



Larkfields Junior School **Mathematics Calculation Policy**



1. Philosophy

The principal focus of mathematics in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large numbers.

In upper key stage 2, pupils must extend their understanding of the number system and place value to include larger integers. By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages (National Curriculum, 2013).

2. Aims

In light of the aims and objectives set out in the National Curriculum, 2013, Larkfields Junior School has produced a calculation policy to reflect the new concepts and pedagogy surrounding the teaching of mathematics.

This calculation policy has been specifically designed to provide a clear, consistent and smooth progression in calculation across school, and has been set out according to the DfES age related Programmes of Study. The expectation is that the majority of pupils will move through these Programmes of Study at broadly the same pace. However at Larkfields Junior School, decisions about when to progress are based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts readily are challenged through being offered rich and sophisticated problems before any acceleration through new content.

3. Progression of Skills, including strategies and methods:

Bold-Statutory requirements

Italics- Added by LJS

3.1 Addition

Addition		
	Mental calculation	Written Calculation
Year 3	<p>Add: A 3 digit number and ones A 3 digit number and tens A 3 digit number and hundreds <i>For mental calculations with 2 digit numbers, answers could exceed 100.</i> <i>Know pairs of multiples of 10 with a total of 100</i> <i>Add any two 2-digit numbers by counting on in 10s and 1s or by using partitioning</i> <i>Add multiples and near multiples of 10 and 100</i> <i>Perform place-value additions without a struggle</i> <i>e.g. $300 + 8 + 50 = 358$</i> <i>Use place value and number facts to add a 1-digit or 2-digit number to a 3-digit number</i> <i>e.g. $104 + 56$ is 160 since $104 + 50 = 154$ and $6 + 4 = 10$</i> <i>$676 + 8$ is 684 since $8 = 4 + 4$ and $76 + 4 + 4 = 84$</i> <i>Add pairs of 'friendly' 3-digit numbers</i> <i>e.g. $320 + 450$</i> <i>Begin to add amounts of money using partitioning</i></p>	<p><i>Use expanded column addition to add numbers with up to 3 digits (working towards columnar method)</i> Add numbers with up to three digits, using formal written methods of columnar addition. <i>Use column addition to add any pair of 1-place decimal numbers, including amounts of money and measures.</i></p>

Year 4	<p><i>Add to the next 100, £1 and whole number</i> e.g. $234 + 66 = 300$ e.g. $3\cdot4 + 0\cdot6 = 4$</p> <p><i>Perform place-value additions without a struggle</i> e.g. $300 + 8 + 50 + 4000 = 4358$</p> <p><i>Add multiples and near multiples of 10, 100 and 1000</i></p> <p><i>Add £1, 10p, 1p to amounts of money</i></p> <p><i>Use place value and number facts to add 1-, 2-, 3- and 4-digit numbers where a mental calculation is appropriate</i> e.g. $4004 + 156$ by knowing that $6 + 4 = 10$ and that $4004 + 150 = 4154$ so the total is 4160</p>	<p>Add numbers with up to four digits, using formal written methods of columnar addition.</p> <p><i>Use column addition to add any pair of 2-place decimal numbers, including amounts of money and measures e.g. $15.68 + 27.86 = 43.54$</i></p>
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Add numbers with increasingly large numbers.

Know number bonds to 1 and to the next whole number

Add to the next 10 from a decimal number

e.g. $13.6 + 6.4 = 20$

Add numbers with 2 significant digits only, using mental strategies

e.g. $3.4 + 4.8$

e.g. $23\ 000 + 47\ 000$

Add 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000

e.g. $8000 + 7000$

e.g. $600\ 000 + 700\ 000$

Add near multiples of 10, 100, 1000, 10 000 and 100 000 to other numbers

e.g. $82\ 472 + 30\ 004$

Add decimal numbers which are near multiples of 1 or 10, including money

e.g. $6.34 + 1.99$

e.g. $£34.59 + £19.95$

Use place value and number facts to add two or more 'friendly' numbers, including money and decimals

e.g. $3 + 8 + 6 + 4 + 7$

e.g. $0.6 + 0.7 + 0.4$

e.g. $2056 + 44$

Add numbers with more than four digits, using formal written methods of columnar addition.

