



Curriculum Guide for Maths

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The de Ferrers Trust

1. Curriculum Rationale

INTENT

The Mathematics curriculum (Y7-11) follows the structure of the Pearson KS3/4 textbooks and Scheme of Work.

There is a Core Curriculum throughout Y7 & Y8, creating a connected pathway in which all students can be successful following on from their KS2 learning.

Students in years 9, 10 and 11 then follow a tiered route, either foundation or higher, that builds on topics taught at KS3 to create a spiral curriculum in which topics are revisited and developed.

Students are given every chance to be successful on the Higher tier GCSE Maths course, with a specific focus on crossover content for those students who this decision is marginal.

The curriculum:

- Is sequenced to ensure topics and concepts are revisited and built upon throughout KS3 and KS4, to embed conceptual understanding and develop problem-solving skills.
- Provides accessible starting points for each learning sequence, with prior knowledge checks and end of unit assessments for each topic.
- Contains consistent and accurate use of mathematical language and explanations which match those contained in student knowledge organisers, to give students the vocabulary they need to reason mathematically.
- The structure of units within the curriculum, following the structure of the National Curriculum, aims to adhere to the principles of 'Responsive teaching' as set out on the next page.

2. How the students will learn in Maths

IMPLEMENTATION

Retrieval Practice

Each lesson will contain a retrieval activity on previously covered content. The aims of this are:

- To improve students' long-term retention of key mathematical skills and knowledge to help improve fluency, transfer and reduce cognitive load.
- To help develop a culture of high expectations, exemplary behaviour and mathematical rigour within every classroom.
- The systematic approach to retrieval practice ensures key knowledge and skills are recalled at specific intervals, leveraging the 'spacing effect' and 'testing effect' to build durable learning. The systematic approach ensures that information is repeated in a distributed fashion or spaced over time, it is learned more slowly but it is repeated much longer' (Roediger & Pyc, 2012).

- To develop students who are capable of selecting required approaches from a variety of different interleaved questions, rather than providing solutions to a 'blocked' set of questions from the same topic (Rohrer, Dedrick & Burgess, 2014).

Where the questions included in the systematic retrieval practice are not deemed appropriate for the students at that time, staff are encouraged to adapt the questions which are included according to the needs of the class.

Sequencing

At Key Stage 3, there is a focus on the basics of number and algebra. The sequencing is designed to allow for interleaving of content; the placement of each unit within the scheme of work allows for knowledge to easily be transferred into the following topics allowing for links between domains to become visible. As a result, much of the Key Stage 3 scheme of work contains the following progression sequence: Number > Algebra > Geometry or Statistics.

Each section of the scheme of work references the prerequisites and dependants for that unit. This is in order to ensure that teaching builds on the knowledge and skills that students have, whilst ensuring that topics are taught in a way which best prepares them for success in future topics. Priority has been given to the topics which are heavily built upon at Key Stage 4 and 5.

Our KS3 and KS4 curriculum is based on the Pearsons SOW. It is a spiral curriculum that ensures students revisit topics . This provides the opportunity for topics to be revisited and knowledge built on and developed. We explicitly convey curriculum links through sharing the student learning journey (curriculum map) which is reinforced through the use of explicit vocabulary tasks to improve links between topics and successful encoding of knowledge and skills into long term memory. As Rohrer & Taylor (2006), found: 'the retention of Mathematics is markedly improved when a given number of practice problems are distributed across multiple assignments and not massed into one'.

Responsive teaching

Decide

- Pre-test to check prerequisites
- Pre-test to check knowledge of content to be taught
- Test in advance of teaching content
- Decide on the next steps and where to start

Explain

- Use of examples/non-examples to define concepts
- Diagnostic questions to check knowledge
- Example-problem pairs (I do, you do)
- Break complex content into smaller steps

Practice

- Ensure high initial success levels
- Introduce desirable difficulties
- Include opportunities for mathematical reasoning
- Problem solving when a choice of approaches is required

Review

- Exit tickets to help decide next steps
- End of unit reviews to help decide next steps
- Retrieval practice and homework
- Cumulative summative assessments

COVID response

As a result of the COVID pandemic, there have been changes to the curriculum. It was not possible to complete all of the required units during the academic year. As a result, some units have been moved into the following year group. This will still enable all students to complete the GCSE curriculum by the end of Y11. Our knowledge organisers and retrieval practise have been updated to mirror this and these changes are reflected in a new curriculum map.

