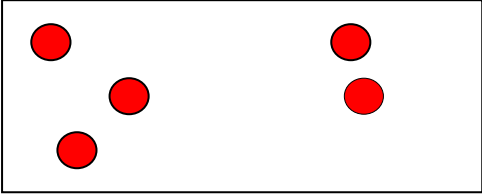
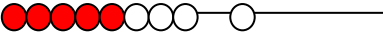
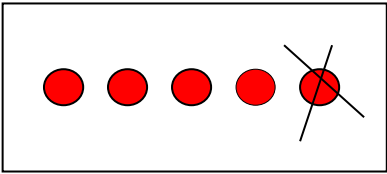

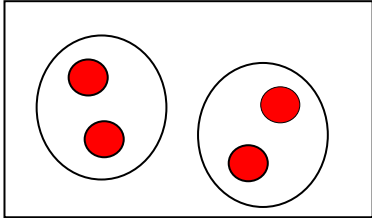


Progression in Calculation

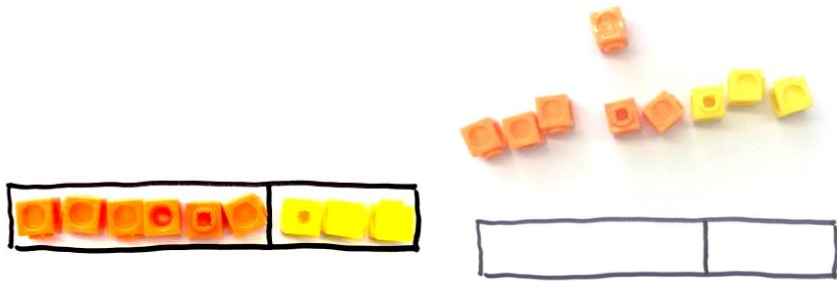
| | Addition | Subtraction | Multiplication | Division |
|--|--|--|---|---|
| | Children are encouraged to develop a mental picture of the number system in their heads to use for calculation, using a variety of concrete resources including songs and rhymes to develop this process | | | |
| | <p>Through practical activities they begin to combine objects and develop ways of recording calculations using pictures, photos etc.</p> <div style="text-align: center;">  </div> <p>They use numberlines and practical resources to support calculation and teachers <i>demonstrate</i> the use of the numberline.</p> <p>Bead strings or bead bars can be used to illustrate addition.</p> <div style="text-align: center;">  </div> <div style="text-align: right; margin-right: 50px;"> $8+1=9$ </div> <p>They will work on practical problem solving activities involving addition.</p> | <p>Through practical activities they begin to understand the concept of taking objects away and develop ways of recording calculations using pictures, photos etc.</p> <div style="text-align: center;">  </div> <p>They use numberlines and practical resources to support calculation and teachers <i>demonstrate</i> the use of the numberline.</p> <p>Bead strings or bead bars can be used to illustrate subtraction.</p> <div style="text-align: center;">  </div> <div style="text-align: right; margin-right: 50px;"> $5-1=4$ </div> <p>They will work on practical problem solving activities.</p> | <p>Children will experience equal groups of objects.</p> <p>They will count in different steps e.g. 2's</p> <div style="text-align: center;">  </div> <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.</p> <p>They will count in different steps e.g. 2s</p> |

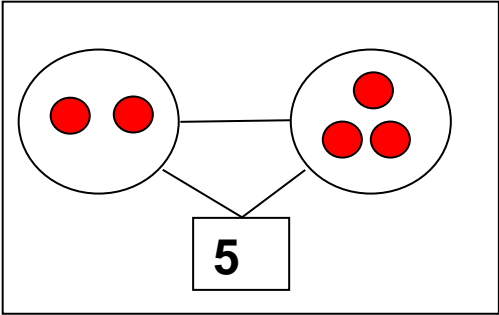
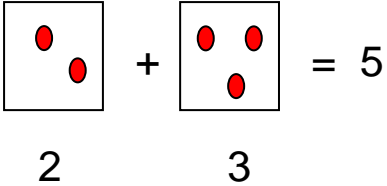

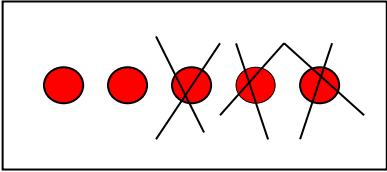
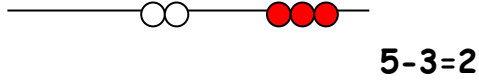
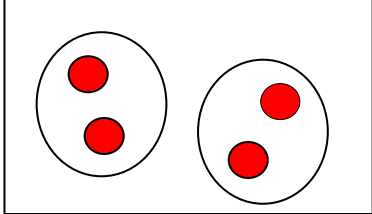
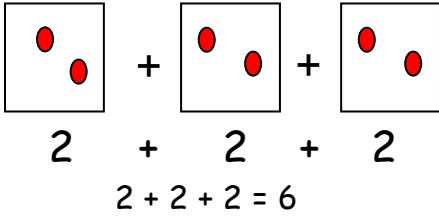
KS1 Transition

Children will begin to order touch counting to prepare for bar modelling.

