




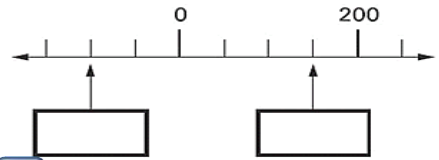

Unit Overview and Guidance

- 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  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. Counting
 2. Read, write, order and compare numbers
 3. Place value (see also fractions, decimals and percentages)
 4. Identify, represent, estimate and round
 5. Solve problems

	Yr 3	Yr 4	Yr 5	Yr 6
NCETM Teaching for Mastery Questions, tasks and activities to support assessment	<p>The Big Ideas</p> <p>The value of a digit is determined by its position in a number.</p> <p>Place value is based on unitising, treating a group of things as one 'unit'. This generalises to 3 units + 2 units = 5 units (where the units are the same size).</p>	<p>The Big Ideas</p> <p>Imagining the position of numbers on a horizontal number line helps us to order them: the number to the right on a number line is the larger number. So 5 is greater than 4, as 5 is to the right of 4. But -4 is greater than -5 as -4 is to the right of -5.</p> <p>Rounding numbers in context may mean rounding up or down. Buying packets of ten cakes, we might round up to the nearest ten to make sure everyone gets a cake.</p> <p>Estimating the number of chairs in a room for a large number of people we might round down to estimate the number of chairs to make sure there are enough.</p> <p>We can think of place value in additive terms: 456 is 400 + 50 + 6, or in multiplicative terms: one hundred is ten times as large as ten.</p>	<p>The Big Ideas</p> <p>Large numbers of six digits are named in a pattern of three: hundreds of thousands, tens of thousands, ones of thousands, mirroring hundreds, tens and ones.</p> <p>It is helpful to relate large numbers to real-world contexts, for example the number of people that a local sports arena can hold.</p>	<p>The Big Ideas</p> <p>For whole numbers, the more digits a number has, the larger it must be: any 4-digit whole number is larger than any 3-digit whole number. But this is not true of decimal numbers: having more digits does not make a decimal number necessarily bigger. For example, 0.5 is larger than 0.35.</p> <p>Ordering decimal numbers uses the same process as for whole numbers i.e. we look at the digits in matching places in the numbers, starting from the place with the highest value i.e. from the left. The number with the higher different digit is the higher number. For example, 256 is greater than 247 because 256 has 5 tens but 247 has only 4 tens. Similarly 1.0843 is smaller than 1.524 because 1.0843 has 0 tenths but 1.524 has 5 tenths.</p>
	Teaching for Mastery Year 3	Teaching for Mastery Year 4	Teaching for Mastery Year 5	Teaching for Mastery Year 6

NUMBER: Number and place value (NPV - 4 weeks)

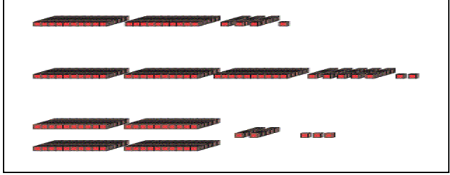



NUMBER: Number and place value (NPV - 4 weeks)

