Witton Gilbert Primary School

Recording Calculations Policy

The purpose of this document is to clarify the developing progression in the aspects of calculation across Key Stages 1 and 2. It takes into account the mathematics programmes of study and non statutory guidance for the National Curriculum 2014.

It covers:

- Recording of calculations that can be done wholly or partially by mental methods, based on fluency with number facts and understanding of place value and number operations. This recording might take the form of horizontally presented number sentences or empty number lines to show steps in thinking.
- The use of expanded or informal written methods to support understanding of compact, formal written methods and
- Developing fluency in the use of formal written methods by the end of key stage 2.

Children should work towards being able to use:

- A range of strategies for mental calculations *appropriate to the numbers involved.*
- One formal written method (for each number operation) for calculations that cannot be done mentally.
- A calculator for calculations where this is the most appropriate choice.

Progression in mental calculation skills can be supported by:

- The ability to quickly recall a range of number facts and an understanding of how to use them to derive other related facts.
- Understanding how numbers and calculations can be represented by materials and images such as arrays, ten frames, Numicon shapes.
- An understanding of the number system (order and relative position of numbers, place value, etc), the four number operations and the laws of arithmetic associated with them
- Understanding of how symbols are used to record calculations especially the equals sign.
- An understanding of how calculations can be represented on empty number lines. They will need to work with numbered tracks and lines first before they are confident to rely on empty lines alone. To make good use of empty lines children need to be able to:
  - Move forward and back confidently on the number line.
  - Make jumps of different sizes.
  - Recognize landmark numbers such as multiples of 10
  - **Know** and use number complements to 10 and multiples of 10.
  - Partition and recombine numbers in appropriate ways eg 7 + 5 as 7 + 3 + 2, or 28 + 9 as 28 + 10 − 1.

Progression to fluency with a formal written method for each number operation can be made by:

- o The appropriate use of informal or expanded written methods that build on mental methods and which continue to highlight understanding of the number system and number operations.
- o Linking of these expanded methods to the formal written method when it is first introduced to highlight steps that may be concealed, and hence not understood, in the procedural execution of the formal written method.
- o Appropriate levels of practice of formal written methods to develop fluency.

Children should continue to develop their mental calculation skills with larger numbers once written methods are introduced and should be given opportunities to identify which calculations might be done mentally, with reference to the **nature** rather than **magnitude** of the numbers involved. They should use mental calculation skills to estimate the likely magnitude of the answer when performing a calculation using a formal written method and hence identify answers that are unreasonable and indicate errors in execution of the method.

The following lists offer some guidance.

Addition and subtraction
Can pupils:

- recall addition and subtraction facts to 20?
- understand place value and partition numbers?
- add three single digit numbers mentally?
- add or subtract any pair of two digit numbers mentally?
- explain their mental strategies orally and record them using horizontal number sentences or an empty number line?
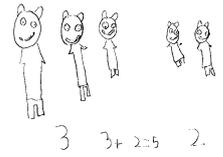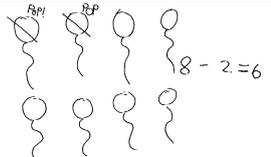
Multiplication and division
Can pupils:
- quickly recall multiplication and division facts for 2, 3, 4, 5 and 10 times tables
- understand of what happens when a number is multiplied by 0 or 1
- understand 0 as a place holder
- multiply two- and three-digit numbers mentally by 10 and 100
- demonstrate understanding of the commutative, distributive and associative laws (though not necessarily know the names See Appendix 1 for further information.
- double and halve two-digit numbers mentally
- explain mental strategies orally and in writing.