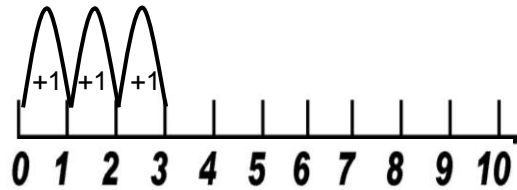


If ready, progressing to drawing a bar to show a calculation.



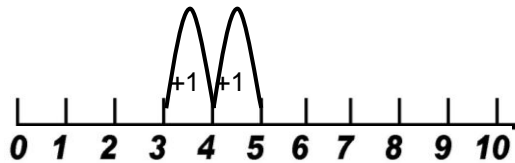
| Addition | Subtraction | Multiplication | Division |
|---|---|---|---|
| <p>Through practical activities they combine objects and develop ways of recording calculations using pictures, photos and numbers.</p>  <p>Children progress to writing number sentences using pictures and corresponding numerals.</p>  <p>Bead strings or bead bars can be used to illustrate addition.</p>  | <p>Through practical activities they combine objects and develop ways of recording calculations using pictures, photos and numbers.</p>  <p>Children progress to writing number sentences using jottings and corresponding numerals.</p> $5 - 3 = 2$ <p>Bead strings or bead bars can be used to illustrate subtraction.</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 begin to understand multiplication as repeated addition and record pictorially, progressing to write the number sentences.</p>  | <p>Children will understand equal groups and share items out in play and problem solving.</p> <p>They will count in 2s and 10s and later in 5s.</p> |

Children then begin to use numbered lines to support their own calculations using a numbered line to count on in ones.



$$2 + 3 = 5$$

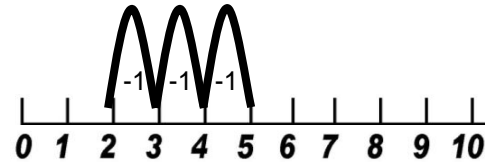
Children will be shown that addition can be done in any order.



$$3 + 2 = 5$$

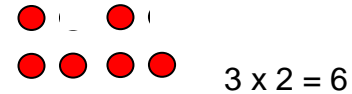
They will work on practical problem solving activities involving addition.

Children then begin to use numbered lines to support their own calculations - using a numbered line to count back in ones.



The number line should also be used to show that $5 - 3$ means the 'difference between 5 and 3' or 'the difference between 3 and 5' and how many jumps they are apart.

Children will represent multiplication as an array with the support of the teacher

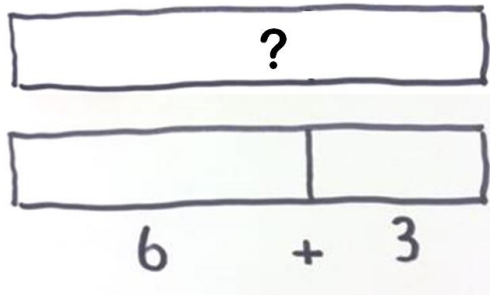
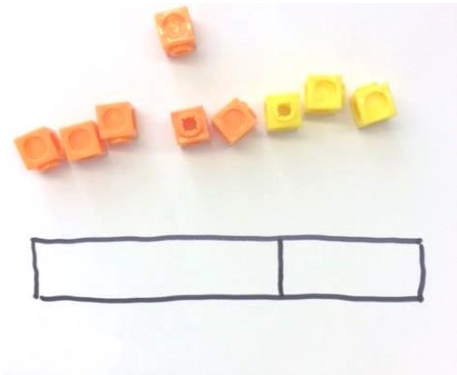


They will work on practical problem solving activities involving equal sets or groups.

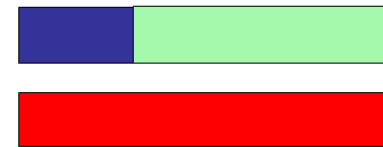
Problem Solving and Reasoning.

This is a mastery curriculum, therefore all children must be reasoning at their level.

