

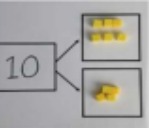


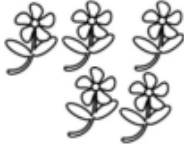
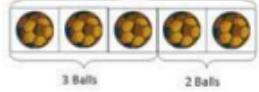


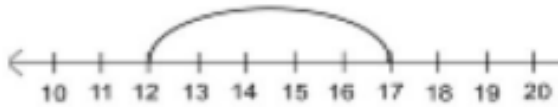


Year One



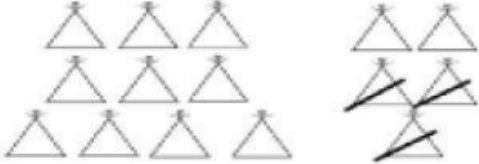


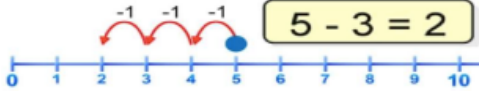
Addition

Skill	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part-whole model	 <p>Use part, part whole model.</p> <p>Use cubes to add two numbers together as a group or in a bar.</p>  	<p>Use pictures to add two numbers together as a group or in a bar.</p>    	$8 = 5 + 3$ $5 + 3 = 8$  <p>Use the part part whole diagram as shown above to move into the abstract.</p> <p>Include missing number questions to support varied fluency:</p> $8 = ? + 3$ $5 + ? = 8$
Starting at the bigger number and counting on	 <p>Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.</p>	 $12 + 5 = 17$ <p>Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p>	<hr/> $5 + 12 = 17$ <p>Place the larger number in your head and count on the smaller number to find your answer.</p>

<p>Regrouping to make 10.</p> <p>This is an essential skill for column addition later.</p>	<div data-bbox="353 204 685 339"> </div> <div data-bbox="757 204 875 236"> $6 + 5 = 11$ </div> <div data-bbox="396 360 598 536"> </div> <div data-bbox="620 360 842 603"> <p>Start with the bigger number and use the smaller number to make 10.</p> <p>Use ten frames.</p> </div>	<div data-bbox="1111 245 1503 347"> </div> <div data-bbox="1122 344 1258 368"> $3 + 9 =$ </div> <div data-bbox="1048 395 1554 507"> <p>Use pictures or a number line. Regroup or partition the smaller number using the part, part whole model to make 10.</p> </div> <div data-bbox="1048 520 1592 596"> </div>	<p>$7 + 4 = 11$</p> <p>If I am at seven, how many more do I need to make 10? How many more do I add on now?</p>
<p>Represent & use number bonds and related subtraction facts within 20</p>	<div data-bbox="327 703 927 855"> </div> <div data-bbox="300 890 519 922"> <p>2 more than 5.</p> </div>	<div data-bbox="972 671 1671 951"> </div>	<p>Include missing number questions:</p> <p>$8 = ? + 3$</p> <p>$5 + ? = 8$</p> <p>Emphasis should be on the language</p> <p>'1 more than 5 is equal to 6.'</p> <p>'2 more than 5 is 7.'</p> <p>'8 is 3 more than 5.'</p>

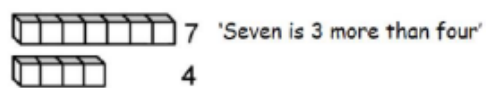
Year One

Subtraction

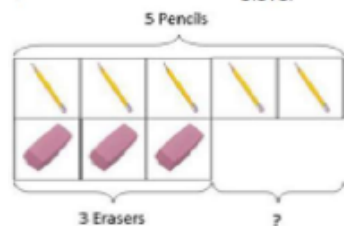
Skill	Concrete	Pictorial	Abstract
Taking away ones.	<p>Use physical objects, counters, cubes etc to show how objects can be taken away.</p> <p>$4 - 2 = 2$</p>  <p>$6 - 4 = 2$</p> 	<p>Cross out drawn objects to show what has been taken away.</p>  <p>$15 - 3 = 12$</p>	<p>$7 - 4 = 3$</p> <p>$16 - 9 = 7$</p>
Counting back	 <p>Move objects away from the group, counting backwards.</p>  <p>Move the beads along the bead string as you count backwards.</p>	 <p>Count back in ones using a number line.</p>	<p>Put 13 in your head, count back 4. What number are you at?</p>

Find the Difference

Compare objects and amounts

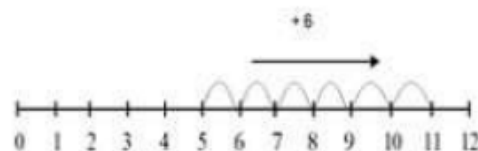


'Seven is 3 more than four'
'I am 2 years older than my sister'



Lay objects to represent bar model.

Count on using a number line to find the difference.

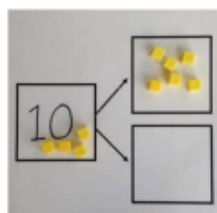


Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister.?

Represent and use number bonds and related subtraction facts within 20

Include subtracting zero

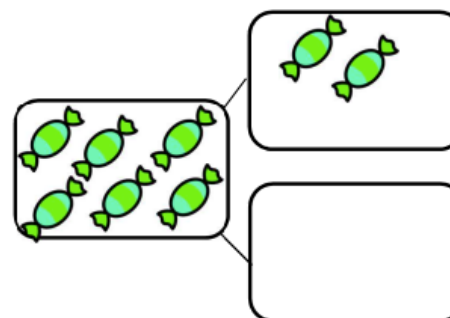
Part-Part-Whole model



Link to addition. Use PPW model to model the inverse.

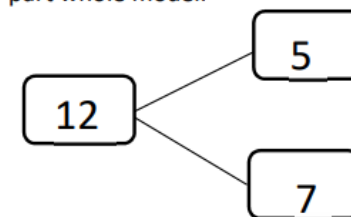
If 10 is the whole and 6 is one of the parts, what is the other part?

$$10 - 6 = 4$$



Use pictorial representations to show the part.


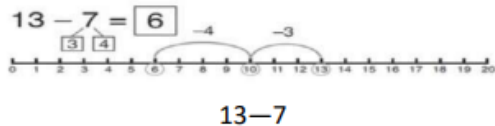
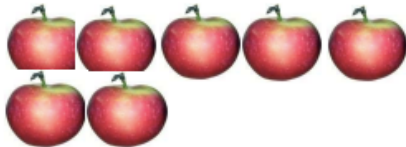
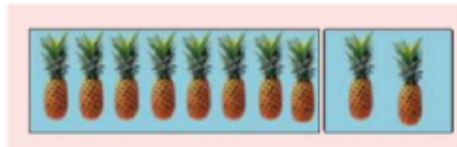
Move to using numbers within the part whole model.



