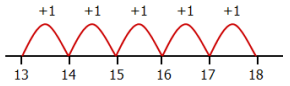
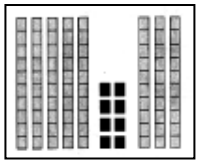
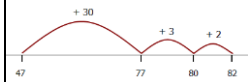
North Cerney C of E Primary Academy

Supporting your child with maths at home

Our Calculation policy is put together to explain the different methods we, as a school, use for the four basic operations in maths (addition, subtraction, multiplication and division.) The policy shows the development in methods as the children progress throughout the school.
Hopefully you will find it helpful when supporting your children at home.
If you would like us to go through a particular method in greater details please talk to your child's class teacher.

Addition

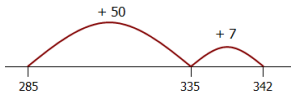
	Statutory Guidance	Non-Statutory Guidance	Problem Solving	Calculation Progression				
YR	Count … from 1-20 … and say which no. is 1 more than a given no. Using quantities objects, add two O numbers and count on to find the answer. [Expected] Estimate no. of objects; check quantities by counting up to 20. [Exceeding]			**Practical or recorded using ICT** Hannah … listed how many girls and how many boys were outside. [She] was able to say that "There are 5 girls and 4 boys. That's 9 altogether". When playing in the shop Christopher used his shopping list to add 2 amounts. He said "the beans are 5 pence and the bananas are 3 pence, altogether that is 8 pence." [EYFS Profile exemplifications, STA]	**Pictures/Objects** I eat 2 cakes and my friend eats 3. How many cakes did we eat altogether? Might be recorded as: *2 + 3 = 5* 	**Symbolic** 8 people are on the bus. 5 more get on at the next stop. How many people are on the bus now  [Might be recorded as: *8 + 5 = 13*]	
Y1	Add and subtract one-digit and two-digit numbers to 20, including zero Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.	They discuss and solve problems in a familiar practical context, including using quantities. Problems should include the terms put together, add, altogether, total, take away, distance between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.	Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems.	**Pupils use concrete objects and pictorial representations** (e.g. place value counters, Dienes)	**Practical/recorded using ICT** Pictures/Symbolic (*see above*)	**Visual (modelled using number lines)** 13 + 5 = 18  	**Use known facts/partitioning** 8 + 5 = 13 8 + 2 = 10 10 + 3 = 13	
Y2	Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: TO + O TO + T TO + TU O + O + O Show that addition of two numbers can be done in any order. Recognise and use inverse relationship between +/- and use this to check calculations and missing number problems.	Pupils extend their understanding of the language of addition and subtraction to include sum and difference. Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.	Solve problems with addition and subtraction: Using concrete objects and pictorial representations, including those involving numbers, quantities and measures; Applying their increasing knowledge of mental and written methods.	**Pupils use concrete objects, pictorial representations and mental strategies.** (e.g. place value counters, Dienes)	**Practical/visual images** 58 + 30 = 88 	**Visual (efficient jumps)** 35 + 47= 82  	**No number line** 35 + 47 = 82 47 + 30 = 77 77 + 5 = 82	**Column Partitioning** 47 + 35 = 82 40 + 7 30 + 5 70 + 12

<table>
<tr><th></th><th>Statutory Guidance</th><th>Non-Statutory Guidance</th><th>Problem Solving</th><th colspan="4">Calculation Progression</th></tr>
<tr><td>Y3</td><td>Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.

Estimate the answer to a calculation and use inverse operations to check answers.</td><td>Pupils practise solving varied addition and subtraction questions.

Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent.</td><td>Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.</td><td>Number line

57 + 285 = 342

 
</td><td>No number line

57 + 285 = 342

285 + 50 = 335
335 + 7 = 342</td><td>Expanded vertical

374 + 248 = 622

374
+ 248
12
110
500
622</td><td>Compact vertical

374 + 248 = 622

374
+ 248
622
1 1</td></tr>
<tr><td>Y4</td><td>Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.

Estimate and use inverse operations to check answers to a calculation.</td><td>Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency.</td><td>Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.</td><td colspan="2">Expanded vertical

5735 + 562 = 6297

5735
+ 562
7
90
1200
5000
6297</td><td colspan="2">Compact vertical

5735 + 562 = 6297

5735
+ 562
6297
1</td></tr>
<tr><td>Y5</td><td>Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</td><td>Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency.</td><td>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</td><td colspan="2">Expanded vertical

23.7 + 48.56 = 72.26

23.70
+ 48.56
0.06
1.20
11.00
60.00
72.26</td><td colspan="2">Compact vertical

23.7 + 48.56 = 72.26

23.70
+ 48.56
11
72.26</td></tr>
<tr><td>Y6</td><td>Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Use knowledge of the order of operations to carry out calculations involving subtraction.</td><td>Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long division.