Addition and subtraction

Year	Addition and subtraction
Reception	Children in Reception should: • Use concrete objects and pictorial representations as appropriate.
1	Children in Year 1 should: • **Use concrete objects and pictorial representations, including number lines, to support their solution of addition and subtraction problems.** • **Represent and use number bonds and related subtraction facts within 20, memorizing and reasoning with these bonds.** • **Add and subtract one-digit and two-digit numbers to 20, including zero (and realizing the effect of adding or subtracting zero to establish the relationship between these operations)** • **Read, write and interpret mathematical statements involving addition (+), subtraction (-) and (=) signs in a range of formats e.g. $\triangle + 5 = 12$ or $7 = \lozenge - 9$**
2	Children in Year 2 should: • **Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 e.g. use $3 + 7 = 10$ to derive $30 + 70 = 100$** • **Use concrete objects and pictorial representations to support their solution of addition and subtraction problems and to add and subtract mentally including TU+/-U, TU+/- T, TU +/- TU, U + U + U.** • **Show that addition can be done in any order (commutative) and subtraction of one number from another cannot. Use the associative law of addition to show for example that $5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5$** • **Recognize and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems** • Record mental additions and subtractions using horizontal number sentences and/or empty number lines to record and explain the steps in their calculations. • **Recording in columns supports place value and prepares for formal methods.**
3	Children in Year 3 should: • **Add and subtract numbers mentally including HTU +/- U, HTU+/- T, HTU+/- H** • Use horizontal number sentences and empty number lines sometimes to support explanation of their mental calculation methods. • **Solve varied addition and subtraction problems including missing number problems using number facts and place value.** • Develop their understanding of written methods; working from expanded to **using** (compact) **formal written methods of columnar addition and subtraction with numbers of up to three digits.** Particular attention should be paid to the language used when modeling these methods. The value of digits should be retained according to place value and use of practical materials /representations may aid understanding • **Estimate the answer to a calculation and use inverse operations to check answers**
4	Children in Year 4 should: • **Continue to add and subtract numbers** with up to four digits **mentally** where the nature of the numbers makes this appropriate. They may use horizontal number sentences or empty number lines to support an explanation of the steps in their calculation. They should be given opportunities to identify calculations which are appropriate for a mental method and explain why. • **Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate**. Their understanding of the procedures involved may be supported by the use of expanded written methods and practical materials if required. • **Estimate and use inverse operations to check answers to a calculation.**

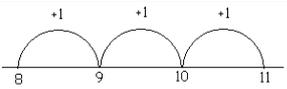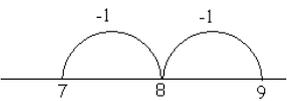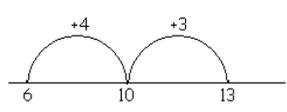|	
5	Children in Year 5 should: • **Add and subtract numbers mentally with increasingly large numbers e.g. 12,462 – 2300 = 10,162.** Use horizontal number sentences and empty number lines sometimes to support explanation of their methods. They should be given opportunities to identify calculations which are appropriate for a mental method and explain why. • **Add and subtract whole numbers with more than four digits, including using formal written methods (columnar addition and subtraction).**Particular attention should be paid to the language used when modelling these methods. The value of digits should be retained according to their place value. Their understanding of the procedures involved may be supported by the use of expanded written methods and practical materials if required. • **Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy** • **Solve addition and subtraction multi-step problems in context, deciding which operations to use and why.** • Learn how to record the method they used when working with a calculator.
6	Children in Year 6 should: • **Perform mental calculations including with mixed operations and large numbers** (and decimals)**.** Use horizontal number sentences and empty number lines sometimes to support explanation of their methods. They should be given opportunities to identify the most appropriate tool for calculations ie mental method, mental with recording, formal written method or calculator and explain why. • **Practise addition and subtraction for (appropriate) larger numbers** and decimals **using the formal written methods of columnar addition and subtraction.** Those who are not able to use the formal compact method may use an expanded method and work towards an understanding of the formal written method. Particular attention should be paid to the language used when modelling these methods. The value of digits should be retained according to their place value. Materials / representations may support understanding. • **Use estimation to check answers to calculations and determine, in the context of the problem, an appropriate degree of accuracy.** • **Round answers to a specified degree of accuracy.** • **Use knowledge of the order of operations, and use of brackets, to carry out calculations involving the four operations.** • **Solve addition and subtraction multi-step problems in contexts, deciding which operations to use and why.** • Learn how to record the method they used when working with a calculator.