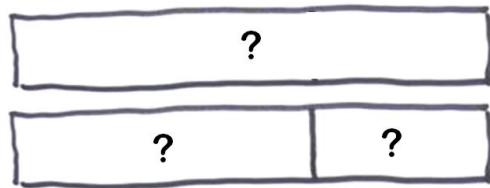
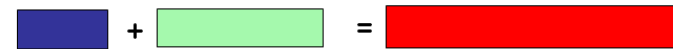
Children will continue to use cubes to begin bar modelling but will progress to representing a bar model.



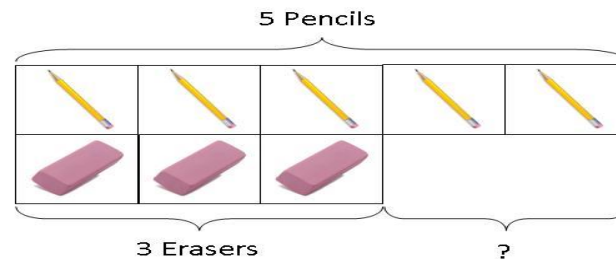
Something *and* something *is the same as* something else

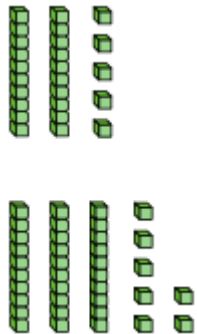
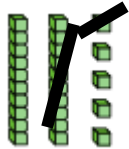
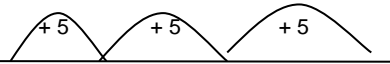
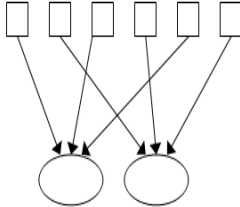
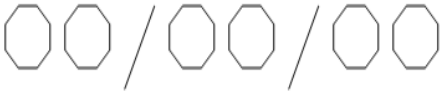


could then be rearranged to demonstrate equivalence in the traditional manner



Children can begin looking at subtraction.



| | Addition | Subtraction | Multiplication | Division |
|--|--|---|--|--|
| | <p>Children will learn efficient methods to add</p> <ul style="list-style-type: none"> • $O + O + O$ • $TO + O$ • $TO + TO$ <p>Children will use practical equipment to begin using partitioning as a means to adding two 2 digit numbers.</p> <p>Children will use Base 10 and numicon to begin addition through partitioning.</p>  | <p>Children will learn efficient methods to subtract</p> <ul style="list-style-type: none"> • $TO - O$ • $TO - TO$ <p>24 25 26 27 37 47</p> <p>Children will use practical equipment to begin using partitioning as a means to subtracting single digit from 2 digit numbers and two 2 digit numbers.</p> <p>Children will use Base 10 and numicon to begin subtracting through partitioning.</p>  <p>$25 - 11 = 14$</p> | <p>Children will develop their understanding of multiplication and use jottings to support calculation:</p> <p>Repeated addition</p> <p>24 25 26 27 37</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>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15</p> <p>and on a bead bar:</p> | <p>Children will develop their understanding of division and use jottings to support calculation</p> <p>Sharing equally</p> <p>6 sweets shared between 2 people, how many do they each get?</p> <p>47</p>  <p>Grouping or repeated subtraction</p> <p>There are 6 sweets, how many people can have 2 sweets each?</p>  |

They will progress to drawing Base 10 to support mental calculations;

$$\begin{array}{|c|c|} \hline ||| & \circ \circ \\ \hline 32 & \\ \hline \end{array} + \begin{array}{|c|c|} \hline || & \circ \\ \hline 21 & \\ \hline \end{array} = 53$$

To support mental strategies, children will become more efficient by adding the tens together first.

$$\begin{aligned} 32 + 21 &= \\ 30 + 20 &= 50 \end{aligned}$$

Then adding the ones by using their knowledge of the commutative law

$$2 + 1 = 3 \text{ or } 1 + 2 = 3$$

$$\begin{aligned} 50 + 3 &= 53 \\ 32 + 21 &= 53 \end{aligned}$$

Children will increase their knowledge of written methods though the use of column addition.

They will progress to drawing Base 10 to support mental calculations;

$$\begin{array}{|c|c|} \hline ||| & \circ \\ \hline 32 & \\ \hline \end{array} - \begin{array}{|c|c|} \hline | & \circ \\ \hline 11 & \\ \hline \end{array} = 21$$

To support mental strategies, children will subtract the tens first.

