

# Maths

## Intent:

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Year 9 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 . 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

## Context:

A continuation of the White Rose scheme growing from year 8

**The Big Picture—Intent:** 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. 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 accessed as and when a class/student requires it.

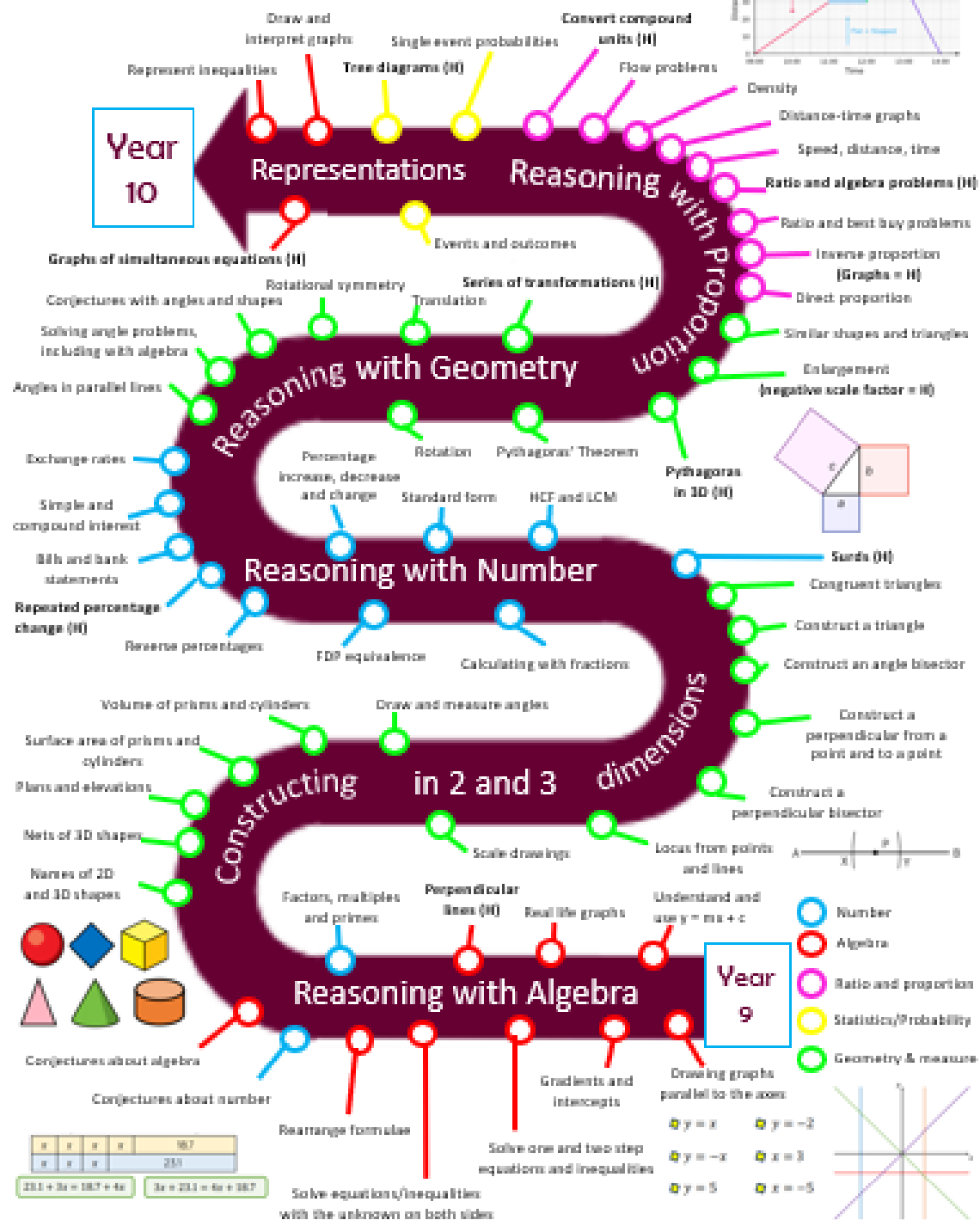
**YEAR 9  
MATHS**

Content / Units	Skills	Knowledge	Prior—Y8	Next—Y10
<ul style="list-style-type: none"> <li>• Reasoning with Algebra</li> <li>• Constructing in 2 and 3 dimensions</li> <li>• Reasoning with number</li> <li>• Reasoning with geometry</li> <li>• Reasoning with proportion</li> <li>• Representations</li> </ul>	<ul style="list-style-type: none"> <li>• To draw and interpret linear graphs</li> <li>• To solve equations and inequalities, including with the unknown on both sides</li> <li>• To change the subject of a formula</li> <li>• To calculate the surface area and volume of prisms and cylinders</li> <li>• To construct nets and scale drawings</li> <li>• To construct perpendiculars and bisectors</li> <li>• To calculate with fractions</li> <li>• To use multipliers to solve percentage problems</li> <li>• To rotate, translate and enlarge shapes</li> <li>• To find lengths using Pythagoras’ Theorem</li> <li>• To calculate with speed and density</li> <li>• To represent and solve problems using graphs, tables and algebra</li> </ul>	<ul style="list-style-type: none"> <li>• To know how to test conjectures and justify answers mathematically</li> <li>• To know the names of 2D and 3D shapes</li> <li>• To know and identify faces, edges and vertices on 3D shapes</li> <li>• To know the meaning of congruency and recognise the conditions for congruent triangles</li> <li>• To know how to solve problems using HCF and LCM</li> <li>• To know how to apply skills to financial maths problems</li> <li>• To know how to apply angle facts to problems involving algebra</li> <li>• To know how to solve direct proportion problems using graphs and ratio</li> <li>• To know how to represent data in different ways, and criticise each representation</li> <li>• To know how to represent worded problems using graphs, tables and algebra</li> </ul>	Learning in Y7 and 8 will be built upon and reinforced to improve understanding and mastery of topics.	Learning in Y10 will apply all of the knowledge learned in KS3 to higher knowledge and problem solving. Students will learn to apply the knowledge learned here to more difficult scenarios.

Implementation	Marches Futures Links	Summative Assessment
There will be 15 LP blocks of approx. 2 weeks each. Each lesson will involve an interleaving starter activity. 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. TOPs and Literacy key words 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.	Fun Maths Roadshow to take place annually  Continue to develop our learners understanding of numeracy and confidence working with number	Formal assessment will take place after each block  Half termly assessment will take place in lieu of the final block assessment  Hegarty Maths tasks set as homework to consolidate learning.  Low-stakes testing as required  Live marking will occur during lessons as required

