

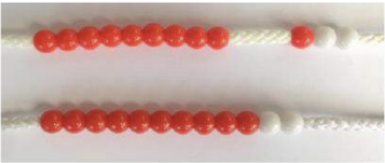
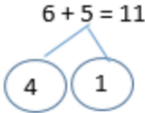
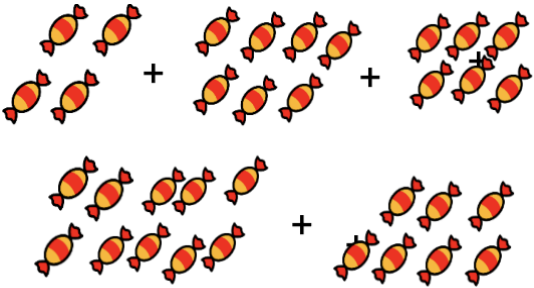
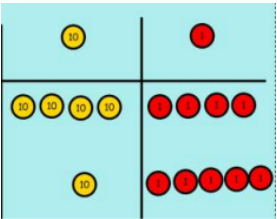
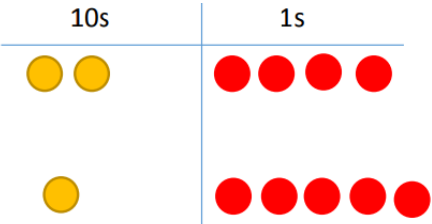


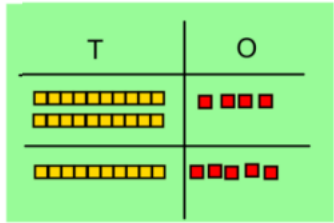
Calculation Guidance



Calculation Guidance - Addition

Year	Vocabulary	Objective	Concrete	Pictorial	Abstract
1	number bonds, add, more, plus, make, sum, total, altogether, inverse double, near double, equals, is the same as (including equals sign), score, one more, two more... ten more, how many more to make...?, how many more is... than...?, how much more is...?	Number bonds of 5, 6, 7, 8, 9 and 10	 Use cubes to add two numbers together as a group or in a bar.	 Use pictures to add two numbers together as a group or in a bar.	$2 + 3 = 5$ $3 + 2 = 5$ $5 = 3 + 2$ $5 = 2 + 3$ Use the part-part-whole diagram as shown above to move into the abstract.
		Counting	 Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer. 	Use a number line to count on in ones 	$5 + 3 = 8$

			  $6 + 5 = 11$ Start with the bigger number and use the smaller number to make 10.	 $6 + 5 = 11$  $6 + 4 = 10$ $10 + 1 = 11$	$6 + 5 = 11$
2	add, addition, more, plus, make, sum, total, altogether, score, double, near double, one more, two more... ten more... one hundred more, how many more to make...?, how many more is... than...?, how much more is...?, tens boundary	Adding 3 single digit numbers	$4 + 7 + 6 = 17$ Put 4 and 6 together to make 10. Add on 7  Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.	 Add together three groups of objects. Draw a picture to recombine the groups to make 10.	$4 + 7 + 6 = 10 + 7 = 17$ Combine the two numbers that make 10 and then add on the remainder.
		Column method without regrouping			$24 + 15 = 39$ $\begin{array}{r} 24 \\ + 15 \\ \hline 39 \end{array}$

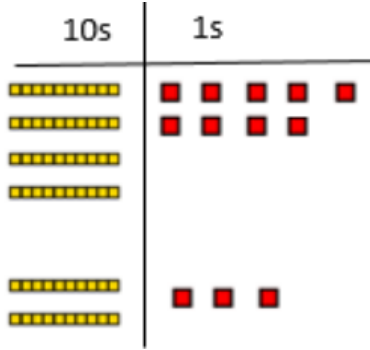


Add together the ones first, then add the tens. Use the Base 10 blocks first before moving onto place value counters.

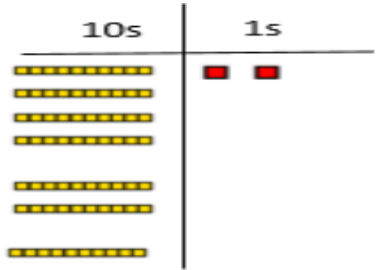
After physically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.