Include missing number problems:

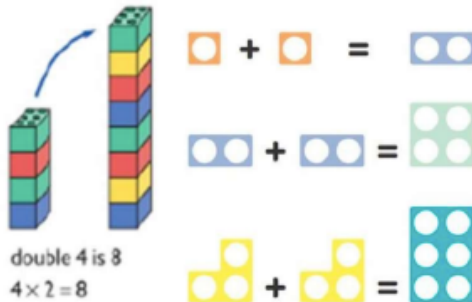

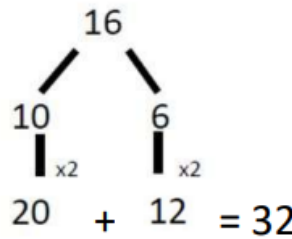
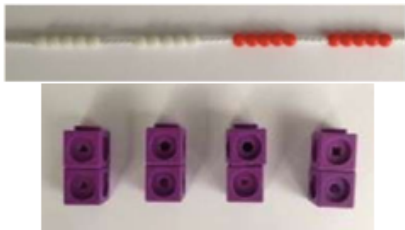

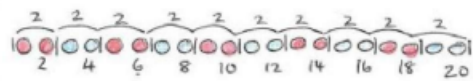
$$12 - ? = 5$$



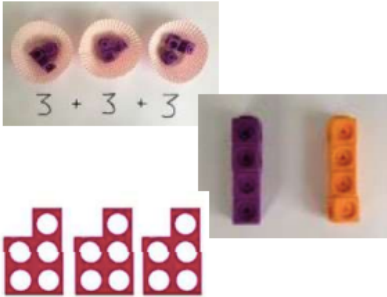
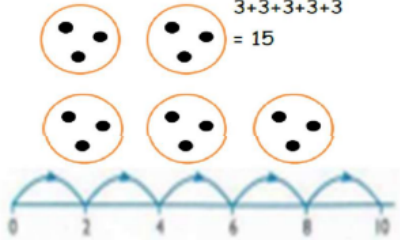

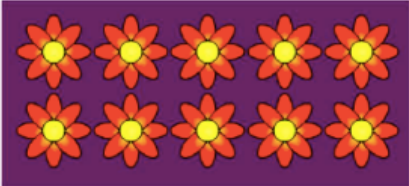
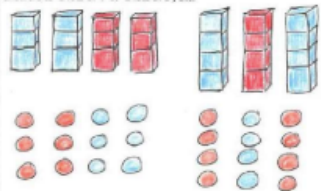
$$7 = 12 - ?$$

Make 10	<div>14—9</div> <div></div> <div>Make 14 on the ten frame. Take 4 away to make ten, then take one more away so that you have taken 5.</div>	<div>13—7</div> <div></div> <div>Jump back 3 first, then another 4. Use ten as the stopping point.</div>	<div>16—8</div> <div>How many do we take off first to get to 10? How many left to take off?</div>		
Bar model, including the inverse operations	<div></div> <div>5—2 = 3</div>	<div></div>	<div><table><tr><td>8</td><td>2</td></tr></table></div> <div>10 = 8 + 2 10 = 2 + 8 10—2 = 8 10—8 = 2</div>	8	2
8	2				

Year One

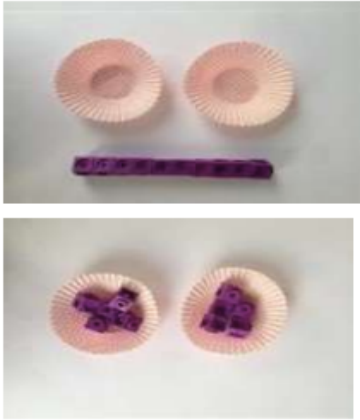

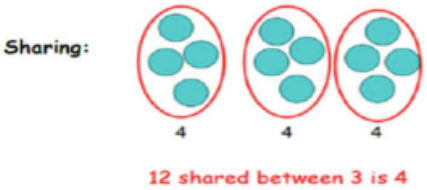
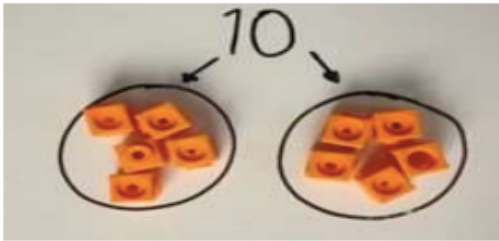
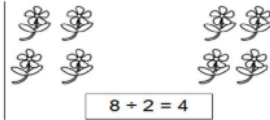
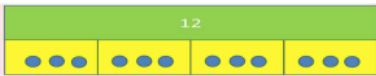
Multiplication

Skill	Concrete	Pictorial	Abstract
Doubling	<p>Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling</p>  <p>double 4 is 8 $4 \times 2 = 8$</p>	<p>Draw pictures to show how to double numbers</p> <p>Double 4 is 8</p> 	<p>Partition a number and then double each part before recombining it back together.</p>  <p>$20 + 12 = 32$</p>
Counting in multiples (2s, 5s, 10s)	<p>Count the groups as children are skip counting, children may use their fingers as they are skip counting.</p> 	 <p>Children make representations to show counting in multiples.</p> 	<p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of numbers.</p> <p>2, 4, 6, 8, 10</p> <p>5, 10, 15, 20, 25, 30</p>

<p>Making equal groups and counting the total</p>	 <p>Use manipulatives to create equal groups.</p>	<p>Draw  to show $2 \times 3 = 6$</p> <p>Draw and make representations</p>	$2 \times 4 = 8$
<p>Repeated addition</p>	 <p>Use different objects to add equal groups</p>	<p>Use pictorial including number lines to solve prob There are 3 sweets in one bag. How many sweets are in 5 bags altogether?</p> <p>$3 + 3 + 3 + 3 + 3 = 15$</p> 	<p>Write addition sentences to describe objects and pictures.</p>  <p>$2 + 2 + 2 + 2 + 2 = 10$</p>
<p>Understanding arrays</p>	<p>Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2 etc.</p> 	<p>Draw representations of arrays to show understanding</p> 	$3 \times 2 = 6$ $2 \times 5 = 10$

Year One

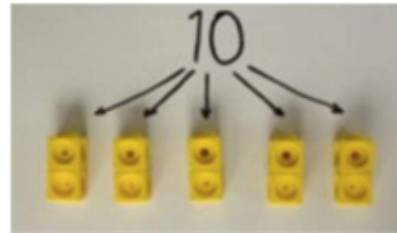
Division

Skill	Concrete	Pictorial	Abstract
Sharing		<p>Children use pictures or shapes to share quantities.</p>  <p>8 shared between 2 is 4</p> <p>Sharing:</p>  <p>12 shared between 3 is 4</p>	12 shared between 3 is 4
Sharing	 <p>I have 10 cubes, can you share them equally in 2 groups?</p>	<p>Children use pictures or shapes to share quantities.</p>  <p>8 ÷ 2 = 4</p> <p>Children use bar modelling to show and support understanding.</p>  <p>12 ÷ 4 = 3</p>	$12 \div 3 = 4$

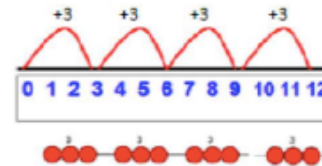
Grouping

Divide quantities into equal groups.