Use column addition to add any pair of 3-place decimal numbers, including amounts of money and measures.

Year 6	<p>Perform mental calculations including with mixed operations and large numbers.</p> <p><i>Know by heart number bonds to 100 and use these to derive related facts</i> e.g. $3 \cdot 46 + 0 \cdot 54$</p> <p><i>Derive, quickly and without difficulty, number bonds to 1000</i></p> <p><i>Add small and large whole numbers where the use of place value or number facts makes the calculation do-able mentally</i> e.g. $34\ 000 + 8000$</p> <p><i>Add multiples of powers of 10 and near multiples of the same</i> e.g. $6345 + 199$</p> <p><i>Add negative numbers in a context such as temperature where the numbers make sense</i></p> <p><i>Add two 1-place decimal numbers or two 2-place decimal numbers less than 1</i> e.g. $4 \cdot 5 + 6 \cdot 3$ e.g. $0 \cdot 74 + 0 \cdot 33$</p> <p><i>Add positive numbers to negative numbers</i> e.g. Calculate a rise in temperature or continue a sequence beginning with a negative number</p>	<p><i>Add numbers with more than four digits, using formal written methods of columnar addition.</i></p> <p><i>Use column addition to add any pair of 3-place decimal numbers, including amounts of money and measures.</i></p>
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3.2 Subtraction

Subtraction		
	Mental calculation	Written Calculation
Year 3	<p>Subtract: A 3 digit number and ones A 3 digit number and tens A 3 digit number and hundreds</p> <p><i>Subtract any two 2-digit numbers</i></p> <p><i>Perform place-value subtractions without a struggle</i> <i>e.g. $536 - 30 = 506$</i></p> <p><i>Subtract 2-digit numbers from numbers > 100 by counting up</i> <i>e.g. $143 - 76$ is done by starting at 76. Then add 4 (80), then add 20 (100), then add 43, making the difference a total of 67</i></p> <p><i>Subtract multiples and near multiples of 10 and 100</i></p> <p><i>Subtract, when appropriate, by counting back or taking away, using place value and number facts</i></p> <p><i>Find change from £1, £5 and £10</i></p>	<p><i>Use expanded column subtraction to subtract numbers with up to 3 digits (working towards columnar method).</i></p> <p>Subtract numbers with up to three digits, using formal written methods of columnar subtraction.</p> <p><i>Use column subtraction to subtract any pair of 1-place decimal numbers, including amounts of money and measures.</i></p>
Year 4	<p><i>Perform place-value subtractions without a struggle</i> <i>e.g. $4736 - 706 = 4030$</i></p> <p><i>Subtract multiples and near multiples of 10, 100, 1000, £1 and 10p</i></p> <p><i>Subtract multiples of 0.1</i></p> <p><i>Subtract by counting up</i> <i>e.g. $503 - 368$ is done by adding</i> <i>$368 + 2 + 30 + 100 + 3$ (so we added 135)</i></p> <p><i>Subtract, when appropriate, by counting back or taking away, using place value and number facts</i></p> <p><i>Subtract £1, 10p, 1p from amounts of money</i></p> <p><i>Find change from £10, £20 and £50</i></p>	<p>Subtract numbers with up to four digits, using formal written methods of columnar subtraction.</p> <p><i>Use column subtraction to subtract any pair of 2-place decimal numbers, including amounts of money and measures.</i></p>

