knowledge and skills gained in Key Stage 3. All students will get a secure grounding in the key concepts of number, algebra, geometry, ratio, and statistics which underpin the future learning in Year 11 and are crucial to building the more complex GCSE concepts.

Year 11

This year will build on knowledge gained in previous years. Students will explore topics such as graphical representation, proportion and spatial reasoning with 3D shapes. Those students following the Higher pathway will also further develop their algebraic skills through the study of topics such as trigonometry and vectors.

Knowledge from year 9 feeds into year 10

- Find probabilities using equally likely outcomes
- Sample space diagrams
- Tree diagrams, Venn diagrams and two-way tables
- Pie charts
- Averages from lists and tables
- Time series graphs
- Scatter graphs and line of best fit

- Enlarge by positive integer and fractional scale factors
- Calculate missing sides and angles in similar shapes
- Scale diagrams
- Parts of a circle
- Solve area and volume problems involving similar shapes

- One-step and two-step equations and inequalities
- Straight line graphs
- Equations with unknowns on both sides
- Simplify algebraic expressions
- Nth term

- Use Ratios
- Fractions, decimals and percentages
- Work out percentages of amounts
- Increase and decrease by a given percentage
- Express one number as a percentage of another
- Find the original value after a percentage change
- Fraction calculations

- Addition, subtraction, multiplication and division
- Rounding to decimal places and significant figures
- Estimation
- Factors, multiples, primes, squares and cubes
- Prime factors, HCF and LCM
- Powers of ten and standard form
- Laws of Indices
- Calculate with numbers in standard form (R)

YEAR 10 MATHS LEARNING JOURNEY

Year 11

Expressions

Solve equations and inequalities with fractions

Algebraic fractions calculations (H)

Fractional indices (H)

Standard form

Indices

Algebraic arguments and proof

Solve equations with algebraic fractions (H)

Simplify expressions and use identities

Using Number

Nth term of linear sequences (quadratic (H))

Arithmetic and geometric sequences

Factors, multiples, primes, HCF and LCM

Upper and lower bounds (H)

Rounding and estimation

Surds

Rational and irrational numbers (H)

Calculations

Delving Into Data

Collecting and types of data

Displaying data

Averages

Stem-and-leaf diagrams

Scatter graphs

Compare distributions

Cumulative frequency and box plots (H)

Pie charts and histograms

Proportion and Proportional Change

Tree diagrams for independent and dependent events

Probability in tables, Venn diagrams, sample space diagrams and frequency trees

Theoretical and practical probability

Conditional probabilities

Reverse percentages

Percentage calculations

Ratio in area, volume and algebra

Comparing ratios and fractions

Problem solving with ratio

Fraction calculations

Fraction calculations

Iterative processes (H)

Simple and compound interest

Fractions, decimals and percentages

Developing Algebra and Geometry

Solve a pair of simultaneous equations where one is linear and the other quadratic (H)

Scale drawings

Length of arcs and areas of circles

Vectors

Volume and surface area of cylinders, cones and spheres

Circle theorems

Circumference and area of circles

Solve linear simultaneous equations

Solve equations and inequalities with unknowns on both sides

Represent solutions to inequalities on a graph

Draw and use straight line graphs

Use inequalities on number lines

Solve quadratic equations and inequalities

Reading and drawing bearings

Bearing problems involving sine and cosine rules (H)

Bearing problems with Pythagoras and Trigonometry

Similarity

Sine Rule, Cosine Rule, Area of Triangles (H)

Congruence

Lengths and angles in similar shapes

Form and solve one and two step equations and inequalities

Sine, cosine and Tangent

Areas and volumes in similar shapes

Enlarging by integers, fractions and negative scale factor

Year 10

Number

Geometry & measure

Ratio and proportion

Statistics/Probability

Algebra

Scheme of Learning YEAR OVERVIEW

The Big Picture

Year Group 10

Y10 Mathematics is designed to maximise progression and allow flexibility. Each topic presents opportunities to recap on previously covered content whilst also giving students the chance to extended themselves on the journey to achieving their potential.