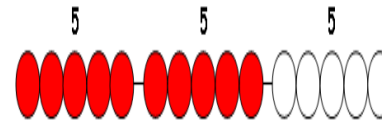
$$\begin{aligned} 32 - 11 &= \\ 30 - 10 &= 20 \end{aligned}$$

Then subtracting the ones.

$$\begin{aligned} 2 - 1 &= 1 \\ 20 + 1 &= 21 \\ 32 - 11 &= 21 \end{aligned}$$

Children will increase their knowledge of written methods though the use of column

$$5 \times 3 = 5 + 5 + 5$$



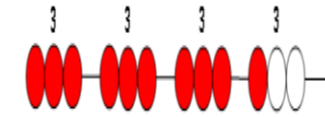
Children will continue to show multiplication as an array to reinforce the commutative law. Children should know that 3×5 has the same answer as 5×3 .

$$\begin{array}{c} \circ \circ \circ \circ \circ \\ \circ \circ \circ \circ \circ \quad 3 \times 5 = 15 \\ \circ \circ \circ \circ \circ \\ 5 \times 3 = 15 \end{array}$$

This can also be shown using numicon.

Repeated subtraction using a bead bar

$$12 \div 3 = 4$$



The bead bar will help children with interpreting division calculations such as $10 \div 5$ as 'how many 5s make 10?'

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

$$\square \div 2 = 4 \quad 20 \div \triangle = 4$$

$$\square \div \triangle = 4$$

$$\begin{array}{r} 32 \\ + 34 \\ \hline 66 \end{array}$$

They will work on practical problem solving activities involving addition.

subtraction.

$$\begin{array}{r} 45 \\ - 23 \\ \hline 22 \end{array}$$

They will work on practical problem solving activities involving subtraction.

Problem Solving and Reasoning.

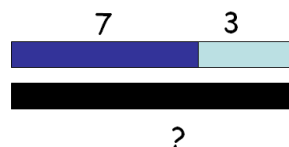
This is a mastery curriculum, therefore all children must be reasoning at their level.

Children will continue to develop confidence using bar method to represent simple addition calculations. Children will then progress to using bar models to find inverse relationships.



In Year 2, children will be introduced to Cuisenaire rods. They will begin building simple bar models.

With addition & subtraction problems there are three possible *unknowns* & you can represent them with bars



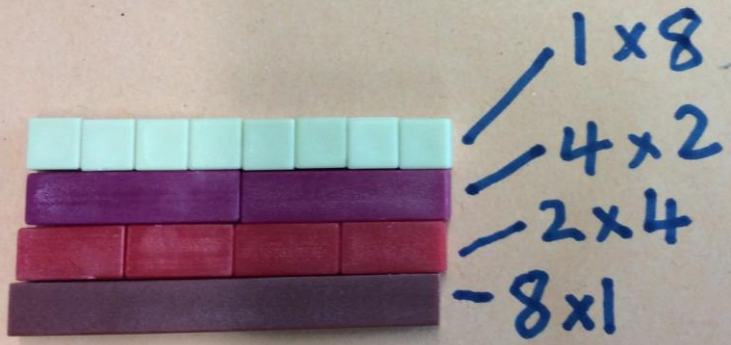
Children will complete simple addition and subtraction problems eg.

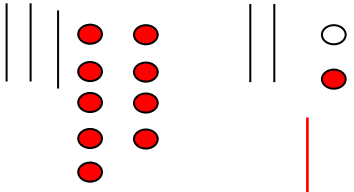
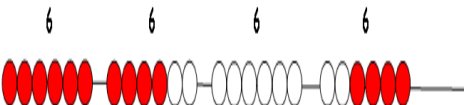
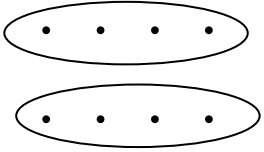
Tom has a bag of 64 marbles. His friend gives him 28 more.

How many does he have now?

Kelsey was running a 26 mile marathon. After 18 miles she felt very tired. How many more miles did she have to run?

Children will begin to use Cuisenaire to support multiplication/ division and fraction understanding.



| | Addition | Subtraction | Multiplication | Division |
|--|--|--|--|--|
| | <p>Children will continue to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.</p> | <p>Children will continue 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>Children will continue to use:</p> <p>✓ Repeated addition</p> <p>4 times 6 is $6 + 6 + 6 + 6 = 24$ or 4 lots of 6 or 6×4</p> <p>Children should use bead bars to support their understanding.</p> | <p>Ensure that the emphasis in Y3 is on grouping and using arrays rather than sharing.</p> |
| | <p>Children will continue to draw tens and ones and will develop strategies to bridge 10.</p>  <p>Making another stick of ten from the available ones to support bridging ten.</p> <p>Children will progress with column addition.</p> | <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>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> | $8 \div 2 = 4$  <p>Children should also move onto calculations involving remainders using grouping to support.</p> $13 \div 4 = 3 \text{ r } 1$ <p>✓ Using symbols to stand for unknown numbers to complete equations using inverse operations</p> $26 \div 2 = \square \qquad 24 \div \triangle = 12$ $\square \div 10 = 8$ |

