Red Oaks Primary School
Calculation Policy

Written methods for addition of whole numbers

The aim is that children use mental methods when appropriate but for calculations that they cannot do in their heads they use an efficient method accurately and with confidence. Children are entitles to be taught and to acquire secure mental methods of calculation and on efficient written method of calculation for addition, that they know and can rely on when mental methods are not appropriate.

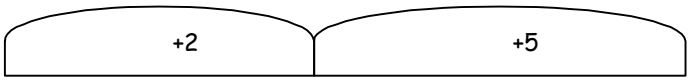
These notes show the stages in building up to an efficient written method for addition of whole numbers by the end of Year 4.

To add successfully, children need to be able to:

- Recall all addition pairs to 9 + 9 and complements in 10;
- Add mentally a series of single-digit numbers, such as 5 + 8 + 4;
- Add multiples of 10, such as 60 + 70, or of 100, such as 600 + 700, using the related addition facts, 6 + 7, and their knowledge of place value;
- Partition two-digit and three digit numbers into multiples of 100, 10 and 1 in different ways.

Note: It is important that children's mental methods of calculation are practices and secured along side their learning and use of an efficient written method for addition.

Year	**Method**
Reception	• Count 1:1 objects up to 10. • Recognise numbers 1 to 9. • Say number names in order • Count to 20 and beyond. • Begin to use a numbered number line as a whole class for addition with numbers to 20

Year 1	• Addition of number bonds to 10 and 20 • Adding by counting on along a given number line and a 100 square. Count in ones first. • Steps in addition above 10 to be recorded on a blank number line. The steps often bridge through a multiple of 10. e.g.  8 10 15
Year 2	• Children should be using number lines first and then 100 squares for additions to 100 and recording their own jumps. • By the end of the year, children should begin to record steps in addition using portioning: e.g. 47 + 76 = 40 + 7 + 70 + 6 = 110 + 13 = 123
Year 3	• Steps are recorded as partitioned numbers (see year 2) and then partitioned numbers are written under one another. This should be taught after Christmas in the Spring term: e.g. 47 = 40 + 7 +76 = 70 + 6 110 + 13 = 123 • By the end of the year children should be writing the numbers in columns adding units first: e.g. 47 76+ 13 110 123

Year 4	• Introduce the compacted method of addition at the beginning of the year with numbers that do not bridge the 10. e.g. 23 42+ 65 • In the spring term begin to include numbers that bridge the 10. Take time to secure understanding of place value. Children should be adding two 2 digit numbers. e.g. 47 34+ 81 1 • In the summer term children should use numbers that bridge the hundreds: e.g. 47 76+ 123 11 And eventually use 3 plus 2 digits and 3 + 3 digit numbers that bridge the tens and hundreds. e.g. 258 366 87+ 458+ 345 824 11 11 • This method of addition remains efficient when used with larger whole numbers and decimals. Once learned the method is quick and reliable.

Year 5	• The compact method is expanded upon by introducing the addition of 2 or more decimals. This should also be used in the context of measures: e.g. 72.5km 54.6km + 126.1km • Addition should also be used in a problem solving context to solve one step problems including those involving measures. • Column addition of whole numbers up to 4 + 5 digits and decimal place.
Year 6	• Addition of numbers with 2 decimals after the decimal point and numbers up to 4 digits. • Addition to be used in problem solving including those involving measures and 2/3 steps.

Written methods for subtraction of whole numbers

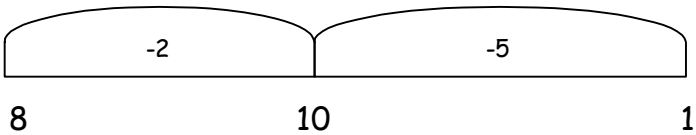
The aim is that children use mental methods when appropriate but for calculations that they cannot do in their heads they use an efficient written method accurately and with confidence. Children are entitled to be taught and to acquire secure mental methods of calculation and one efficient written method of calculation for subtraction that they know they can rely on when mental methods are not appropriate.