**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.

# YEAR 9 MATHS LEARNING JOURNEY



## Autumn Half Term 1 – Reasoning with Algebra

Block 1 – Weeks 1 and 2	Block 2 – Weeks 3 and 4	Block 3– Weeks 5 and 6
<p><b>Straight line graphs</b></p> <ul style="list-style-type: none"> <li>Interpret straight line graphs</li> <li>Find and use the equation of a straight line</li> <li>Reduce equations to the form <math>y = mx + c</math></li> <li>Compare to linear sequences and finding the rule for the <math>n^{\text{th}}</math> term</li> </ul>	<p><b>Forming and solving equations and inequalities</b></p> <ul style="list-style-type: none"> <li>Revisit and extend to equations and inequalities with unknowns on both side using all previous contexts: angles, probability, area etc.</li> <li>Change the subject of a formula</li> </ul>	<p><b>Testing conjectures</b></p> <ul style="list-style-type: none"> <li>Test conjectures in a wide range of context e.g.                             <ul style="list-style-type: none"> <li>Sums and products of odd and even numbers</li> <li>Is a given number in a sequence?</li> <li>Is this shape...?</li> <li>Are these lines parallel?</li> <li>What would happen if...?</li> </ul> </li> </ul>
<p style="text-align: center;"><b>Notes/Links/Interleaving</b></p> <ul style="list-style-type: none"> <li>Link equations of graphs to solving equations</li> <li>Revisit key topics through equations</li> <li>Review use of brackets</li> <li>Review geometric properties and rules</li> </ul>		<p style="text-align: center;"><b>Additional Higher Content</b></p> <ul style="list-style-type: none"> <li>Solve a pair of simultaneous equations using graphical methods</li> <li>Change the subject of a complex formula</li> <li>Explore the gradients of perpendicular lines</li> </ul>

## Autumn Half Term 2 – Constructing in 2 and 3 Dimensions

Block 4 – Weeks 7 to 9	Block 5 – Weeks 10 to 12
<p><b>Three dimensional shapes</b></p> <ul style="list-style-type: none"> <li>Understand the language of faces, edges and vertices</li> <li>Know the names of common prisms and non-prisms</li> <li>Identify 2-D shapes within 3-D shapes</li> <li>Work out the volume and surface area of cuboids and cylinders</li> <li>Work out the volume of any prism</li> <li>Work out missing lengths given area and/or volume</li> </ul>	<p><b>Constructions and congruency</b></p> <ul style="list-style-type: none"> <li>Construct 3-D shapes from nets, and construct the net of a given 3-D shape</li> <li>Construct and use scale drawings</li> <li>Construct perpendiculars and bisectors</li> <li>Understand congruency</li> <li>Exploring congruency via construction</li> </ul>
<p style="text-align: center;"><b>Notes/Links/Interleaving</b></p> <ul style="list-style-type: none"> <li>Revisit estimation</li> <li>Revisit rounding to nearest integer, decimal places, significant figures</li> <li>Revisit unit conversions, including area and volume units</li> </ul>	<p style="text-align: center;"><b>Additional Higher Content</b></p> <ul style="list-style-type: none"> <li>Explore volume of cones, spheres and complex shapes</li> <li>Work out the surface area of any prism</li> <li>Explore the locus of a path</li> </ul>