Intent

'Learning Programme' blocks to be covered: Similarity, Developing algebra, Geometry, Proportions and proportional change, Delving into data, Using number.

Each term is split into units to ensure content is covered and students spend enough time to get a deep understanding of the topic covered. Units have an element of interleaving as a key element enabling students to revisit previous work, develop knowledge and understanding and further extend their skills. Number work is emphasized throughout the blocks alongside estimation. Calculator skills have been incorporated throughout the curriculum, thus enabling all students to access the materials presented. Any student will be able to access the work the challenging strands present however in extreme cases where student(s) are having considerable issues alternatives will be put in place alongside the main strand.

Implementation

There will be 11 units of approx. 2/3 weeks each. Each lesson will involve a WRM flashback task.
Independence and study skills will be fostered through: challenging questions and problems, group and pair work, modelling, homework and PLC after each unit and past paper assessment.
Lessons will be based around multiple representations; Concrete, Pictorial, Abstract to give a deeper understanding of concepts. Reasoning will be developed through the exploration of mathematical patterns and images with a variety of problem solving methods for just one question. Formal structure to answering GCSE questions will be embedded.
Learning to move forward and uncover mathematical ideas from mistakes and misconceptions via true/false, spot the mistake and other reasoning tasks where students are required to make a judgement and justify their answers.
Knowledge organisers will be provided for each block to enable students to recall keywords, facts, formulas and/or formal methods.
WOW moments will occur when students solve complex problems, when the barrier wall disappears and they have a moment of satisfying clarity (no matter how brief) or spotting a relationship that was previously unseen.
Numeracy and calculator skills will be embedded.

Key assessments:

Sparx tasks set as homework to consolidate learning.

Low-stakes testing as required
Live marking will occur during lessons as required

Autumn – GCSE paper
Spring – GCSE paper

Summer – Y10 mock exams 3 examination papers.

Autumn Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

GCSE paper

Spring Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

GCSE paper

Summer Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

Year 10 mock examinations – 3 papers

Impact

Students will have increased understanding and confidence in maths and be able to apply new skills to a variety of new and challenging mathematical problems. Students will know more and remember more. Students will have developed their AO2/3 skills enabling them to manipulate familiar and unfamiliar vocabulary and deduce mathematical content. They will be familiar with a variety of exam questions and be suitably prepared to answer examination style questions. There will be an increase in attainment, evidenced in regular, formal and interleaved assessments.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	**Similarity**						**Developing Algebra**					
	Congruence, similarity and enlargement			Trigonometry			Representing solutions of equations and inequalities			Simultaneous equations		
Spring	**Geometry**						**Proportions and Proportional Change**					
	Angles & bearings		Working with circles		Vectors		Ratios & fractions		Percentages and Interest		Probability	
Summer	**Delving into data**				**Using number**						**Expressions**	
	Collecting, representing and interpreting data				Non-calculator methods		Types of number and sequences		Indices and Roots		Manipulating expressions	

Knowledge from year 10

- Solve linear equations and inequalities
- Inequalities on a number line
- Straight line graphs
- Inequalities on a graph
- Solve quadratic equations and inequalities
- Simultaneous equations
- Nth term of linear and quadratic
- Algebraic fractions
- Algebraic proof

- Compare ratios and fractions
- Problem solve with ratio
- Ratio in area and volume

