Rokeby Primary School

Calculation Policy

2019

Chair of Governors signature J Kenny

Headteacher's signature J James

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Calculation Policy

Introduction

There are four mathematical operations that are taught to the children: addition, subtraction, multiplication and division. This policy outlines the progression within these operations and the way in which children may be using them.

About our calculation policy

The following calculation policy has been devised to meet requirements of the National Curriculum 2014 for the teaching and learning of mathematics and is also designed to give pupils a consistent and smooth progression of learning calculations across the school. Early learning in number and calculation in Reception follows the 'Development Matters" EYFS document and this calculation policy is designed to build on progressively from the content and methods established in the Early Years Foundation Stage.

Age and stage expectations

In the 2014 Primary National Curriculum for mathematics, there are end of Key Stage year expectations and suggested goals for each year; there is also an emphasis on depth before breadth and a greater expectation of what children should achieve. In addition, there is a whole new assessment method, as the removal of levels gives schools greater freedom to develop and use their own systems. At Rokeby Primary School we use the Assertive mentoring system to aid the teaching and learning of calculating. One of the key differences of the 2014 Primary National Curriculum is the level of detail included, indicating what children should be learning and when. In many ways, these specific objectives make it easier for teachers to plan a coherent approach to the development of pupils' calculation skills. However, the expectation of using formal methods is rightly coupled with the explicit requirement for children to use concrete materials and create pictorial representations – a key component of the mastery approach. This calculation policy is organised according to the expectations as set out in the National Curriculum 2014, however it is vital that pupils are taught according to the stage that they are currently working at, being moved onto the next stage as soon as they are ready, or working at a lower stage until they are secure enough to move on. We support and extend children as needed, broadening, deepening and applying their calculation knowledge. The layout of this calculation policy allows for children to move onto a more advanced calculation method when they are ready for it.

Providing a context for calculations

It is important that any type of calculation is given a real life context, challenge or problem solving approach to help build children's understanding of the purpose of calculation and to help them recognise when to use certain operations and methods when faced with problems. This must be a priority within mathematics lessons at Rokeby Primary School.

Mental calculations and formal written methods

Children at Rokeby Primary School will learn to calculate both mentally and using formal written methods. It is important for children to learn that the two ways of calculating are linked and that one can be used to support the other. It is recognised at Rokeby that it is important for children to understand the fundamentals of mental calculation and therefore the need for written mathematics at times may be limited. Mental calculation does not progress in quite the same way as written aspects of mathematics. Therefore the list of mental calculation ideas are not exhaustive and would be expected to be seen across the school however the context and the numbers may be differentiated.

Choosing calculation methods

At Rokeby we believe it is important that children become effective in their use of calculations. Children need to be taught and encouraged to use the following processes in deciding what approach they will take to a calculation and therefore ensure they select the most appropriate method.

Mastery

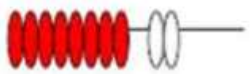
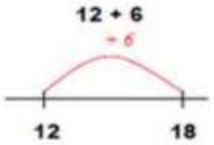
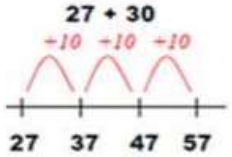
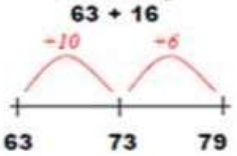
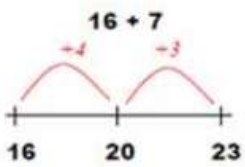
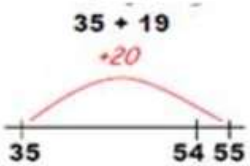
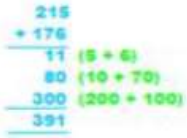
> The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof.
>
> 2014 Maths Programme of Study

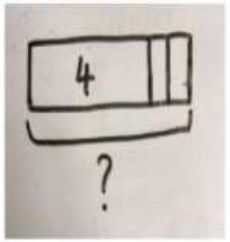
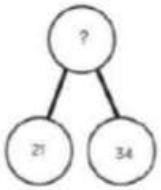
At the centre of the mastery approach to the teaching of mathematics is the belief that all children have the potential to succeed. They should have access to the same curriculum content and, rather than being extended with new learning, they should deepen their conceptual understanding by tackling challenging and varied problems. Similarly, with calculation strategies, children must not simply rote learn procedures but demonstrate their understanding of these procedures through the use of concrete materials and pictorial representations. This policy includes some of the ways that we develop Mastery at Rokeby. When we mark we set the children challenge questions, often from the White Rose, 'Teaching for Mastery' document. Strategies to promote Mastery are included in this policy.