Year 5	<p>Subtract numbers with increasingly large numbers. <i>e.g. $12,462 - 2,300 = 10,162$</i></p> <p><i>Subtract numbers with 2 significant digits only, using mental strategies</i> <i>e.g. $6 \cdot 2 - 4 \cdot 5$</i> <i>e.g. $72\,000 - 47\,000$</i></p> <p><i>Subtract 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000</i> <i>e.g. $8000 - 3000$</i> <i>e.g. $60\,000 - 200\,000$</i></p> <p><i>Subtract 1- or 2-digit near multiples of 10, 100, 1000, 10 000 and 100 000 from other numbers</i> <i>e.g. $82\,472 - 30\,004$</i></p> <p><i>Subtract decimal numbers which are near multiples of 1 or 10, including money</i> <i>e.g. $6 \cdot 34 - 1 \cdot 99$</i> <i>e.g. $\pounds 34 \cdot 59 - \pounds 19 \cdot 95$</i></p> <p><i>Use counting up subtraction, with knowledge of number bonds to 10, 100 or $\pounds 1$, as a strategy to perform mental subtraction</i> <i>e.g. $\pounds 10 - \pounds 3 \cdot 45$</i> <i>e.g. $1000 - 782$</i></p> <p><i>Recognise fraction complements to 1 and to the next whole number</i> <i>e.g. $1 \frac{2}{5} + \frac{3}{5} = 2$</i></p>	<p>Subtract numbers with more than four digits, using formal written methods of columnar subtraction.</p> <p><i>Use column subtraction to subtract any pair of 3-place decimal numbers, including amounts of money and measures.</i></p>
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Perform mental calculations including with mixed operations and large numbers.

Use number bonds to 100 to perform mental subtraction of any pair of integers by complementary addition

e.g. $1000 - 654$ as $46 + 300$ in our heads

Use number bonds to 1 and 10 to perform mental subtraction of any pair of 1-place or

2-place decimal numbers using complementary addition and including money

e.g. $10 - 3.65$ as $0.35 + 6$

e.g. $£50 - £34.29$ as $71p + £15$

Use number facts and place value to perform mental subtraction of large numbers or decimal numbers with up to 2 places

e.g. $467\,900 - 3005$

e.g. $4.63 - 1.02$

Subtract multiples of powers of 10 and near multiples of the same

Subtract negative numbers in a context such as temperature where the numbers make sense

Subtract numbers with more than four digits, using formal written methods of columnar subtraction.

Use column subtraction to subtract any pair of 3-place decimal numbers, including amounts of money and measures.

3.3 Multiplication

Multiplication		
	Mental calculation	Written Calculation
Year 3	<p>Recall and use multiplication facts for the 3,4 and 8 times tables.</p> <p><i>Multiply whole numbers by 10 and 100</i></p> <p><i>Recognise that multiplication is commutative</i></p> <p><i>Use place value and number facts in mental multiplication</i> e.g. 30×5 is 15×10</p> <p><i>Partition teen numbers to multiply by a 1-digit number</i> e.g. 3×14 as 3×10 and 3×4</p> <p><i>Double numbers up to 50</i></p>	<p><i>Use partitioning (grid multiplication) to multiply 2-digit numbers by 1-digit numbers (working towards formal written layout).</i></p> <p>Write and calculate mathematical statements for multiplication using multiplication tables they know, including for 2 digit numbers times 1 digit numbers.</p>
Year 4	<p>Recall and use multiplication facts up to 12x12.</p> <p>Use place value, known and derived facts to multiply mentally, including: multiplying by 0 and 1 and multiplying 3 numbers together.</p> <p><i>Multiply whole numbers and 1- and 2-place decimals by 10, 100, 1000, 10 000</i></p> <p><i>Use knowledge of factors and multiples in multiplication</i> e.g. 43×6 is double 43×3 e.g. 28×50 is $1/2$ of $28 \times 100 = 1400$</p> <p><i>Use knowledge of place value and rounding in mental multiplication</i> e.g. 67×199 as $67 \times 200 - 67$</p> <p><i>Use doubling and halving as a strategy in mental multiplication</i> e.g. 58×5 is half of 58×10 e.g. 34×4 is 34 doubled twice</p> <p><i>Partition 2-digit numbers, including decimals, to multiply by a 1-digit number mentally</i> e.g. 6×27 as 6×20 (120) plus 6×7 (42)</p>	<p><i>Use expanded written method to multiply 2 and 3 digit numbers by a 1digit number (working towards formal written layout of short multiplication).</i></p> <p>Multiply 2 and 3 digit numbers by a 1 digit number, using formal written layout of short multiplication.</p>