Adding the least significant digits first

$$\begin{array}{r} 67 \\ + 24 \\ \hline 11 \text{ (7+4)} \\ 80 \text{ (60+20)} \\ \hline 91 \end{array}$$

$$\begin{array}{r} 267 \\ + 85 \\ \hline 12 \text{ (7+5)} \\ 140 \text{ (60+80)} \\ \hline 200 \\ \hline 352 \end{array}$$

$$89 = 80 + 9$$

$$\begin{array}{r} -57 \\ \hline 50 + 7 \\ 30 + 2 = 32 \end{array}$$

✓ **Begin to exchange.**

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

Step 1

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

Step 2

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

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

This would be recorded by the children as

$$\begin{array}{r} 80 \\ \cancel{70} + 11 \\ -40 + 6 \\ 20 + 5 = 25 \end{array}$$



$$9 \times 4 = 36$$

$$9 \times 4 = 36$$

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

$$\square \times 5 = 20$$

$$3 \times \triangle = 18$$

$$\square \times \circ = 32$$

✓ **Partitioning**

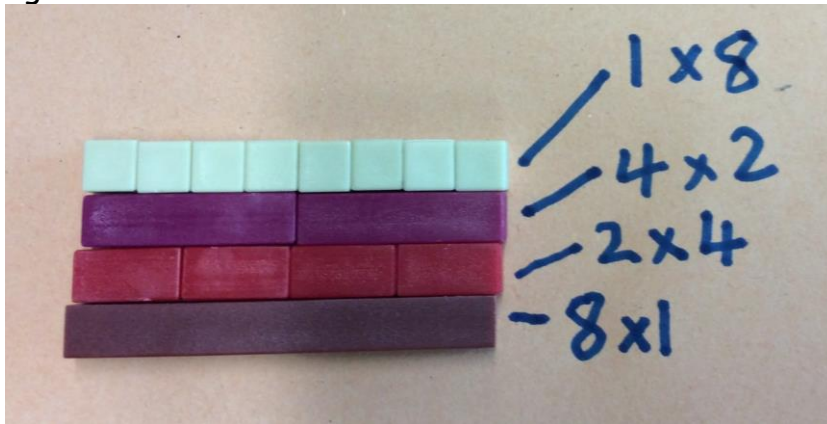
$$\begin{aligned} 38 \times 5 &= (30 \times 5) + (8 \times 5) \\ &= 150 + 40 \\ &= 190 \end{aligned}$$

Problem Solving and Reasoning.

This is a mastery curriculum, therefore all children must be reasoning at their level.

Children will continue to use bar models to support addition/ subtraction/ multiplication and division. Children will continue to use Cuisenaire rods to support alongside drawing their own bar models.

Eg



Addition and Subtraction:

Carly bought an apple for 17p and a banana for 26p.

How much has she spent?

Ali had £10. He bought a DVD for £6.70 and a CD for £2.90.

How much money did he have left?

Multiplication:

Children should begin to use bar models to explain answers and make links between multiplication and division.

Peter has 4 books

Harry has five times as many books as Peter.

How many books has Harry?

How might you represent the problem?

4

4

4

4

4

4

✓ Carry below the line.

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

Using similar methods, children will:

- ✓ add several numbers with different numbers of digits;
- ✓ begin to add two or more three-digit sums of money, with or 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.

✓ **Partitioning and decomposition**

$$\begin{array}{r} 764 = \\ - 86 \\ \hline \end{array}$$

Step 1 $700 + 50 + 4$
 $- \quad \quad 80 + 6$

Step 2 $700 + 40 + 14$ (adjust from T to U)
 $- \quad \quad 80 + 6$

Step 3 $600 + 140 + 14$ (adjust from H to T)
 $- \quad \quad 80 + 6$
 $600 + 60 + 8 = 668$

This would be recorded by the children as

$$\begin{array}{r} 600 + 140 \\ \cancel{700} + \cancel{50} + 14 \\ - \quad \quad 80 + 6 \\ \hline 600 + 60 + 8 = 668 \end{array}$$

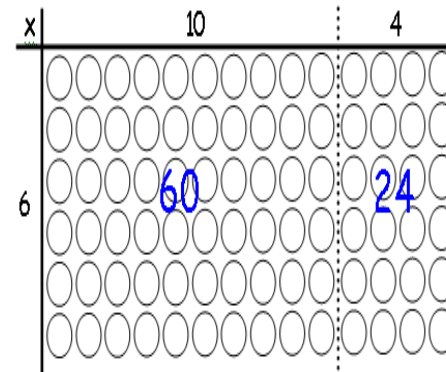
✓ **Decomposition**

$$\begin{array}{r} 6141 \\ \cancel{784} \\ - \quad 86 \\ \hline 668 \end{array}$$