Mathematical language

The 2014 National Curriculum is explicit in articulating the importance of children using the correct mathematical language as a central part of their learning (reasoning). Indeed, in certain year groups, the non-statutory guidance highlights the requirement for children to extend their language around certain concepts. It is therefore essential that teaching using the strategies outlined in this policy is accompanied by the use of appropriate and precise mathematical vocabulary. New vocabulary should be introduced in a suitable context (for example, with relevant real objects, apparatus, pictures or diagrams) and explained carefully. High expectations of the mathematical language used are essential, with teachers only accepting what is correct. This policy includes the mathematical vocabulary to be taught at each stage/in each year group. New vocabulary for each year group is highlighted in red. Appendix One at the end of this policy highlights common errors in mathematical vocabulary.

Progress in addition

I can record calculations using pictures. **Make 6**  2 + 4 = 6 3 + 3 = 6	I can use bead strings or bead bars to illustrate addition. 8 + 2  8 + 2 = 10	I can use a number line to count on in ones. 12 + 6  12 + 6 = 18	I can use a number line to count on in tens. 27 + 30  27 + 10 + 10 + 10 = 57 27 + 30 = 57	I can use a number line to count on in tens and ones by partitioning. 63 + 16  63 + 10 + 6 = 79 63 + 16 = 79
I can partition a number to bridge through a multiple of ten. 16 + 7  16 + 4 + 3 = 23 16 + 7 = 23	I can add near multiples of ten by adding in tens and then adjusting. 35 + 19  35 + 20 - 1 = 54 35 + 20 - 1 = 54	I can use methods of partitioning to solve more complex addition calculations. 375 + 167  5 + 7 = 12 70 + 60 = 130 300 + 100 = 400 400 + 130 + 12 = 542 375 + 167 = 542	I can use the expanded method to add amounts. 215 + 176  215 + 176 = 391	I can carry numbers to add using the compact method of addition. 625 + 48  625 + 48 = 673

I can add decimals amounts using the compact method. **16.4 kg + 7.68 kg** 16.40 + 7.68 24.08 **16.4 + 7.68 = 24.08 kg**	Strategies to promote Mastery: A bar model-which encourages children to count on, rather than count all. 	TO+0 using base 10. Continue to develop understanding of partitioning and place value. 41+8 	Conceptual variation.  ? (21, 34)	Children to develop an understanding of equality e.g. 6 + □ = 11 6 + 5 = 5 + □ 6 + 5 = □ + 4

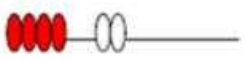
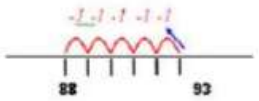
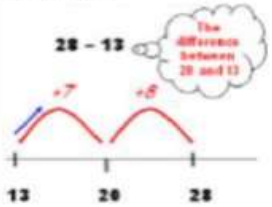
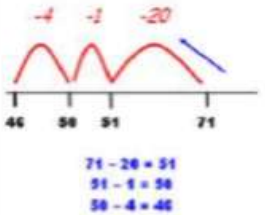
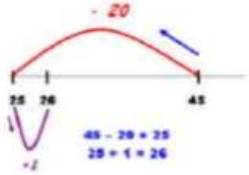
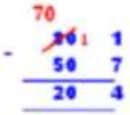
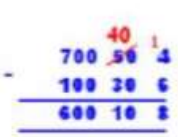
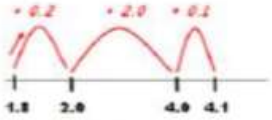
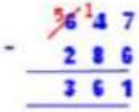
Key skills and key vocabulary for addition