Pupils round answers to a specified degree of accuracy.</td><td>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</td><td colspan="2">Expanded vertical

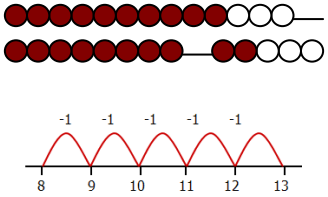
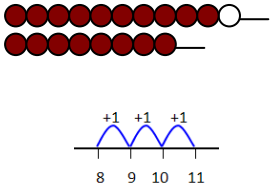
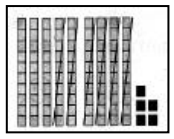
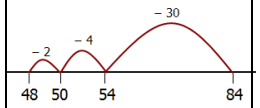
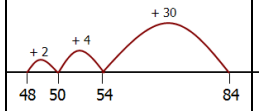
3.243 + 18.070 = 21.313

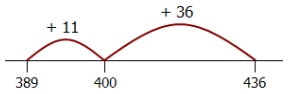
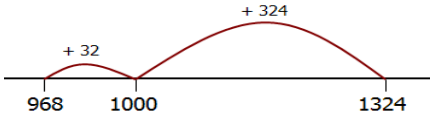
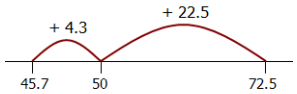
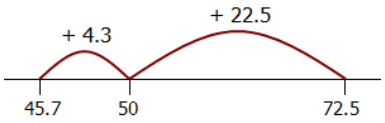
3.243
+ 18.070
0.003
0.110
0.200
21.000
21.313</td><td colspan="2">Compact vertical

3.243 + 18.070 = 21.313

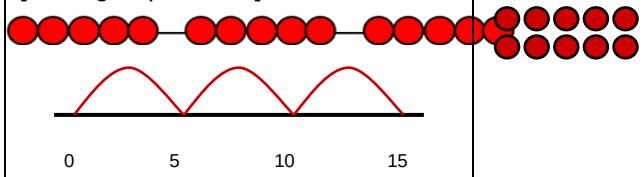
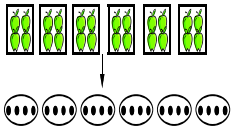
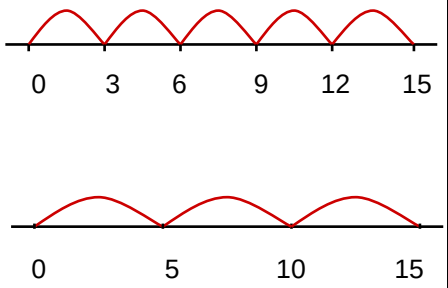
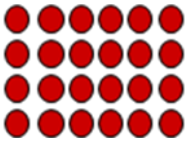
3.243
+ 18.070
1 1
21.313</td></tr>
</table>