Strand	Yr3	Yr4	Yr5	Yr6
Counting	<p>Counting</p> <p><u>count from 0 in multiples of 4, 8, 50 and 100:</u></p> <p>a) Count on from zero in steps of 2, 3, 4, 5, 8, 50, 100;</p> 	<p><u>count in multiples of 6, 7, 9, 25 and 1000</u></p> <p>Explain how to work out the 6 times-table from the 3 times-table or the 9 times-table from the 3 times-table.</p> <p>Know that $9 \times 8 = 72$ so that $72 \div 9 = 8$ and deduce $720 \div 9$.</p> <p>Explain the relationship between $8 \times 7 = 56$, $6 \times 7 = 42$ and $14 \times 7 = 98$.</p>	<p><u>count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000</u></p> <p>Count from any given number in powers of 10 and decimal steps extending beyond zero when counting backwards; relate the numbers to their position on a number line</p> <p>Answer problems such as:</p> <ul style="list-style-type: none"> Write the next number in this counting sequence: 110 000, 120 000, 130 000 ... Create a sequence that goes backwards and forwards in tens and includes the number 190. Describe your sequence. Here is part of a sequence: 30, 70, 110, □, 190, □. How can you find the missing numbers? 	
	<p>More, Less</p> <p><u>find 10 or 100 more or less than a given number</u></p> <p>b) Give me the number 100 less than 756</p>	<p><u>find 1000 more or less than a given number</u></p> <p>Answer questions such as, what is the missing number in the number sentence and how do you know? $5742 + \square = 9742$</p>		
	<p>Negative Numbers</p> <p><u>count backwards through zero to include negative numbers</u></p> <p>Create a sequence that includes the number -5 and then describe the sequence to the class.</p> <p>Explain how to find the missing numbers in a sequence</p> <p>eg. $\square - 9, -5, -1, \square$ and explain the rule.</p> <p>Answer questions eg What number can you put in the box to make this statement true? $\square < -2$</p>	<p><u>count backwards through zero to include negative numbers</u></p> <p>Create a sequence that includes the number -5 and then describe the sequence to the class.</p> <p>Explain how to find the missing numbers in a sequence</p> <p>eg. $\square - 9, -5, -1, \square$ and explain the rule.</p> <p>Answer questions eg What number can you put in the box to make this statement true? $\square < -2$</p>	<p><u>interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through 0</u></p> <p>Count from any given number in whole-number and decimal steps extending beyond zero when counting backwards; relate the numbers to their position on a number line.</p> 	<p><u>use negative numbers in context, and calculate intervals across zero</u></p> <p>work with negative numbers in a similar way, determining values on a scale and estimating.</p>  
<p>NCETM Reasoning</p> <p>Spot the mistake: 50,100,115,200 What is wrong with this sequence of numbers?</p> <p>True or False? 38 is a multiple of 8</p> <p>What comes next? $936 - 10 = 926$ $926 - 10 = 916$ $916 - 10 = 906$</p>	<p>Spot the mistake: 950, 975,1000,1250 What is wrong with this sequence of numbers?</p> <p>True or False? 324 is a multiple of 9</p> <p>What comes next? $6706 + 1000 = 7706$ $7706 + 1000 = 8706$ $8706 + 1000 = 9706$</p>	<p>Spot the mistake: 177000,187000,197000,217000 What is wrong with this sequence of numbers?</p> <p>True or False? When I count in 10's I will say the number 10100</p> <p>What comes next? $646000 - 10000 = 636000$ $636000 - 10000 = 626000$ $626000 - 10000 = 616000$</p>	<p>Spot the mistake: -80,-40,10,50 What is wrong with this sequence of numbers?</p> <p>True or False? When I count backwards in 50s from 10 I will say -200</p> <p>True or False? The temperature is -3. It gets 2 degrees warmer. The new temperature is -5</p>	

NUMBER: Number and place value (NPV - 4 weeks)

