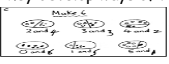
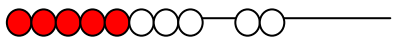

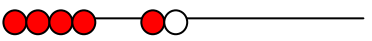
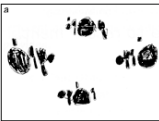

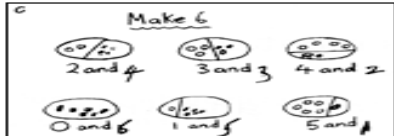
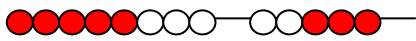
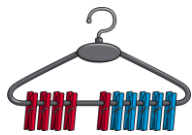
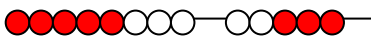
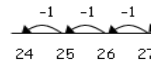
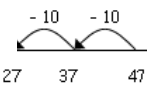
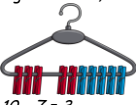

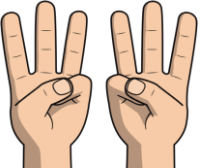
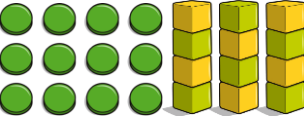

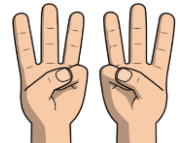
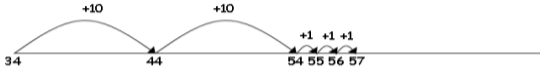
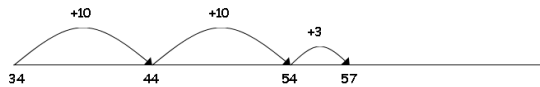
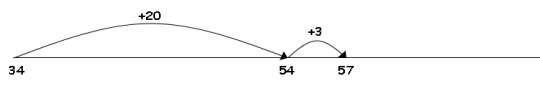
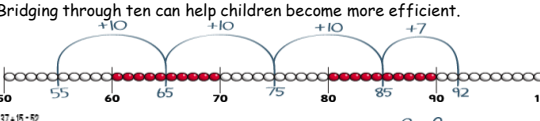
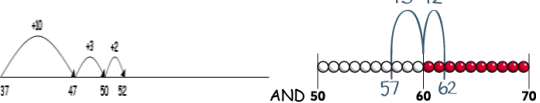
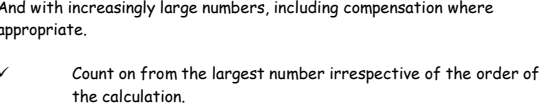


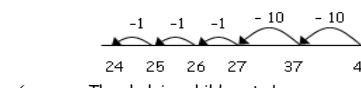
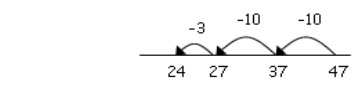
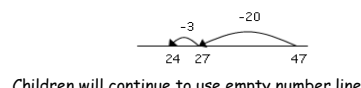
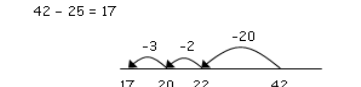


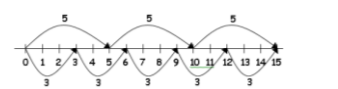
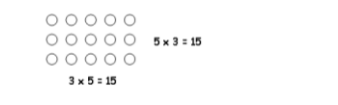
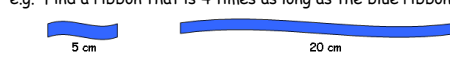

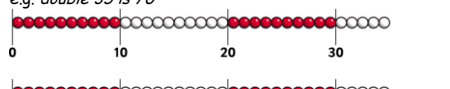

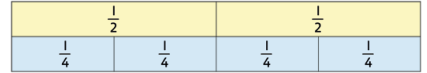
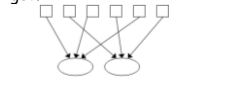