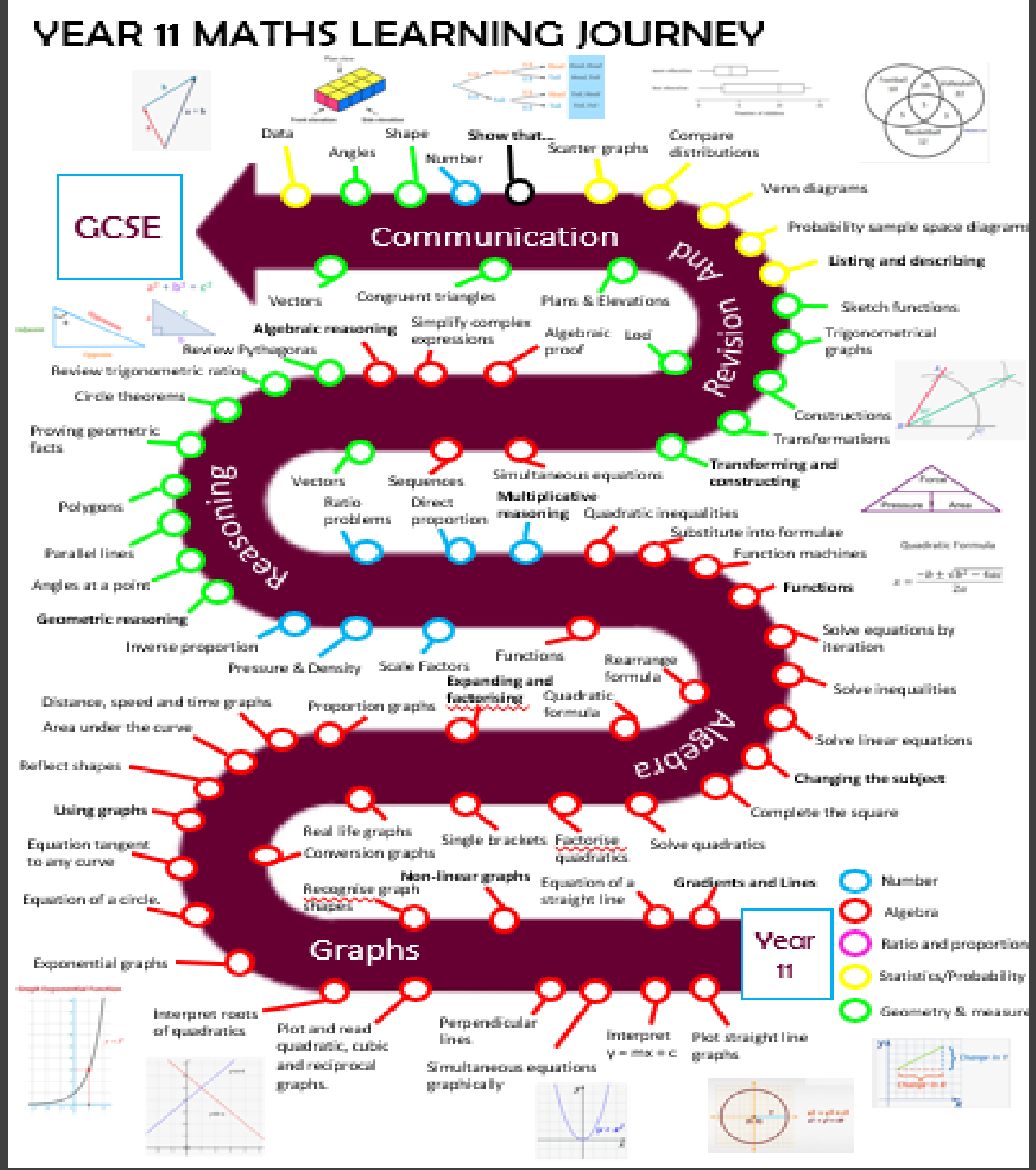
- Fractions, decimals and percentages
- Percentage calculations
- Simple and compound interest
- Fraction calculations
- Surds
- Rounding and estimation
- Upper and lower bounds
- HFC and LCM
- Indices
- Standard form

feeds into year 11

- Enlargement
- Length, area and volume of similar shapes
- Trigonometric ratios
- Congruency
- Bearings
- Scale drawings
- Area, circumference and parts of circles
- Circle theorems
- Cylinders, cones and spheres
- Vectors

- Theoretical probability
- Conditional probability
- Venn diagrams, sample space diagrams, frequency trees, pie charts
- Histograms
- Tree diagrams
- Cumulative frequency
- Boxplots
- Collecting and displaying data
- Averages
- Stem and leaf diagrams
- Scatter graphs

YEAR 11 MATHS LEARNING JOURNEY



Scheme of Learning YEAR OVERVIEW

The Big Picture

Year Group 11

Y11 Mathematics is the final year of the GCSE where students will continue to develop and build mathematical skills and knowledge required for their final examinations in the summer. There is an emphasis placed on reasoning skills at this stage in preparation for the final examinations.