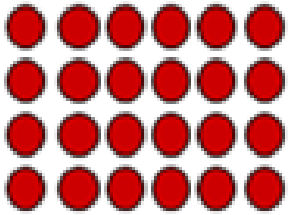
Subtraction

	Statutory Guidance	Non-Statutory Guidance	Problem Solving	Calculation Progression				
YR	Count … from 1-20 … and say which no. is 1 less than a given no. Using quantities objects, subtract two O numbers and count back to find the answer. [Expected] Estimate no. of objects; check quantities by counting up to 20. [Exceeding]			**Practical or recorded using ICT** Chloe was playing in the maths area. "I need three more" she said as she added some cubes to the circle. She then realised she had more than her friend. "Oh, I have too many". She removed one. "Now we have the same". During a game of skittles outdoors Joseph knocked three numbered skittles down. He was able to calculate his score in his head. [EYFS Profile exemplifications, STA]	**Pictures/Objects** I have five cakes. I eat two of them. How many do I have left?  Might be recorded as: *5 – 2 = 3*	**Symbolic** Mum baked 9 biscuits. I ate 5. How many were left?  [Might be recorded as: *9 – 5 = 4]*		
Y1	Add and subtract one-digit and two-digit numbers to 20, including zero. Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs	They discuss and solve problems in a familiar practical context, including using quantities. Problems should include the terms put together, add, altogether, total, take away, distance between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.	Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems.	**Practical or recorded using ICT** Pupils use concrete objects and pictorial representations (e.g. place value counters, Dienes)	**Taking away – jumps of 1** (modelled using bead strings) 13 – 5 = 8  	**Counting on – jumps of 1** (modelled using bead strings) Find the difference between 8 and 11.  	**Counting on** (efficient jumps) Find the difference between 8 and 11. With, or without, number line 8 + 2 = 10 10 + 1 = 11	
Y2	Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: TO - O TO - T TO - TO O - O - O Show that addition of two numbers can be done in any order. Recognise and use inverse relationship between +/- and use this to check calculations and missing number problems.	Pupils extend their understanding of the language of addition and subtraction to include sum and difference. Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.	Solve problems with addition and subtraction: Using concrete objects and pictorial representations, including those involving numbers, quantities and measures; Applying their increasing knowledge of mental and written methods.	**Pupils use concrete objects and pictorial representations and mental strategies.** (e.g. place value counters, Dienes)	**Practical/visual images** 95 - 60 = 35 	**Taking away** 84 - 36 = 48  (Jumps can also be completed in 10s/1s)	**Taking away** (no number line) 84 - 36 = 48 84 - 30 = 54 54 - 4 = 50 50 - 2 = 48	**Counting on** 84 - 48 = 36  (Jumps can also be completed in 10s/1s)	**Expanded vertical** 98 - 35 = 63 90 and 8 30 and 5 60 and 3

	Statutory Guidance	Non-Statutory Guidance	Problem Solving	Calculation Progression			
Y3	Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction. Estimate the answer to a calculation and use inverse operations to check answers.	Pupils practise solving varied addition and subtraction questions. Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent.	Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	**Counting on** 436 - 389 = 47  	**Taking away** (no number line) 326 - 178 = 148 326 - 100 = 226 226 - 70 = 156 156 - 6 = 150 150 - 2 = 148	**Expanded vertical** 700 20 3 400 50 8 600 110 13 400 50 8 200 60 5 723 - 458 = 265	**Compact vertical** 932 - 457 = 475 8 12 1 9 3 2 − 4 5 7 4 7 5
Y4	Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. Estimate and use inverse operations to check answers to a calculation.	Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency.	Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	**Counting on** 1324 - 968 = 356  	**Partitioned** 1374 - 968 = 406 1000 and 300 and 70 and 4 − 900 and 60 and 8 1300 and 60 and 14 − 900 and 60 and 8 400 and 0 and 6		**Compact vertical** 1374 - 968 = 406 6 1 3 7 1 4 − 9 6 8 4 0 6
Y5	Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy. Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)	Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency.	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.	**Counting on** 72.5 – 45.7 = 26.8  	**Taking away** (no number line) 72.5 – 45.7 72.5 – 40 = 32.5 32.5 – 5 = 27.5 27.5 – 0.7 = 26.8		**Compact vertical** 72.5 - 45.7 = 26.8 6 7 11 2 . 15 − 4 5 . 7 2 6 . 8
Y6	Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. Use knowledge of the order of operations to carry out calculations involving subtraction.	Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long division. Pupils round answers to a specified degree of accuracy.	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.	**Counting on** 72.5 – 45.7 = 26.8  	**Taking away** (no number line) 72.5 – 45.7 72.5 – 40 = 32.5 32.5 – 5 = 27.5 27.5 – 0.7 = 26.8		**Compact vertical** 72.5 - 45.7 = 26.8 6 7 11 2 . 15 − 4 5 . 7 2 6 . 8

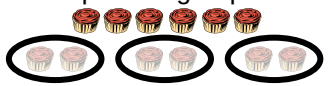
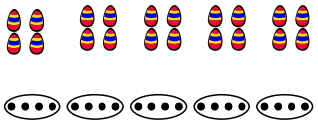
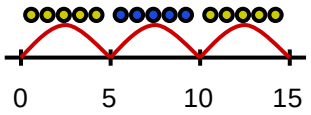
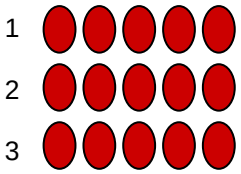
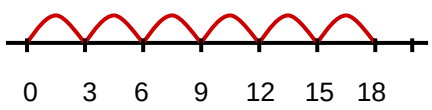
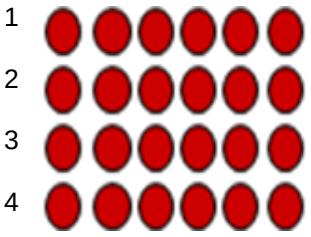
Multiplication

