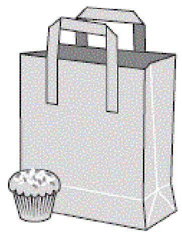
Unit Overview and Guidance

- The exemplification has been taken from the NCETM online ‘Resource Toolkit’, with additions in order to ensure full coverage.
- Links to the White Rose Maths hubs schemes of work (with questions categorised into the three aims of the national curriculum i.e. fluency, problem solving and reasoning) are hyperlinked to each of the objectives. Many thanks go to the White Rose Maths hub for permission to include their resources.
- The NCETM reasoning questions have also been incorporated into each unit and are identified in pale purple boxes underneath the group of the most relevant objectives.
- The ‘big Ideas’ sections from the NCETM ‘Teaching for Mastery’ documents have been included at the start of each unit. Hyperlinks to the full NCETM ‘Teaching for Mastery’ documents have also been included for easy reference.
- Hyperlinks to NRich activities have also been added to this version. These are found by clicking on the blue buttons like this one 1 at the bottom of relevant objective.
- Some additional content has been added in order to support mixed-aged planning. Any additional content is in *italics*. Occasionally ~~strikethrough~~ has been used to identify when an objective has been altered and this is primarily where an objective has been split between two units.
- Each unit is sub-divided into sections for ease of planning. Sub-categories in this unit are;
    1. Algebra

	Yr 3	Yr 4	Yr 5	Yr 6
NCETM Teaching for Mastery Questions, tasks and activities to support assessment	**The Big Ideas**	**The Big Ideas**	**The Big Ideas**	**The Big Ideas** A linear sequence of numbers is where the difference between the values of neighbouring terms is constant. The relationship can be generated in two ways: the sequence-generating rule can be recursive, i.e. one number in the sequence is generated from the preceding number (e.g. by adding 3 to the preceding number), or ordinal, i.e. the position of the number in the sequence generates the number (e.g. by multiplying the position by 3, and then subtracting 2). Sometimes sequence generating rules that seem different can generate the same sequence: the ordinal rule ‘one more than each of the even numbers, starting with 2’ generates the same sequence as the recursive rule ‘start at 1 and add on 2, then another 2, then another 2, and so on’. Sequences can arise from naturally occurring patterns in mathematics and it is exciting for pupils to discover and generalise these. For example adding successive odd numbers will generate a sequence of square numbers. Letters or symbols are used to represent unknown numbers in a symbol sentence (i.e. an equation) or instruction. Usually, but not necessarily, in any one symbol sentence (equation) or instruction, different letters or different symbols represent different unknown numbers. A value is said to solve a symbol sentence (or an equation) if substituting the value into the sentence (equation) satisfies it, i.e. results in a true statement. For example, we can say that 4 solves the symbol sentence (equation) 9 – = + 1 (or 9 – x = x + 1) because it is a true statement that 9 – 4 = 4 + 1. We say that 4 satisfies the symbol sentence (equation) 9 – = + 1 (or 9 – x = x + 1).
	Teaching for Mastery Year 3	Teaching for Mastery Year 4	Teaching for Mastery Year 5	Teaching for Mastery Year 6

ALGEBRA (ALG - X weeks)

Strand		Yr3	Yr4	Yr5	Yr6
Algebra	Equations and variables				**find pairs of numbers that satisfy number sentences with two unknowns** **enumerate all possibilities of combinations of two variables.** Here are five number cards: **Examples of what children should be able to do, in relation to each (boxed) Programme of Study statement** A A A B B A and B stand for two different whole numbers. The sum of all the numbers on all five cards is 30. What could be the values of A and B?
	Formulae				**express missing number problems algebraically** **use simple formulae** Children should be able to express a relationship in symbols, and start to use simple formulae. • Use symbols to write a formula for the number of months m in y years. • Write a formula for the cost of c chews at 4p each. • The perimeter of a rectangle is 2 × (l + b), where l is the length and b is the breadth of the rectangle. What is the perimeter if l = 8 cm and b = 5 cm? • Understand equivalent expressions (eg a + b = b + a) The number of bean sticks needed for a row which is m metres long is 2m + 1. How many bean sticks do you need for a row which is 60 metres long? • Find missing numbers, lengths, co-ordinates and angles Maria bakes cakes and sells them in bags.  She uses this formula to work out how much to charge for one bag of cakes. **Cost = number of cakes × 20p + 15p for the bag** How much will a bag of 12 cakes cost?

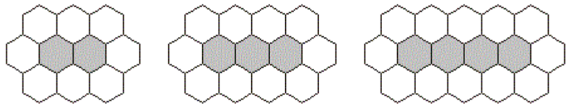
Algebra

Sequences and graphs

generate and describe linear number sequences

generate and describe linear number sequences (with fractions)

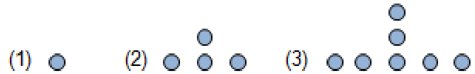
In this pattern **white hexagons** surround **shaded hexagons**.



How many **white hexagons** are needed to surround a line of **100 shaded hexagons**?

- Write a formula which connects the number of white hexagons (W) with the shaded ones (S)

A number sequence is made from counters. There are 7 counters in the third number.



How many counters in the 6th number? the 20th...?Write a formula for the number of counters in the nth number in the sequence.

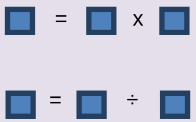
- Write a formula for the nth term of this sequence: 3, 6, 9, 12, 15…
- Plot the points which show pairs of numbers with a sum of 9.

1 2 3 4

NCETM Reasoning

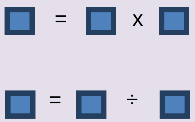
Connected Calculations

Put the numbers 3, 12, 36 in the boxes to make the number sentences correct.



Connected Calculations

Put the numbers 7.2, 8, 0.9 in the boxes to make the number sentences correct.



Undoing

If the longer length of a rectangle is 13cm and the perimeter is 36cm, what is the length of the shorter side?

Explain how you got your answer.

Connected Calculations

The number sentence below represents the angles in degrees of an isosceles triangle.

A + B + C = 180 degrees

A and B are equal and are multiples of 5.

Give an example of what the 3 angles could be.

Write down 3 more examples

Undoing

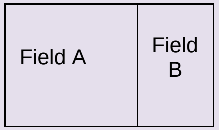
The perimeter of a rectangular garden is between 40 and 50 metres.

What could the dimensions of the garden be?

Connected Calculations

p and q each stand for whole numbers. p + q = 1000 and p is 150 greater than q. Work out the values of p and q.

The diagram below represents two rectangular fields that are next to each other.



Field A is twice as long as field B but their widths are the same and are 7.6 metres. If the perimeter of the small field is 23m what is the perimeter of the entire shape containing both fields?

If y stands for a number complete the table below. What is the largest value of y if the greatest number in the table was 163?

y	$3y$	$3y + 1$
25		
		28

Generalising

Write a formula for the 10th, 100th and nth terms of the sequences below.
4, 8, 12, 16 ……… and 0.4, 0.8, 1.2, 1.6, ……..

ALGEBRA (ALG - X weeks)