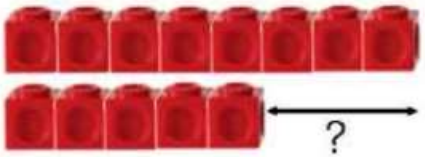
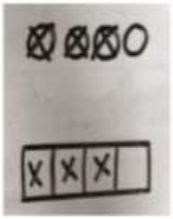
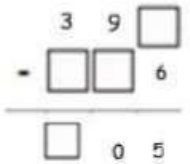
EYFS	Key skills for ELGs: • Using quantities and objects, they add two single digit numbers and count on to find the answer.
Year One/Stage One	Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on and number line. Key skills for addition at Y1: • Read and write numbers to 100 in numerals, incl. 1—20 in words. • Recall bonds to 10 and 20, and addition facts within 20. • Count to and across 100. • Count in multiples of 1 2, 5 and 10. • Solve simple 1-step problems involving addition, using objects, number lines and pictorial representations.
Year Two/Stage Two	Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, addition, column and tens boundary. Key skills for addition at Y2: • Add a 2-digit number and ones (e.g. 27 + 6). • Add a 2-digit number and tens (e.g. 23 + 40). • Add pairs of 2-digit numbers (e.g. 35 + 47). • Add three single-digit numbers (e.g. 5 + 9 + 7). • Show that adding can be done in any order (the commutative law). • Recall bonds to 20 and bonds of tens to 100 (30 + 70 etc.). • Count in steps of 2, 3 and 5 and count in tens from any number. • Understand the place value of 2-digit numbers (tens and ones). • Compare and order numbers to 100 using < > and = signs. • Read and write numbers to at least 100 in numerals and words. • Solve problems with addition, using concrete objects, pictorial representations, involving numbers, quantities and measures, and applying mental and written methods.
Year Three/Stage Three	Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, vertical, carry ,expanded and compact. Key skills for addition at Y3: • Read and write numbers to 1000 in numerals and words. • Add 2-digit numbers mentally, incl. those exceeding 100. • Add a three-digit number and ones mentally (175 + 8). • Add a three-digit number and tens mentally (249 + 50). • Add a three-digit number and hundreds mentally (381 + 400).

	• Estimate answers to calculations, using inverse to check answers. • Solve problems, including missing number problems, using number facts, place value, and more complex addition. • Recognise place value of each digit in 3-digit numbers (hundreds, tens, and ones.) • Continue to practise a wide range of mental addition strategies, i.e. number bonds, adding the nearest multiple of 10, 100, 100 and adjusting, using near doubles, partitioning and recombining.
Year Four/Stage Four	Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits and inverse. Key skills for addition at Y4: • Select most appropriate method: mental, jottings or written and explain why. • Recognise the place value of each digit in a four-digit number. • Round any number to the nearest 10, 100 or 1000. • Estimate and use inverse operations to check answers. • Solve 2-step problems in context, deciding which operations and methods to use and why. • Find 1000 more or less than a given number. • Continue to practise a wide range of mental addition strategies, i.e. number bonds, add the nearest multiple of 10, 100, 1000 and adjust, use near doubles, partitioning and recombining. • Add numbers with up to 4 digits using the formal written method of column addition. • Solve 2-step problems in contexts, deciding which operations and methods to use and why. • Estimate and use inverse operations to check answers to a calculation.
Year Five/Stage Five	Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, carry, expanded, compact, vertical, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths and thousandths. Key skills for addition at Y5: • Add numbers mentally with increasingly large numbers, using and practising a range of mental strategies i.e. add the nearest multiple of 10, 100, 100 and adjust; use near doubles, inverse, partitioning and re-combining; using number bonds. • Use rounding to check answers and accuracy. • Solve multi-step problems in contexts, deciding which operations and methods to use and why. • Read, write, order and compare numbers to at least 1 million and determine the value of each digit. • Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000. • Add numbers with more than 4 digits using formal written method of columnar addition.
Year Six/Stage Six	Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary,

	increase, carry, expanded, compact, vertical, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths and thousandths. Key skills for addition at Y6: • Perform mental calculations, including with mixed operations and large numbers, using and practising a range of mental strategies. • Solve multi-step problems in context, deciding which operations and methods to use and why. • Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy. • Read, write, order and compare numbers up to 10 million and determine the value of each digit. • Round any whole number to a required degree of accuracy. • Pupils understand how to add mentally with larger numbers and calculations of increasing complexity.