Year 5	<p>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 mentally drawing upon known facts. Multiply whole numbers and those involving decimals by 10,100 and 1000.</p> <p><i>Recognise that multiplication is commutative</i> <i>Use place value and number facts in mental multiplication</i> <i>e.g. 30×5 is 15×10</i> <i>Partition teen numbers to multiply by a 1-digit number</i> <i>e.g. 3×14 as 3×10 and 3×4</i> <i>Double numbers up to 50</i></p>	<p>Multiply numbers with up to 4 digits by a 1 or 2 digit number, using formal written layout of short and long multiplication.</p>
Year 6	<p>Identify common factors, common multiples and prime numbers. <i>Know by heart all the multiplication facts up to 12×12</i> <i>Multiply whole numbers and decimals with up to 3 places by 10, 100 or 1000</i> <i>e.g. $234 \times 1000 = 234\ 000$</i> <i>e.g. $0.23 \times 1000 = 230$</i> <i>Identify common factors, common multiples and prime numbers and use factors in mental multiplication</i> <i>e.g. 326×6 is 652×3 which is 1956</i> <i>Use place value and number facts in mental multiplication</i> <i>e.g. $4000 \times 6 = 24\ 000$</i> <i>e.g. $0.03 \times 6 = 0.18$</i></p>	<p>Multiply multi-digit numbers up to 4 digits by a 2 digit whole number, using formal written layout of long multiplication.</p>

3.4 Division

Division		
	Mental calculation	Written Calculation
Year 3	<p>Recall and use associated division facts for the 3,4 and 8 times tables.</p> <p><i>Divide whole numbers by 10 or 100 to give whole number answers</i></p> <p><i>Recognise that division is not commutative</i></p> <p><i>Use place value and number facts in mental division</i></p> <p style="padding-left: 20px;"><i>e.g. $84 \div 4$ is half of 42</i></p> <p><i>Divide larger numbers mentally by subtracting the 10th multiple as appropriate, including those with remainders</i></p> <p style="padding-left: 20px;"><i>e.g. $57 \div 3$ is $10 + 9$ as $10 \times 3 = 30$ and $9 \times 3 = 27$</i></p> <p><i>Halve even numbers to 100, halve odd numbers to 20</i></p>	<p>Write and calculate mathematical statements for division using multiplication tables they know, including for 2 digit numbers divided by 1 digit numbers.</p> <p><i>Perform divisions just above the 12th multiple using horizontal or vertical jottings and understanding how to give a remainder as a whole number.</i></p>