Column method with regrouping

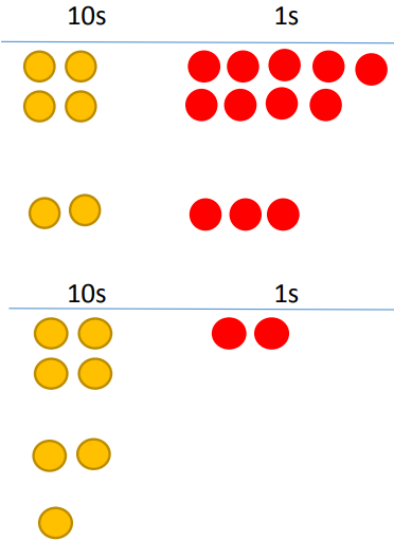
Make both numbers on a place value grid.



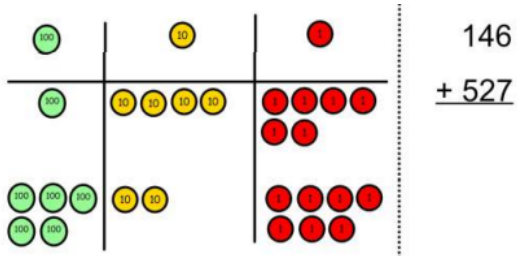
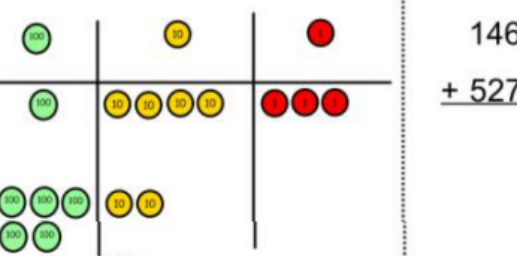
Add up the units and exchange 10 ones for 1 ten.



Using place value counters, children can draw the counters to help them to solve additions.

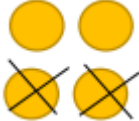
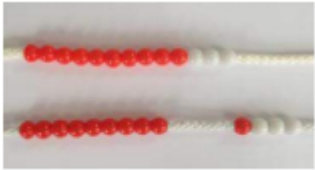
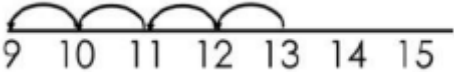


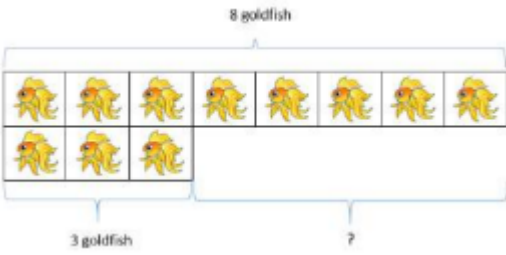
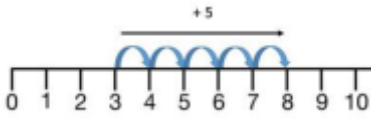
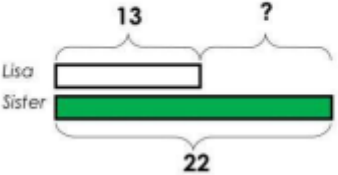
$$\begin{array}{r} 40 + 9 \\ 20 + 3 \\ \hline 60 + 12 = 72 \end{array}$$