Progress in subtraction

I can record using pictures.  8 – 5 = 3	I can use bead strings or bead bars to illustrate subtraction. 6 - 2  6 -2 = 4	I can use a number line to count back when subtracting. 93 - 5  93 – 5 = 88	I can count on using a number line to solve a subtraction calculation.  28 – 13 = 15	I can bridge through multiples of 10 when counting back.  71 – 25 = 46
I can subtract near multiples of 10 by taking away in tens and adjusting. 45 - 19  45 – 19 = 26	I can partition numbers and subtract using decomposition. 81 – 57  81 – 57 = 24	I can solve more complex subtraction calculations by partitioning and using decomposition. 754 - 136  754 – 136 = 618	I can use a number line to subtract or find the difference between decimal amounts. 4.1 – 1.8  1.8 + 0.2 + 2.0 + 0.1 = 4.1 4.1 - 1.8 = 2.3	I can use compact decomposition to solve subtraction calculations. 647 - 286  647 – 286 = 361

I can use compact decomposition to solve subtraction calculations with decimals. **137.4 - 29.6** $\begin{array}{r} {}^{2}{}^{1}6 \\ 1\,\not{3}\,\not{7}.{}^{1}4 \\ -\quad 2\ 9.\ 6 \\ \hline 1\ 0\ 7.\ 8 \end{array}$ **137.4 - 29.6 = 107.8**	**Strategies to promote Mastery:** Finding the difference (using cubes, Numicon or Cuisenaire rods, other objects can also be used). Calculate the difference between 8 and 5. 	Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used. 	Missing digit calculations. 

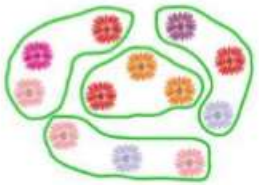
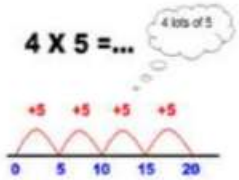
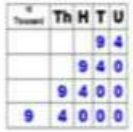
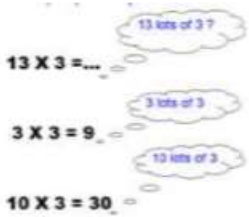
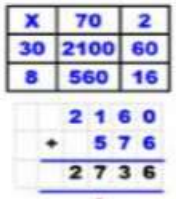
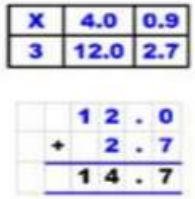
Key skills and key vocabulary for subtraction

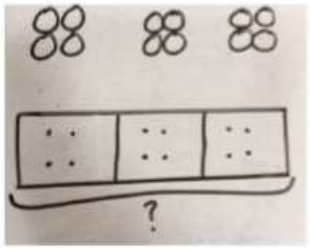
EYFS	Key skills for ELGs: • Using quantities and objects, they subtract two single digit numbers and count back to find the answer.
Year One/Stage One	Key vocabulary :equal to, fewer, take, take away, less, minus, subtract, leaves, difference between, how many more, how many fewer / less than, most, least, count back , how many left and how much less is_? Key skills for subtraction at Y1: • Given a number, say one more or one less. • Count to and over 100, forward and back, from any number. • Represent and use subtraction facts to 20 and within 20. • Subtract with one-digit and two-digit numbers to 20, including zero. • Solve one-step problems that involve addition and subtraction, using concrete objects (i.e. bead string, objects, cubes) and pictures, and missing number problems. • Read and write numbers from 0 to 20 in numerals and words.
Year Two/Stage Two	Key vocabulary: equal to, take, take away, less minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_?, difference, count on, strategy, partition, tens and units. Key skills for subtraction at Y2: • Recognise the place value of each digit in a two-digit number. • Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100. • Subtract using concrete objects, pictorial representations, 100 squares and mentally, including: a two digit number and ones, a two-digit number and tens, and two two-digit numbers. • Show that subtraction of one number from another cannot be done in any order. • Recognise and use inverse relationship between addition and subtraction, using this to check calculations and missing number problems. • Solve simple addition and subtraction problems including measures, using concrete objects, pictorial representation, and also applying their increasing knowledge of mental and written methods. • Read and write numbers to at least 100 in numerals and in words.
Year Three/Stage Three	Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_? difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value and digit. Key skills for subtraction at Y3: • Subtract mentally a: 3-digit number and ones, 3-digit number and tens, 3-digit number and hundreds.