These notes show the stages in building up to an efficient method for subtraction of two-digit and three-digit whole numbers by the end of Year 4.

To subtract successfully, children need to be able to:

- Recall all addition and subtraction facts to 20;
- Subtract multiples of 10, such as 160 – 70, using the related subtraction fact 16 – 7, and their knowledge of place value;
- Partition two-digit and three-digit numbers into multiples of one hundred, ten and one in different ways, e.g. partition 74 into 70 + 4 or 60 + 14.

Note: It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for subtraction.

Reception	• Subtract using physical objects such as counters. • Use songs and rhymes
Year 1	• Count back on a number line in jumps of one. • By the end of the year, count up from the lowest number to find the difference. Count up in head and on fingers.
Year 2	• Use a 100 square and partition into tens and units to subtract. e.g. 56 – 13 = 56 – 10 = 46 46 – 3 = 43 • Steps in subtraction to be recorded on a number line. The steps often bridge through a multiple of 10. 15 – 7 = 8 

	• By the end of year 2 this method should be used counting on and back using 2-digit numbers on a blank number line: e.g. 74 – 27 = 47, worked out by counting back  47 50 54 74 • These steps may be recorded in a different order or combined. e.g.  47 70 74 • By the end of the year, children should be able to subtract a 2-digit number from a 2-digit number by partitioning. e.g. 74 – 27 = 74 – 20 – 7 = 54 – 7 74 – 27 = 70 + 4 – 20 – 7 = 60 + 14 – 20 – 7 = 40 + 7 • This requires children to subtract mentally a single digit number or a multiple of 10 from a 2-digit number. The method of recording links to counting back on the number line.  47 50 54 74
Year 3	• Children to continue using method as at end of year 2 but include numbers in the hundreds. Record jumps of their own choice on a number line. • Partition numbers and calculate horizontally (units first), without bridging the tens. e.g. 79 – 34 = 45 70 | 9 -30 | 4 40 | 5

Year 4	• Term 1/2, children should be taught the compact method of subtraction without bridging: e.g. 79 79 – 34 = 45 34 – 45 • In terms 3/4, bridging the tens should be introduced. e.g. 6 14 ~~7~~ 4 ~~2~~ 7 4 7 By the end of Year 4, children should be using the compact method of subtraction with 3 digit numbers bridging the tens and the hundreds. e.g. 6 13 1 ~~7~~ 4 1 -3 6 7 3 7 4 • Particular time and attention will be necessary when the number contains a zero in the tens column.
Year 5	• Use of the contracted method for decimal numbers (always the same number of places after the decimal point). e.g. 72.5 -4.6 • Special attention needs to be paid to place value and lining up the digits correctly before calculation is carried out. • Calculations involving measures. • Calculations set on the context of real life problems involving 1 and 2 step. • Calculations involving whole numbers and decimal places.
Year 6	• Decomposition using 4 digit numbers. • Subtraction using decimal numbers not always with the same number of places after the decimal point. • Subtraction of decimals and whole numbers in problem solving contexts using more that one step.

Written methods for multiplication of whole numbers

The aim is that children use mental methods when appropriate but for calculations that they cannot do in their heads they use an efficient written method accurately and with confidence. Children are entitled to be taught and to acquire secure mental methods of calculation and one efficient written method of calculation for multiplication that they know they can rely on when mental methods are not appropriate.

x	30	8	
4	120	32	152

These notes show the stages in building up to an efficient method for two-digit by one-digit multiplication by the end of Year 4, two-digit by two digit multiplication by the end of Year 5, and three-digit by two-digit multiplication by the end of Year 6.

To multiply successfully, children need to be able to:

x	20	7	
50	1000	350	1350
6	120	42	162
			1512

- Recall all multiplication facts to 10 x 10;
- Partition numbers into multiples of one hundred, ten and one;
- Work out products such as 70 x 5, 70 x 50, 700 x 50, using their knowledge of related fact, 7 x 5, and of place value.
- Add multiples of 10, such as 60 + 70, or of 100, such as 600 + 700, using the related addition facts, 6 + 7, and their knowledge of place value;
- Add combinations of whole numbers using the column method.