### Spring Half Term 1 – Reasoning with number

#### Block 1 – Weeks 1 and 2

##### Numbers

- Revisit types of number – extend to include rational and real numbers
- Revisit fraction arithmetic
- Extend knowledge of HCF and LCM
- Revisit standard form

#### Block 2 – Weeks 3 and 4

##### Using percentages

- Revisit percentage increase and decrease
- Use percentages over 100%
- Find percentage changes
- Use multipliers in a variety of contexts
- Solve “reverse percentage” problems

#### Block 3– Weeks 5 and 6

##### Mathematics and money

- Explore financial mathematics including:
  - Bills and bank statements
  - Interest
  - Unit pricing (best buys)

##### Notes/Links/Interleaving

- Add and subtract fractions (lowest common denominator)
- Working out fractions of amounts
- FDP equivalence
- Ratio

##### Additional Higher Content

- Work with repeated percentage change

### Spring Half Term 2 – Reasoning with geometry

#### Block 4 – Weeks 7 and 8

##### Deduction

- Revisit angles rules, including within special quadrilaterals
- Find angles using algebraic methods
- Use chains of reasoning to evaluate angles

#### Block 5 – Weeks 9 and 10

##### Rotation and translation

- Identify the order of rotational symmetry of a shape
- Find the result of rotating a shapes
- Translate points and shapes by a given vector
- Understand variance and invariance in the context of transformations

#### Block 6– Weeks 11 and 12

##### Pythagoras’ theorem

- Identify the hypotenuse of a right-angled triangle
- Determine whether a triangle is right-angled
- Calculate missing sides in right-angled triangles

##### Notes/Links/Interleaving

- Revisit fractions and directed number in the context of rotation
- Compare and contrast rotational symmetry with line symmetry
- Identify 2-D and 3-D shapes
- Link constructions and geometric reasoning

##### Additional Higher Content

- Develop more complex geometrical proofs
- Find the result of a series of transformations
- Explore proofs of Pythagoras’ theorem
- Use Pythagoras’ theorem in 3-D shapes

## Summer Half Term 1 – Reasoning with proportion

### Block 1 – Weeks 1 and 2

#### Enlargement and similarity

- Enlarge shapes by a positive scale factor, including from a given point
- Calculate the lengths of missing sides in similar shapes

### Block 2 – Weeks 3 and 4

#### Solving ratio and proportion problems

- Direct proportion problems and graphs
- Conversion graphs
- Solve ratio problems given the whole or a part
- Simple inverse proportion
- Unit pricing problems ('best buys')

### Block 3– Weeks 5 and 6

#### Rates

- Work with speed, distance, time
- Solve problems involving density
- Work with compound units

#### Notes/Links/Interleaving

- Links to ratio notation
- Revisit circumference
- Revisit  $y = mx$
- Revisit unit pricing

#### Additional Higher Content

- Enlarge shapes by a negative scale factor
- Similar triangles – exploring ratios in right-angled triangles
- Inverse proportion graphs
- Converting compound measures

## Summer Half Term 2 – Representations

### Block 4 – Weeks 7 to 12

#### Solving problems using graphs, tables and algebra. Include:

- Revisit data measures, charts and graphs including bivariate data; criticise misleading graphs
- Revisit alternative representations of sequences – including finding algebraic rules
- Revisit frequency trees and other representations e.g. tables
- Revisit conversion between standard form and ordinary form, and representing numbers as products of primes
- Expand a pair of binomials
- Create and interpret tables and timetables; solve problems involving speed distance and time
- Solve inequalities on number lines, including error intervals
- Represent word problems in a variety of forms (graphs, tables, expressions...)
- Interpret graphs of any form (exponential, piece-wise, reading from quadratics, speed/time)
- Compare theoretical and experimental probabilities; probability of two or more events

#### Notes/Links/Interleaving

- Throughout – see above

#### Additional Higher Content

- Tree diagrams

# Glossary of Key Terms:

LORIC

Interleaving

Mastery