	• Estimate answers and use inverse operations to check. • Solve problems, including missing number problems. • Find 10 or 100 more or less than a given number. • Recognise the place value of each digit in a 3-digit number. • Counting up differences as a mental strategy when numbers are close together or near multiples of 10 (see examples above). • Read and write numbers up to 1000 in numerals and words. • Practise mental subtraction strategies, such as subtracting near multiples of 10 and adjusting (e.g. subtracting 19 or 21), and select most appropriate methods to subtract, explaining why. Approximate, Calculate, Check it mate!
Year Four/Stage Four	Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back , how many left, how much less is_? difference, count on, strategy, partition, tens, units exchange, decrease, hundreds, value, digit and inverse. Key skills for subtraction at Y4: • Subtract by counting on where numbers are close together or they are near to multiples of 10, 100 etc. • Children select the most appropriate and efficient methods for given subtraction calculations. • Estimate and use inverse operations to check answers. • Solve addition and subtraction 2-step problems, choosing which operations and methods to use and why. • Solve simple measure and money problems involving fractions and decimals to two decimal places. • Find 1000 more or less than a given number. • Count backwards through zero, including negative numbers. • Recognise place value of each digit in a 4-digit number Round any number to the nearest 10, 100 or 1000. • Solve number and practical problems that involve the above, with increasingly large positive numbers.
Year Five/Stage Five	Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_?, difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point, and decimal. Key skills for subtraction at Y5: • Subtract numbers mentally with increasingly large numbers. • Use rounding and estimation to check answers to calculations and determine, in a range of contexts, levels of accuracy. • Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why. • Read, write, order and compare numbers to at least 1 million and determine the value of each digit. • Count forwards or backwards in steps of powers of 10 for any given number up to 1 million. • Interpret negative numbers in context, counting forwards and backwards with positive and negative integers through 0. • Round any number up to 1 million to the nearest 10, 100, 1000, 10 000 and 100 000.
Year Six/Stage Six	Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_? difference, count on, strategy, partition, tens, units exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point and decimal.

	Key skills for subtraction at Y6: • Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why. • Read, write, order and compare numbers up to 10 million and determine the value of each digit. • Round any whole number to a required degree of accuracy. • Use negative numbers in context, and calculate intervals across zero. • Children need to utilise and consider a range of mental subtraction strategies, jottings and written methods before choosing how to calculate.

Progress in multiplication

I can count in 2s, 5s and 10s I can place objects in equal groups. 	I can understand multiplication as repeated addition.  5 X 2 = 2 + 2 + 2 + 2 + 2 =10	I can understand multiplication as repeated addition using a number line. 4 X 5 =...  4 X 5 = 20	I can multiply numbers by 10, 100 and 1000.   94 X 10 = 940 94 X 100 = 9400 94 X 1000 = 94000	I can partition numbers to simplify multiplication.  13 X 3 =... 3 X 3 = 9 10 X 3 = 30 13 X 3 = 39
I can solve problems involving multiples of 10, 100 and 1000. 6 X 20 2 X 10 = 6 X 2 X 10 = 120 8 X 300 3 X 100 = 8 X 3 X 100 = 2400	I can use the grid method to solve multiplication problems. 23 X 8 =  23 X 8 = 184	I can use expanded multiplication methods. 32 X 6 =  32 X 6 = 192	I can use the grid method to solve more complex problems. 72 X 38  72 X 38 = 2736	I can use the grid method to include decimal numbers. 4.9 X 3  4.9 X 3 = 14.7