Use cubes, counters, objects or place value counters to aid understanding.



Use number lines for grouping



$$12 \div 3 = 4$$

Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.




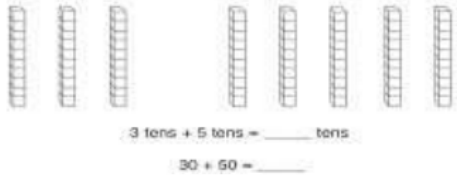
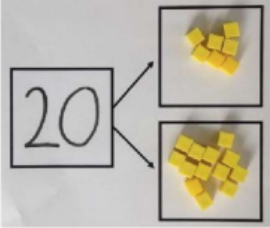
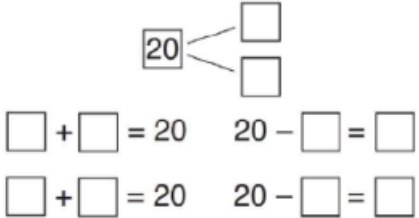
$$20 \div 5 = ?$$
$$5 \times ? = 20$$

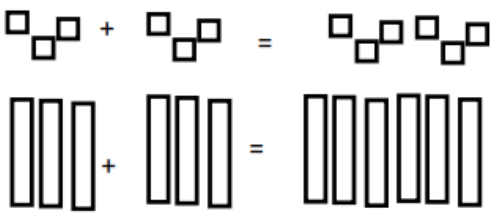
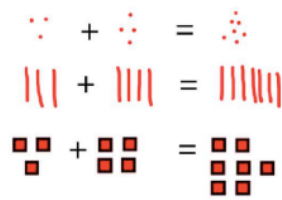


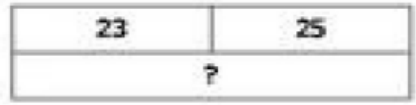
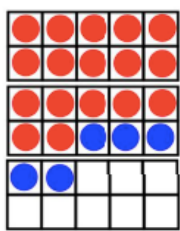
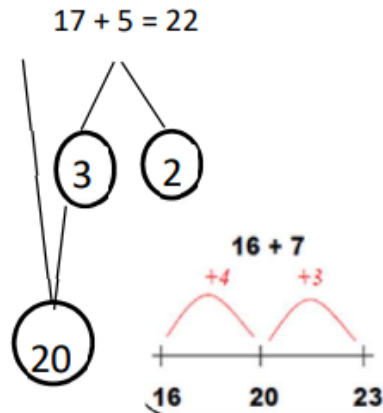
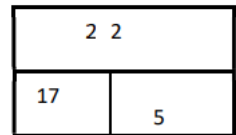
$$28 \div 7 = 4$$


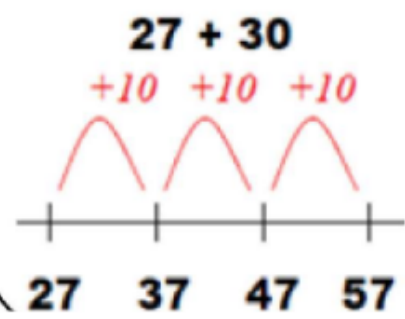

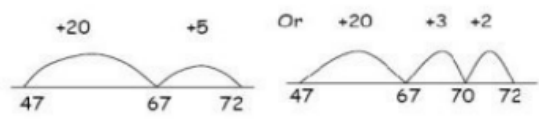
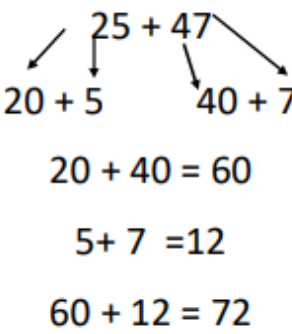

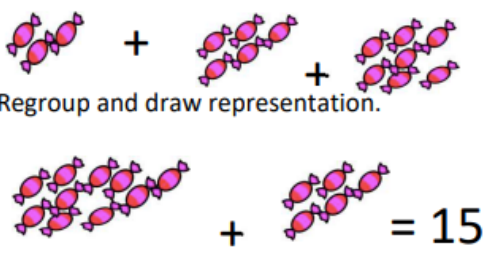
Divide 28 into 7 groups.
How many are in each group?

Year Two

Addition

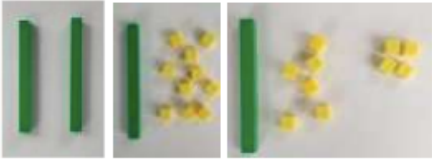
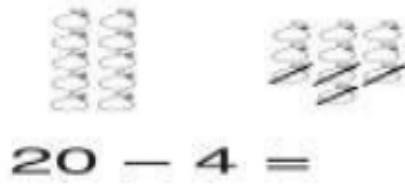
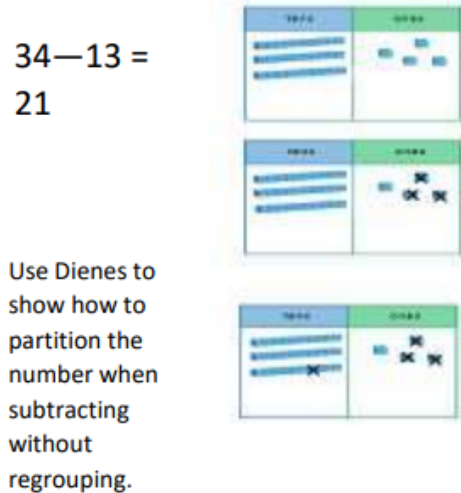
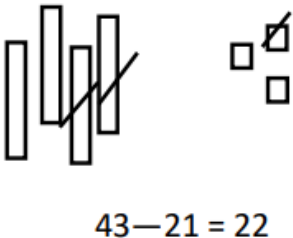
Skill	Concrete	Pictorial	Abstract
Adding multiples of ten	<p>50 = 30 + 20</p>  <p>Model using dienes and bead strings</p>	 <p>Use representations for base ten.</p>	$20 + 30 = 50$ $70 = 50 + 20$ $40 + \square = 60$
Use known number facts Part, part whole	 <p>Children explore ways of making numbers within 20</p>		<p>Explore commutativity of addition by swapping the addends to build a fact family.</p> <p>Explore the concept of the inverse relationship of addition and subtractions and use this to check calculations.</p> $\square + 1 = 16 \quad 16 - 1 = \square$ $1 + \square = 16 \quad 16 - \square = 1$