Children should:

- ✓ be able to subtract

Children will continue to use arrays where appropriate leading into the grid method of multiplication.



$$(6 \times 10) + (6 \times 4)$$

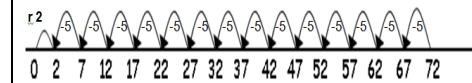
$$60 + 24$$

$$84$$

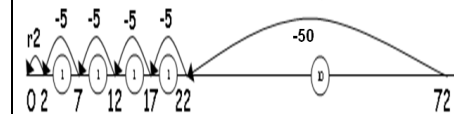
- ✓ **Grid method**

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.

$$72 \div 5$$



Moving onto:



- numbers with different numbers of 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.*

$$\begin{array}{r}
 \text{£}8.95 = 8 + 0.9 + 0.05 \\
 \text{-£}4.38 = -4 + 0.3 + 0.08 \\
 \hline
 = 8 + 0.8 + 0.15 \quad (\text{adjust from T to U}) \\
 - 4 + 0.3 + 0.08 \\
 \hline
 4 + 0.5 + 0.07 \\
 \hline
 = \text{£}4.57
 \end{array}$$

leading to

TO x O

(Short multiplication - multiplication by a single digit)

$$23 \times 8$$

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

$$\begin{array}{r}
 \times 20 \quad 3 \\
 8 \quad \boxed{160} \quad 24 \\
 \hline
 160 \\
 + 24 \\
 \hline
 184
 \end{array}$$

Then onto the vertical method:

Short division TO ÷ O

$$72 \div 3$$

$$\begin{array}{r}
 3 \overline{) 72} \\
 - 30 \\
 \hline
 42 \\
 - 30 \\
 \hline
 12 \\
 - 6 \\
 \hline
 6 \\
 - 6 \\
 \hline
 0
 \end{array}$$

Answer : 24

Leading to subtraction of other multiples.

$96 \div 6$

$$\begin{array}{r} 16 \\ 6 \overline{) 96} \\ \underline{- 60} \\ 36 \\ \underline{- 36} \\ 0 \end{array}$$

Diagram illustrating the division process with annotations:

- An oval encircles the numbers 10x and 6x, with an arrow pointing down to the final answer 16.
- The number 16 is written above the horizontal line.
- The number 6 is written to the left of the vertical line.
- The number 96 is written to the right of the vertical line.
- The number 60 is written below 96, with a horizontal line underneath it.
- The number 36 is written below 60.
- The number 36 is written below 36, with a horizontal line underneath it.
- The number 0 is written below 36.
- The text "Answer : 16" is written below the final result.

Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2.

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.

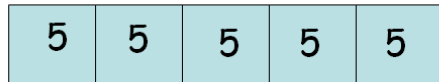
Problem Solving and Reasoning.

This is a mastery curriculum, therefore all children must be reasoning at their level.

Children should build on prior knowledge to use bar models to explain how to find an answer to a problem, focusing on multiplication, division, fractions and percentages.

Bob's got a 25 cm bit of wood and saws it into 5 equal pieces. How long's each bit?

Or, in another context, what's $\frac{1}{5}$ of 25?
(Or $\frac{2}{5}$, $\frac{3}{5}$ etc)



| Addition | Subtraction | Multiplication | Division |
|---|--|--|---|
| <p>Children should extend the carrying method to numbers with at least four digits.</p> $\begin{array}{r} 587 \\ + 475 \\ \hline 1062 \\ 11 \end{array} \qquad \begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 111 \end{array}$ <p>Using similar methods, children will:</p> <ul style="list-style-type: none"> ✓ add several numbers with different numbers of digits; ✓ begin to add two or more decimal fractions with up to three digits and the same number of decimal places; ✓ know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m - 280 cm. | <p>Partitioning and decomposition</p> <p>Step 1 $754 = 700 + 50 + 4$ $\underline{- 286} \quad \underline{- 200 + 80 + 6}$</p> <p>Step 2 $700 + 40 + 14$ (adjust from T to U) $\underline{- 200 + 80 + 6}$</p> <p>Step 3 $600 + 140 + 14$ (adjust from H to T) $\underline{- 200 + 80 + 6}$ $400 + 60 + 8 = 468$</p> <p>This would be recorded by the children as</p> $\begin{array}{r} 600 + 140 \\ 700 + 50 + 4 \\ \underline{- 200 + 80 + 6} \\ 400 + 60 + 8 = 468 \end{array}$ <p>Decomposition</p> $\begin{array}{r} 6141 \\ 784 \\ \hline - 286 \\ \hline 468 \end{array}$ <p>Children should:</p> <ul style="list-style-type: none"> ✓ be able to subtract | <p>Grid method HTO x O (Short multiplication - multiplication by a single digit) 346×9 Children will approximate first 346×9 is approximately $350 \times 10 = 3500$</p> $\begin{array}{r} \times 300 \ 40 \ 6 \\ 9 \ \boxed{2700} \ \boxed{360} \ \boxed{54} \\ \hline 2700 \\ + 360 \\ + 54 \\ \hline 3114 \\ 11 \end{array}$ <p>TO x TO (Long multiplication - multiplication by more than a single digit) 72×38 Children will approximate first 72×38 is approximately $70 \times 40 = 2800$</p> | <p>Children will continue to use written methods to solve short division TO ÷ O.</p> <p>Children can start to subtract larger multiples of the divisor, e.g. 30x</p> <p>Short division HTO ÷ O</p> $196 \div 6$ $\begin{array}{r} 32 \text{ r } 4 \\ 6 \overline{) 196} \\ \underline{- 180} \\ 16 \\ \underline{- 12} \\ 4 \end{array}$ <p>Answer: 32 remainder 4 or 32 r 4</p> <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</p> |

