

Addition	Subtraction																																								
Year 3 (Step 22 –24)																																									
Where “borrowing” or “carrying over” is needed, this is referred to as exchanging.																																									
<p>38 = 30 + 8 $21 = 20 + 1$ $\underline{50 + 9}$ Reinforce from year 2, move on to three digit numbers.</p>	<p>Expanded method no exchanging</p> $\begin{array}{r} 700 \quad 50 \quad 4 \\ - \quad \quad 30 \quad 2 \\ \hline 700 \quad 20 \quad 2 = 722 \end{array}$																																								
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr><td> </td><td>2</td><td>3</td><td>6</td></tr> <tr><td>+</td><td> </td><td>7</td><td>3</td></tr> <tr><td colspan="4"><hr/></td></tr> <tr><td> </td><td> </td><td> </td><td>9</td></tr> <tr><td colspan="4"><hr/></td></tr> <tr><td>1</td><td>0</td><td>0</td><td> </td></tr> <tr><td colspan="4"><hr/></td></tr> <tr><td>2</td><td>0</td><td>0</td><td> </td></tr> <tr><td colspan="4"><hr/></td></tr> <tr><td>3</td><td>0</td><td>9</td><td> </td></tr> </table> <p>Quick transition step that consolidates bridging ten and 100 i.e. 170 = 17 tens and 1700 = 17 hundreds, moving to compact column method.</p>		2	3	6	+		7	3	<hr/>							9	<hr/>				1	0	0		<hr/>				2	0	0		<hr/>				3	0	9		$\begin{array}{r} \overset{600}{\cancel{700}} \quad \overset{140}{\cancel{50}} \quad 4 \\ - \quad \quad \quad \cancel{80} \quad 6 \\ \hline 600 \quad 60 \quad 8 = 668 \end{array}$ <p>Expanded method with exchanging.</p>
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Resources: Dienes, arrow cards, numicon,																																									
<p>Key skills for addition at Y3:</p> <ul style="list-style-type: none"> • 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, ones.) • Continue to practise a wide range of mental addition strategies, ie. number bonds, adding the nearest multiple of 10, 100, 100 and adjusting, using near doubles, partitioning and recombining. 	<p>Key skills for subtraction at Y3:</p> <ul style="list-style-type: none"> • 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. 																																								

Multiplication

Division

Year 3 (Step 22 –24)

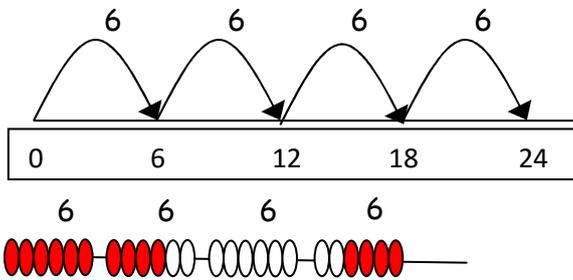
Children should be taught to recall and use multiplication and division facts for the 2,3,4,5,8 and 10 multiplication tables.

Ensure children progress through repeated addition and subtraction arrays, grouping, scaling and partitioning to the use of formal written methods to calculate 2 digit by 1 digit numbers

Repeated addition

4 times 6 is $6 + 6 + 6 + 6 = 24$ or 4 lots of 6 or 6×4

Children should use number lines or bead bars to support their understanding.

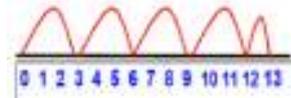


The emphasis in Y3 is on grouping rather than sharing.

Children will continue to use:

Repeated addition using a number line

$$13 \div 3 =$$



Children will use become able to use an empty number line to support their calculation.

Children continue to work out unknown division facts by grouping on a number line from zero.

They are also now taught the concept of remainders, as in the example. This should be introduced practically and with arrays, as well as being translated to a number line.

Children should work towards calculating some basic division facts with remainders mentally for the 2s, 3s, 4s, 5s, 8s and 10s, ready for "carrying" remainders across within the short division method.

Arrays

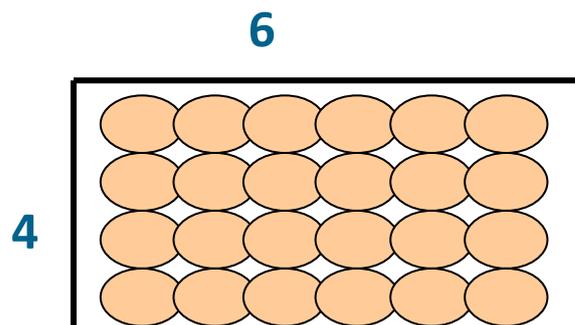
Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.



$$9 \times 4 = 36$$

Children will develop their use of repeated subtraction to be able to subtract multiples of the divisor. Initially, these should be multiples of 10s, 5s, 2s and 1s - numbers with which the children are more familiar.

Once children are secure with division as grouping and demonstrate this using number lines, arrays etc., short division for larger 2-digit numbers should be introduced, initially with carefully selected examples requiring no calculating of remainders at all. Start by introducing the layout of short division by comparing it to an array.



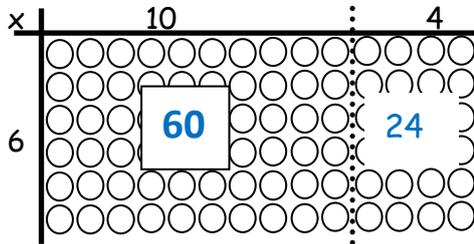
Partitioning

$$\begin{aligned} 38 \times 5 &= (30 \times 5) + (8 \times 5) \\ &= 150 + 40 \\ &= 190 \end{aligned}$$

Then show how this relates to the written method

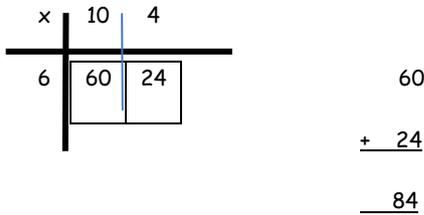
$$\begin{array}{r} 6 \\ 4 \overline{) 24} \end{array}$$

Grid Method



Let the children see why the grid works in this way by showing the link with arrays. Once understood, this method can be used without illustration.

Grid method



TU x U

(Short multiplication - multiplication by a single digit)

$$23 \times 8$$

Children will approximate first
 23×8 is approximately $25 \times 8 = 200$

Using symbols to stand for unknown numbers to complete equations using inverse operations

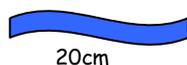
$$\square \times 5 = 20 \quad 3 \times \triangle = 18 \quad \square \times \circ = 32$$

Using symbols to stand for unknown numbers to complete equations using inverse operations

$$26 \div 2 = \square \quad 24 \div \triangle = 12 \quad \square \div 10 = 8$$

Scaling

e.g. Find a ribbon that is 4 times as long as the blue ribbon



<p>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, value</p>	<p>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</p>
<p>Key skills for multiplication at Y3:</p> <ul style="list-style-type: none"> • 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. $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) • 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 ($4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and for missing number problems $x \times 5 = 20$, $3 \times x = 18$, $x = 32$ 	<p>Key skills for division at Y3:</p> <ul style="list-style-type: none"> • 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 times 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 $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts ($30 \times 2 = 60$, so $60 \div 3 = 20$ and $20 = 60 \div 3$). • 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.