Intent

Units to be covered: Graphs, Algebra, Reasoning

Up till February half term, terms are split into units to ensure content is covered and students spend enough time to get a deep understanding of the topic covered. From February student will follow a bespoke revision timetable based on previous PLC's and exam feed back. Units have an element of interleaving as a key element enabling students to revisit previous work, develop knowledge and understanding and further extend their skills. Number work is emphasized throughout the blocks alongside estimation. Calculator skills have been incorporated throughout the curriculum, thus enabling all students to access the materials presented. Any student will be able to access the work the challenging strands present however in extreme cases where student(s) are having considerable issues alternatives will be put in place alongside the main strand.

Implementation

There will be 4/5 units of approx. 3/4 weeks each. Each lesson will involve a WRM flashback task.
Independence and study skills will be fostered through: challenging questions and problems, group and pair work, modelling, homework and PLC after each unit and mock assessment.
Lessons will be based around multiple representations; Concrete, Pictorial, Abstract to give a deeper understanding of concepts. Reasoning will be developed through the exploration of mathematical patterns and images with a variety of problem solving methods for just one question. Formal structure to answering GCSE questions will be embedded. Past papers will be part of everv dav lessons
Learning to move forward and uncover mathematical ideas from mistakes and misconceptions via true/false, spot the mistake and other reasoning tasks where students are required to make a judgement and justify their answers.
Knowledge organisers will be provided for each block to enable students to recall keywords, facts, formulas and/or formal methods. Revision maps and other resources will be utilized to aid recall
WOW moments will occur when students solve complex problems, when the barrier wall disappears and they have a moment of satisfying clarity (no matter how brief) or spotting a relationship that was previously unseen. Completion and accessing more exam questions will boost motivation to succeed.
Numeracy and calculator skills will be embedded.

Key assessments:

Sparx tasks set as homework to consolidate learning.

Low-stakes testing as required
Live marking will occur during lessons as required

Autumn – Mock 1
3 examination papers.

Spring – Mock 2
3 examination papers.

Autumn Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

Mock examinations 1

Spring Term

Ongoing AFL through mini whiteboard work. Topic assessments with feedback sessions. Each topic has multiple Sparx tasks with feedback.

Mock examinations 2

Summer Term

GCSE examinations

Impact

Students will have the desired understanding and confidence in maths and be able to apply skills to a variety of challenging mathematical problems. Students will know more and remember more. Students will have developed their AO1/2/3 skills enabling them to manipulate familiar and unfamiliar vocabulary and deduce mathematical content. They will be familiar with a variety of exam questions and be suitably prepared to answer all examination style questions. Students will achieve their maximum attainment level to progress to their next level of study.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	**Graphs**						**Algebra**					
	Gradients & lines		Non-linear graphs		Using graphs		Expanding & factorising		Changing the subject		Functions	
Spring	**Reasoning**						**Revision and Communication**					
	Multiplicative		Geometric		Algebraic		Transforming& constructing			Listing & describing	Show that…	
Summer	**Revision**						**Examinations**					