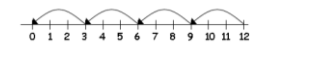
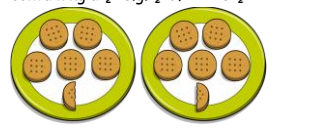


	Addition	Subtraction	Multiplication	Division
Rec	<p>Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures, etc.</p>  <p>Bead strings or bead bars can be used to illustrate addition</p>  $8+2=10$ <p>They use numberlines and practical resources to support calculation and teachers <i>demonstrate</i> the use of the number line.</p> <p>Children then begin to use numbered lines to support their own calculations using a numbered line to count on in ones.</p>	<p>Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures etc.</p>  <p>Bead strings or bead bars can be used to illustrate subtraction.</p>  $6-2=4$ <p>They use numberlines and practical resources to support calculation. Teachers <i>demonstrate</i> the use of the numberline.</p> <p>Children then begin to use numbered lines to support their own calculations - using a numbered line to count back in ones.</p>	<p>Children will experience equal groups of objects.</p> <p>They will count in 2s and 10s and begin to count in 5s.</p> <p>They will work on practical problem solving activities involving equal sets or groups.</p> 	<p>Children will understand equal groups and share items out in play and problem solving. They will count in 2s and 10s and later in 5s.</p> 
Y1	<p>using pictures</p>  <p>Bead strings or bead bars can be used to illustrate addition including bridging through ten by counting on 2 then counting on 3.</p>  <p>They use numberlines and practical resources to support calculation and teachers <i>demonstrate</i> the use of the number line.</p> <ul style="list-style-type: none"> Children will continue to use 'empty number lines themselves starting with the larger number and counting in ones. And then progress to counting in tens <p>$34+20$</p> <ul style="list-style-type: none"> They will then use empty number lines to support calculation and teachers <i>demonstrate</i> the use of the number line. <p>Using number facts</p>  <p>'Story' of 4, 5, 6, 7, 8 and 9 e.g. $7=7+0$, $6+1$, $5+2$, $4+3$ Number bonds to 10 e.g. $5+5$, $6+2$, $7+3$, $8+2$, $9+1$, $10+0$</p>	<ul style="list-style-type: none"> Children will continue to use pictures. Bead strings or bead bars can be used to illustrate subtraction including bridging through ten by counting back 3 then counting back 2.  <p>The number line should also be used to show that $6-3$ means the 'difference between 6 and 3' or 'the difference between 3 and 6' and how many jumps they are apart.</p> <p>Counting back: Children will begin to use empty number lines to support calculations.</p> <ul style="list-style-type: none"> First counting back in ones.  <p>And then in tens.</p>  <p>Using number facts 'Story' of 4, 5, 6, 7, 8 and 9 e.g. 'Story' of 7 is $7-1=6$, $7-2=5$, $7-3=4$ Number bonds to 10 e.g. $10-1=9$, $10-2=8$, $10-3=7$</p>  <p>$10-7=3$ Subtract using patterns of known facts e.g. $7-3=4$ so we know $27-3=24$, $47-3=44$, $77-3=74$</p>	<p>Children will experience equal groups of objects.</p> <p>They will count in 2s and 10s and begin to count in 5s.</p> <p>They will work on practical problem solving activities involving equal sets or groups.</p>  <p>Doubling and halving Find doubles to double 5 using fingers e.g. double 3</p>  <p>Grouping Begin to use visual and concrete arrays and sets of objects to find the answers to 'three lots of four' or 'two lots of five' e.g. three lots of four</p> 	<p>Children will understand equal groups and share items out in play and problem solving. They will count in 2s and 10s and later in 5s.</p>  <p>Doubling and halving Find half of even numbers up to 12, including realising that it is hard to halve an odd number</p>  <p>Grouping Begin to use visual and concrete arrays and 'sets of' objects to find the answers to questions such as 'How many towers of three can I make with twelve cubes?'</p> <p>Sharing Begin to find half of a quantity using sharing e.g. find half of 16 cubes by giving one each repeatedly to two children</p>