Read, write, order and compare numbers	Arabic Numerals	<p>read and write numbers up to 1000 in numerals and words</p> <p>Read these numbers 428, 205, 130, 25, 7, 909</p> <p>compare and order numbers up to 1000</p> <p>Sort these numbers into ascending order: 95, 163, 8, 740, 25, 0, 400, 303</p>	<p>order and compare numbers beyond 1000</p> <p>Children can find numbers that could go in the boxes to make these correct</p> <p>$\square + \square < 2000, 3000 > \square - \square$</p>	<p>read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit</p> <p>Explain what each digit represents in whole numbers and decimals with up to two places and partition, round and order these numbers.</p> <p>Answer problems such as</p> <ul style="list-style-type: none"> What is the value of the 7 in 3 274 105? Write in figures forty thousand and twenty. A number is partitioned like this: 4 000 000 + 200 000 + 60 000 + 300 + 50 + 8 <p>Write the number. Now read it to me.</p> <ul style="list-style-type: none"> A car costs more than £8600 but less than £9100. Tick the prices that the car might cost. <p>£8569 <input type="checkbox"/> £9090 <input type="checkbox"/> £9130 <input type="checkbox"/> £8999 <input type="checkbox"/></p>	<p>read, write, order and compare numbers up to 10 000 000 and determine the value of each digit</p> <p>Children should be able to determine the steps used in different scales, and so complete activities such as -</p>
	Roman Numerals	<p>read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value</p> <p>Know what each letter represents in Roman numerals</p> <p>Convert from Roman numeral to our current system (Arabic) and from Arabic to Roman e.g. 76 = _ in Roman numerals, CLXIX = _ Arabic numerals.</p> <p>Know that the current western numeral system is the modified version of the Hindu numeral system developed in India to include the concept of zero and place value.</p>	<p>read Roman numerals to 1000 (M) and recognise years written in Roman numerals</p> <p>Recognise Roman numerals in their historical context</p> <p>Read and write Roman numerals to one thousand</p>		
	NCETM Reasoning	<p>Do, then explain</p> <p>835 535 538 388 508</p> <p>If you wrote these numbers in order starting with the smallest, which number would be third?</p> <p>Explain how you ordered the numbers.</p>	<p>Do, then explain</p> <p>5035 5053 5350 5530 5503</p> <p>If you wrote these numbers in order starting with the largest, which number would be third?</p> <p>Explain how you ordered the numbers.</p>	<p>Do, then explain</p> <p>Show the value of the digit 5 in these numbers? 350114 567432 985376</p> <p>Explain how you know.</p> <p>Make up an example Give further examples</p> <p>Create six digit numbers where the digit sum is five and the thousands digit is two.</p> <p>Eg 3002000 2102000</p> <p>What is the largest/smallest number?</p> <p>Do, then explain</p> <p>747014, 774014, 747017, 774077, 744444</p> <p>If you wrote these numbers in order starting with the smallest, which number would be third?</p> <p>Explain how you ordered the numbers.</p>	<p>Do, then explain</p> <p>Show the value of the digit 6 in these numbers? 6787555 95467754</p> <p>Explain how you know.</p> <p>Make up an example Create seven digit numbers where the digit sum is six and the tens of thousands digit is two.</p> <p>Eg 4020000</p> <p>What is the largest/smallest number?</p> <p>Do, then explain</p> <p>Find out the populations in five countries. Order the populations starting with the largest. Explain how you ordered the countries and their populations.</p>

NUMBER: Number and place value (NPV - 4 weeks)

Identify, represent, estimate and round	Identify, represent and estimate	<p>Identify, represent and estimate numbers using different representations</p> <p>Show me 642 on a number line, with Dienes apparatus, with place value cards etc.</p> <p>What number is represented by each set –</p>  <p>What number is halfway between 65 and 95? How do you know?</p>	<p>Identify, represent and estimate numbers using different representations</p> <p>which of these numbers is closest to the answer of $342 - 119$:</p> <p>200 220 230 250 300</p> <p>Identify what the digit 7 represents in each of these amounts:</p> <p>£2.70, 7.35m, £0.37, 7.07m</p>		
	Rounding	<p>(Y4 adapted) round any number to the nearest 10</p> <p><i>Children should be able to explain tips to give someone who is learning how to round numbers to the nearest 10.</i></p> <p><i>I rounded a number to the nearest 10. The answer is 50. What number could I have started with?</i></p> <p><i>Know what to look for first when you order a set of numbers and know which part of each number to look at to help you.</i></p> <p><i>Know which multiple of 10 is closest to a number.</i></p>	<p>round any number to the nearest 10, 100 or 1000</p> <p>Children should be able to explain tips to give someone who is learning how to round numbers to the nearest 10, 100 or 1000.</p> <p>I rounded a number to the nearest 10. The answer is 340. What number could I have started with?</p> <p>Know what to look for first when you order a set of numbers and know which part of each number to look at to help you.</p>  <p>round decimals with one decimal place to the nearest whole number</p> <p>Round these to the nearest whole number: 9.7, 25.6, 148.3</p> <p>Round these lengths to the nearest metre: 1.5m, 6.7m, 4.1m, 8.9m</p> <p>Round these costs to the nearest £: £3.27, £12.60, £14.05, £6.50</p> 	<p>round any number up to 1 000 000 to the nearest 10 100 1 000 10 000 and 100 000</p> <p>Explain what each digit represents in whole numbers and decimals with up to two places and partition round and order these numbers and answer questions such as:</p> <ul style="list-style-type: none"> What is 4773 rounded to the nearest hundred? <p>round decimals with two decimal places to the nearest whole number and to one decimal place</p> <p>Round these to one decimal place</p> <p>9.78, 27.34, 39.95</p> 	<p>(Y6 extended) round any whole number to a required degree of accuracy</p> <p>Children should be able to circle the best estimate of the answer to questions such as:</p> <p>$72.34 \div 8.91$</p> <p>When given 6, 7, 8, 9, 10, 11 as possible answers</p> <p>Children should estimate the position of numbers on a number line. They should suggest which number lies about two-fifths of the way along a line from 0 to 1000, or a line from 0 to 1. They should be able to justify their decisions.</p>