Using known facts		 <p>Children draw representations of H,T and O</p>	$3 + 4 = 7$ <i>leads to</i> $30 + 40 = 70$ <i>leads to</i> $300 + 400 = 700$
Bar model	 $3 + 4 = 7$	 $7 + 3 = 10$	 $23 + 25 = 48$
Add a two digit number and ones	 <p>17 + 5 = 22</p> <p>Use ten frame to make 'magic ten'</p> <p>Children explore the pattern.</p> $17 + 5 = 22$ $27 + 5 = 32$	<p>Use part part whole and number line to model.</p> 	$17 + 5 = 22$ Explore related facts $17 + 5 = 22$ $5 + 17 = 22$ $22 - 17 = 5$ $22 - 5 = 17$  <p>Lead into recording in column format, to reinforce place value and prepare children for formal written methods with larger values.</p>

<p>Add a 2 digit number and tens</p>	 <p>$25 + 10 = 35$</p> <p>Explore that the ones digit does not change</p>	 <p>$27 + 30$</p> <p>$+10 +10 +10$</p> <p>$27 \quad 37 \quad 47 \quad 57$</p>	<p>$27 + 10 = 37$</p> <p>$27 + 20 = 47$</p> <p>$27 + \square = 57$</p>
<p>Add two 2-digit numbers</p>	 <p>Model using dienes , place value counters and numicon</p>	 <p>$+20 \quad +5$ Or $+20 \quad +3 \quad +2$</p> <p>47 67 72 47 67 70 72</p> <p>Use number line and bridge ten using part whole if necessary.</p>	 <p>$25 + 47$</p> <p>$20 + 5 \quad 40 + 7$</p> <p>$20 + 40 = 60$</p> <p>$5 + 7 = 12$</p> <p>$60 + 12 = 72$</p>
<p>Add three 1-digit numbers</p>	 <p>Combine to make 10 first if possible, or bridge 10 then add third digit</p>	 <p>Regroup and draw representation.</p> <p>$+ = 15$</p>	

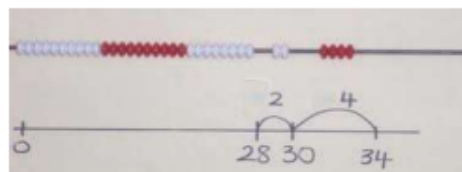
Year Two

Subtraction

Skill	Concrete	Pictorial	Abstract
Regroup a ten into ten ones	 <p>Use a PV chart to show how to change a ten into ten ones, use the term 'take and make'</p>	 $20 - 4 =$	$20 - 4 = 16$
Partitioning to subtract without regrouping. 'Friendly numbers'	$34 - 13 = 21$  <p>Use Dienes to show how to partition the number when subtracting without regrouping.</p>	<p>Children draw representations of Dienes and cross off.</p>  $43 - 21 = 22$	$43 - 21 = 22$

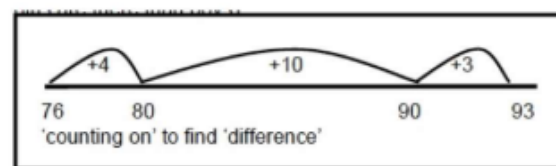
Make ten strategy

Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.



$$34 - 28$$

Use a bead bar or bead strings to model counting to next ten and the rest.

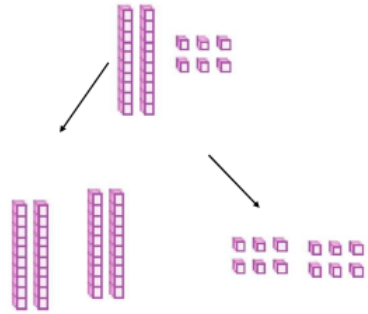
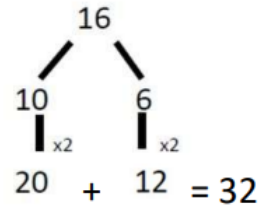


Use a number line to count on to next ten and then the rest.

$$93 - 76 = 17$$

Year Two

Multiplication

Skill	Concrete	Pictorial	Abstract
Doubling	<p>Model doubling using dienes and PV counters.</p>  <p>$40 + 12 = 52$</p>	<p>Draw pictures and representations to show how to double numbers.</p>	<p>Partition a number and then double each part before recombining it back together.</p>  <p>$20 + 12 = 32$</p>

Counting in multiples of
2, 3, 4, 5, 10 from 0
(repeated addition)

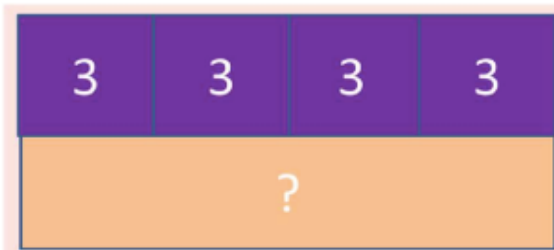
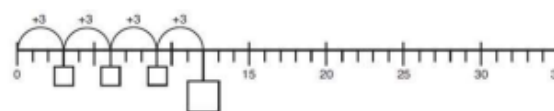
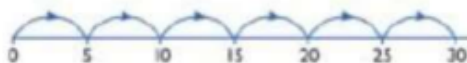
Count the groups as children are
skip counting, children may use
their fingers as they are skip
counting. Use bar models.



$$5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40$$



Number lines, counting sticks and bar
models should be used to show
representation of counting in multiples.



Count in multiples of a number aloud.

Write sequences with multiples of
numbers.

0, 2, 4, 6, 8, 10

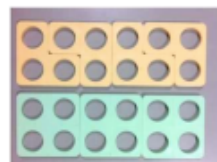
0, 3, 6, 9, 12, 15

0, 5, 10, 15, 20, 25, 30

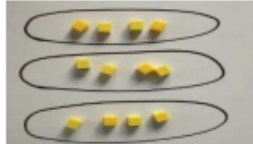
$$4 \times 3 = \square$$

Multiplication is commutative

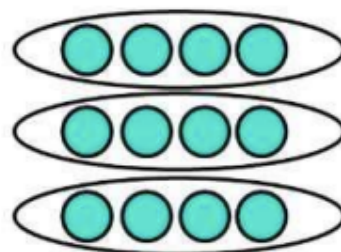
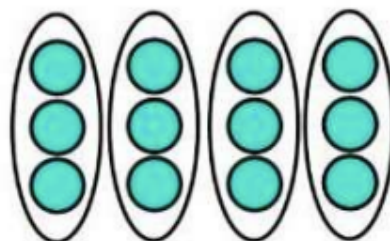
Create arrays using counters and cubes and Numicon.



Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer.



Use representations of arrays to show different calculations and explore commutativity.



$$12 = 3 \times 4 \quad 12 = 4 \times$$

3

Use an array to write multiplication sentences and reinforce repeated addition.