Reception				
Strategy	**Addition sentences**	**Recording**	**Subtraction sentences**	**Number lines**
Counting on/back	$3 + 2 = 5$	 3 3+2=5 2	$9 - 2 = 7$	 $8 - 2 = 6$
Finding 1 more and 1 less	$2 + 1 = 3$ $3 + 1 = 4$ $4 + 1 = 5$		$2 - 1 = 1$ $3 - 1 = 2$ $4 - 1 = 3$	

YEAR 1				

NOTE: Pupils should <u>memorise</u> and reason with number bonds to 10 and 20. Use of structured materials such as ten frames may support this and reduce dependence on count by ones strategies.

Pupils should become familiar with the terms: *put together, add, altogether, total, take away, distance between, difference between* so they develop the concept of addition and subtraction and can use these operations flexibly.

Strategy	Addition sentences	Number lines	Subtraction sentences	Number lines
Counting on/back	$8 + 3 = 11$	+1 +1 +1 / 8 9 10 11	$9 - 2 = 7$	-1 -1 / 7 8 9
Reordering: Count on from larger number	$3 + 8 = \mathscr{O}$ rewrite as $8 + 3 = 11$	Reorder before using number line as above		
Find pairs that total 10	$3 + 4 + 7 =$ $3 + 7 + 4 =$ $10 + 4 = 14$			
Partition into 5 and a bit	$5 + 8 = \mathscr{O}$ $5 + 5 + 3 =$ $10 + 3 = 13$			
	$7 + 8 = \mathscr{O}$ $5 + 2 + 5 + 3 =$ $5 + 5 + 2 + 3 =$ $10 + 5 = 15$			
Use near doubles	$5 + 6 = \mathscr{O}$ $5 + 5 + 1 = \mathscr{O}$ $10 + 1 = 11$			
Begin to bridge through 10	$6 + 7 = \mathscr{O}$ $6 + 4 + 3 =$ $10 + 3 = 13$	6 + 7 = / +4 +3 / 6 10 13	$13 - 7 = \mathscr{O}$ $13 - 3 - 4 =$ $10 - 4 = 6$	13 - 7 = / -4 -3 / 6 10 13
	$18 + 5 = \mathscr{O}$ $18 + 2 + 3 =$ $20 + 3 = 23$	18 + 5 = / +2 +3 / 18 20 23	$25 - 8 = \mathscr{O}$ $25 - 5 - 3 =$ $20 - 3 = 17$	25 - 8 = / -3 -5 / 17 20 25
Add or subtract 9	$6 + 9 = \mathscr{O}$ $6 + 10 - 1 =$ $16 - 1 = 15$	6 + 9 = / +10 / -1 / 6 15 16	$17 - 9 = \mathscr{O}$ $17 - 10 + 1 =$ $7 + 1 = 8$	17 - 9 = / -10 / +1 / 7 8 17
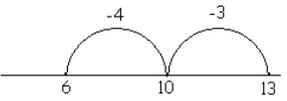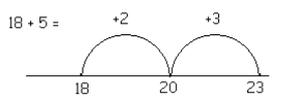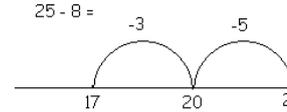
YEAR 2

Establish the use of efficient, non counting based, strategies using bonds to 20, place value etc.
Use of representations and materials such as ten frames and base ten materials may support understanding.