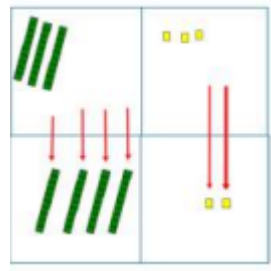
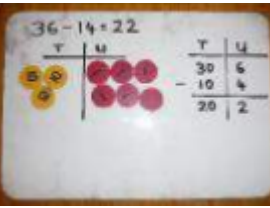
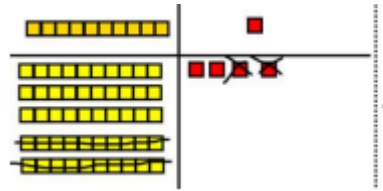
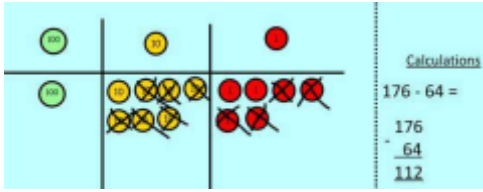
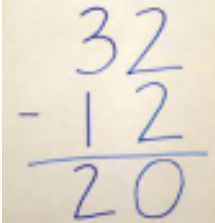
3/4	add, increase, total, plus, sum, more, altogether, column addition, estimate, inverse, double, near double, one more, ten more... one hundred more, how many more to make ...? how many more is... than ...? how much more is...?, tens boundary, hundreds boundary	Column method with regrouping	Make both numbers on a place value grid.  146 + 527 Add up the units and exchange 10 ones for 1 ten.  146 + 527 As children move on to decimals, money and decimal place value counters can be used to support learning. NB By Year 4 children will progress on to adding four digit numbers.	Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding. NB Addition of money needs to have £ and p added separately. <table><tr><th>100s</th><th>10s</th><th>1s</th></tr><tr><td>●</td><td>●●</td><td>●●●</td></tr><tr><td>●●●</td><td>●●</td><td>●●●●</td></tr><tr><td>●●●</td><td>●●</td><td>●●●●</td></tr></table> <table><tr><th>100s</th><th>10s</th><th>1s</th></tr><tr><td>●</td><td>●●</td><td>●●●</td></tr><tr><td>●●●</td><td>●●</td><td>●●●</td></tr><tr><td>●●●</td><td>●●</td><td>●●●</td></tr></table>	100s	10s	1s	●	●●	●●●	●●●	●●	●●●●	●●●	●●	●●●●	100s	10s	1s	●	●●	●●●	●●●	●●	●●●	●●●	●●	●●●	$100 + 40 + 6$ $500 + 20 + 7$ $600 + 70 + 3 = 673$ As the children progress, they will move from the expanded to the compacted method. 146 $+ 527$ 673 1 As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here.
100s	10s	1s																											
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●●●	●●	●●●●																											
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5/6	Efficient written method, add, addition, more, plus, increase, sum, total, altogether, score, tens	Column method with regrouping	Consolidate understanding using numbers with more than 4 digits and extend by adding numbers with up to 3 decimal places																										

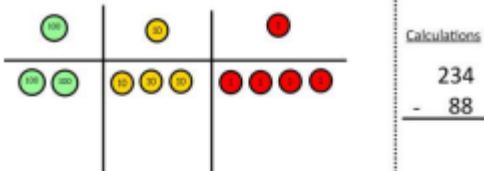
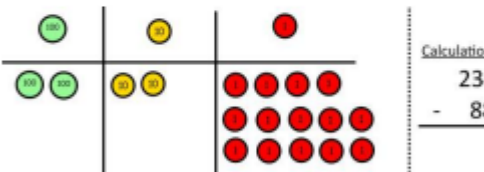
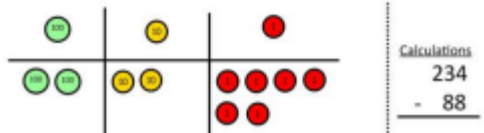
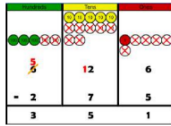
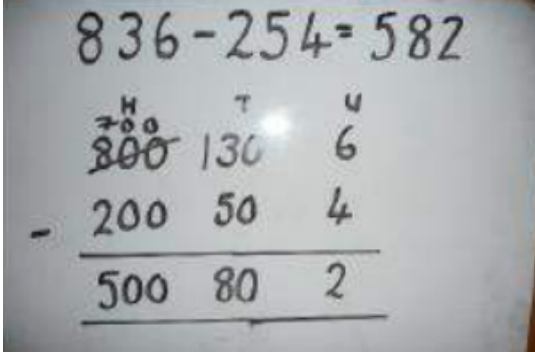
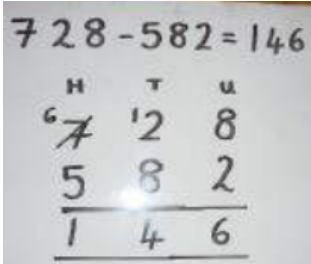
	boundary, hundreds boundary, thousands boundary, units boundary, tenths boundary, inverse order of operations, column addition, add, in total, answer, decimal place, inverse		
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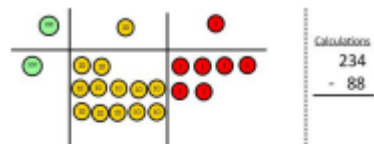
Calculation Guidance - Subtraction