Key Stage 5
Maths

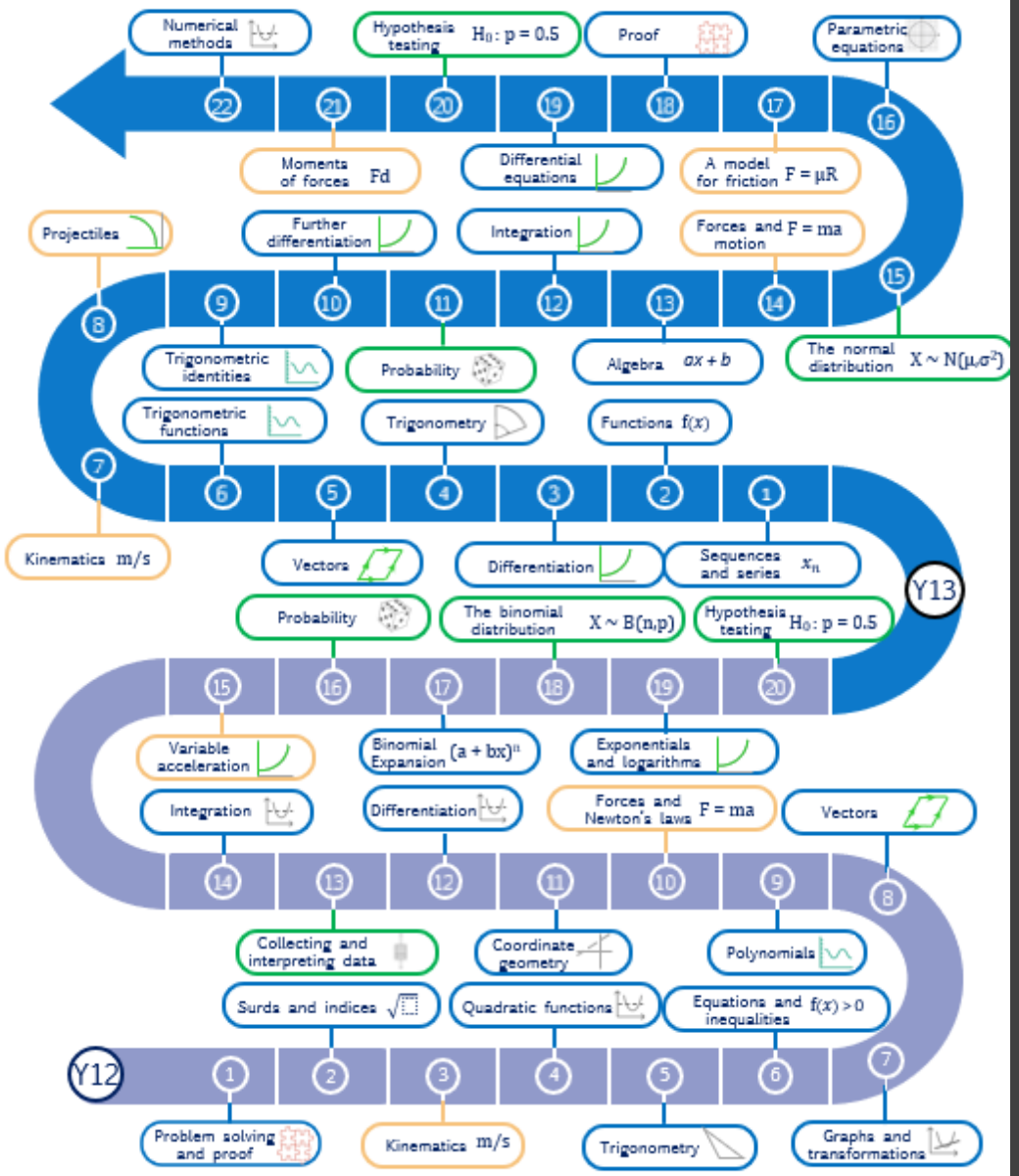
Year 12

This year will build on the foundations of maths knowledge and skills gained in Key Stage 4. Students will be introduced to calculus and additional algebraic methods, as well as studying constant and variable acceleration and probability. All students will gain a secure grounding in the key concepts of Pure Maths, Statistics, and Mechanics which underpin their future learning in Year 13, and are crucial to more complex concepts. Students studying Further Maths will take this further by studying more intricate methods of algebraic reasoning and proof, as well as the study of Mechanics and Statistics.

Year 13

This year will extend the work done by students in Year 12. All students will consolidate and develop knowledge and understanding of the additional key concepts of Pure Maths, Statistics, and Mechanics which underpin the application of Maths at A Level, whilst preparing students for higher-level and undergraduate study. Students of Further Maths will also have the opportunity to study additional modules such as Modelling with Algorithms or Further Pure.

