

KS3 Curriculum

National curriculum aims: develop fluency, to reason mathematically and to solve problems

The government guidance 28 September 2021 <https://www.gov.uk/government/publications/teaching-mathematics-at-key-stage-3> included a sample KS3 curriculum framework. The sample curriculum framework below is based on the NCETM secondary mastery PD materials for Key Stage 3. These offer a 'fine-grained' description of the key themes and big ideas of the curriculum, detailing:

- six broad mathematical 'themes'
- a number of 'core concepts' within each theme
- a set of 'knowledge, skills and understanding' statements within each core concept
- a collection of focused 'key ideas' within each of those statements.

Links to the NCETM materials for each area can be found below the curriculum.

Below is an adaptation of the government guidance sample curriculum. The term-based allocations will be used flexibly to enable teachers to address gaps in prior learning and to revisit taught content later in the year. All areas have been included so that teachers remain aware of all areas of the curriculum.

Key

RtP (ready to progress criteria points) which are linked to learning from Years 1-6, the Primary guidance can also be used to track back points for access of less confident learners in the class.

The units highlighted in green are those that as a school we at SGS Pegasus will prioritise: the structure of number, operating on number and multiplicative reasoning. - We believe that a strong understanding of number will enable students to access the maths curriculum at the highest possible level and also best prepare them for the confident use of maths in their everyday lives.

The units highlighted in orange are units about statistics, probability, sequences and graphs where students have the opportunity to apply their numerical skills in different ways. Whilst these areas are not given predominance in our curriculum, we hope to be able to provide access to learning in these areas where students are ready to access it and in a cross curricular context.

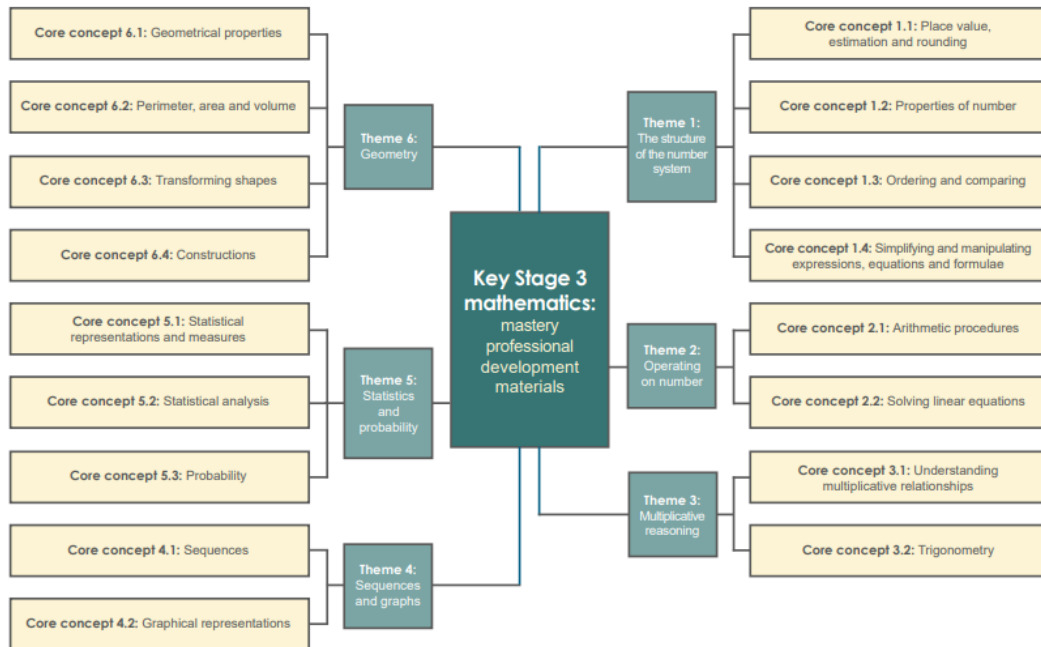
The units highlighted in red are largely focused around geometry. Whilst it is desirable to access all areas of the curriculum, we believe that if students are supported to a strong understanding of number and algebra, they will be in a good position to apply these skills effectively and quickly to developing geometric understanding in KS4. Students who are quick graspers will take on this learning as additional project work whilst their peers focus on developing secure number sense