Strategy	Addition sentences	Number lines	Subtraction sentences	Number lines
Counting on/back in ones and tens. ***Encourage the use of more efficient strategies using bonds, place value etc.***	$34 + 3 =$ ✐ $23 + 20 =$ ✐	+1 +1 +1 34 ⌢⌢⌢ 37 +10 +10 23 ⌢ ⌢ 43	$27 - 4 =$ ✐ $45 - 20 =$ ✐	-1 -1 -1 -1 23 ⌢⌢⌢⌢ 27 -10 -10 25 ⌢ ⌢ 45
Count up to find a small difference			$82 - 79 =$ ✐	+1 +2 79 ⌢ 80 ⌢ 82
Reordering	$5 + 7 + 5 =$ ✐ $5 + 5 + 7 =$ ✐			
Use near doubles	$6 + 7 =$ ✐ $6 + 6 + 1 =$ ✐ $40 + 39 =$ ✐ $40 + 40 - 1 =$ ✐			
Bridge through multiples of 10	$25 + 7 =$ ✐ $25 + 5 + 2 =$ ✐	+5 +2 25 ⌢ 30 ⌢ 32	$45 - 8 =$ ✐ $45 - 5 - 3 =$ ✐	-3 -5 37 ⌢ 40 ⌢ 45
Partitioning using multiples of 10. *Partition both numbers or just the second.*	$25 + 14 =$ ✐ $25 + 10 = 35$ $35 + 4 = 39$	+10 +4 25 ⌢ 35 ⌢ 39	$46 - 23 =$ ✐ $46 - 20 = 26$ $26 - 3 = 23$ Note In cases such as $43 - 26 =$ ✐ Partition the second number only.	-3 -20 23 ⌢ 26 ⌢ 46
Compensating to add/subtract numbers close to a multiple of 10	$24 + 19 =$ ✐ $24 + 20 - 1 =$ ✐ $58 + 21 =$ ✐ $58 + 20 + 1 =$ ✐	+20 24 ⌢ 43 ⌢ 44 -1 +20 +1 58 ⌢ 78 ⌢ 79	$70 - 11 =$ ✐ $70 - 10 - 1 =$ ✐ $53 - 19 =$ ✐ $53 - 20 + 1 =$ ✐	-1 -10 59 ⌢ 60 ⌢ 70 -20 33 ⌢ 34 ⌢ 53 +1

Preparing for a standard written method

	Addition	Subtraction

Partitioning both numbers using multiples of 10. Preparing for a standard method.	$287 + 45 =$
	
	200 80 7
	       40 5
	200 120 12 = 332
		$87 - 53 =$
		
		  87 = 80 7
		- 53 50 3
		         30 4
		
		         70 13
		  83 = ~~80~~ ~~3~~
		- 57 50 7
		         20 6

YEAR 3				
Strategy	**Addition sentences**	**Number lines**	**Subtraction sentences**	**Number lines**
Children should calculate mentally with up to three digit numbers when nature of numbers makes this appropriate. They should use number bonds and place value to make efficient steps in their calculations. They may sometimes use a number line to record their thinking but may be able to work without jottings e.g. 433 + 200, 385 – 40, 501 – 4. They may use the following strategies.				
Add/subtract ones, tens and hundreds using number bonds and place value to find most efficient steps.	90 + 40 = ✎		110 – 30 = ✎	
Encourage the use of more efficient strategies using bonds, place value etc				
Count up to find a difference			504 – 498 = ✎	
			84 – 56 = ✎	
Bridge through multiples of 10	49 + 7 = ✎ 49 + 1 + 6 = ✎		62 – 7 = ✎ 62 – 2 – 5 = ✎	
Compensating to add/subtract numbers close to a multiple of 10	543 + 29 = ✎ 543 + 30 – 1 =		273 – 29 =✎ 273 – 30 + 1 = ✎	
Partitioning using multiples of 10 *Partition both numbers or just the second*	86 + 57 = ✎ 86 + 50 = 136 136 + 7 = 143		96 – 24 = ✎ 96 – 20 = 76 76 – 4 = 72	

Introducing the formal written method of columnar addition and subtraction		

Partitioning both numbers using multiples of 10 and using the expanded method as may help children move to the formal written method with understanding.	287 + 45 =
	
	 200 80 7
	          40 5
	 ―――――――――
	 200 120 12 = 332
	
	     67
	 + 24
	 ――――
	     11
	     80
	 ――――
	     91
		87 = 80 7
		 - 53 50 3
		 ―――――――
		           30 4
		
		           70 13
		 83 = 8̶0̶ 3̶
		 - 57 50 7
		 ―――――――
		           20 6

Introduce the **formal method** with or without regrouping as appropriate for pupils	234 234
	 +145 +178
	 ――― ―――
	  379 412
	                 1 1
		7 1
		 285 285
		 - 123 - 127
		 ―――― ―――
		  162 158

NB The addition method can be shown adding the most significant digits first but children should understand that this makes no difference and should be able to work with the least significant digit first in preparation for carrying.		