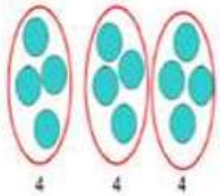
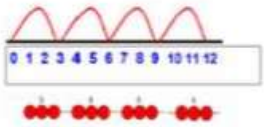
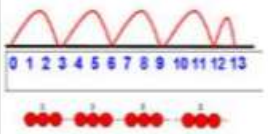
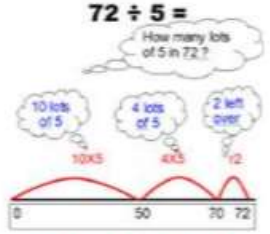
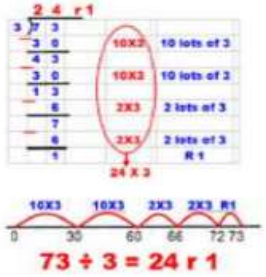
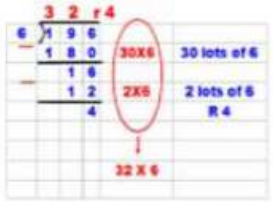
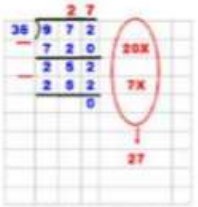
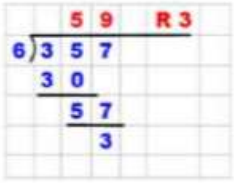
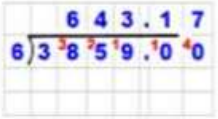
I can use the compact method of multiplication.	Strategies to promote Mastery: Children to represent the practical resources in a picture and use a bar model.	Children to record what it is they are doing to show understanding.	Conceptual variation.
24 X 37 24 X 37 168 720 888 **24 X 37 = 888**	 	3 × 23 20 3 23 × 3 69 3 × 20 = 60 3 × 3 = 9 60 + 9 = 69	Find the product of 6 and 23 6 × 23 = □ = 6 × 23 6 × 23 23 × 6

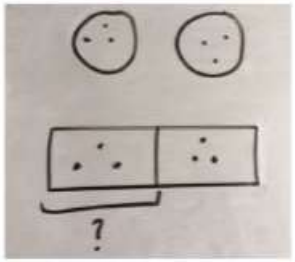
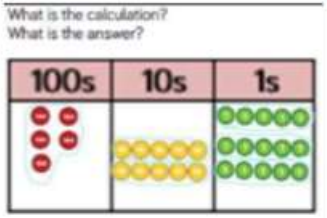
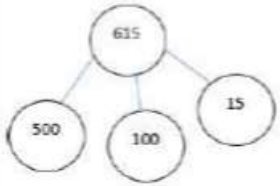
Key skills and key vocabulary for multiplication

EYFS	Key skills for ELGs: • Solving problems, involving doubling
Year One/Stage One	Key vocabulary: groups of, lots of, times, array, altogether, multiply and count. Key skills for multiplication at Y1: • Count in multiples of 2, 5 and 10. • Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. • Make connections between arrays, number patterns, and counting in twos, fives and tens. • Begin to understand doubling using concrete objects and pictorial representations.
Year Two/Stage Two	Key vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice and three times... Key skills for multiplication at Y2: • Count in steps of 2, 3 and 5 from zero, and in 10s from any number. • Recall and use multiplication facts from the **2, 5 and 10** multiplication tables, including recognising odds and evens. • Write and calculate number statements using the x and = signs. • Show that multiplication can be done in any order (commutative). • Solve a range of problems involving multiplication, using concrete objects, arrays, repeated addition, mental methods, and multiplication facts. • Pupils use a variety of language to discuss and describe multiplication.
Year Three/Stage Three	Key vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, _times as big as, once, twice, three times..., partition, grid method, multiple, product, tens, units and value. Key skills for multiplication at Y3: • Recall and use multiplication facts for **the 2, 3, 4, 5, 8 and 10 multiplication tables**, and multiply multiples of 10. • Write and calculate number statements using the multiplication tables they know, including 2-digit x single-digit, drawing upon mental methods, and progressing to reliable written methods. • Solve multiplication problems, including missing number problems. • Develop mental strategies using commutativity (e.g. 4 x 12 x 5 = 4 x 5 x 12 = 20 x 12 = 240). • Solve simple problems in contexts, deciding which operations and methods to use. • Develop efficient mental methods to solve a range of problems e.g using commutativity (4 × 12 × 5 =