Year 7	Term 1 and term 2	Term 3 and term 4	Term 5 and term 6
<p>Teachers should ensure that students are confident in the RtP (ready to progress criteria) from KS1 and KS2 Where there are gaps in knowledge and understanding students should be given additional support in developing these skills.</p> <p>KS1/2 exemplification-of-ready-to-progress-criteria 79 powerpoints by topic and year group</p>	<p><u>Place value</u></p> <ul style="list-style-type: none"> Understand the value of digits in decimals, measure and integers <p>Prior - 6NPV-1 6NPV-2 6NPV-3 6NPV-4</p> <p><u>Properties of number: factors, multiples, squares and cubes</u></p> <ul style="list-style-type: none"> Understand multiples Understand integer exponents and roots Understand and use the unique prime factorisation of a number <p>Prior - 5MD-2</p> <p><u>Arithmetic procedures with integers and decimals</u></p> <ul style="list-style-type: none"> Understand and use the structures that underpin addition and subtraction strategies Understand and use the structures that underpin multiplication and division strategies Use the laws and conventions of arithmetic to calculate efficiently <p>Prior 6AS/MD-1 6AS/MD2 5MD-3 5MD-4</p> <p><u>Expressions and equations</u></p> <ul style="list-style-type: none"> Understand and use the conventions and vocabulary of algebra including forming and interpreting algebraic expressions and equations Simplify algebraic expressions by collecting like terms to maintain equivalence Manipulate algebraic expressions using the distributive law to maintain equivalence <p>Prior 6AS/MD-2 6AS/MD-4</p>	<p><u>Plotting coordinates</u></p> <ul style="list-style-type: none"> Connect coordinates, equations and graphs <p>Prior - 4G-1</p> <p><u>Perimeter and area</u></p> <ul style="list-style-type: none"> Understand the concept of perimeter and use it in a range of problem-solving situations Understand the concept of area and use it in a range of problem-solving situations <p>Prior 4G-2 5G-2 6G-1</p> <p><u>Arithmetic procedures including fractions</u></p> <ul style="list-style-type: none"> Work interchangeably with terminating decimals and their corresponding fractions Compare and order positive and negative integers, decimals and fractions Know, understand and use fluently a range of calculation strategies for addition and subtraction of fractions Know, understand and use fluently a range of calculation strategies for multiplication and division of fractions <p>Prior 5NPV-5 5F-2 5F-3 6F-1 6F-2 6F-3</p>	<p><u>Understanding multiplicative relationships: fractions and ratio</u></p> <ul style="list-style-type: none"> Understand the concept of multiplicative relationships Understand that multiplicative relationships can be represented in a number of ways and connect and move between those different representations Understand that fractions are an example of a multiplicative relationship and apply this understanding to a range of contexts Understand that ratios are an example of a multiplicative relationship and apply this understanding to a range of contexts <p>Prior 6AS/MD-1 6AS/MD-2 6AS/MD-3 6AS/MD-4</p> <p><u>Transformations</u></p> <ul style="list-style-type: none"> Understand and use translations Understand and use rotations Understand and use reflections Understand and use enlargements <p>Prior 4G-1 4G-3</p>