Each class has a live document that is updated regularly that includes topics to either reteach or set as homework. If a topic is highlighted as high priority and therefore requires reteaching then the class teacher will alter their medium term plan to include this.

Teachers also have autonomy over topics included in the retrieval questions and these can also be altered to allow the recall of low priority topics.

The majority of assessments are also followed up with a question level analysis (QLA) that not only informs the class teacher's medium and long term plan but also provides students with an individualised revision list that links to our homework platform.

3. Curriculum Map

Mathematics Curriculum Map

Y7

Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10
Frequency tables	DMAS	Function machines	Ordering decimals	Equivalent fractions	Probability scales	Direct proportion	Measuring angles	Term-to-term rules	Congruence
Averages	DMAS Negative numbers	Writing expressions	Rounding decimals	Ordering fractions	Single event probability	Equivalent ratios	Basic angle rules	Fibonacci sequences	Enlargement (no centre)
Pictograms	HCF/LCM	DMAS expressions	Metric conversions	AS fractions	Experimental probability	Dividing in a given ratio	Angles in a triangle	Geometric sequences	Symmetry (inc rotational)
Bar charts	Squares, cubes and roots	Substitution	Coordinates	Fractions of a quantity		Ratio to find a quantity	Angles in a quadrilateral	Linear sequences	Reflections
	BIDMAS	Formulae	DMAS decimals	FDP conversions		Ratio given the difference		Nth term	Rotations
		Expanding brackets	Perimeter	Percentages of a quantity		Ratio & FDP		Midpoint of line segments	Translation
			Area (rectangle, triangle)					Plot linear graphs	

Y8

Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10
DMAS decimals	Area of a triangle	Pie charts	Expanding brackets	Conversion graphs	Rounding (inc sig figs)	Classifying quadrilaterals	Ordering fractions	Direct proportion graph	Decimal time
DMAS negatives	Area of a parallelogram	Averages from a table	Factorise expressions	Distance time graphs	DMAS decimals	Angles in parallel lines	DMAS fractions	Plotting linear graphs	FDP conversion
Squares, cubes and roots	Area of a trapezium	Two-way tables	Solve equations	Line graphs	Ratio	Interior + exterior angles		Gradient	Percentages inc/dec
Index form	Volume and surface area	Comparing data	Form + solve equations		Ratio 1:n, n:1	Angles in polygons		$y = mx + c$	Percentage change
Prime factorisation	Plans and elevations	Scatter graphs	Equations (both sides)						Reverse percentages
HCF/LCM using primes	Unit conversions								Percentage multipliers

Y9F

Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
DMAS negatives	Forming expressions	Frequency tables	DMAS fractions	Solving equations	Congruence
Rounding	DMAS expressions	Two-way tables	Fractions of a quantity	Inequality notation	Angles in triangles
Estimation	Substitution	Bar charts + line graphs	FDP conversion	Solving inequalities	Angles in quadrilaterals
HCF/LCM by listing	Expanding brackets	Pie charts	Percentages of a quantity	Rearrange formulae	Angles in parallel lines
Prime factorisation	Factorising expressions	Scatter graphs	Simple interest	Generate sequences	Angles in polygons
HCF/LCM using primes			Percentage inc/dec	Nth term of a sequence	
Laws of indices					

Y9H

Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Product rule	Expand double brackets	Pie charts	DMAS fractions	Angles in polygons	Distance-time graphs
Estimation	Factorise quadratics	Time-series graphs	Ratio problems	Angles in parallel lines	Velocity-time graphs
HCF/LCM using primes	Solve complex equations	Scatter graphs	Simple interest	Pythagoras' Theorem	Length of line segments
Laws of indices	Form + solve equations	Averages (estimated)	Percentage multipliers	Trigonometry	Parallel lines
Fractional indices	Rearrange formulae	Two-way tables	Percentage inc/dec		Plot quadratics + cubics
Standard form	Fibonacci sequences	Venn diagrams	Reverse percentages		Plot graphs of circles
Surds	Quadratic sequences		Compound interest		