NUMBER: Number and place value (NPV - 4 weeks)

Identify, represent, estimate and round	<p style="text-align: center;">NCETM Reasoning</p> <p>Possible answers A number rounded to the nearest ten is 540. What is the smallest possible number it could be?</p> <p>What do you notice? Round 296 to the nearest 10. Round it to the nearest 100. What do you notice? Can you suggest other numbers like this?</p>	<p>Possible answers A number rounded to the nearest ten is 540. What is the smallest possible number it could be?</p> <p>What do you notice? Round 296 to the nearest 10. Round it to the nearest 100. What do you notice? Can you suggest other numbers like this?</p> <p>Do, then explain Circle each decimal which when rounded to the nearest whole number is 5. 5.3 5.7 5.2 5.8 Explain your reasoning</p> <p>Top tips Explain how to round numbers to one decimal place?</p>	<p>Possible answers A number rounded to the nearest thousand is 76000 What is the largest possible number it could be?</p> <p>What do you notice? Round 343997 to the nearest 1000. Round it to the nearest 10000. What do you notice? Can you suggest other numbers like this?</p> <p>Do, then explain Circle each decimal which when rounded to one decimal place is 6.2. 6.32 6.23 6.27 6.17 Explain your reasoning</p> <p>Top tips Explain how to round decimal numbers to one decimal place?</p>	<p>Possible answers Two numbers each with two decimal places round to 23.1 to one decimal place. The total of the numbers is 46.2. What could the numbers be?</p> <p>What do you notice? Give an example of a six digit number which rounds to the same number when rounded to the nearest 10000 and 100000</p> <p>Do, then explain Write the answer of each calculation rounded to the nearest whole number 75.7 × 59 7734 ÷ 60 772.4 × 9.7 20.34 × (7.9 – 5.4)</p> <p>What's the same, what's different? ..when you round numbers to one decimal place and two decimal places?</p>
	Solve problems	<p style="text-align: center;">Solving Problems</p> <p>solve number problems and practical problems involving these ideas</p> <p>a) Jack walks 645 metres to school. Suzy walks 100 metres less. How far does Suzy walk? b) What is 1 more than 485? Than 569? Than 299? c) What number needs to go into each triangle? Explain why? 642 = 600 + Δ + 2 967 = Δ + 60 + 7</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">1</div> <div style="border: 1px solid black; padding: 2px;">2</div> <div style="border: 1px solid black; padding: 2px;">3</div> <div style="border: 1px solid black; padding: 2px;">4</div> <div style="border: 1px solid black; padding: 2px;">5</div> <div style="border: 1px solid black; padding: 2px;">6</div> <div style="border: 1px solid black; padding: 2px;">7</div> <div style="border: 1px solid black; padding: 2px;">8</div> <div style="border: 1px solid black; padding: 2px;">9</div> </div>	<p>solve number and practical problems that involve all of the above and with increasingly large positive numbers</p> <p>Children should be able to sort problems into those they would do mentally and those they would do with pencil and paper and explain their decisions.</p> <p>There are 70 children on a camping trip. Each tent can accommodate up to 6 children. What is the smallest number of tents they will need?</p> <p>The distance to the park is 5 km when rounded to the nearest kilometre. What is the longest/shortest distance it could be?</p>	<p>solve number problems and practical problems that involve all of the above</p> <p>Partition decimals using both decimal and fraction notation for example recording 6.38 as $6 + \frac{3}{10} + \frac{8}{100}$ and as $6 + 0.3 + 0.08$.</p> <p>Write a decimal given its parts: e.g. record the number that is made from 4 wholes 2 tenths and 7 hundredths as 4.27. Apply understanding in activities such as:</p> <ul style="list-style-type: none"> Find the missing number in $17.82 - \square = 17.22$ Play 'Zap the digit': In pairs choose a decimal to enter into a calculator e.g. 47.25. Take turns to 'zap' (remove) a particular digit using subtraction. For example, to 'zap' the 2 in 47.25 subtract 0.2 to leave 47.05. The children explain how they work out calculations showing understanding of the place value that underpins written methods.