Year	Vocabulary	Objective	Concrete	Pictorial	Abstract
1	subtract take away how many are left/left over? how many have gone? one less, two less, ten less ... how many fewer is ... than ...? how much less is ...? difference between	Taking away ones	Use physical objects, counters, cubes etc. to show how objects can be taken away $4 - 2 = 2$ 	Cross out drawn objects to show what has been taken away. $4 - 2 = 2$ 	$4 - 2 = 2$
		Counting back	Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones  $13 - 4 = 9$	Count back on a number line or number track  Start at the bigger number and count back the smaller number, showing the jumps on the number line.	Put 13 in your head, count back 4. What number are you at? Use your fingers to help.

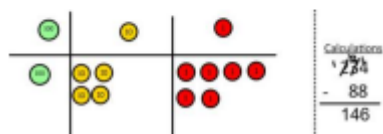
		Find the difference	Compare amounts and objects to find the difference.  Use cubes to build towers or make bars to find the difference. Use basic bar models with items to find the difference.	 Count on to find the difference. Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them.  Draw bars to find the difference between 2 numbers	Hannah has 8 goldfish. Helen has 3 goldfish. Find the difference between the number of goldfish the girls have.
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2	subtract take away how many are left/left over? how many have gone? one less, two less, ten less ... one hundred less how many fewer is ... than ...? how much less is ...? difference between equals is the same as number bonds/pairs/fa cts	Column method without regrouping	$75 - 42 = 33$  Use Base 10 to make the bigger number then take the smaller number away. Show how you partition numbers to subtract. Again make the larger number first. 	 Calculations $\begin{array}{r} 54 \\ - 22 \\ \hline 32 \end{array}$ Draw the Base 10 or place value counters alongside the written calculation to help to show working.  Calculations $\begin{array}{r} 176 \\ - 64 \\ \hline 112 \end{array}$	$47 - 24 = 23$ $\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$ This will lead to a clear written column subtraction. 
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	tens boundary				
3-6	subtract take away how many are left/left over? how many have gone? one less, two less, ten less ... one hundred less how many fewer is ... than ...? how much less is ...? difference between equals is the same as number bonds/pairs/fa cts missing number tens boundary, hundreds boundary, ones boundary, tenths boundary inverse	Column method with regrouping	Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtraction with 2 exchanges. Make the larger number with the place value counters  Calculations $\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$ Start with the ones, can I take away 8 from 4 easily? I need to exchange 1 of my tens for 10 ones.  Calculations $\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$ Now I can subtract my ones.  Calculations $\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$ Now look at the tens, can I take away 8 tens easily? I need to exchange 1 hundred for 10 tens.	 Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make. When confident, children can find their own way to record the exchange/regrouping. Just writing the numbers as shown here shows that the child understands the method and knows when to exchange/regroup. 	 Children can start their formal written method by partitioning the number into clear place value columns.  Moving forward the children use a more compact method. This will lead to an understanding of subtracting any number including decimals.



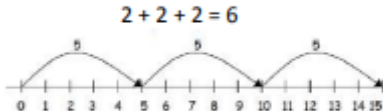
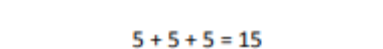
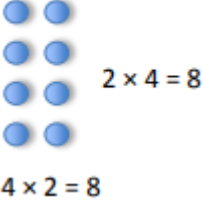
Now I can take away 8 tens and complete my subtraction.

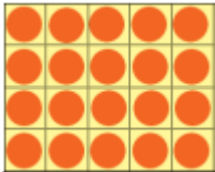


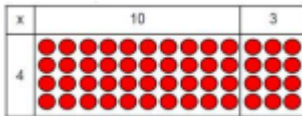
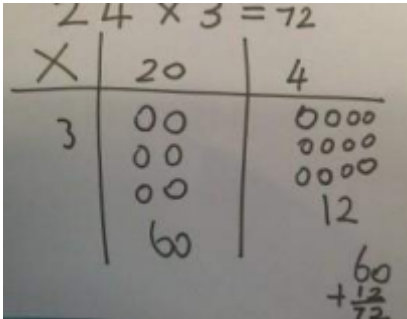
Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.