numbers with different numbers of digits;
 ✓ begin to find the difference between two decimal fractions with up to three digits and the same number of decimal places;
 know that decimal points should line up under each other

$$\begin{array}{r}
 \times \quad 70 \quad 2 \\
 30 \quad \boxed{2100} \quad \boxed{60} \\
 8 \quad \boxed{560} \quad \boxed{16} \\
 \hline
 2100 \\
 + 560 \\
 + 60 \\
 + 16 \\
 \hline
 2736 \\
 \hline
 1
 \end{array}$$

Using similar methods, they will be able to multiply decimals with one decimal place by a single digit number, approximating first. They should know that the decimal points line up under each other.
 e.g. 4.9×3

Children will approximate first
 4.9×3 is approximately $5 \times 3 = 15$

up or down accordingly. They should make sensible decisions about rounding up or down after division.

$$\begin{array}{r} \times \quad 4 \quad 0.9 \\ 3 \quad \boxed{12} \quad \boxed{2.7} \end{array}$$

$$\begin{array}{r} 12 \\ + \quad 2.7 \\ \hline 14.7 \end{array}$$

Problem Solving and Reasoning.

This is a mastery curriculum, therefore all children must be reasoning at their level.

| Addition | Subtraction | Multiplication | Division | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--|----------|------|--------------|----|---|--|---|-------|------|-----|----|-------|--|--|--|--|--|--------|--|--|--|--|--|-------|--|--|--|--|--|------|--|--|--|--|--|--------------|--|----|----|--|---|-----|-----|--|-------|--|--|-----|--|--|-------|----|--|---|--|---------|----|--|
| <p>Children should extend the carrying method to number with any number of digits.</p> $\begin{array}{r} 7648 \\ + 1486 \\ \hline 9134 \\ \hline 111 \end{array}$ $\begin{array}{r} 6584 \\ + 5848 \\ \hline 12432 \\ \hline 111 \end{array}$ $\begin{array}{r} 42 \\ 6432 \\ 786 \\ 3 \\ \hline + 4681 \\ \hline 11944 \\ \hline 121 \end{array}$ <p>Using similar methods, children will</p> <ul style="list-style-type: none"> ✓ add several numbers with different numbers of digits; ✓ begin to add two or more decimal fractions with up to four digits and either one or two decimal places; ✓ know that decimal points should line up under each | <p>Decomposition</p> $\begin{array}{r} 3131 \\ \cancel{6}467 \\ - 2684 \\ \hline 3783 \end{array}$ <p>Children should:</p> <ul style="list-style-type: none"> ✓ be able to subtract numbers with different numbers of digits; ✓ be able to subtract two or more decimal fractions with up to three digits and either one or two decimal places; ✓ know that decimal points should line up under each other. | <p>ThHTO × O (Short multiplication - multiplication by a single digit) 4346 × 8 Children will approximate first 4346 × 8 is approximately 4346 × 10 = 43460</p> <table style="border-collapse: collapse; margin-left: 20px;"> <tr> <td style="padding-right: 5px;">x</td> <td style="border: 1px solid black; padding: 2px;">4000</td> <td style="border: 1px solid black; padding: 2px;">300</td> <td style="border: 1px solid black; padding: 2px;">40</td> <td style="border: 1px solid black; padding: 2px;">6</td> <td style="padding-left: 20px;"></td> </tr> <tr> <td style="padding-right: 5px;">8</td> <td style="border: 1px solid black; padding: 2px;">32000</td> <td style="border: 1px solid black; padding: 2px;">2400</td> <td style="border: 1px solid black; padding: 2px;">320</td> <td style="border: 1px solid black; padding: 2px;">48</td> <td style="padding-left: 20px;">32000</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="padding-left: 20px;">+ 2400</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="padding-left: 20px;">+ 320</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="padding-left: 20px;">+ 48</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="padding-left: 20px;"><u>34768</u></td> </tr> </table> <p>HTO × TO (Long multiplication - multiplication by more than a single digit) 372 × 24 Children will approximate first 372 × 24 is approximately</p> | x | 4000 | 300 | 40 | 6 | | 8 | 32000 | 2400 | 320 | 48 | 32000 | | | | | | + 2400 | | | | | | + 320 | | | | | | + 48 | | | | | | <u>34768</u> | <p>Children will continue to use written methods to solve short division TO ÷ O and HTO ÷ O.