YEAR 4

Strategy	Addition sentences	Number lines	Subtraction sentences	Number lines
Children should calculate mentally with up to four digit numbers when nature of numbers makes this appropriate. They should use number bonds and place value to make efficient steps in their calculations. They may sometimes use a number line to record their thinking but may be able to work without jottings e.g. 1433 + 200, 985 – 420, 1510 – 40. They may use the following strategies.				
Counting on/back in ones/tens/ hundreds	643 + 50 = 🖉 460 + 500 = 🖉		387 – 50 = 🖉 2423 – 200 = 🖉	
Encourage the use of efficient strategies using bonds, place value etc. Use jottings if required.				
Count up to find a small difference			403 – 386 = 🖉 4008 – 3993 = 🖉	+7 +8 3993 4000 4008
Bridge through multiples of 10	357 + 7 = 🖉 357 + 3 + 4 = 🖉	+3 +4 357 360 364	905 – 7 = 🖉 905 – 5 – 2 = 🖉	-2 -5 898 900 905
Compensating to add/subtract numbers close to a multiple of 10	74 + 58 = 🖉 74 + 60 – 2 = 🖉	+60 -2 74 132 134	283 – 71 = 🖉 283 – 70 – 1 = 🖉	-1 -70 212 213 283
Partitioning using multiples of 10 *Partition both numbers or just the second.*	88 + 76 = 🖉 88 + 70 = 158 158 + 6 = 164	+70 +6 88 158 164	98 – 43 = 🖉 98 – 40 = 58 58 – 3 = 55	-3 -40 55 58 98

Developing the formal written method of columnar addition and subtraction

	Addition	Subtraction
Most children should add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction.		

For children who are not ready for these formal methods use:
o   the informal expanded method for addition, adding the least significant digits first and /or
o   the expanded decomposition method for subtraction
Move from these when ready to the **formal written method** supporting children to understand regroupings involved.
Place value materials and representations may support children to understand the written procedure if required
	358
	      + 73
	        11
	      120
	      300
	      431
	
	        358
	      + 73
	      431
	      1 1
		40 + 14
		754 = 700 + ~~50 + 4~~
		- 36 30 + 6
		        700 + 10 + 8
		
		600 + 140
		        40 + 14
		754 = ~~700~~ + ~~50 + 4~~
		- 86 80 + 6
		        600 + 60 + 8
		
		7⁴5¹4
		- 36
		7 1 8

9

YEAR 5				
Strategy	**Addition sentences**	**Number lines**	**Subtraction sentences**	**Number lines**

Children should calculate mentally with large numbers when nature of numbers makes this appropriate e.g. 12,462 – 2,300 = 10,162. They should use number bonds and place value to make efficient steps in their calculations. They may sometimes use a number line to record their thinking but may be able to work without jottings. They may use the following strategies.

Strategy	Addition sentences	Number lines	Subtraction sentences	Number lines
Count up to find a small difference			$705 - 287 = $ ✎ $8006 - 2993 = $ ✎	
Bridge through whole numbers for decimals	$3.8 + 2.6 = $ ✎ $3.8 + 0.2 + 2.4 = $ ✎		$7.5 - 0.8 = $ ✎ $7.5 - 0.5 - 0.3 = $ ✎	
Compensating to add/subtract numbers close to a multiple of 10	$346 + 59 = $ ✎ $346 + 60 - 1 = $ ✎ $406 - 1 = 405$ $478 + 71 = $ ✎ $478 + 70 + 1 = 549$		$425 - 58 = $ ✎ $425 - 60 + 2 = $ ✎ $365 + 2 = 367$ $583 - 71 = $ ✎ $583 - 70 - 1 = $ ✎	
Partition using multiples of 10. *Partition both numbers or just the second.*	$324 + 58 = $ ✎ $324 + 50 = 374$ $374 + 8 = 382$		$428 - 43 = $ ✎ $428 - 40 - 3 = $ ✎	

Continue to develop an efficient standard method.

	Addition	Subtraction
Most children use the formal written methods of columnar addition and subtraction with appropriate **whole numbers of more than 4 digits**		

Most children use the formal written methods.
Extend to numbers with 4 or more digits and to decimals.
 	