Y10F

Unit 7	Unit 8	Unit 9	Unit 10	Unit 11	Unit 12	Unit 13	Unit 14	Unit 15	Unit 16
Averages	Area	Midpoints	Translation	Solving ratio problems	Pythagoras' Theorem	Single event probability	Percentage multipliers	Plans and elevations	Double brackets
Averages from a table	Converting units of area	Plotting linear graphs	Reflection	Comparing ratios	Trigonometry	Expectation	Reverse percentages	Constructions	Quadratic graphs
Averages (estimated)	Volume and surface area	Gradient	Rotation	Direct proportion	Exact trig values	Relative frequency	Percentage change	Loci	Factorising quadratics
Sampling		$y = mx + c$	Enlargement			Listing outcomes	Simple interest	Bearings	Solving quadratics
		Distance-time graphs				Sample space diagrams	Compound interest		
						Venn diagrams	Compound measures		
						Probability trees	Direct proportion		

Y10H

Unit 7	Unit 8	Unit 9	Unit 10	Unit 11	Unit 12	Unit 13	Unit 14	Unit 15	Unit 16
Compound shapes	Plans and elevations	Solving inequalities	Product rule	Percentage multipliers	Congruence (inc proofs)	Upper and lower bounds	Sampling	Sim eqns graphically	Circle theorems
Upper and lower bounds	Reflections	Expanding brackets	Listing outcomes	Repeated percentages	Similar triangles	Sine rule + cosine rule	Cumulative frequency	Graphical inequalities	Proving circle theorems
Error intervals	Rotations	Factorising quadratics	Sample spaces	Compound measures	Proving similarity	3D Pythag + trigonometry	Box plots	Sketching quadratics	
Volume and surface area	Enlargements	Solving by factorisation	Experimental probability	Direct proportion	LSF, ASF, VSF	Trigonometric graphs	Histograms	Quadratic inequalities	
Circles	Translations	The quadratic formula	Tree diagrams	Inverse proportion		Graph transformations	Comparing data	Triple brackets	
Arc length + sector area	Bearings	Completing the square	Conditional probability					Solving by iteration	
Cylinders + spheres	Constructions	Linear simultaneous eqns	Venn diagrams						
Pyramids + cones	Loci	Non-linear simultaneous							

Y11F

Unit 17	Unit 18	Unit 19	Unit 20
Circles	DMAS fractions	Similarity	Non-linear graphs
Arc length + sector area	Laws of indices	Congruence	Simultaneous equations
Volume and surface area	Standard form	Vectors	Rearranging formulae

4. Assessment Plan

Assessment

There are 6 **summative** assessments per year for years 7 - 10. Three of these are Granville Academy assessments and the other three are De Ferrers Trust assessments that aim to test all of the knowledge and skills that the students have developed.

To support our students' learning and to inform responsive teaching approaches we also use **formative** assessment. Examples of this are exit tickets and topic reviews which are used to provide whole class feedback to our students and provide opportunities to reflect on teaching and learning.

5. Homework and Independent Learning

The Maths faculty uses a platform called HegartyMaths (www.hegartymaths.com) for student homework.

Each student in Year 7 to 9 will be set two HegartyMaths tasks for homework each week plus a Knowledge organiser task or Memri; whilst in Years 10 and 11 students will be set three tasks each week plus a Knowledge organiser task or Memri. Every student has a homework book in which they are to complete their extended practise.

The homework that is set using HegartyMaths will be practice of previously learnt material. The aim for every student is to achieve 100% on each task that is set. In the event that a student does not achieve 100%, we ask that students watch the accompanying video and then reattempt only the questions that they have got incorrect. It may also be useful to complete the building block tasks in order to help achieve 100%. If help is still required students are encouraged to contact their Math teacher.

6. Useful Websites

<https://hegartymaths.com/>

<https://corbettmaths.com/>

<https://www.mathsgenie.co.uk/>

<https://www.onmaths.com/>

<https://www.cgpbooks.co.uk/>

<http://www.deferrerstrust.com/knowledgeorganisers>