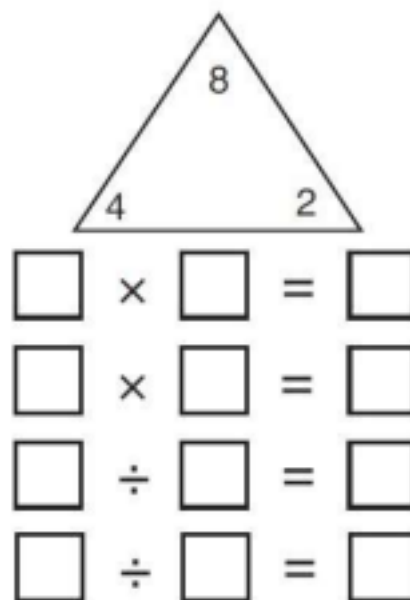
$$5 + 5 + 5 = 15$$

$$3 + 3 + 3 + 3 + 3 = 15$$

$$5 \times 3 = 15$$

$$3 \times 5 = 15$$

Using the Inverse This should be taught alongside division, so pupils learn how they work alongside each other.



$$2 \times 4 = 8$$

$$4 \times 2 = 8$$

$$8 \div 2 = 4$$

$$8 \div 4 = 2$$

$$8 = 2 \times 4$$

$$8 = 4 \times 2$$

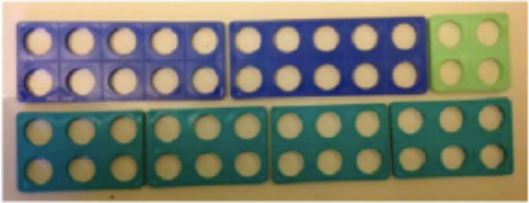


$$2 = 8 \div 4$$

$$4 = 8 \div 2$$

Show all 8 related fact family sentences.

Year Two

Division

Skill	Concrete	Pictorial	Abstract
Grouping	<p>Use cubes, counters, objects or place value counters to aid understanding.</p>  <p>24 divided into groups of 6 = 4</p> $96 \div 3 = 32$ 	<p>Continue to use bar modelling to aid solving division problems.</p>  $20 \div 5 = ?$ $5 \times ? = 20$	<p>How many groups of 6 in 24?</p> $24 \div 6 = 4$

Arrays

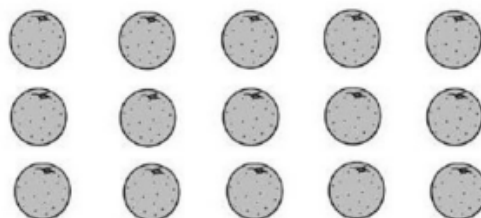


Link division to multiplication by creating an array and thinking about the number sentences that can be created.

Eg $15 \div 3 = 5$ $5 \times 3 = 15$

$15 \div 5 = 3$ $3 \times 5 = 15$

Draw an array and use lines to split the array into groups to make multiplication and division sentences



Find the inverse of multiplication and division sentences by creating eight linking number sentences. $7 \times 4 = 28$

$4 \times 7 = 28$

$28 \div 7 = 4$

$28 \div 4 = 7$

$28 = 7 \times 4$

$28 = 4 \times 7$

$4 = 28 \div 7$

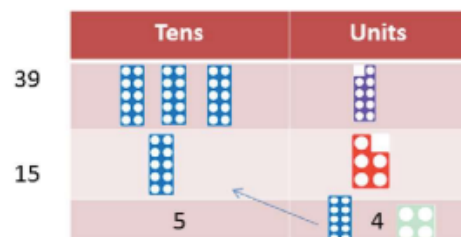
$7 = 28 \div 4$

Year Three

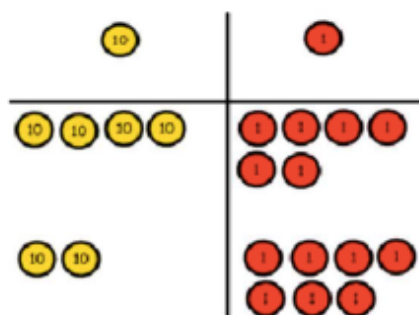
Addition

Skill	Concrete	Pictorial	Abstract
<p>Column Addition—no regrouping (friendly numbers)</p> <p>Add two or three 2 or 3digit numbers.</p>	<div><div><div><div>T</div><div>O</div></div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div></div><div>Dienes or numicon</div><div>Add together the ones first, then the tens.</div><div><div><div><div>Tens</div><div>Units</div></div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div></div><div>45</div><div>34</div><div>7</div><div>9</div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div></div><div>21 + 42 =</div><div>21</div><div>+ 42</div></div><div>Move to using place value counters</div></div></div></div>	<p>Children move to drawing the counters using a tens and one frame.</p> <div><div>tens</div><div>ones</div></div> <div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div> <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	
			<div><div>2 2 3</div><div>+ 1 1 4</div><div>3 3 7</div></div> <div>Add the ones first, then the tens, then the hundreds.</div>

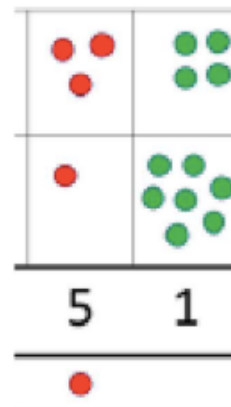
Column Addition with regrouping.



Exchange ten ones for a ten. Model using numicon and place value counters.



$$46 + 27 = 73$$



$$\begin{array}{r} 34 \\ +17 \\ \hline \end{array}$$

Children can draw a representation of the grid to further support their understanding, carrying the ten underneath the line

$$\begin{array}{r} 20 + 5 \\ 40 + 8 \\ 60 + 13 = 73 \end{array}$$

Start by partitioning the numbers before formal column to show the exchange.

$$\begin{array}{r} 536 \\ + 85 \\ \hline 621 \\ 11 \end{array}$$

Estimate the answers to questions and use inverse operations to check answers



Estimating $98 + 17 = ?$
 $100 + 20 = 120$

Use number lines to illustrate estimation.