Work with calculations involving numbers with different numbers of digits eg find total of
468 + 2187 + 9 + 56
or
find difference between
782, 175 and 4387.
	587
	+ 475
	1062
	11
		$^{6}\not{7}^{14}\not{5}^{1}4$
		- 2 8 6
		   4 6 8
		
		         600 140
		              40 14
		754 = 700 50 4
		-286 200 80 6
		         400 60 8

Use the expanded methods to support children who are not ready for the compact written method to understand and move towards use of the formal methods. Place value materials and representations may support children to understand the written procedure if required.	587 +475 12 150 900 1062	

YEAR 6

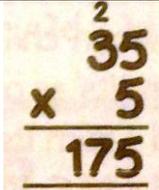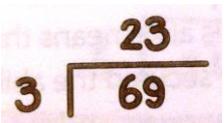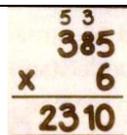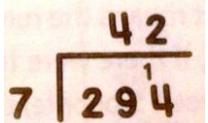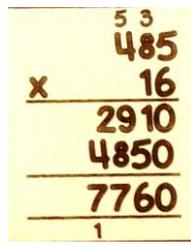| Strategy	Addition sentences	Number lines	Subtraction sentences	Number lines
Children should continue to calculate mentally with large numbers when nature of numbers makes this appropriate e.g. 12,462 – 2,300 = 10,162. They should use number bonds and place value to make efficient steps in their calculations. They may sometimes use a number line to record their thinking but will often be able to work without jottings. They may use the following strategies.				
Count up to find a small difference			8004 – 2785 = ✐	+15 +200 +5004 2785 2800 3000 8004
Bridge through whole numbers for decimals	3.8 + 2.6 = ✐ 3.8 + 0.2 + 2.4 = ✐	0.2 2.4 3.8 4.0 6.4	7.5 – 0.8 = ✐ 7.5 – 0.5 – 0.3 = ✐	-0.3 -0.5 6.7 7.0 7.5
Compensating to add/subtract numbers close to a multiple of 10 and whole numbers when working with decimals	7.5 + 0.9 = ✐ 7.5 + 1.0 – 0.1 = ✐	+1 -0.1 7.5 8.4 8.5	19.3 – 2.9 = ✐ 19.3 – 3.0 + 0.1 = ✐	-3.0 +0.1 16.3 16.4 19.3
Partition using multiples of 10. *Partition both numbers or just the second.*	540 + 280 = ✐ 540 + 200 + 80 = ✐		276 – 153 = ✐ 276 – 100 – 50 – 3 = ✐	

Most children use the formal written method of columnar addition and subtraction. Some children who are not ready for this may use expanded methods to support their progression to the compact method. Progression through this stage should support understanding of formal written method but should be moved through as quickly as possible.
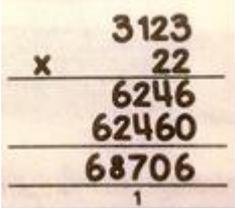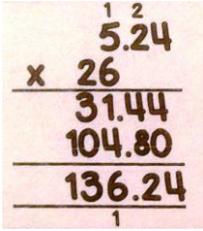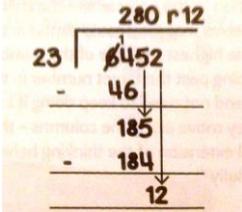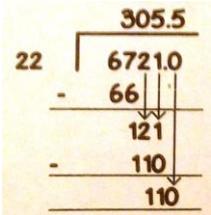
	Addition	Subtraction
Most children practice addition and subtraction of larger numbers using the formal written methods of columnar addition and subtraction		
Most children use the formal written methods. Extend practice to numbers with any number of digits and to two or three decimal places.	7648 +1486 9134 1 1 1	5 13 1 6̶ 4̶ 6 7 - 2 6 8 4 3 7 8 3
Use expanded method for those who are not ready for standard method. Work with calculations involving numbers with different numbers of digits eg find total of 468 + 2187 + 9 + 56 or find difference between 782, 175 and 4387.	7648 +1486 14 120 1000 8000 9134	600 + 140 40 + 14 754 = 7̶0̶0̶ + 5̶0̶ + 4̶ -286 200 + 80 + 6 400 + 60 + 8