A LEVEL MATHS LEARNING JOURNEY
YEAR 12 AND 13



Scheme of Learning YEAR OVERVIEW

The Big Picture

Year Group 12

Y12 Mathematics is designed to maximise progression in preparation for Y13 or AS Level outcomes. Many topics presents opportunities to recap on GCSE covered content linking this to brand new A-Level content. All topics give students the chance to extended themselves on the journey to achieving their potential.

Content covered – A Level Maths

Pure mathematics: Problem solving, surds and indices, quadratic functions, equations and inequalities, coordinate geometry, trigonometry, polynomials, graphs and transformations, the binomial expansion, differentiation, integration, vectors, exponentials and logarithms.
Statistics: Collecting and interpreting data, probability, the binomial distribution, statistical hypothesis testing.
Mechanics: Kinematics, Newton's laws of motion, variable acceleration.

Implementation

Lessons are split between two members of staff. Both teachers deliver Pure Maths modules with a focus on Mechanics from Teacher 1 and Statistics from Teacher 2.

Independence and study skills will be fostered through challenging questions and problems, group and pair work, modelling, homework and PLC after each unit and past paper assessment.

Lessons will be based around multiple representations; Concrete, Pictorial, Abstract to give a deeper understanding of concepts. Reasoning will be developed through the exploration of mathematical patterns and images with a variety of problem-solving methods for just one question. Formal structure to answering A-Level questions will be embedded.

Learning to move forward and uncover mathematical ideas from mistakes and misconceptions via true/false, spot the mistake and other reasoning tasks where students are required to make a judgement and justify their answers.

Knowledge organisers will be provided for each block to enable students to recall keywords, facts, formulas and/or formal methods.
WOW moments will occur when students solve complex problems, when the barrier wall disappears, and they have a moment of satisfying clarity (no matter how brief) or spotting a relationship that was previously unseen.

Numeracy and calculator skills specific to A-Level content will be embedded.

Key assessments:

Topic assessments throughout the academic year.

Low-stakes testing.

Live marking during lessons.

January mock examinations.

June mock examinations.

Impact

Students will have increased understanding and confidence in A-Level Maths and be able to apply new skills to a variety of new and challenging mathematical problems. Students will know more and remember more. Students will have developed skills enabling them to manipulate familiar and unfamiliar vocabulary and deduce mathematical content. They will be familiar with a variety of exam questions and be suitably prepared to answer examination style questions. There will be an increase in attainment, evidenced in regular, formal and interleaved assessments.

Scheme of Learning YEAR OVERVIEW

The Big Picture

Year Group 13

Y13 Mathematics is designed to maximise progression in preparation for Y13 Examination and Maths at Degree Level. Many topics presents opportunities to recap on Year 12 covered content linking this to brand new Year 2 A-Level content. All topics give students the chance to extended themselves on the journey to achieving their potential.

Content covered – A Level Maths

Pure mathematics: Proof, trigonometry, sequences and series, functions, differentiation, trigonometric functions, algebra, trigonometric identities, further differentiation, integration, parametric equations, vectors, differential equations, numerical methods.
Statistics: Probability, statistical distributions, statistical hypothesis testing.
Mechanics: Kinematics, forces and motion, moments of forces, projectiles, a model for friction.

Implementation

Lessons are split between two members of staff. Both teachers deliver Pure Maths modules with a focus on Mechanics from Teacher 1 and Statistics from Teacher 2.

Independence and study skills will be fostered through challenging questions and problems, group and pair work, modelling, homework and PLC after each unit and past paper assessment.

Lessons will be based around multiple representations; Concrete, Pictorial, Abstract to give a deeper understanding of concepts. Reasoning will be developed through the exploration of mathematical patterns and images with a variety of problem-solving methods for just one question. Formal structure to answering A-Level questions will be embedded.

Learning to move forward and uncover mathematical ideas from mistakes and misconceptions via true/false, spot the mistake and other reasoning tasks where students are required to make a judgement and justify their answers.

Knowledge organisers will be provided for each block to enable students to recall keywords, facts, formulas and/or formal methods.
WOW moments will occur when students solve complex problems, when the barrier wall disappears, and they have a moment of satisfying clarity (no matter how brief) or spotting a relationship that was previously unseen.

Numeracy and calculator skills specific to A-Level content will be embedded.