	Addition	Subtraction	Multiplication	Division
Y2	<p>Children will continue to use 'empty number lines' themselves starting with the larger number and counting on.</p> <p>$34 + 23 = 57$</p>  <p>✓ Then helping children to become more efficient by adding the units in one jump (by using the known fact $4 + 3 = 7$).</p> <p>$34 + 23 = 57$</p>  <p>✓ Followed by adding the tens in one jump and the units in one jump.</p> <p>$34 + 23 = 57$</p>  <p>Bridging through ten can help children become more efficient.</p>  <p>$37 + 15 = 52$</p>  <p>AND 50</p>  <p>And with increasingly large numbers, including compensation where appropriate.</p> <p>✓ Count on from the largest number irrespective of the order of the calculation.</p> <p>$86 + 86 = 124$</p>  <p>✓ Compensation</p> <p>$49 + 73 = 122$</p>  <p>Step 1: Expand the number $32 \rightarrow 30 + 2$ $+ 41 \rightarrow 40 + 1$ <hr/> $73 \leftarrow 70 + 3$ Step 2: Add Step 3: Collapse the number</p> <p>Children will begin to use pencil and paper methods and partition the numbers in order to start adding in a column.</p>	<p>Counting back:</p> <p>✓ First counting back in tens and ones.</p> <p>$47 - 23 = 24$</p>  <p>✓ Then helping children to become more efficient by subtracting the units in one jump (by using the known fact $7 - 3 = 4$).</p> <p>$47 - 23 = 24$</p>  <p>✓ Subtracting the tens in one jump and the units in one jump.</p> <p>$47 - 23 = 24$</p>  <p>Children will continue to use empty number lines with increasingly large numbers.</p> <p>✓ Bridging through ten can help children become more efficient.</p> <p>$42 - 25 = 17$</p>  <p>Counting on: The number line should still show 0 so children can cross out the section from 0 to the smallest number. They then associate this method with 'taking away'. Children should be encouraged to count on or back deciding which is more efficient.</p> <p>Children will begin to use informal pencil and paper methods (jottings).</p> <p>✓ Partitioning and decomposition</p> <ul style="list-style-type: none"> Partitioning - demonstrated using arrow cards Decomposition - base 10 materials <p>NOTE When solving the calculation $89 - 57$, children should know that 57 does NOT EXIST AS AN AMOUNT it is what you are subtracting from the other number. Therefore, when using base 10 materials, children would need to count out only the 89.</p> <p>$89 = 80 + 9$ $- 57 = 50 + 7$ <hr/> $30 + 2 = 32$</p> <p>NB: Rather than writing a + sign, the teacher may use an arrow sign to avoid confusion in the subtraction.</p>	<p>Repeated addition</p> <p>3 times 5 is $5 + 5 + 5 = 15$ or 3 lots of 5 or 5×3</p> <p>Repeated addition can be shown easily on a number line:</p> <p>$5 \times 3 = 5 + 5 + 5$</p>  <p>and on a bead bar:</p> <p>$5 \times 3 = 5 + 5 + 5$</p>  <p>✓ Commutativity</p> <p>Children should know that 3×5 has the same answer as 5×3. This can also be shown on the number line.</p>  <p>✓ Arrays</p> <p>Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.</p> <p>$5 \times 3 = 15$ $3 \times 5 = 15$</p>  <p>✓ Scaling</p> <p>e.g. Find a ribbon that is 4 times as long as the blue ribbon</p>  <p>Children will know 2, 5 and 10 times tables relating these to 'clever' counting in 2s, 5s, and 10s e.g. $5 \times 10 = 50$, and five steps in the 10s count = 10, 20, 30, 40, 50. Begin to know $\times 3$ facts</p>  <p>Doubling and halving</p> <p>Begin to know doubles of multiples of 5 to 100 e.g. double 35 is 70</p>  <p>Begin to double 2-digit numbers less than 50 with 1s digits of 1, 2, 3, 4 or 5</p> <p>Using number facts Know doubles to double 20 e.g. double 7 is 14</p> 	<p>Sharing</p> <p>Begin to find half or a quarter of a quantity using sharing e.g. find a quarter of 16 cubes by sorting the cubes into four piles</p> <p>Find $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ of small quantities</p>  <p>6 sweets shared between 2 people, how many do they each get?</p>  <p>Grouping or repeated subtraction</p> <p>There are 6 sweets, how many people can have 2 sweets each?</p>  <p>Relate division to multiplication by using arrays or towers of cubes to find answers to division e.g. 'How many towers of five cubes can I make from twenty cubes?' as $_ \times 5 = 20$ and also $20 \div 5 = _$</p>  <p>Relate division to 'clever' counting and hence to multiplication e.g. 'How many fives do I count to get to twenty?'</p> <p>Repeated subtraction using a bead bar or number line</p> <p>$12 \div 3 = 4$</p>  <p>The bead bar will help children with interpreting division calculations such as $10 \div 5 = 2$ as 'how many 5s make 10?'</p> <p>Doubling and halving</p> <p>Find half of numbers up to 40, including realising that half of an odd number gives a remainder of 1 or an answer containing a $\frac{1}{2}$ e.g. $\frac{1}{2}$ of 11 = $5\frac{1}{2}$</p>  <p>Begin to know half of multiples of 10 to 100 e.g. $\frac{1}{2}$ of 70</p> <p>Using number facts</p> <p>Know half of even numbers to 24. Begin to know $\times 3$ division facts</p> <p>Using symbols to stand for unknown numbers</p> <p>These will be solved using concrete apparatus and pictures. Problems will be selected from number facts known to the children.</p> <p>$\square \div 2 = 4$ $20 \div \triangle = 4$ $\square \div \triangle = 4$</p>