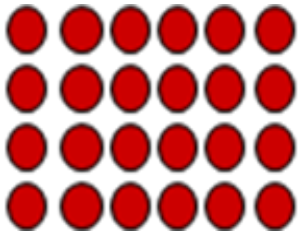
	Statutory Guidance	Non-Statutory Guidance	Problem Solving	Calculation Progression		
YR	Children … solve problems, including doubling, halving and sharing. [Expected] Solve practical problems that involve combining groups of 2/5/10. [Exceeding]			**Practical/recorded using ICT** How many 10p coins are here? How much money is that? This domino is a double 4. How many spots does it have?	**Pictures/Objects** How many socks in three pairs? 	**Symbolic** 3 pairs, 2 socks in each pair: 
Y1		Through grouping and sharing small quantities, pupils begin to understand; multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities. They make connections between arrays, number patterns, and counting in twos, fives and tens.	Solve one-step problems involving multiplication and division, using concrete objects, pictorial representations and arrays *(with the support of the teacher)*	**Practical/Recorded using ICT/Pictures/Symbolic** There are five cakes in each bag. How many cakes are there in three bags? 	**Visual** (eg modelled using bead strings) 5 x 3 or 3 x 5 [two, three times] or [three groups of two] 	**Arrays** 5 x 2 or 2 x 5
Y2	Calculate statements for multiplication and division within the multiplication tables and write them using the multiplication, division and equals signs. Show that multiplication of two numbers can be done in any order and division of one number by another cannot.	Pupils use a variety of language to describe multiplication and division. Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures. They use commutativity and inverse relations to develop multiplicative reasoning.	Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	**Pictures/Symbolic** There are four apples in each box. How many apples in six boxes 	**Repeated addition** 5 x 3 or 3 x 5 	**Arrays** 6 x 4 or 4 x 6 

	Statutory Guidance	Non-Statutory Guidance	Problem Solving	Calculation Progression		
Y3	Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.	Pupils develop efficient mental methods, for example, using commutativity and multiplication and division facts to derive related facts. Pupils develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division. Pupils solve simple problems in contexts, deciding which of the four operations to use and why, including measuring and scaling contexts, and correspondence problems in which m objects are connected to n objects.	Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.	**Arrays** 6 x 4 or 4 x 6 	**Multiplication grids** 36 x 4 = 144 X | 30 | 6 4 | 120 | 24	36 x 4 = 144 30 x 4 = 120 6 x 4 = 24
Y4	Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.	Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers. Pupils write statements about the equality of expressions, They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations. Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children.	Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one-digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.	**Multiplication grids** 342 x 7 = 2394 x | 300 | 40 | 2 7 | 2100 | 280 | 14	**Expanded long multiplication** 237 x 4 = 948 237 × 4 28 120 800 948	**Long multiplication** 342 x 7 = 2394 3 4 2 × 7 2 3 9 4 2 1

	Statutory Guidance	Non-Statutory Guidance	Problem Solving	Calculation Progression			
Y5	Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers. Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.	Pupils practise and extend their use of the formal written methods of short multiplication and short division. They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations. Pupils use multiplication and division as inverses to support the introduction of ratio in Y6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 100 in converting between units such as km/m. Pupils use and explain the equals sign to indicate equivalence, including in missing number problems.	Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes. Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign. Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	**Expanded long multiplication** 27 x 34 = 918 (estimate 30 x 30 = 900) 27 x 34 28 (7 x 4) 80 (20 x 4) 210 (7 x 30) 600 (20 x 30) 918	**Long multiplication** 2741 x 6 = 16446 (estimate 3000 x 6 = 18000) 2741 × 6 = 16446 (carry 4, 2)	**Expanded long multiplication** 24 x 16 = 384 (estimate 25 x 15 = 375) 24 × 16 = 240 + 144 = 384 (carry 2)	**Long multiplication** 124 x 26 = 3224 124 × 26 = 3224 (carry 1, 2; carry 1, 1)
Y6		Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long division. Pupils round answers to a specified degree of accuracy.		**Expanded long multiplication** 256 x 18 = 4608 (estimate 250 x 20 = 5000) 256 × 18 = 2560 + 2048 = 4608 (carry 1)	**Long multiplication** 124 x 26 = 3224 124 × 26 = 3224 (carry 1, 2; carry 1, 1)	**Long multiplication** 4.7 x 8 = 37.6 (estimate 5 x 8 = 40) 4.7 × 8 = 37.6 (carry 6)	**Multiplication grids** 5.65 x 9 = 50.85 (estimate 6 x 9 = 54) 9 × 5.65 = 45 + 5.4 + 0.45 = 50.85

