

Sample Key Stage 3 Curriculum Framework

Teaching for mastery is teaching that aims for deep and sustainable learning; learning that is rooted in an appreciation of the connectedness of mathematical ideas and based on an understanding of the underlying structures. It emphasises the need to go beyond being able to memorise facts and practise procedures and routines. Such teaching requires us to ‘look through’ the national curriculum statements of content and descriptions of what students need to be able to do. We must discern what students need to be aware of and understand in order to do these things fluently.

This Sample Curriculum Framework is based upon the [NCETM Key Stage 3 Professional Development Materials](#) which offer a more ‘fine-grained’ description of the key themes and big ideas of the curriculum by 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 statement of knowledge, skills and understanding.

There are many ways to organise the curriculum, and schools will make their own decisions locally. This Sample Key Stage 3 Curriculum Framework is designed to support schools in their decision-making processes by offering an *example* of how the teaching of the ‘knowledge, skills and understanding’ statements *could* be distributed across Key Stage 3.

This curriculum framework outlines the skills and knowledge to be developed in each term; it does not specify particular resources or activities. When putting together a curriculum framework it is important to consider the order of development of learning so that content is covered in a coherent way, and structures and connections within the mathematics are emphasised, helping to ensure that students’ learning is sustainable over time. When developing a scheme of work from a curriculum framework, time needs to be built in to ensure that students have the prerequisite knowledge and skills for the forthcoming modules of work, and time for both formative and summative assessments will need to be included. Schools will need to keep this in mind when using this framework to inform their planning.

Within this Sample Key Stage 3 Curriculum Framework it should be recognised that the ‘knowledge, skills and understanding’ statements are not of equal size and do not each represent one week’s worth of learning; some may do, but others will take longer. Schools will need to make their own decisions about timings based on knowledge of their students, while taking into consideration that, with a teaching for mastery approach, it is important that significant time is spent developing a deep understanding of the key ideas and concepts that are needed to underpin future learning. Note that this model exemplifies a three-year Key Stage 3; it is not recommended that the content is condensed into two years as the necessary depth of understanding is unlikely to be attained within a shorter time frame.