Key assessments:

Topic assessments throughout the academic year.

Low-stakes testing.

Live marking during lessons.

January mock examinations.

Impact

Students will have increased understanding and confidence in A-Level Maths and be able to apply new skills to a variety of new and challenging mathematical problems. Students will know more and remember more. Students will have developed skills enabling them to manipulate familiar and unfamiliar vocabulary and deduce mathematical content. They will be familiar with a variety of exam questions and be suitably prepared to answer examination style questions. There will be an increase in attainment, evidenced in regular, formal and interleaved assessments.

A LEVEL FURTHER MATHS LEARNING JOURNEY
YEAR 12 AND 13

One major option + one minor option OR **Three minor options**

Major options

Major

Mechanics major
Statistics major
The first half of each of these is the same content as a minor option and can be taught in Year 12.

You cannot choose:
Mechanics major + Mechanics minor
Statistics major + Statistics minor

Minor options

Minor

Mechanics minor
Statistics minor
Modelling with algorithms
Numerical methods
These can be taught in either Year 12 or Year 13.

Extra pure
Further pure with technology

AS LEVEL FURTHER MATHS LEARNING JOURNEY
YEAR 12

Core pure is mandatory, choose two AS options

These AS options are available as standalone Level 3 Certificates:

AS Core pure
Statistics a
Numerical methods
Mechanics a
Modelling with algorithms

AS options

AS option

Mechanics a
Statistics a
Modelling with algorithms
Numerical methods
These are suitable for Year 12 and have the same content as the respective A level minor option.

Mechanics b
Statistics b
These are suitable for Year 13 and have the same content as the second half of the respective A level major option.

Scheme of Learning YEAR OVERVIEW

The Big Picture

Year Group 12 & 13

Further Mathematics is designed to maximise progression in preparation for Y13 Examination and related degree Level studies. Many topics presents opportunities to recap and build on content covered in A Level Mathematics. All topics give students the chance to extended themselves on the journey to achieving their potential.

Content covered – Further Maths

Core Pure: Matrices, complex numbers, roots of polynomials, sequences and series, Vectors and 3D space.
Statistics: Discrete random variables, discrete probability distributions, bivariate data, Chi-squared tests.
Mechanics: Forces, work, energy and power, impulse and momentum, centre of mass, dimensional analysis.
Modelling with Algorithms: Algorithms, graphs and networks, linear programming, simplex method.

Implementation

Four weekly lessons are split between two members of staff. Both teachers deliver Core Pure content, whilst the applied units are delivered in a way that utilises expertise of staff and maximises the potential of students.

Independence and study skills will be fostered through challenging questions and problems, group and pair work, modelling, homework and PLC after each unit and past paper assessment.

Each unit starts with a student self reflective log which is revisited after each objective has been taught (may be across a few lessons).

Lessons will be based around developing a deeper understanding of concepts. Reasoning will be developed through the exploration of mathematical patterns and images with a variety of problem-solving methods for just one question. Formal structure to answering A Level questions will be embedded.

Learning to move forward and uncover mathematical ideas from mistakes and misconceptions via true/false, spot the mistake and other reasoning tasks where students are required to make a judgement and justify their answers.

Knowledge organisers will be provided for each block to enable students to recall keywords, facts, formulas and/or formal methods.
WOW moments will occur when students solve complex problems, when the barrier wall disappears, and they have a moment of satisfying clarity (no matter how brief) or spotting a relationship that was previously unseen.

Numeracy and calculator skills specific to A Level content will be embedded.

Key assessments:

Topic assessments throughout the academic year.

Low-stakes testing.

Live marking during lessons.

End of year Y12 exams & Y13 mock examinations

Impact

Students will have increased understanding and confidence in A Level Maths and be able to apply new skills to a variety of new and challenging mathematical problems. Students will know more and remember more. Students will have developed skills enabling them to manipulate familiar and unfamiliar vocabulary and deduce mathematical content. They will be familiar with a variety of exam questions and be suitably prepared to answer examination style questions. There will be an increase in attainment, evidenced in regular, formal and interleaved assessments.