Building up known facts and using them to illustrate the inverse and to check answers:

$$98 + 18 = 116$$



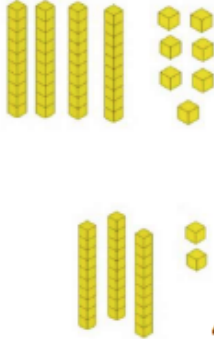
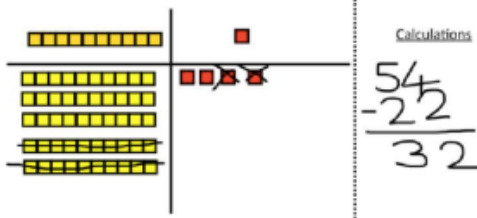
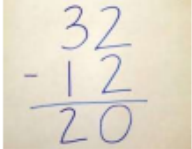
$$116 - 18 = 98$$

$$18 + 98 = 116$$

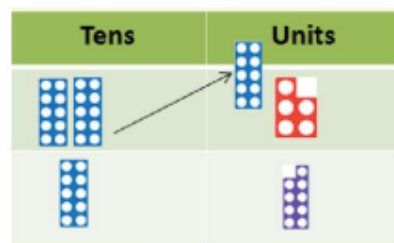
$$116 - 98 = 18$$

Year Three

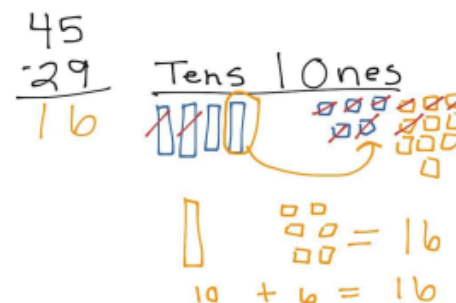
Subtraction

Skill	Concrete	Pictorial	Abstract
<p>Subtract numbers mentally, including:</p> <p>Three digit number + ones</p> <p>Three digit number + tens</p> <p>Three digit number + hundreds</p>			<p>Vary the position of the answer and question.</p> <p>Expose children to missing number questions and vary the missing part of the calculation.</p> $678 = ? - 1$ $688 - 10 = ?$ $678 = ? - 100$
<p>Column subtraction without regrouping (friendly numbers)</p>	 <p>47—32</p> <p>Use base 10 or Numicon to model</p>	 <p>Draw representations to support understanding</p>	<p>Calculations</p> $\begin{array}{r} 54 \\ - 22 \\ \hline 32 \end{array}$ $47 - 24 = 23$ $\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$ <p>Intermediate step may be needed to lead to clear subtraction understanding.</p> 

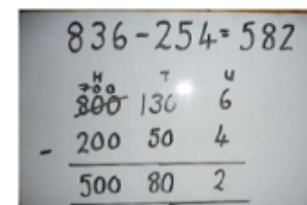
Column subtraction with regrouping



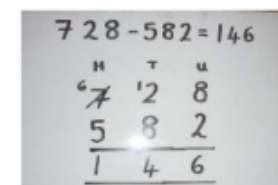
Begin with base 10 or Numicon. Move to pv counters, modelling the exchange of a ten into ten ones. Use the phrase 'take and make' for exchange.



Children may draw base ten or PV counters and cross off.



Begin by partitioning into pv columns



Then move to formal method.

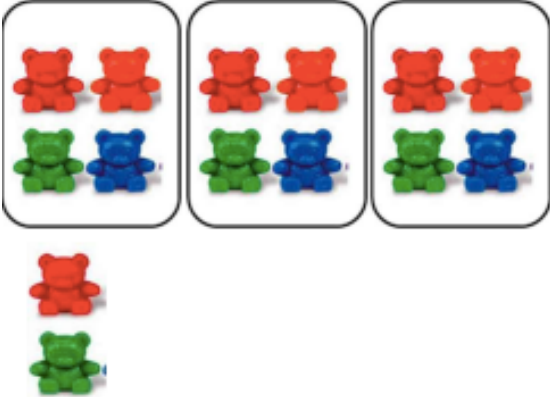


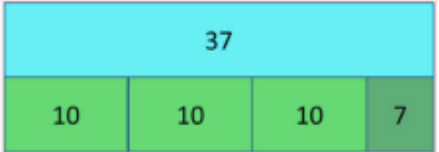
Year Three

Multiplication

Skill	Concrete	Pictorial	Abstract
<p>Grid method, progressing to the formal method</p> <p>Multiply 2 digit numbers by 1 digit numbers</p>	<p>Show the links with arrays to first introduce the grid method.</p> <div><div><div><div>x</div><div></div><div>10</div><div>3</div></div><div><div>4</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div><div><div>4 rows of 10</div><div>4 rows of 3</div></div></div></div><p>Move onto base ten to move towards a more compact method.</p><div><div><div>x</div><div></div><div>T</div><div>U</div></div><div><div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div><div><div>4 rows of 13</div></div></div></div> <p>Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows</p> <div><div><div>100</div><div>10</div><div>1</div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div> <div>Calculations 4 x 126</div> <div><div><div>100</div><div>10</div><div>1</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div><div><div>4 rows of 126</div></div></div> <div>Calculations 4 x 126</div> <p>Fill each row with 126. Add up each column, starting with the ones making any exchanges needed Then you have your answer.</p> <div><div><div>100</div><div>10</div><div>1</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div><div><div>4 rows of 126</div></div></div> <div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>4 rows of 126</div></div></div>	<p>Children can represent their work with place value counters in a way that they understand.</p> <p>They can draw the counters using colours to show different amounts or just use the circles in the different columns to show their thinking as shown below.</p> <div><div>24 x 3 = 72</div><div><div><div>X</div><div>20</div><div>4</div></div><div><div>3</div><div><div>00</div><div>00</div><div>00</div><div>60</div></div><div><div>0000</div><div>0000</div><div>0000</div><div>12</div><div>60</div><div>+ 12</div><div>72</div></div></div></div></div> <p>Bar model are used to explore missing numbers</p> <div><div>4 x <div></div> = 20</div><div><div><div>20</div><div>4</div></div></div></div>	<p>Start with multiplying by one digit numbers and showing the clear addition alongside the grid.</p> <div><div><div><div>x</div><div>30</div><div>5</div></div><div><div>7</div><div>210</div><div>35</div></div></div></div> <p>210 + 35 = 245</p> <p>Move forward to the formal written method:</p> <div><div><div>35</div><div>x 7</div><div><div><div>245</div><div>3</div></div></div></div></div>