How to use the framework

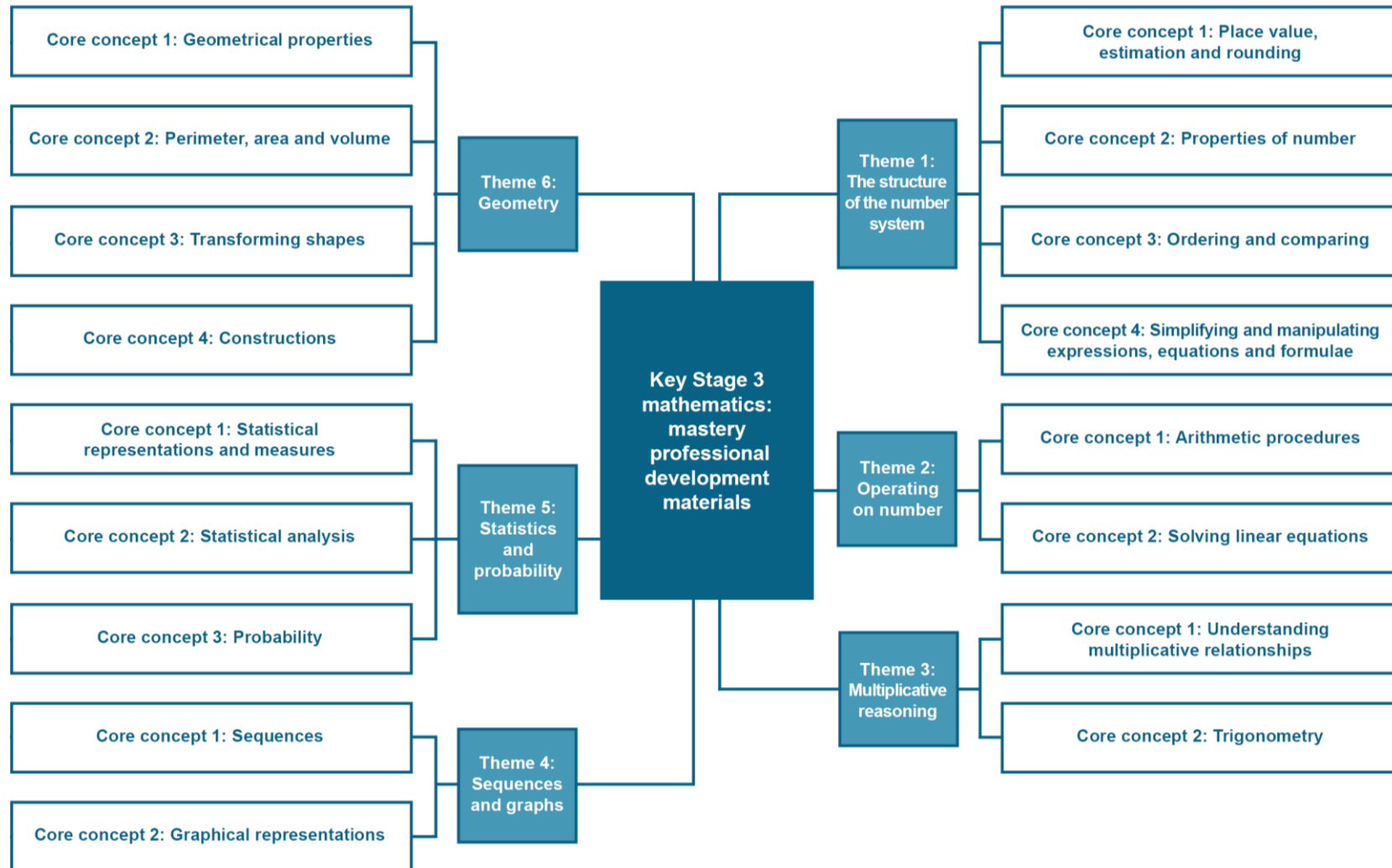
The three-digit numbers in the table below (for example 2.1.5, 3.1.6 and 6.4.2) tell you where, in the NCETM Professional Development Materials, key ideas to guide teacher planning based on the statements of knowledge, skills and understanding in the final column of the table can be found.

When you see a three-digit number below which is hyperlinked, it will take you to the relevant PDF document of the PD Materials. The page number after the statement of knowledge, skills and understanding then tells you which page of the hyperlinked document you need to scroll to in order to find the relevant key ideas for planning teaching.

In each three-digit number, the first number is an indication of the theme, the second number identifies the core concept document, and the third number describes the statement of knowledge, skills and understanding contained within that document. The themes and core concepts are also displayed in the spider diagram below.

In several places, you’ll see a notation looking like this **6^{\$}**. This indicates where key ideas within the knowledge, skills and understanding statements have been split, in order to sequence learning more effectively. These are detailed at the bottom of the framework.

Structure of the NCETM Key Stage 3 Professional Development Materials



Year 7

Term	Core concept	Statements of knowledge, skills and understanding	
Autumn	Place value	1.1.1	Understand the value of digits in decimals, measure and integers (p4)
	Properties of number: factors, multiples, squares and cubes.	1.2.1	Understand multiples (p7)
		1.2.2	Understand integer exponents and roots (p7)
		1.2.3	Understand and use the unique prime factorisation of a number (p8)
	Arithmetic procedures with integers and decimals	2.1.1	Understand and use the structures that underpin addition and subtraction strategies (p10)
		2.1.2	Understand and use the structures that underpin multiplication and division strategies (p10)
		2.1.5	Use the laws and conventions of arithmetic to calculate efficiently (p12)
	Expressions and equations	1.4.1	Understand and use the conventions and vocabulary of algebra including forming and interpreting algebraic expressions and equations (p5)
		1.4.2	Simplify algebraic expressions by collecting like terms to maintain equivalence (p5)
		1.4.3	Manipulate algebraic expressions using the distributive law to maintain equivalence (p6)