Year 8	Term 1 and 2	Term 3 and 4	Term 5 and 6
<p>Teachers should ensure that students are confident in the RtP (ready to progress criteria) from KS1 and KS2 Where there are gaps in knowledge and understanding students should be given additional support in developing these skills.</p> <p>KS1/2 exemplification-of-ready-to-progress-criteria 79 powerpoints by topic and year group</p>	<p>Estimation and rounding</p> <ul style="list-style-type: none"> • Round numbers to a required number of decimal places • Round numbers to a required number of significant figures • Estimate calculations by rounding <p>Prior 5NPV-3 6NPV-2 6NPV-3</p> <p>Sequences</p> <ul style="list-style-type: none"> • Understand the features of a sequence • Recognise and describe arithmetic sequences <p>Graphical representations of linear relationships</p> <ul style="list-style-type: none"> • Connect coordinates, equations and graphs • Explore linear relationships <p>Solving linear equations</p> <ul style="list-style-type: none"> • Understand what is meant by finding a solution to a linear equation with one unknown • Solve a linear equation with a single unknown on one side where obtaining the solution requires one step • Solve a linear equation with a single unknown where obtaining the solution requires two or more steps (no brackets) • Solve efficiently a linear equation with a single unknown involving brackets 	<p>Understanding multiplicative relationships: percentages and proportionality</p> <ul style="list-style-type: none"> • Understand that multiplicative relationships can be represented in a number of ways and connect and move between those different representations • Understand that percentages are an example of a multiplicative relationship and apply this understanding to a range of contexts <p>Prior 6AS/MD-1 6AS/MD-2 6AS/MD-3</p> <p>Understand proportionality</p> <p>Statistical representations, measures and analysis</p> <ul style="list-style-type: none"> • Understand and calculate accurately measures of central tendency and spread • Construct accurately statistical representations • Interpret reasonably statistical measures and representations • Choose appropriately statistical measures and representations 	<p>Perimeter, area and volume</p> <ul style="list-style-type: none"> • Understand the concept of perimeter and use it in a range of problem-solving situations • Understand the concept of area and use it in a range of problem-solving situations • Understand the concept of volume and use it in a range of problem-solving situations <p>Prior 5G-2 6G-1</p> <p>Geometrical properties: polygons</p> <ul style="list-style-type: none"> • Understand and use angle properties <p>Prior 4G-2 5G-1 6G-1</p> <p>Constructions</p> <ul style="list-style-type: none"> • Use the properties of a circle in constructions • Use the properties of a rhombus in constructions <p>Prior 5G-1 6G-1</p>

Year 9			
<p>Teachers should ensure that students are confident in the RtP (ready to progress criteria) from KS1 and KS2 Where there are gaps in knowledge and understanding students should be given additional support in developing these skills.</p> <p>KS1/2 exemplification-of-ready-to-progress-criteria 79 powerpoints by topic and year group</p>	<p><u>Geometrical properties: similarity and Pythagoras' theorem</u></p> <ul style="list-style-type: none"> Understand and use similarity and congruence Understand and use Pythagoras' theorem <p><u>Probability</u></p> <ul style="list-style-type: none"> Explore, describe and analyse the frequency of outcomes in a range of situations Systematically record outcomes to find theoretical probabilities Calculate and use probabilities of single and combined events <p>Prior 6F-2 6AS/MD-3</p>	<p><u>Non-linear relationships</u></p> <ul style="list-style-type: none"> Recognise and describe other types of sequences (non-arithmetic) <p><u>Expressions and formulae</u></p> <ul style="list-style-type: none"> Find products of binomials Rearrange formulae to change the subject <p>Prior 4MD-2 6AS/MD-2 6AS/MD3</p> <p><u>Trigonometry</u></p> <ul style="list-style-type: none"> Understand the trigonometric functions Use trigonometry to solve problems in a range of contexts <p>Prior 6AS/MD-3</p>	<p><u>Standard form</u></p> <ul style="list-style-type: none"> Interpret and compare numbers in standard form $A \times 10^n$, $1 \leq A < 10$ <p>Prior 6NPV-1 6NPV-2</p> <p><u>Graphical representations</u></p> <ul style="list-style-type: none"> Model and interpret a range of situations graphically

To support good subject knowledge of staff delivering and supporting the KS3 curriculum, it is essential to have access to resources and materials that will aid the development of accurate knowledge and strategies for delivery. The NCETM provides this support through its PD materials. We will use these in conjunction with the White Rose small step guides to plan our lessons.



[NCETM KS3](#) PD materials [hyperlink for areas](#)
NCETM PD materials KS3

- six broad mathematical **themes**
- a number of **core concepts** within each theme
- a set of **‘knowledge, skills and understanding’ statements** within each core concept
- a collection of focused **key ideas** within each statement of knowledge, skills and understanding.

There are:

videos as PD for each area core concept documents to support **checkpoints** for assessing knowledge (this could be prior to or following teaching)

power points to support understanding and knowledge of the key ideas

For further information in each area, follow the links below.