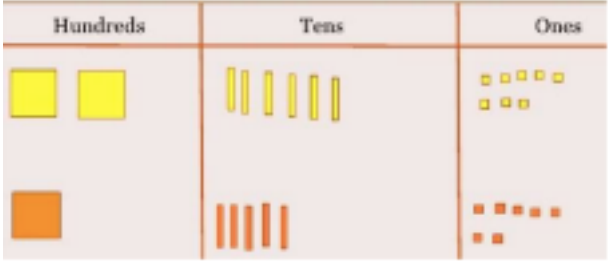
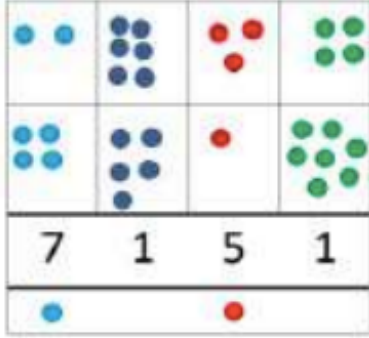
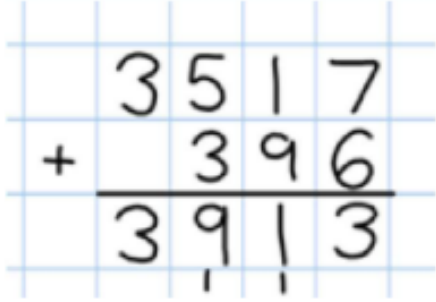
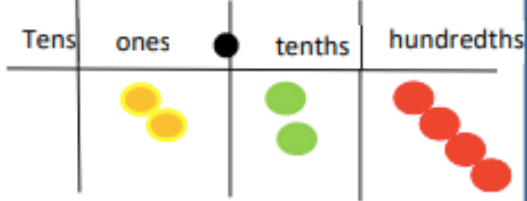
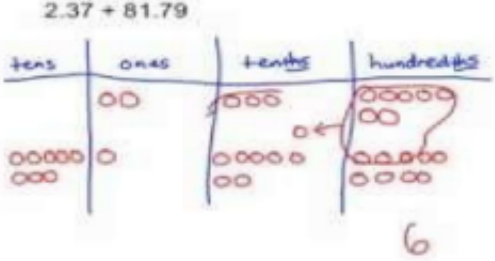
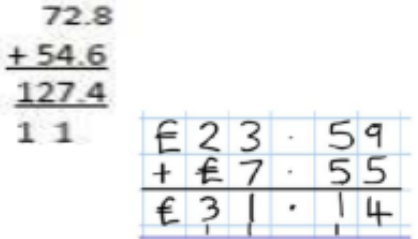
Year Three

Division

Skill	Concrete	Pictorial	Abstract
Division with remainders.	<p>$14 \div 3 =$</p> <p>Divide objects between groups and see how much is left over</p> 	<p>Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.</p>  <p>Draw dots and group them to divide an amount and clearly show a remainder.</p>  <p>Use bar models to show division with remainders.</p> 	<p>Complete written divisions and show the remainder using r.</p> <p>$29 \div 8 = 3 \text{ REMAINDER } 5$</p> <p>↑ ↑ ↑ ↑</p> <p>dividend divisor quotient remainder</p>

Years Four-Six

Addition

Skill	Concrete	Pictorial	Abstract
Y4—add numbers with up to 4 digits	<p>Children continue to use dienes or place value counters to add, exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand.</p> 	 <p>Draw representations using place value grid.</p>	 <p>Continue from previous work to carry hundreds as well as tens.</p> <p>Relate to money and measures.</p>
Y5—add numbers with more than 4 digits. Add decimals with 2 decimal places, including money.	<p>As year 4</p>  <p>Introduce decimal place value counters and model exchange for addition.</p>		

Y6—add several numbers of increasing complexity, including adding money, measure and decimals with different numbers of decimal points.

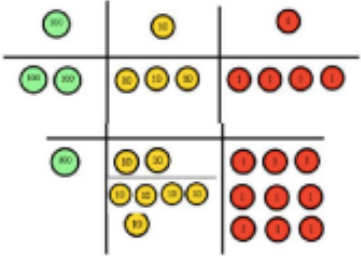
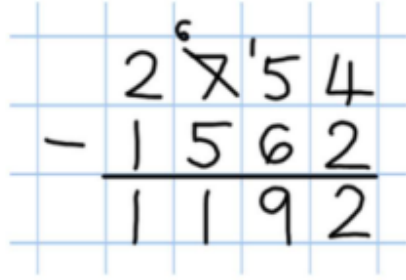
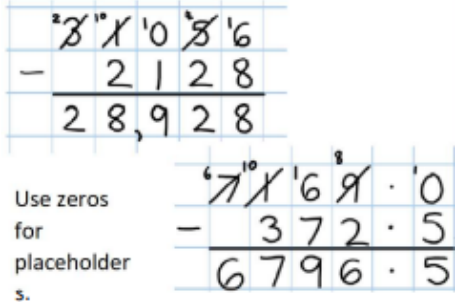
Insert zeros for place holders.

$$\begin{array}{r} 81,059 \\ 3,668 \\ 15,301 \\ + 20,551 \\ \hline 120,579 \\ \hline \end{array}$$

$$\begin{array}{r} 23.361 \\ 9.080 \\ 59.770 \\ + 1.300 \\ \hline 93.511 \end{array}$$

Years Four-Six

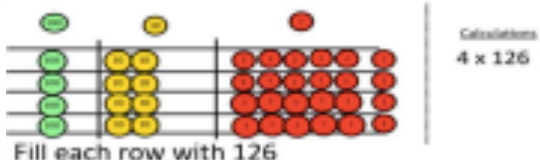

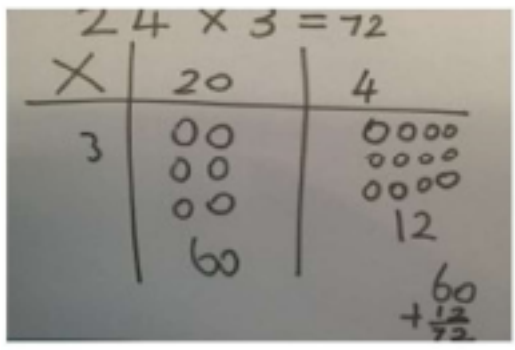
Subtraction

Skill	Concrete	Pictorial	Abstract
<p>Year 4 subtract with up to 4 digits.</p> <p>Introduce decimal subtraction through context of money.</p>	<p>234 - 179</p>  <p>Model process of exchange using Numicon, base ten and then move to PV counters.</p>	<p>Children to draw PV counters and show their exchange—see Y3</p>	 <p>Use the phrase 'take and make' for exchange</p>
<p>Year 5- Subtract with at least 4 digits, including money and measures. Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal Up to 3 decimal places</p>	<p>See Year 4</p>	<p>Children to draw pv counters and show their exchange—see Y3</p>	 <p>Use zeros for placeholder s.</p>

<p>Year 6—Subtract with increasingly large and more complex numbers and decimal values (up to 3 decimal place).</p>	<p>See Year 4</p>	<p>Children to draw pv counters and show their exchange—see Y3</p>	<div data-bbox="1621 145 2051 347"> $\begin{array}{r} \cancel{7} \cancel{8} \cancel{0}, 699 \\ - \quad 89,949 \\ \hline 60,750 \end{array}$ </div> <div data-bbox="1621 373 2107 571"> $\begin{array}{r} \cancel{7} \cancel{0} 5 \cdot \cancel{4} 19 \text{ kg} \\ - \quad 36 \cdot 08 \text{ kg} \\ \hline 69 \cdot 339 \text{ kg} \end{array}$ </div>
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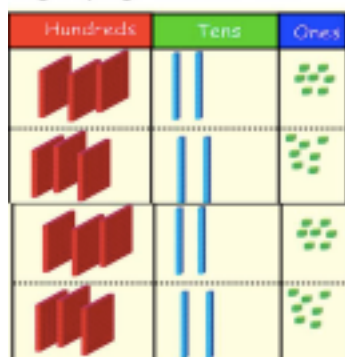
Years Four-Six