Spring	Plotting coordinates	<u>4.2.1</u> ^{\$}	Connect coordinates, equations and graphs (<i>p7</i>)
	Perimeter and area	<u>6.2.1</u> ^{\$}	Understand the concept of perimeter and use it in a range of problem-solving situations (<i>p9</i>)
		<u>6.2.2</u> ^{\$}	Understand the concept of area and use it in a range of problem-solving situations (<i>p11</i>)
	Arithmetic procedures including fractions	<u>1.3.1</u>	Work interchangeably with terminating decimals and their corresponding fractions (<i>p6</i>)
		<u>1.3.2</u>	Compare and order positive and negative integers, decimals and fractions (<i>p7</i>)
		<u>2.1.3</u>	Know, understand and use fluently a range of calculation strategies for addition and subtraction of fractions (<i>p11</i>)
		<u>2.1.4</u>	Know, understand and use fluently a range of calculation strategies for multiplication and division of fractions (<i>p11</i>)
	Summer	Understanding multiplicative relationships: fractions and ratio	<u>3.1.1</u>
<u>3.1.2</u> ^{\$}			Understand that multiplicative relationships can be represented in a number of ways and connect and move between those different representations (<i>p5</i>)
<u>3.1.3</u>			Understand that fractions are an example of a multiplicative relationship and apply this understanding to a range of contexts (<i>p5</i>)
<u>3.1.4</u>			Understand that ratios are an example of a multiplicative relationship and apply this understanding to a range of contexts (<i>p6</i>)

	Transformations	<u>6.3.1</u>	Understand and use translations (<i>p5</i>)
		<u>6.3.2</u>	Understand and use rotations (<i>p5</i>)
		<u>6.3.3</u>	Understand and use reflections (<i>p6</i>)
		<u>6.3.4</u>	Understand and use enlargements (<i>p6</i>)

Year 8

Term	Core concept	Statements of knowledge, skills and understanding	
Autumn	Estimation and rounding	1.1.2	Round numbers to a required number of decimal places (p5)
		1.1.3	Round numbers to a required number of significant figures (p5)
		1.1.4	Estimate calculations by rounding (p5)
	Sequences	4.1.1	Understand the features of a sequence (p7)
		4.1.2	Recognise and describe arithmetic sequences (p7)
	Graphical representations of linear relationships	4.2.1 ^{\$}	Connect coordinates, equations and graphs (p7)
		4.2.2	Explore linear relationships (p8)
	Solving linear equations	2.2.1	Understand what is meant by finding a solution to a linear equation with one unknown (p6)
		2.2.2	Solve a linear equation with a single unknown on one side where obtaining the solution requires one step (p7)

		2.2.3	Solve a linear equation with a single unknown where obtaining the solution requires two or more steps (no brackets) (p7)
		2.2.4	Solve efficiently a linear equation with a single unknown involving brackets (p8)
Spring	Understanding multiplicative relationships: percentages and proportionality	3.1.2 ^{\$}	Understand that multiplicative relationships can be represented in a number of ways and connect and move between those different representations (p5)
		3.1.5	Understand that percentages are an example of a multiplicative relationship and apply this understanding to a range of contexts (p6)
		3.1.6	Understand proportionality (p7)
	Statistical representations, measures and analysis	5.1.1	Understand and calculate accurately measures of central tendency and spread (p5)
		5.1.2	Construct accurately statistical representations (p5)
		5.2.1	Interpret reasonably statistical measures and representations (p9)
		5.2.2	Choose appropriately statistical measures and representations (p9)
Summer	Perimeter, area and volume	6.2.1 ^{\$}	Understand the concept of perimeter and use it in a range of problem-solving situations (p9)
		6.2.2 ^{\$}	Understand the concept of area and use it in a range of problem-solving situations (p11)

		<u>6.2.3</u>	Understand the concept of volume and use it in a range of problem-solving situations (p12)
	Geometrical properties: polygons	<u>6.1.1</u>	Understand and use angle properties (p8)
	Constructions	<u>6.4.1</u>	Use the properties of a circle in constructions (p4)
		<u>6.4.2</u>	Use the properties of a rhombus in constructions (p5)