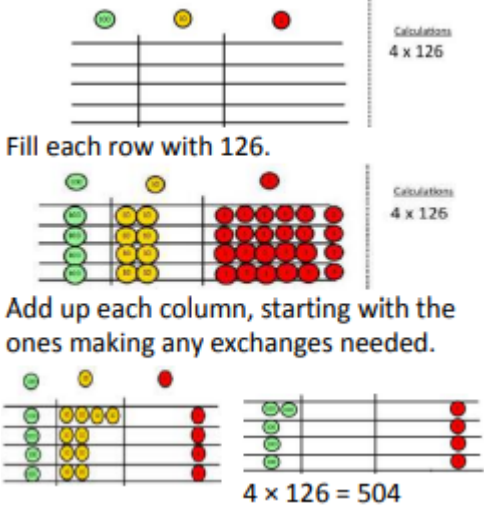
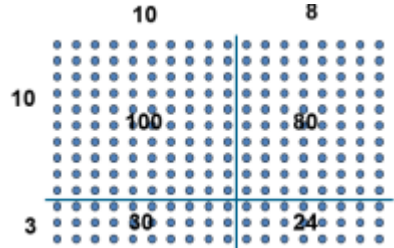
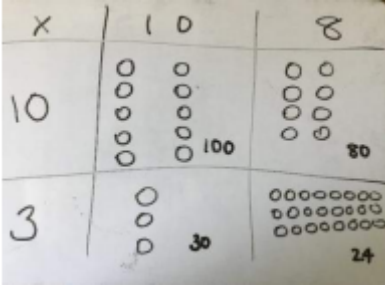
$$\begin{array}{r} 5121 \\ - 2\cancel{6}\cancel{3}.0 \\ \hline 236.5 \end{array}$$

Calculation Guidance - Multiplication

Year	Vocabulary	Objective	Concrete	Pictorial	Abstract
1/2	multiplication multiply multiplied by multiple groups of times once, twice, three times ... ten times repeated addition division dividing, divide, divided by, divided into grouping sharing, share, share equally left, left over one each, two each, three each ... ten each group in pairs, threes ... tens equal groups of doubling halving array row, column	Repeated addition	Use different objects to add equal groups.   	There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?   	Write addition sentences to describe objects and pictures.  $2 + 2 + 2 = 6$
		Arrays showing commutative multiplication	Create arrays using counters/cubes to show multiplication sentences.	Draw arrays in different rotations to find commutative multiplication sentences    Link arrays to area of rectangles.	Use an array to write multiplication sentences and reinforce repeated addition.  $5 + 5 + 5 = 15$ $3 + 3 + 3 + 3 + 3 = 15$ $5 \times 3 = 15$ $3 \times 5 = 15$

	number patterns multiplication table multiplication fact, division fact				
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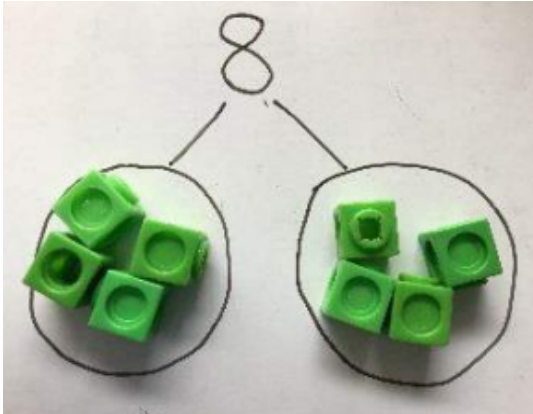
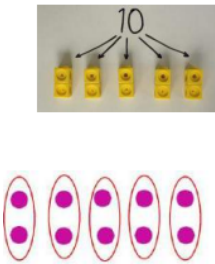
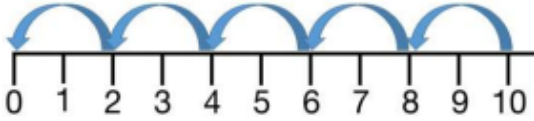
3/4	multiplication multiply multiplied by multiple, factor groups of times product once, twice, three times ... ten times repeated addition division dividing, divide, divided by, divided into left, left over, remainder grouping sharing, share, share equally one each, two each, three each ... ten each group in pairs, threes ... tens equal groups of doubling halving	Grid method	Show the link with arrays to first introduce the grid method. 4 rows of 10 4 rows of 3 	Children can represent the work they have done with place value counters in a way that they understand. They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below. 	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. <table border="1" data-bbox="1765 561 2067 654"><tr><td>x</td><td>30</td><td>5</td></tr><tr><td>7</td><td>210</td><td>35</td></tr></table> 210 + 35 = 245 Moving forward, multiply by a 2 digit number showing the different rows within the grid method. <table border="1" data-bbox="1803 861 2092 1050"><tr><td></td><td>10</td><td>8</td></tr><tr><td>10</td><td>100</td><td>80</td></tr><tr><td>3</td><td>30</td><td>24</td></tr></table> <table border="1" data-bbox="1724 1115 2110 1294"><tr><td>x</td><td>1000</td><td>300</td><td>40</td><td>2</td></tr><tr><td>10</td><td>10000</td><td>3000</td><td>400</td><td>20</td></tr><tr><td>8</td><td>8000</td><td>2400</td><td>320</td><td>16</td></tr></table>	x	30	5	7	210	35		10	8	10	100	80	3	30	24	x	1000	300	40	2	10	10000	3000	400	20	8	8000	2400	320	16
			x	30	5																														
7	210	35																																	
	10	8																																	
10	100	80																																	
3	30	24																																	
x	1000	300	40	2																															
10	10000	3000	400	20																															
8	8000	2400	320	16																															