Y3

Addition

✓ Carry below the line.

$$\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ 1 \end{array} \qquad \begin{array}{r} 783 \\ + 42 \\ \hline 825 \\ 1 \end{array} \qquad \begin{array}{r} 367 \\ + 85 \\ \hline 452 \\ 11 \end{array}$$

Using similar methods, children will:

- ✓ add several numbers with up to 3 digits;
- ✓ begin to add two or more three-digit sums of money, without adjustment from the pence to the pounds;
- ✓ know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. £3.59 + 78p.

Subtraction

✓ Partitioning and decomposition

- Partitioning - demonstrated using arrow cards
 - Decomposition - base 10 materials
- Children will continue to use empty number lines with increasingly large numbers.

✓ Begin to exchange.

$$71 = \quad =$$

$$\begin{array}{r} 71 \\ - 46 \\ \hline \end{array}$$

Step 1

$$\begin{array}{r} 70 + 1 \\ - 40 + 6 \\ \hline \end{array}$$

Step 2

$$\begin{array}{r} 60 + 11 \\ - 40 + 6 \\ \hline 20 + 5 = 25 \end{array}$$

The calculation should be read as e.g. take 6 from 1.

This would be recorded by the children as

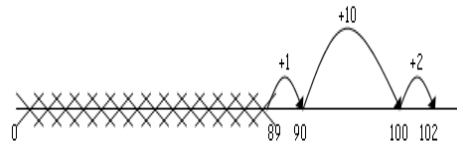
$$\begin{array}{r} 70 + 1 \\ - 40 + 6 \\ \hline 20 + 5 = 25 \end{array}$$

NB: Rather than writing a + sign, the teacher will use an arrow sign to avoid confusion in the subtraction.

✓ The children will then move on to a standard method of recording HTU - HTU with decomposition.

Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.

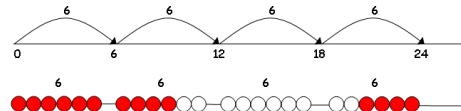
$$102 - 89 = 13$$



Multiplication

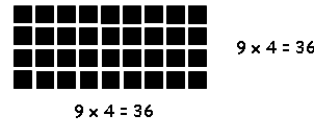
Children will continue to use:

- ✓ 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.

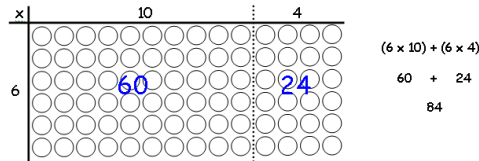


✓ Arrays

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



✓ Partitioning



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

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

✓ Children will know 2, 3, 4, 5, 8 and 10 times tables

Grid method

HTU x U (2, 3, 4, 5, 8)

(Short multiplication - multiplication by a single digit)

$$346 \times 9$$

Children will approximate first

$$346 \times 9 \text{ is approximately } 350 \times 10 = 3500$$

$$\begin{array}{r} \times \quad 300 \quad 40 \quad 6 \\ 9 \quad \boxed{2700} \quad \boxed{360} \quad \boxed{54} \\ \hline 2700 \\ + 360 \\ + 54 \\ \hline 3114 \\ 11 \end{array}$$

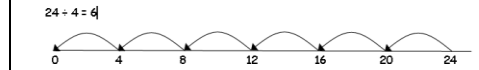
Division

Ensure that the emphasis in Y3 is on grouping rather than sharing.

Children will continue to use:

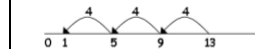
✓ Repeated subtraction using a number line

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

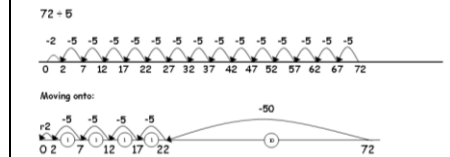


Children should also move onto calculations involving remainders.

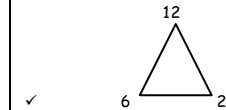
$$13 - 4 = 3 + 1$$



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.



Link to multiplication tables made explicit



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

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

	Addition	Subtraction	Multiplication	Division
Y4	<p>✓ Carry below the line.</p> $\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ 1 \end{array}$ $\begin{array}{r} 783 \\ + 42 \\ \hline 825 \\ 1 \end{array}$ $\begin{array}{r} 367 \\ + 85 \\ \hline 452 \\ 11 \end{array}$ <p>Using similar methods, children will:</p> <ul style="list-style-type: none"> ✓ add several numbers with up to 4 digits <u>including those with the same numbers of decimal places</u>; ✓ add two or more sums of money, with different numbers of digits, adjusting from the pence to the pounds; ✓ know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts of lengths, weights or capacities. E.g. £3.58 + 78p or 2.15 m + 35cm 	<p>✓ Partitioning and decomposition Demonstrated by the teacher as:</p> $\begin{array}{r} 754 \\ - 86 \\ \hline \end{array}$ <p>Step 1 $700 + 50 + 4$ $- \quad \quad 80 + 6$</p> <p>Step 2 $700 + 40 + 14$ (adjust from T to U) $- \quad \quad 80 + 6$</p> <p>Step 3 $600 + 140 + 14$ (adjust from H to T) $- \quad \quad 80 + 6$</p> $\begin{array}{r} 600 + 60 + 8 = 668 \\ - \quad \quad 80 + 6 \end{array}$ <p>Decomposition Recorded by the children using the standard method of decomposition:</p> $\begin{array}{r} 6141 \\ 754 \\ - 86 \\ \hline 668 \end{array}$ <p>Children should:</p> <ul style="list-style-type: none"> ✓ be able to subtract numbers with up to 4 digits; ✓ using this method, children should also begin to find the difference between two three-digit sums of money, with or without 'adjustment' from the pence to the pounds; ✓ know that decimal points should line up under each other. <p>Where the numbers are involved in the calculation are close together or near to multiples of 10, 100, 1000 etc counting on using a number line should be used.</p> $1209 - 388 = 821$	<p>Children will continue to use arrays where appropriate leading into the grid method of multiplication.</p> <p>Partitioning</p> $38 \times 5 = (30 \times 5) + (8 \times 5)$ $= 150 + 40$ $= 190$ <p>Grid method</p> <p>TU x TU (Long multiplication - multiplication by more than a single digit) 72×38 Children will approximate first 72×38 is approximately $70 \times 40 = 2800$</p> $\begin{array}{r} \times \quad 70 \quad 2 \\ 30 \quad 2100 \quad 60 \\ 8 \quad 560 \quad 16 \\ \hline 2100 \\ + 560 \\ + 60 \\ + 16 \\ \hline 2736 \end{array}$ <p>HTU x U (Short multiplication - multiplication by a single digit) 346×9 Children will approximate first 346×9 is approximately $350 \times 10 = 3500$</p> <p>✓ Children will know all times tables to 12 x 12</p>	<p>Children should be able to:</p> <p>Use the vertical method: Short division TU ÷ U</p> $72 \div 3$ <p>Children can start to subtract larger multiples of the divisor, e.g. $30x$</p> <p>Short division HTU ÷ U</p> $196 \div 6$ <p>Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2.</p> <p>✓ Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division.</p>