Year 9

Term	Core concept	Statements of knowledge, skills and understanding	
Autumn	Geometrical properties: similarity and Pythagoras' theorem	6.1.2	Understand and use similarity and congruence (<i>p9</i>)
		6.1.3	Understand and use Pythagoras' theorem (<i>p9</i>)
	Probability	5.3.1	Explore, describe and analyse the frequency of outcomes in a range of situations (<i>p5</i>)
		5.3.2	Systematically record outcomes to find theoretical probabilities (<i>p5</i>)
		5.3.3	Calculate and use probabilities of single and combined events (<i>p6</i>)
Spring	Non-linear relationships	4.1.3	Recognise and describe other types of sequences (non-arithmetic) (<i>p7</i>)
	Expressions and formulae	1.4.4	Find products of binomials (<i>p7</i>)
		1.4.5	Rearrange formulae to change the subject (<i>p8</i>)
	Trigonometry	3.2.1	Understand the trigonometric functions (<i>p6</i>)
		3.2.2	Use trigonometry to solve problems in a range of contexts (<i>p8</i>)

Summer	Standard form	<u>1.3.3</u>	Interpret and compare numbers in standard form $A \times 10^n$, $1 \leq A < 10$ (p7)
	Graphical representations	<u>4.2.3</u>	Model and interpret a range of situations graphically (p9)

Statements of knowledge, skills and understanding which have been split in the framework

Statement of knowledge, skills and understanding		Key ideas		Location
3.1.2	Understand that multiplicative relationships can be represented in a number of ways and connect and move between those different representations	<u>3.1.2.1</u>	Use a double number line to represent a multiplicative relationship and connect to other known representations (p5)	Year 7 summer
		<u>3.1.2.2</u>	Understand the language and notation of ratio and use a ratio table to represent a multiplicative relationship and connect to other known representations (p5)	Year 7 summer
		<u>3.1.2.3</u>	Use a graph to represent a multiplicative relationship and connect to other known representations (p5)	Year 8 spring
		<u>3.1.2.4</u>	Use a scaling diagram to represent a multiplicative relationship and connect to other known representations (p5)	Year 8 spring
4.2.1	Connect coordinates, equations and graphs	<u>4.2.1.1</u>	Describe and plot coordinates, including non-integer values, in all four quadrants (p7)	Year 7 spring
		<u>4.2.1.2</u>	Solve a range of problems involving coordinates (p7)	Year 7 spring
		<u>4.2.1.3</u>	Know that a set of coordinates, constructed according to a mathematical rule, can be represented algebraically and graphically (p7)	Year 8 autumn
		<u>4.2.1.4</u>	Understand that a graphical representation shows all of the points (within a range) that satisfy a relationship (p8)	Year 8 autumn
6.2.1	Understand the concept of perimeter and use it in	<u>6.2.1.1</u>	Use the properties of a range of polygons to deduce their perimeters (p10)	Year 7 spring

	a range of problem-solving situations	6.2.1.2	Recognise that there is constant multiplicative relationship (π) between the diameter and circumference of a circle (<i>p10</i>)	Year 8 summer
		6.2.1.3	Use the relationship $C = \pi d$ to calculate unknown lengths in contexts involving the circumference of circles (<i>p10</i>)	Year 8 summer
6.2.2	Understand the concept of area and use it in a range of problem-solving situations	6.2.2.1	Derive and use the formula for the area of a trapezium (<i>p11</i>)	Year 7 spring
		6.2.2.2	Understand that the areas of composite shapes can be found in different ways (<i>p11</i>)	Year 7 spring
		6.2.2.3	Understand the derivation of, and use the formula for, the area of a circle (<i>p11</i>)	Year 8 summer
		6.2.2.4	Solve area problems of composite shapes involving whole and/or part circles, including finding the radius or diameter given the area (<i>p11</i>)	Year 8 summer
		6.2.2.5	Understand the concept of surface area and find the surface area of 3D shapes in an efficient way (<i>p11</i>)	Year 8 summer