Multiplication and Division

Year	Addition and subtraction
Reception	Children in Reception should: • Use concrete objects and pictorial representations as appropriate.
1	Children in Year 1 should: • **Count in multiples of twos, fives and tens**
2	Children in Year 2 should: • **Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers** • **Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) signs** • **Show that multiplications of two numbers can be done in any order (commutative) and division of one number by another cannot** • **Solve one-step problems involving multiplication and division, using materials arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.**
3	Children in Year 3 should: • **Recall and use multiplication and division facts for the 3, 4, 6 and 9 multiplication tables** • **Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including two-digit numbers times one-digit numbers, using mental and progressing to efficient written methods** • **Solve problems, including missing number problems, involving multiplication and division, including integer scaling problems and correspondence problems in which n objects are connected to m objects.**
4	Children in Year 4 should: • **Recall multiplication and division facts for multiplication tables up to 12 x 12** • **Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers** • **Recognise and use factor pairs and commutatively in mental calculations** • **Multiply two-digit and three-digit numbers by a one-digit number using formal written layout** • **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 which n objects are connected to m objects.**
5	Children in Year 5 should: • **Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.** • **Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers** • **Establish whether a number up to 100 is prime and recall prime numbers up to 19** • **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 numbers mentally drawing upon known facts** • **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** • **Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000** • **Recognise and use square numbers and cube numbers, and the notation for**

	squared (²) and cubed (³)
	• **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.**
6	Children in Year 6 should:
	• **Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the efficient written method of long multiplication**
	• **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 context**
	• **Perform mental calculations, including with mixed operations and large numbers**
	• **Identify common factors, common multiples and prime numbers**
	• **Use their knowledge of the order of operations to carry out calculations involving the four operations**
	• **Solve problems involving addition, subtraction, multiplication and division**
	• **Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.**

Developing the formal written method of long multiplication and long division

Strategy	Multiplication sentences	End of year expected method	Division sentences	End of year expected method
Year 1				
Count in multiples of 2s, 5s and 10s				
Year 2				
Recognise multiplication & division facts for 2x, 5x & 10x tables	2 lots of 5 = 10 2 groups of 5 = 10 2 x 5 = 10 5 x 2 = 10		10 shared by 2 = 5 10 divide by 2 = 5 10 ÷ 2 = 5	
Year 3				
Multiply & divide 2d by 1d using formal written method		$\begin{array}{r} {}^{2}35 \\ \times\ \ 5 \\ \hline 175 \end{array}$		$3\overline{)69}$ → 23
Year 4				
Multiply & divide 3d by 1d using formal written method		$\begin{array}{r} {}^{5\,3}385 \\ \times\ \ \ 6 \\ \hline 2310 \end{array}$		$7\overline{)29^{1}4}$ → 42
Year 5				
Multiply 3d x 2d using formal written method Divide 4d by 1d incl remainders, using formal column method		$\begin{array}{r} {}^{5\,3}485 \\ \times\ \ \ 16 \\ \hline 2910 \\ 4850 \\ \hline 7760 \\ {}_{1} \end{array}$		$6\overline{)4^{4}0^{4}00}$ → 666 r4
Year 6				

Multiply 4d x 2d using formal column method Multiply numbers with 2 dp x 2d		$$\begin{array}{r} 3123 \\ \times\ \ \ 22 \\ \hline 6246 \\ 62460 \\ \hline 68706 \\ \hline 1 \end{array}$$		$$\begin{array}{r} 280\ r12 \\ 23\ \overline{)\ 6452} \\ -\ \ \ 46 \\ \hline 185 \\ -\ 184 \\ \hline 12 \end{array}$$
Divide 4d by 2d using formal column methods, showing remainder as a fraction or decimal		$$\begin{array}{r} {}^{1}\ \ {}^{2} \\ 5.24 \\ \times\ \ 26 \\ \hline 31.44 \\ 104.80 \\ \hline 136.24 \\ \hline 1 \end{array}$$		$$\begin{array}{r} 305.5 \\ 22\ \overline{)\ 6721.0} \\ -\ \ 66 \\ \hline 121 \\ -\ 110 \\ \hline 110 \end{array}$$