	Addition	Subtraction	Multiplication	Division																																													
Y5	<p>Use column addition to add two or three whole numbers with up to 5 digits Ensure 'carry overs' go under the answer line.</p> $\begin{array}{r} 587 \\ + 475 \\ \hline 1062 \\ 11 \end{array}$ $\begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 111 \end{array}$ <p>Using similar methods, children will:</p> <ul style="list-style-type: none"> Use column addition to add any pair of 2-place decimal numbers, including amounts of money <u>including those with different numbers of decimal places</u>; know that decimal points should line up under each other, particularly when adding mixed amounts, e.g. 3.2 m - 280 cm. 	<p>Decomposition</p> $\begin{array}{r} 6141 \\ \cancel{784} \\ - 286 \\ \hline 468 \end{array}$ <p>Children should:</p> <ul style="list-style-type: none"> Confidently be able to subtract numbers using decomposition, inc from numbers incorporating a zero. be able to subtract numbers with up to 5 digits; begin to find the difference between two decimal fractions with up to three digits and same number of decimal places; know decimal points should line up under each other 	<p>Children will learn to use the standard method of short multiplication to ThHTU x U and TU.th x U in the context of money.</p> <p>Ensure 'carry overs' go under the answer line.</p> $\begin{array}{r} \text{Th H T U} \\ 6481 \\ \times \quad 9 \\ \hline 58329 \leftarrow \text{Answer} \\ 47 \end{array}$ <p>Children will develop the Grid method for long multiplication as below, <u>moving on to the standard method of long multiplication when ready (see year 6)</u>:</p> <p>ThHTU x TU 372 x 24 Children will approximate first 372 x 24 is approximately 400 x 25 = 10000</p> <table border="1"> <tr> <td>x</td> <td>300</td> <td>70</td> <td>2</td> <td></td> </tr> <tr> <td>20</td> <td>6000</td> <td>1400</td> <td>40</td> <td>6000</td> </tr> <tr> <td>4</td> <td>1200</td> <td>280</td> <td>8</td> <td>+ 1400</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>+ 1200</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>+ 280</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>+ 40</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>+ 8</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td><u>8928</u></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>1</td> </tr> </table>	x	300	70	2		20	6000	1400	40	6000	4	1200	280	8	+ 1400					+ 1200					+ 280					+ 40					+ 8					<u>8928</u>					1	<p>Children will use the standard written method of short division to solve short division ThHTU ÷ ≤ 12.</p> <p>Remainders could be shown as integers, i.e. 14 remainder 2 or 14 r 2 or as fractions</p> <p>Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division.</p> <p>Long division ThHTU ÷ TU</p> <p>972 ÷ 36</p> $\begin{array}{r} 27 \\ 36 \overline{) 972} \\ - 720 \\ \hline 252 \\ - 252 \\ \hline 0 \end{array}$ <p>Answer: 27</p> <p>Remainders could be shown as fractions, i.e. if the children were dividing 32 by 10; the answer should be shown as 3 ²/₁₀ which could then be written as 3 ¹/₅ in its lowest terms.</p>
x	300	70	2																																														
20	6000	1400	40	6000																																													
4	1200	280	8	+ 1400																																													