Multiplication

Skill	Concrete	Pictorial	Abstract						
Grid method recap, following onto formal three-digit by one-digit column multiplication	<p>Use place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows</p>  <p>Fill each row with 126</p>  <p>Add up each col. making any exchanges needed</p>	<p>Children can represent their work with place value counters in a way that they understand. They can draw the counters using colours to show different amounts or just use the circles in the different columns to show their thinking as shown below.</p> 	<p>Start with multiplying by one digit numbers and showing the clear addition alongside the grid.</p> <table border="1" data-bbox="1778 612 2112 700"><tr><td>x</td><td>30</td><td>5</td></tr><tr><td>7</td><td>210</td><td>35</td></tr></table> <p>210 + 35 = 245</p>	x	30	5	7	210	35
x	30	5							
7	210	35							

Column Multiplication

Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. $321 \times 2 = 642$

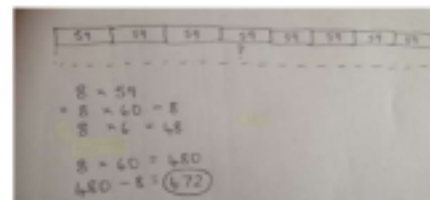


It is important at this stage that they always multiply the ones first.

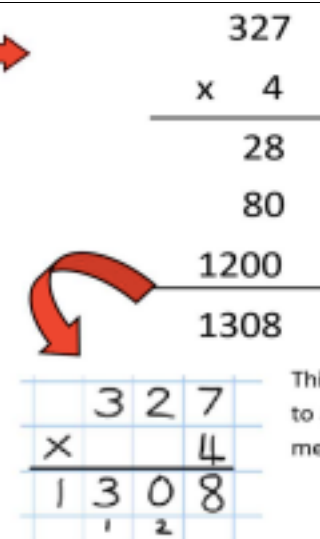
The corresponding long multiplication is modelled alongside

x	300	20	7
4	1200	80	28

The grid method may be used to show how this relates to a formal written method.

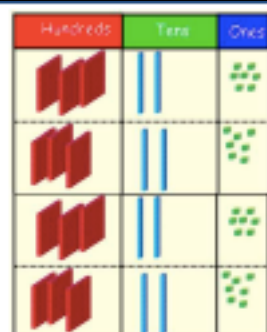


Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.



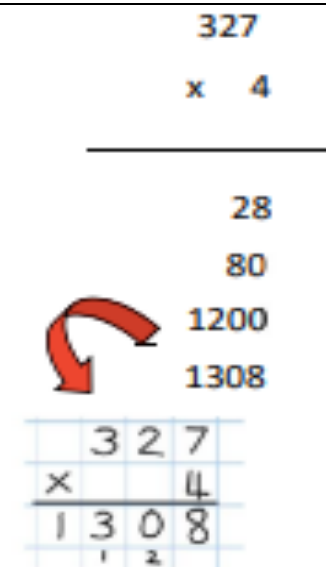
This may lead to a compact method.

Column multiplication for $\frac{3}{4}$ digit numbers



It is important at this stage that they always Multiply the ones first.
Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. $321 \times 2 = 642$

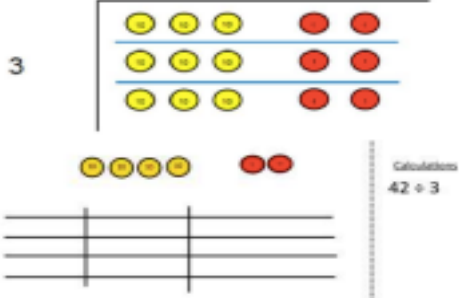
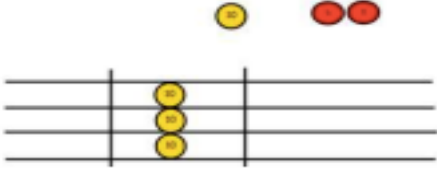
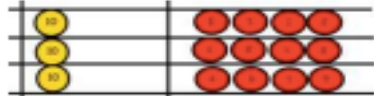
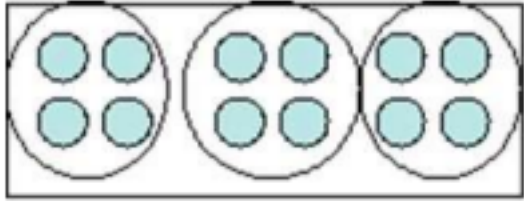
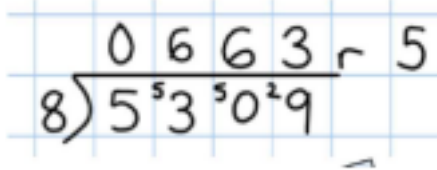
x	300	20	7
4	1200	80	28



<p>Column multiplication (long)</p>			<div data-bbox="1668 159 1915 438"> </div> <div data-bbox="1937 151 2161 359"> <p>18 x 3 on the first row (8 x 3 = 24, carrying the 2 for 20, then 1 x 3)</p> </div> <div data-bbox="1937 375 2161 662"> <p>18 x 10 on the 2nd row. Show multiplying by 10 by putting zero in units first</p> </div> <div data-bbox="1691 486 1892 710"> </div>
<p>Multiplying decimals up to two decimal places by a single digit</p>			<p>Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer.</p> <div data-bbox="1713 885 2049 1141"> </div>

Years Four-Six

Division

Skill	Concrete	Pictorial	Abstract
Short Division	<p>$96 \div 3$</p> <p>Tens Units</p> <p>3 2</p>  <p>Use place value counters to divide using the bus stop method alongside</p> <p>$42 \div 3 =$</p> <p>Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.</p>  <p>We exchange this ten for ten ones and then share the ones equally among the groups.</p>  <p>We look how much in 1 group so the answer is 14.</p>	<p>Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.</p>  <p>Encourage them to move towards counting in multiples to divide more efficiently.</p>	<p>Begin with divisions that divide equally with no remainder.</p> $\begin{array}{r} 218 \\ 3 \overline{) 872} \end{array}$ <p>Move onto divisions with a remainder.</p> $\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{) 432} \end{array}$ <p>Finally move into decimal places to divide the total accurately.</p> $\begin{array}{r} 14.6 \\ 35 \overline{) 511.0} \end{array}$ 

Long Division (Year 5/6)

Long division can be taught as an extension in Year 5, and should be taught in Year 6.

$$\begin{array}{r} 67 \\ 36 \overline{) 2412} \\ \underline{216} \downarrow \\ 252 \\ \underline{252} \\ 000 \end{array}$$