Note: It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for multiplication.

Reception	• Doubles up to double 5
Year 1	• Doubles up to double 10 • Counting in 2's
Year 2	• 2,5 and 10 x tables • Repeated addition • Arrays and grids (as a whole class)
Year 3	• 2,3,4,5,6, and 10 x tables • Multiplying by multiples of 10 (Summer term) e.g. 30 x 5, 70 x 4 • Continue with arrays and grids.

Year 4	• All times tables up to 10 x 10 by end of the year using a variety of strategies including rote, fingers comp. singing etc. • Spring term – using grids to multiply a 2 digit by 1-digit number (always put biggest number across the top of the grid). e.g. 38 x 4 = 152 • Summer term- using grids to multiply 2-digit by 2-digit numbers e.g. 27 x 56 = 1512
Year 5	• Consolidate grid method above for 2 x 2 and 3 x 2 digits • 2 x 2 digit vertical • 3 x 2 vertical 286 X 29 4000 — 200 x 20 = 4000 120 — 80 x 20 = 1600 350 — 6 x 20 = 120 1800 — 200 x 9 = 1800 720 — 80 x 9 = 720 42 8294 1 • Multiplication in problems solving contexts including those involving measures.
Year 6	• Method consolidated from Year 5 and children are encouraged to make approximations. e.g. 286 x 29 is approximately 300 x 30 = 9000

	• Multiplication in problems solving contexts including those involving measures. Problems may involve more than one step. • Multiplication using decimals.

Written methods for division of whole numbers

The aim is that children use mental methods when appropriate but for calculations that they cannot do in their heads they use an efficient written method accurately and with confidence. Children are entitled to be taught and to acquire secure mental methods of calculation and one efficient written method of calculation for division that they know they can rely on when mental methods are not appropriate.

These notes show the stages in building up to long division through years 4 to 6, first long division TU Ç U, extending to HTU Ç U, then HTU Ç TU, and short division of HTU Ç U.

To divide successfully in their heads, children need to be able to:

- Understand and use the vocabulary of division, e.g. in 18 3 = 6, the 18 is the dividend, the 3 is the divisor and the 6 is the quotient;
- Partition two-digit and three-digit numbers into multiples of one hundred, ten and ones in different ways;
- Recall multiplication and related division facts to 10 x 10, recognise multiples of single-digit numbers, and divide multiples of 10 or 100 by a single-digit number using their knowledge of division facts and place value;
- Know how to find a remainder working mentally, e.g. find the remainder when 48 is divided by 5;
- Understand and use multiplication and division as inverse operations.

Note: It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for division.

Reception	• Practical sharing activities e.g. using hoops.
Year 1	• Finding halves and quarters of shapes and low numbers. Practical whole class activities.
Year 2	• É, Ñ, Ö of shapes • Repeated subtraction using a number line • Sharing/grouping and recording as a number sentence. • Dividing by 2, 3 and 5 to solve simple problems.

Year 3	• Repeated subtraction using a number line. Continue to use grouping and arrays • Using the inverse with small numbers e.g. 3 x 4 = 12 12 3 = 4 • Practical lessons with small numbers • Finding a remainder as a whole number
Year 4	• Finding remainders • Continue to use the inverse for all times tables up to 10 x 10. • Use the 'chunking' method to divide first a 2-digit by 1-digit and by the end of the year a 3-digit by 1-digit number e.g. 6 ⟌196 -180 6 x 30 16 12 6 x 2 4 Answer: 32 R4
Year 5	• Continue to use the chunking method for HTU divided by TU looking for 'short cuts' and larger chunks to subtract using knowledge of times tables. • Problem solving in real life contexts including those involving measures.
Year 6	• Continue to use the chunking method for HTU divided by TU looking for 'short cuts' and larger chunks to subtract using knowledge of times tables. • Problem solving in real life contexts including those involving measures. Problems may involve more than one step. • Finding remainders as a decimal.