<p style="text-align: center;">Year 4</p>	<p>Recall and use associated division facts up to 12x12. Use place value, known and derived facts to divide mentally, including: dividing by 0 and 1.</p> <p><i>Divide whole numbers by 10, 100, to give whole number answers or answers with 1 decimal place</i></p> <p><i>Divide multiples of 100 by 1-digit numbers using division facts</i> <i>e.g. $3200 \div 8 = 400$</i></p> <p><i>Use place value and number facts in mental division</i> <i>e.g. $245 \div 20$ is half of $245 \div 10$</i></p> <p><i>Divide larger numbers mentally by subtracting the 10th or 20th multiple as appropriate</i> <i>e.g. $156 \div 6$ is $20 + 6$ as $20 \times 6 = 120$ and $6 \times 6 = 36$</i></p> <p><i>Find halves of even numbers to 200 and beyond using partitioning</i></p> <p><i>Begin to halve amounts of money</i> <i>e.g. half of $\pounds 52.40$ is $\pounds 26.20$</i></p>	<p><i>Perform divisions just above the 12th multiple using horizontal or vertical jottings and understanding how to give a remainder as a whole number.</i></p> <p><i>Divide numbers up to 3 digits by a 1 digit number, using formal written method of short division. Interpret remainders appropriately according to context.</i></p>
<p style="text-align: center;">Year 5</p>	<p>Divide numbers mentally drawing upon known facts. Divide whole numbers and those involving decimals by 10, 100 and 1000.</p> <p><i>Use place value and number facts in mental division</i> <i>e.g. $84 \div 4$ is half of 42</i></p> <p><i>Divide larger numbers mentally by subtracting the 10th multiple as appropriate, including those with remainders</i> <i>e.g. $57 \div 3$ is $10 + 9$ as $10 \times 3 = 30$ and $9 \times 3 = 27$</i></p> <p><i>Halve even numbers to 100, halve odd numbers to 20</i></p>	<p>Divide numbers up to 4 digits by a 1 digit number, using formal written method of short division. Interpret remainders appropriately according to context.</p>

Year 6	<p>Perform mental calculations, including with mixed operation and large numbers.</p> <p><i>Divide whole numbers by powers of 10 to give whole number answers or answers with up to 3 decimal places</i></p> <p><i>Identify common factors, common multiples and primes numbers and use factors in mental division</i></p> <p><i>e.g. $438 \div 6$ is $219 \div 3$ which is 73</i></p> <p><i>Use tests for divisibility to aid mental calculation</i></p> <p><i>Use doubling and halving as mental division strategies, for example to divide by 2, 4, 8, 5, 20 and 25</i></p> <p><i>e.g. $628 \div 8$ is halved three times: 314, 157, 78.5</i></p> <p><i>Divide 1- and 2-place decimals by numbers up to and including 10 using place value</i></p> <p><i>e.g. $2.4 \div 6 = 0.4$</i></p> <p><i>e.g. $0.65 \div 5 = 0.13$</i></p> <p><i>e.g. $\pounds 6.33 \div 3 = \pounds 2.11$</i></p> <p><i>Halve decimal numbers with up to 2 places using partitioning</i></p> <p><i>e.g. Half of 36.86 is half of 36 (18) plus half of 0.86 (0.43)</i></p> <p><i>Know and use equivalence between simple fractions, decimals and percentages, including in different contexts</i></p> <p><i>Recognise a given ratio and reduce a given ratio to its lowest terms</i></p>	<p>Divide numbers up to 4 digits by a 2 digit whole number, using formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.</p>
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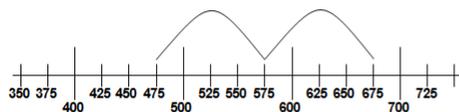
4. Strategies and Methods

The following examples illustrate a range of mental and formal written methods that are taught at Larkfields Junior School.

Addition

Mental Strategies and Methods

Using place value
Count in 100s
e.g. Know $475 + 200$ as $475, 575, 675$



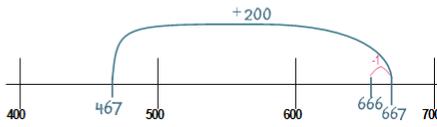
Add multiples of 10, 100 and £1
e.g. $746 + 200$
e.g. $746 + 40$
e.g. $£6.34 + £5$ as $£6 + £5$ and $34p$

Partitioning
e.g. $£8.50 + £3.70$ as $£8 + £3$ and $50p + 70p$ and combine the totals: $£11 + £1.20$
e.g. $347 + 36$ as $300 + 40 + 30$ and $7 + 6$ and combine the totals: $370 + 13 = 383$
e.g. $68 + 74$ as $60 + 70$ and $8 + 4$ and combine the totals: $130 + 12 = 142$