	4 × 5 × 12 = 20 × 12 = 240) and for missing number problems ___ x 5 = 20, 3 x ___ = 18, ___ x ___ =32.
Year Four/Stage Four	Key vocabulary: groups of, lots of, times, array, altogether ,multiply, count, multiplied by, repeated addition, array, column, row, commutative, groups of, sets of, lots of, equal groups, times, multiply, times as big as, once, twice, three times... partition, grid method, total, multiple, product, sets of and inverse. Key skills for multiplication at Y4: • Count in multiples of 6, 7, 9, 25 and 1000. • Recall multiplication facts for **all multiplication tables up to 12 x 12.** • Recognise place value of digits in up to 4-digit numbers. • Use place value, known facts and derived facts to multiply mentally, e.g. multiply by 1, 10, 100, by 0, or to multiply 3 numbers. • Use commutativity and other strategies mentally 3 x 6 = 6 x 3, 2 x 6 x 5 = 10 x 6 , 39x7 = 30 x 7 + 9 x 7. • Solve problems with increasingly complex multiplication in a range of contexts. • Count in multiples of 6, 7, 9, 25 and 1000. • Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones).
Year Five/Stage Five	Key vocabulary groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, _times as big as, once, twice, three times..., partition, grid method, total, multiple, product, inverse, square, factor, integer, decimal, short/long multiplication and carry. Key skills for multiplication at Y5: • Identify multiples and factors, using knowledge of multiplication tables to 12x12. • Solve problems where larger numbers are decomposed into their factors. • Multiply and divide integers and decimals by 10, 100 and 1000. • Recognise and use square and cube numbers and their notation. • Solve problems involving combinations of operations, choosing and using calculations and methods appropriately.
Year Six/Stage Six	Key vocabulary: groups of, lots of, times, array, altogether ,multiply, count, multiplied by, repeated addition, array, column, row, commutative, sets of, equal groups,___ times as big as, once, twice, three times..., partition, grid method, total, multiple, product, inverse, square, factor, integer, decimal, short / long multiplication, carry, tenths, hundredths and decimal. Key skills for multiplication at Y6: • Recall multiplication facts for all times tables up to 12 x 12 (as Y4 and Y5). • Multiply multi-digit numbers, up to 4-digit x 2-digit using long multiplication. • Perform mental calculations with mixed operations and large numbers. • Solve multi-step problems in a range of contexts, choosing appropriate combinations of operations and methods. • Estimate answers using round and approximation and determine levels of accuracy. • Round any integer to a required degree of accuracy.

Progress in division

I can count in 2s, 5s and 10s. 	I can share items into equal groups.  4 4 4 12 shared between 3 is 4	I can understand division as repeated subtraction. **12 ÷ 3 =**  **12 ÷ 3 = 4**	I can understand division as repeated subtraction- with remainders. **13 ÷ 3 =**  **12 ÷3 = 4 r 1**	I can divide a number by using a blank number line and grouping the divisor. **72 ÷ 5 =**  **72 ÷ 5 = 14 r 2**
I can divide a number by chunking. **73 ÷ 3 =**  **73 ÷ 3 = 24 r 1**	I can divide a number by chunking- grouping in multiples of 10. **196 ÷ 6 =**  **196 ÷ 6 = 32 r4**	I can divide a number by chunking-HTO+ TO. **972 ÷ 36 =**  **972 ÷ 36 = 27**	I can use a semi-compact division method. **357 ÷ 6 =**  **357 ÷ 6 = 59 r 3**	I can use a compact division method. **3859 ÷ 6 =**  **3859 ÷ 6 = 3859.17** ***(to 2 dp)***

I can use a compact division method-showing the remainder as a decimal. **3859 ÷ 6 =** 643.17 6)3 3 8 5 9 . 1 0 4 0 **3859 ÷ 6 = 3859.17** ***(to 2 dp)***	Strategies to promote Mastery: Represent the sharing pictorially.  	Children to be able to make sense of the place value counters and write calculations to show the process. 42 ÷ 3 42 = 30 + 12 30 ÷ 3 = 10 12 ÷ 3 = 4 10 + 4 = 14	What is the calculation? What is the answer?  	Using the part whole model below, how can you divide 625 by 5 without using short division? 