	array row, column number patterns multiplication table multiplication fact, division fact inverse square, squared cube, cubed		 Calculations 4×126 Fill each row with 126. Calculations 4×126 Add up each column, starting with the ones making any exchanges needed. $4 \times 126 = 504$		
		Expanded method	Show the link with arrays to first introduce the expanded method.  10 8 10 100 80 3 30 24		Start with long multiplication, reminding the children about lining up their numbers clearly in columns. $ \begin{array}{r} 18 \\ \times 13 \\ \hline 24 \text{ (3 x 8)} \\ 30 \text{ (3 x 10)} \\ 80 \text{ (10 x 8)} \\ \underline{100} \text{ (10 x 10)} \\ 234 \end{array} $

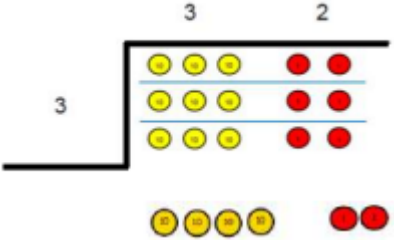
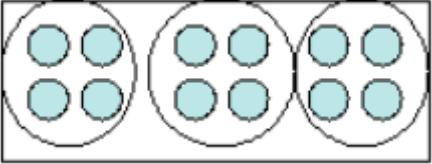
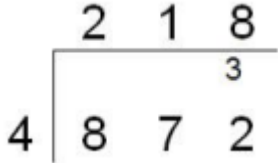
5/6	multiplication multiply multiplied by multiple, factor groups of times product once, twice, three times ... ten times repeated addition division dividing, divide, divided by, divided into left, left over, remainder grouping sharing, share, share equally one each, two each, three each ... ten each group in pairs, threes ... tens equal groups of doubling halving array row, column number patterns multiplication table multiplication fact, division	Compact method	Children can continue to be supported by place value counters at the stage of Multiplication. It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.	Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.	Start with long multiplication, reminding the children about lining up their numbers clearly in columns. If it helps, children can write out what they are solving next to their answer. $\begin{array}{r} 74 \\ 63 \\ \hline 12 \\ 210 \\ 240 \\ + 4200 \\ \hline 4662 \end{array}$ This moves to the more compact method. $\begin{array}{r} 231 \\ 1342 \\ \times 18 \\ \hline 13420 \\ 10736 \\ \hline 24156 \end{array}$
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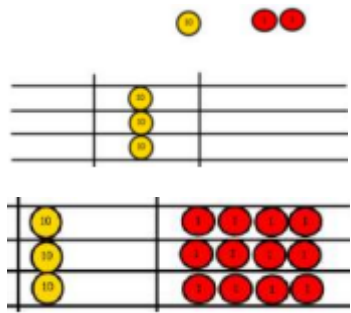
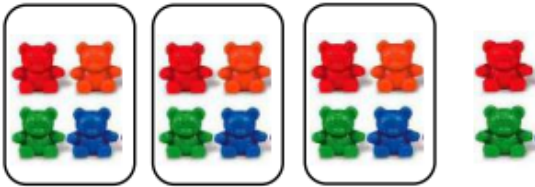
	inverse square, squared cube, cubed				
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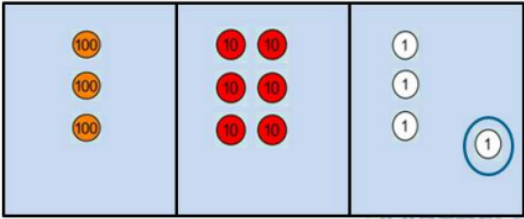
Calculation Guidance - Division