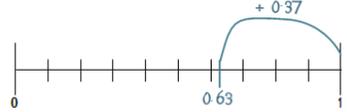
Using place value
Count in 1000s
e.g. Know $3475 + 2000$ as $3475, 4475, 5475$

Partitioning
e.g. $746 + 40$
e.g. $746 + 203$ as $700 + 200$ and 40 and $6 + 3$
e.g. $134 + 707$ as $100 + 700$ and 30 and $4 + 7$

Counting on
Add 2-digit numbers to 2-, 3- and 4-digit numbers by adding the multiple of 10 then the 1s
e.g. $167 + 55$ as $167 + 50 (217) + 5 = 222$
Add near multiples of 10, 100 and 1000
e.g. $467 + 199$
e.g. $3462 + 2999$



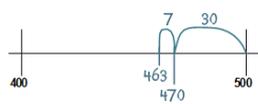
Using number facts
Number bonds to 1 and to the next multiple of 1
e.g. $0.63 + 0.37$
e.g. $2.355 + 0.645$



Add to the next 10
e.g. $4.62 + 5.38$

Counting on
Add two 2-digit numbers by adding the multiple of 10, then the 1s
e.g. $67 + 55$ as $67 + 50 (117) + 5 = 122$
Add near multiples of 10 and 100
e.g. $67 + 39$
e.g. $364 + 199$
Add pairs of 'friendly' 3-digit numbers
e.g. $548 + 120$
Count on from 3-digit numbers
e.g. $247 + 34$ as $247 + 30 (277) + 4 = 281$

Using number facts
Number bonds to 100 and to the next multiple of 100
e.g. $288 + 12 = 300$
e.g. $1353 + 47 = 1400$
e.g. $463 + 37 = 500$



Number bonds to £1 and to the next whole pound
e.g. $63p + 37p = £1$
e.g. $£3.45 + 55p = £4$
Add to the next whole number
e.g. $4.6 + 0.4$
e.g. $7.2 + 0.8$

Using number facts
Know pairs which total each number to 20
e.g. $7 + 8 = 15$
e.g. $12 + 6 = 18$
Number bonds to 100
e.g. $35 + 65$
e.g. $46 + 54$
e.g. $73 + 27$

Add to the next 10 and the next 100
e.g. $176 + 4 = 180$
e.g. $435 + 65 = 500$

Use place value									
M	Hth	Tth	Th	H	T	O	.	1/10	1/100

Written Strategies and Methods

Expanded written method:

$$\begin{array}{r} 353 + 268 = 621 \\ 300 + 50 + 3 \\ 200 + 60 + 8 \\ \hline 600 + 20 + 1 = 621 \\ \begin{array}{cc} 100 & 10 \end{array} \end{array}$$

Formal written method*:

789 + 642 becomes

$$\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \\ \begin{array}{cc} 1 & 1 \end{array} \end{array}$$