Key skills and key vocabulary for division

EYFS	Key skills for ELGs: • Solving problems, involving halving and sharing.
Year One/Stage One	Key Vocabulary: share, share equally, one each, two each…, group, groups of, lots of and array. Key number skills needed for division at Y1: • Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations arrays with the support of the teacher. • Through grouping and sharing small quantities, pupils begin to understand, division, and finding simple fractions of objects, numbers and quantities. • They make connections between arrays, number patterns, and counting in twos, fives and tens.
Year Two/Stage Two	Key Vocabulary: share, share equally, one each, two each…, group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left and left over. Key number skills needed for division at Y2: • Count in steps of 2, 3, and 5 from 0. • 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 x, ÷ and = signs. • Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. • Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
Year Three/Stage Three	Key Vocabulary: share, share equally, one each, two each…, group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, 'carry', remainder and multiple. Key number skills needed for division at Y3: • Recall and use multiplication and division facts for the 2, 3, 4, 5, 8 and 10 multiplication tables (through doubling, connect the 2, 4 and 8s). • Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers multiplied by one-digit numbers, using mental and progressing to formal written methods. • Solve problems, in contexts, and including missing number problems, involving multiplication and division.

	• Pupils develop efficient mental methods, for example, using multiplication and division facts (e.g. using 3 × 2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3) to derive related facts (30 × 2 = 60, so 60 ÷ 3 = 20 and 20 = 60 ÷ 3). • Pupils develop reliable written methods for division, starting with calculations of 2-digit numbers by 1-digit numbers and progressing to the formal written method of short division.
Year Four/Stage Four	Key Vocabulary: share, share equally, one each, two each…, group, equal groups of, lots of, array, divide, dividedby,dividedinto,division,grouping,numberline,left,leftover,inverse,shortdivision, carry, remainder, multiple, divisible by and factor. Key number skills needed for division at Y4: • Recall multiplication and division facts for all numbers up to 12 x 12. • Use place value, known and derived facts to multiply and divide mentally, including: multiplying and dividing by 10 and 100 and 1. • Pupils practise to become fluent in the formal written method of short division with exact answers when dividing by a one-digit number. • Pupils practise mental methods and extend this to three-digit numbers to derive facts, for example 200 × 3 = 600 so 600 ÷ 3 = 200 • Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as three cakes shared equally between 10 children.
Year Five/Stage Five	Key Vocabulary: share, share equally, one each, two each…, group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors and composite number (non-prime). Key number skills needed for division at Y5: • Recall multiplication and division facts for all numbers up to 12 x 12 (as in Y4). • Multiply and divide numbers mentally, drawing upon known facts. • Identify multiples and factors, including finding all factor pairs of a number, and common factors of two number. • Solve problems involving multiplication and division where larger numbers are decomposed into their factors. • Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000. • Use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. • Work out whether a number up to 100 is prime, and recall prime numbers to 19. • 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. • Use multiplication and division as inverses. • Interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (e.g. 98 ÷ 4 = 24 r 2 = 241/2 = 24.5 ≈ 25). • Solve problems involving combinations of all four operations, including understanding of the equals sign, and including division for scaling by different fractions and problems involving simple rates.

Year Six/Stage Six	Key Vocabulary: share, share equally, one each, two each…, group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors, composite number (non-prime) and common factor. Key number skills needed for division at Y6: • Recall and use multiplication and division facts for all numbers to 12 x 12 for more complex calculations. • 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. Use short division where appropriate. • Perform mental calculations, including with mixed operations and large numbers. • Identify common factors, common multiples and prime numbers. • Solve problems involving all 4 operations. • Use estimation to check answers to calculations and determine accuracy, in the context of a problem. • Use written division methods in cases where the answer has up to two decimal places. • Solve problems which require answers to be rounded to specified degrees of accuracy.

Appendix One

Mathematical Language

High expectations of the mathematical language used are essential, with staff only accepting what is correct. Consistency across the school is key:

Correct Terminology	Incorrect Terminology
ones	units
zero	oh (the letter o)
exchange exchanging regrouping	stealing borrowing
calculation- a mathematical sentence where the sides are not equal, e.g. 25 x 2= equation- an equation is a mathematical sentence that has two equal sides separated by an equal sign, e.g. 25 x 2=50	generic term of 'sum' or 'number sentence'
known unknown	
whole part	
estimate-encourage children to estimate what a sensible answer would be before calculating	guess
is equal to (is the same as)	equals
numeral- the symbol or collection of symbols we use to represent a number	
number-the concept represented by the numeral	
digit-one of the symbols of our number system-0, 1, 2, 3, 4, 5, 6, 7, 8 and 9	