Division

	Statutory Guidance	Non-Statutory Guidance	Problem Solving	Calculation Progression		
YR	Children … solve problems, including doubling, halving and sharing. [Expected] They solve practical problems that involve sharing into equal groups. [Exceeding]			**Practical / recorded using ICT** (eg digital photos/pictures on IWB)	**Pictures/Objects** 6 cakes shared between 2  6 cakes put into groups of 2 	**Symbolic** 6 cakes shared between 2  6 cakes put into groups of 2 
Y1		Through grouping and sharing small quantities, pupils begin to understand; multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities. They make connections between arrays, number patterns, and counting in twos, fives and tens.	Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	**Practical/recorded using ICT** There are 14 people on the bus. Half of them get off. How many remain on the bus? There are 20 people in the class. One quarter are boys. How many boys are there?	**Pictures/Symbolic** Four eggs fit in a box. How many boxes would you need to pack 20 eggs? 	**Visual** (modelled using bead strings) 15 ÷ 5 = 3  0 5 10 15	**Arrays** 15 ÷ 3 = 5  1 2 3
Y2	Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equal (=) signs.	Pupils use a variety of language to describe multiplication and division. Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures. They use commutativity and inverse relations to develop multiplicative reasoning.	Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	**Visual** (modelled using bead strings) 18 ÷ 3 = 6  0 3 6 9 12 15 18	**Arrays** 24 ÷ 4 = 6 Find ¼ of 24  1 2 3 4	**Chunking** 30 ÷ 2 = 15 30 10 x 2 = 20 10 5 x 2 = 10 0

	Statutory Guidance	Non-Statutory Guidance	Problem Solving	Calculation Progression		
Y3	Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.	Pupils develop efficient mental methods, for example, using commutativity and multiplication and division facts to derive related facts. Pupils develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division. Pupils solve simple problems in contexts, deciding which of the four operations to use and why, including measuring and scaling contexts, and correspondence problems in which m objects are connected to n objects.	Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.	**Arrays** 24 ÷ 4 = 6 Find ¼ of 24 1 2 3 4 	**Chunking** 51 ÷ 3 =17 51 10 x 3 = 30 21 7 x 3 = 21 0	**Short division** 98 ÷ 7 = 14 1 4 7 | 9 8 2
Y4		Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers. Pupils write statements about the equality of expressions, They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations. Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children.	Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one-digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.	**Chunking** 252 ÷ 7 = 36 252 30 x 7 = 210 42 6 x 7 = 42 0		**Short division** 252 ÷ 7 = 36 36 7 | 252 2 4

	Statutory Guidance	Non-Statutory Guidance	Problem Solving	Calculation Progression			
Y5	Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.	Pupils practise and extend their use of the formal written methods of short multiplication and short division. They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations. Pupils use multiplication and division as inverses to support the introduction of ratio in Y6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 100 in converting between units such as km/m. Pupils use and explain the equals sign to indicate equivalence, including in missing number problems.	Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes. Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign. Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	**Chunking** 346 ÷ 8 = 43 r2 (estimate >40, <50) 346 40 x 8 = 320 26 3 x 8 = 24 2		**Short division** 8520 ÷ 6 = 1420 1420 6 | 8520 (2 1)	
Y6	Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context	Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long division. Pupils round answers to a specified degree of accuracy.		**Chunking (mental)** 43.4 ÷ 7 = 6.2 (estimate 42 ÷ 7 = 6) 6 x 7 = 42 0.2 x 7 = 1.4	**Short division (decimals)** 43.68 ÷ 7 = 6.24 (estimate: 42 ÷ 7 = 6) 6.24 7 | 43.68 (1 2)	**Short division** 496 ÷ 11 (estimate 500 ÷ 10 = 50) 45 r 1 11 | 496 (5) Answer: $45\frac{1}{11}$	**Long division** 432÷ 15 = 28.8 28.8 15 | 432.0 30 ↓ 132 120 120 0