Year	Vocabulary	Objective	Concrete	Pictorial	Abstract
1/2	multiplication multiply multiplied by multiple groups of times once, twice, three times ... ten times repeated addition division dividing, divide, divided by, divided into grouping sharing, share, share equally left, left over one each, two each, three each ... ten each group in pairs, threes ... tens equal groups of doubling	Sharing	I have 8 cubes, can you share them equally between two people?	Children use pictures or shapes to share quantities.  $8 \div 2 = 4$	Share 8 buns between two people. $8 \div 2 = 4$ 
		Grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding. 	Use a number line to show jumps in groups. The number of jumps equals the number of groups.  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.	$10 \div 5 = 2$ Divide 10 into 5 groups. How many are in each group?

	halving array row, column number patterns multiplication table multiplication fact, division fact			10 ? $10 \div 5 = ?$ $5 \times ? = 10$	
3/4	multiplication multiply multiplied by multiple, factor groups of times product once, twice, three times ... ten times repeated addition division dividing, divide, divided by, divided into left, left over, remainder grouping sharing, share, share equally one each, two each, three each ... ten each	Division with arrays	Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg $15 \div 3 = 5$ $5 \times 3 = 15$ $15 \div 5 = 3$ $3 \times 5 = 15$ 	$5 \times 3 = 15$ $3 \times 5 = 15$ $15 \div 5 = 3$ $15 \div 3 = 5$ Draw an array and use lines to split the array into groups to make multiplication and division sentences. <td> Find the inverse of multiplication and division sentences by creating four linking number sentences. $5 \times 3 = 15$ $3 \times 5 = 15$ $15 \div 5 = 3$ $15 \div 3 = 5$ </td>	Find the inverse of multiplication and division sentences by creating four linking number sentences. $5 \times 3 = 15$ $3 \times 5 = 15$ $15 \div 5 = 3$ $15 \div 3 = 5$

	group in pairs, threes ... tens equal groups of doubling halving array row, column number patterns multiplication table multiplication fact, division fact inverse square, squared cube, cubed				
	Short Division		Use place value counters to divide using the short division method alongside. $96 \div 3$  $42 \div 3$ 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. We exchange this ten for 10 ones and then share the ones equally among the groups. We look at how many are in each group.	Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.  Encourage them to move towards counting in multiples to divide more efficiently.	Begin with divisions that divide equally with no remainder. 

					
5/6	multiplication multiply multiplied by multiple, factor groups of times product once, twice, three times ... ten times repeated addition division dividing, divide, divided by, divided into left, left over, remainder grouping sharing, share, share equally one each, two each, three each ... ten each	Division with remainders	$14 \div 3 =$ Divide objects between groups and see how much is left over 	Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.  Draw dots and group them to divide an amount and clearly show a remainder. 	Complete written divisions and show the remainder using r. 29 ÷ 8 = 3 REMAINDER 5 ↑ dividend ↑ divisor ↑ quotient ↑ remaind

	group in pairs, threes ... tens equal groups of doubling halving array row, column number patterns multiplication table multiplication fact, division inverse square, squared cube, cubed	Short division with remainders	$364 \div 3 =$ $\begin{array}{r} 121 \text{ rem } 1 \\ 3 \overline{) 364} \end{array}$ 		Move onto divisions with a remainder. Once children understand remainders, begin to express as a fraction or decimal according to the context. $\begin{array}{r} 86 \text{ r } 2 \\ 3 \overline{) 432} \end{array}$ $\begin{array}{r} 186 \frac{1}{5} \\ 5 \overline{) 931} \end{array}$ $\begin{array}{r} 14.6 \\ 35 \overline{) 511.0} \end{array}$ Children will use long division to divide numbers with up to 4 digits by 2 digit numbers.
		Long division			

					015 32 487 -0 48 -32 167 -160 7 17 r 19 31 546 31↓ 236 217 19
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