Answer: 1431

**At LJS, we carry digits at the bottom; 'on the doorstep'*

Subtraction

Mental Strategies and Methods

Taking away

Use place value to subtract

e.g. $348 - 300$

e.g. $348 - 40$

e.g. $348 - 8$



Take away multiples of 10, 100 and £1

e.g. $476 - 40 = 436$

e.g. $476 - 300 = 176$

e.g. $£4.76 - £2 = £2.76$

Partitioning

e.g. $68 - 42$ as $60 - 40$ and $8 - 2$

e.g. $£6.84 - £2.40$ as $£6 - £2$ and $80p - 40p$



Taking away

Use place value to subtract

e.g. $4748 - 4000$



Take away multiples of 10, 100, 1000, £1, 10p or 0.1

e.g. $8392 - 50$

e.g. $6723 - 3000$

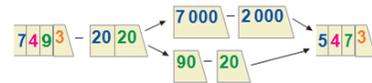
e.g. $£3.74 - 30p$

e.g. $5.6 - 0.2$

Partitioning

e.g. $£5.87 - £3.04$ as $£5 - £3$ and $7p - 4p$

e.g. $7493 - 2020$ as $7000 - 2000$ and $90 - 20$



Count back

e.g. $6482 - 1301$ as $6482 - 1000$ (5482) $- 300$ (5182) $- 1 = 5181$

Subtract near multiples of 10, 100, 1000 or £1

e.g. $3522 - 1999$

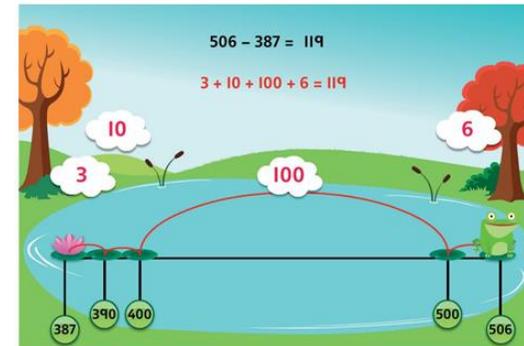
e.g. $£34.86 - £19.99$

Counting up

Find a difference between two numbers by counting up from the smaller to the larger

e.g. $506 - 387$

e.g. $4000 - 2693$



Using number facts

Know pairs which total each number to 20

e.g. $20 - 14 = 6$

Number bonds to 100

e.g. $100 - 48 = 52$

e.g. $100 - 35 = 65$



Subtract using number facts to bridge back through a 10

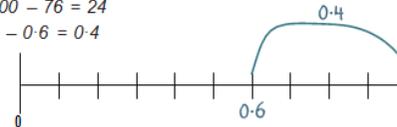
e.g. $42 - 5 = 42 - 2$ (40) $- 3 = 37$

Using number facts

Number bonds to 10 and 100 and derived facts

e.g. $100 - 76 = 24$

e.g. $1 - 0.6 = 0.4$



Number bonds to £1 and £10

e.g. $£1.00 - 86p = 14p$

e.g. $£10.00 - £3.40 = £6.60$

Written Strategies and Methods

Expanded written method:

$$\begin{array}{r}
 457 - 226 = 231 \\
 400 + 50 + 7 \quad - \\
 200 + 20 + 6 \\
 \hline
 200 + 30 + 1 \\
 \hline
 = 231
 \end{array}$$

$$\begin{array}{r}
 534 - 265 = 269 \\
 \overset{400}{500} + \overset{120}{30} + \overset{14}{4} \quad - \\
 200 + 60 + 5 \\
 \hline
 200 + 60 + 9 = 269
 \end{array}$$

Formal written method:

932 - 457 becomes

$$\begin{array}{r}
 \overset{8}{9} \overset{12}{3} \overset{1}{2} \\
 - 4 \quad 5 \quad 7 \\
 \hline
 4 \quad 7 \quad 5
 \end{array}$$

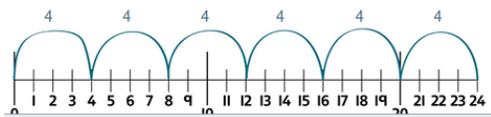
Answer: 475

Multiplication Mental Strategies and Methods

Counting in steps ('clever' counting)

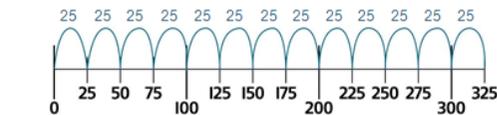
Count in 2s, 3s, 4s, 5s, 8s and 10s

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



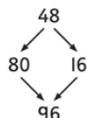
Counting in steps (sequences)

Count in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 11s, 12s, 25s, 50s, 100s and 1000s