				+ 1200																																													
				+ 280																																													
				+ 40																																													
				+ 8																																													
				<u>8928</u>																																													
				1																																													
Y6	<p>Children should extend the carrying method to number with any number of digits.</p> $\begin{array}{r} 7648 \\ + 1486 \\ \hline 9134 \\ 111 \end{array}$ $\begin{array}{r} 6584 \\ + 5848 \\ \hline 12432 \\ 111 \end{array}$ $\begin{array}{r} 42 \\ + 4681 \\ \hline 11944 \\ 121 \end{array}$ <p>Using similar methods, children will</p> <ul style="list-style-type: none"> add several numbers with up to 6 digits including those without a whole number component; know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 401.2 + 26.85 + 0.71. Be able to check additions by their knowledge of inverse operations. 	<p>Decomposition</p> $\begin{array}{r} 3131 \\ \cancel{6467} \\ - 2684 \\ \hline 3783 \end{array}$ <p>Children should:</p> <ul style="list-style-type: none"> be able to subtract numbers with up to 6 of digits; Be able to check answers by using an inverse operation be able to subtract two or more decimal fractions with up to three digits and up to 3 decimal places; know decimal points should line up under each other. Find the difference between a pair of numbers with different numbers of decimal places <p>Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.</p> <p>3002 - 1997 = 1005</p>	<p>Standard method</p> <p>Children should:</p> <ul style="list-style-type: none"> Be able to use the standard method of long multiplication to ThHTU x TU as below $\begin{array}{r} 327 \\ \times 53 \\ \hline 981 \leftarrow 327 \times 3 \\ 16350 \leftarrow 327 \times 50 \\ \hline 17331 \end{array}$ <p>Be able to check answers by using an inverse operation</p> <p>Through their developing knowledge of decimal facts associated with multiplication tables they should progress to multiplying TU.t x U.t by long multiplication and adjustment. E.g. change it to HTU x TU by multiplying both by 10, then using the standard method and finally dividing the answer by 10 to compensate.</p>	<p>Standard method for short division</p> <p>Children should:</p> <ul style="list-style-type: none"> Continue to use written methods to solve short division ThHTU ÷ TU (bus stop method) Children should know that decimal points line up under each other. Know how to decompose and divide the remainder using further columns of decimals. $\begin{array}{r} 0.1375 \\ 8 \overline{) 11.000} \\ - 8 \\ \hline 30 \\ - 24 \\ \hline 60 \\ - 56 \\ \hline 40 \\ - 40 \\ \hline 0 \end{array}$ <ul style="list-style-type: none"> Know when to give an exact answer and how to round to an appropriate degree of accuracy. Be able to check answers by using an inverse operation <p>Standard method for Long division HTU ÷ TU</p> <p>Children should:</p> <ul style="list-style-type: none"> Know how to use the standard method for long division Through their developing knowledge of decimal facts associated with multiplication tables they should progress to dividing TU.t ÷ U.t by adjustment and long division. 																																													