<u>The structure of the number system</u>	<u>operating on number</u>	<u>Multiplicative reasoning</u>	<u>Sequencing and graphs</u>	<u>Statistics and probability</u>	<u>Geometry</u>
Theme 1 comprises four core concepts: place value, estimation and rounding; properties of number; ordering and comparing; simplifying and manipulating expressions, equations and formulae.	Theme 2 comprises two core concepts: arithmetic procedures; solving linear equations.	Theme 3 comprises two core concepts: understanding multiplicative relationships; trigonometry	Theme 4 comprises two core concepts: sequences; graphical representations	Theme 5 comprises three core concepts: statistical representations and measure; statistical analysis; probability	Theme 6 comprises four core concepts: geometrical properties; perimeter, area and volume; transforming shapes; constructions.
1.1. <u>place value, estimation and rounding</u> Core concept 1.1 covers the structure of our place-value system (particularly as it relates to decimals) and rounding numbers to a required number of decimal places or significant figures	2.1 <u>Arithmetic procedures</u> Core concept 2.1 offers guidance on developing understanding of the mathematical structures that underpin standard procedures for calculation with decimals, fractions and directed numbers.	3.1 <u>Understanding multiplicative relationships</u> Core concept 3.1 explores fractions, percentages, ratio and proportion (direct and inverse) as contexts in which multiplicative relationships are used.	4.1 <u>Sequences</u> Core concept 4.1 covers sequences through exploration of the mathematical structure. It also introduces the idea of the nth term of a linear sequence	5.1 <u>Statistical representations and measures</u> Core concept 5.1 covers measures of central tendency, work with grouped data and measures of spread, as well as the construction of scatter graphs and pie charts	6.1 <u>Geometrical properties</u> Core concept 6.1 covers angle facts and the geometry of intersecting lines, similarity and congruence, and Pythagoras' theorem
1.2 <u>Properties of number</u> Core concept 1.2 focuses on factors, multiples and primes, exploring various representations to support understanding of highest common factors and lowest common multiples.	2.2 <u>Solving Linear equations</u> Core concept 2.2 explores how linear equations are effectively the formulation of a series of operations on unknown numbers	3.2 <u>Trigonometry</u> Core concept 3.2 introduces trigonometric functions through the unit circle. Ideas of similarity, scale factor and multiplicative	4.2 <u>Graphical relations</u> Core concept 4.2 introduces x- and y-coordinates as input and output of a function. It explores linear and quadratic functions, and how linear graphs can	5.2 <u>Statistical analysis</u> Core concept 5.2 explores making informed choices about which statistical analysis and representation to use for different types of data, as	6.2 <u>Perimeter, area, and volume</u> Core concept 6.2 covers how the formulae for perimeter, area and volume are derived and connected, and the importance of

	and how solving them involves undoing these operations	relationships are integrated to explore problem-solving.	solve simultaneous equations.	well as the effect on interpretation.	reasoning mathematically to solve a range of problems.
<p>1.3 Ordering and comparing Core concept 1.3 covers the conversion of decimals to fractions (and vice versa), ordering positive and negative integers, fractions and decimals, and the expression of numbers in standard form</p>				<p>5.3 Probability Core concept 5.3 introduces probability as a way to quantify, explore and explain likelihood and coincidence, and to reason about uncertainty.</p>	<p>6.3 Transforming shapes Core concept 6.3 introduces translation, rotation, reflection and enlargement. It explores the degrees of freedom available, in terms of what does and doesn't vary for each one.</p>
<p>1.4 Simplifying and manipulating expressions, equations and formulae Core concept 1.4 concerns the generalisation of number structures, the use of algebraic symbols, and techniques for their manipulation. The rearranging of formulae is also explored.</p>					<p>6.4 constructions Core concept 6.4 explores: triangles of given lengths; a perpendicular bisector of a line segment; a perpendicular to a given line through a given point; an angle bisector.</p>

Additional website links which you may find useful

[NCETM KS3](#) PD materials hyperlink for areas

<https://www.ncetm.org.uk/classroom-resources/assessment-materials-secondary/> KS3 assessment materials from the NCETM

<https://www.drfrostmaths.com/resourceexplorer.php> Resources and question banks

<https://colleenyoung.org/ks3/> link to links very very useful

<https://thirdspacelearning.com/blog/autism-maths/> research