Doubling and halving

Find doubles of numbers to 50 using partitioning
e.g. double 48



Use doubling as a strategy in multiplying by 2
e.g. 18×2 is double $18 = 36$

Grouping

Recognise that multiplication is commutative
e.g. $4 \times 8 = 8 \times 4$
Multiply multiples of 10 by 1-digit numbers
e.g. $30 \times 8 = 240$
Multiply 'friendly' 2-digit numbers by 1-digit numbers
e.g. 13×4

Begin to double amounts of money
e.g. £3.50 doubled is £7



Use doubling as a strategy in multiplying by 2, 4 and 8
e.g. 34×4 is double 34 (68) doubled again = 136

Using number facts

Know times-tables up to 12×12

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Written Strategies and Methods

Expanded written method:

x	60	4
5	300	20
64x5=320		

Formal written method:

342 × 7 becomes

$$\begin{array}{r}
 342 \\
 \times 7 \\
 \hline
 2394 \\
 \hline
 \begin{array}{cc}
 2 & 1
 \end{array}
 \end{array}$$

Answer: 2394

$$\begin{array}{r}
 53 \\
 \times 24 \\
 \hline
 212 \\
 1060 \\
 \hline
 1272
 \end{array}$$

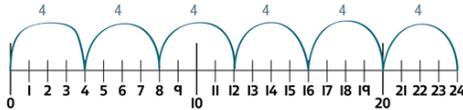
Division

Mental Strategies and Methods

Counting in steps ('clever' counting)

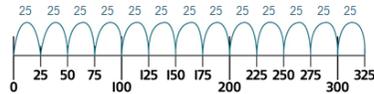
Count in 2s, 3s, 4s, 5s, 8s and 10s

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



Counting in steps (sequences)

Count in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 11s, 12s, 25s, 50s, 100s and 1000s



Grouping

Recognise that division is not commutative

e.g. $16 \div 8$ does not equal $8 \div 16$

Relate division to multiplications 'with holes in'

e.g. $_ \times 5 = 30$ is the same calculation as $30 \div 5 = _$ thus we can count in 5s to find the answer



$_ \times £5 = £30$

Divide multiples of 10 by 1-digit numbers

e.g. $240 \div 8 = 30$

Begin to use subtraction of multiples of 10 of the divisor to divide numbers above the 10th multiple

e.g. $52 \div 4$ is 10×4 (40) and 3×4 (12) = 13

Using number facts

Know half of even numbers to 40

Know half of multiples of 10 to 200

e.g. half of 170 is 85

Know $\times 2$, $\times 3$, $\times 4$, $\times 5$, $\times 8$, $\times 10$ division facts

Using number facts

Know times-tables up to 12×12 and all related division facts

\times	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Begin to halve amounts of money

e.g. £9 halved is £4.50



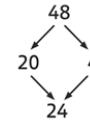
Use halving as a strategy in dividing by 2, 4 and 8

e.g. $164 \div 4$ is half of 164 (82) halved again = 41

Doubling and halving

Find half of even numbers to 100 using partitioning

e.g. find half of 48



Use halving as a strategy in dividing by 2

e.g. $36 \div 2$ is half of 36 = 18

Find half of odd numbers

Written Strategies and Methods

Horizontal method, including remainders:

$$47 \div 5 = 9r2$$

Formal written method:

$$432 \div 5 \text{ becomes}$$

$$\begin{array}{r} 8 \quad 6 \quad r2 \\ 5 \overline{) 432} \\ \underline{40} \\ 32 \\ \underline{30} \\ 2 \end{array}$$

Answer: 86 remainder 2

$$432 \div 15 \text{ becomes}$$

$$\begin{array}{r} 2 \quad 8 \quad r12 \\ 15 \overline{) 432} \\ \underline{30} \\ 132 \\ \underline{120} \\ 12 \end{array}$$

Answer: 28 remainder 12