</p> <p>Long division HTO ÷ TO</p> <p>972 ÷ 36</p> <div style="text-align: center;"> <table style="border-collapse: collapse;"> <tr> <td style="padding-right: 10px;">36</td> <td style="border-left: 1px solid black; padding-left: 5px;">27</td> <td></td> </tr> <tr> <td style="padding-right: 10px;">)</td> <td style="border-left: 1px solid black; padding-left: 5px;">972</td> <td style="padding-left: 10px;">20x</td> </tr> <tr> <td></td> <td style="border-left: 1px solid black; padding-left: 5px;">- 720</td> <td></td> </tr> <tr> <td></td> <td style="border-left: 1px solid black; padding-left: 5px;">252</td> <td></td> </tr> <tr> <td></td> <td style="border-left: 1px solid black; padding-left: 5px;">- 252</td> <td style="padding-left: 10px;">7x</td> </tr> <tr> <td></td> <td style="border-left: 1px solid black; padding-left: 5px;">0</td> <td></td> </tr> <tr> <td style="padding-right: 10px;">Answer:</td> <td style="border-left: 1px solid black; padding-left: 5px;">27</td> <td></td> </tr> </table> </div> <p>Any remainders should 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 it's lowest terms.</p> <p>Extend to decimals with up to two decimal places. Children should know that decimal points line up under</p> | 36 | 27 | |) | 972 | 20x | | - 720 | | | 252 | | | - 252 | 7x | | 0 | | Answer: | 27 | |
| x | 4000 | 300 | 40 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 32000 | 2400 | 320 | 48 | 32000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | + 2400 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | + 320 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | + 48 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | <u>34768</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|) | 972 | 20x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - 720 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 252 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | - 252 | 7x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Answer: | 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

other, particularly when adding or subtracting mixed amounts, e.g. $401.2 + 26.85 + 0.71$.

$$400 \times 25 = 10000$$

| | | | | |
|----|------|------|----|-------------|
| x | 300 | 70 | 2 | |
| 20 | 6000 | 1400 | 40 | 6000 |
| 4 | 1200 | 280 | 8 | + 1400 |
| | | | | + 1200 |
| | | | | + 280 |
| | | | | + 40 |
| | | | | + 8 |
| | | | | <u>8928</u> |

Using similar methods, they will be able to multiply decimals with up to two decimal places by a single digit number and then two digit numbers, approximating first. They should know that the decimal points line up under each other.

For example:

$$4.92 \times 3$$

Children will approximate first

first

$$4.92 \times 3 \text{ is approximately } 5 \times 3 = 15$$

each other.

$$87.5 \div 7$$

| | | |
|-----------------------|--------|--|
| $7 \overline{) 87.5}$ | 12.5 | |
| $- 70.0$ | 17.5 | <div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;"> <p>10x</p> <p>2x</p> <p>0.5x</p> </div> <p>↓</p> |
| $- 14.0$ | 3.5 | |
| $- 3.5$ | 0 | |
| 0 | | |

Answer : 12.5

$$7 \overline{) 186} \begin{array}{l} 26 \text{ r}4 \\ 14 \\ 46 \\ 42 \\ 4 \end{array}$$

| | | | | |
|---|---|----|----|----|
| | H | T | U | |
| | 1 | 3 | 4 | r4 |
| 6 | 8 | 20 | 28 | |

Problem Solving and Reasoning.

This is a mastery curriculum, therefore all children must be reasoning at their level.

By the end of year 6, children will have a range of calculation methods: mental and written. Selection will depend upon the numbers involved. Children should not be allowed to go onto the next stage if:

- They are not ready.
- They are not confident.

Children should be encouraged to **approximate** their answers before calculating.

Children should be encouraged to **consider if a mental calculation** would be appropriate before using written methods.