Calcot Schools Calculation Policy

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition	Add single digit numbers and then 1 and 2 digit numbers to 20. Combine 2 parts to make a whole part. **Add by starting at the biggest number and counting on.** **Regrouping to make 10 and then 20.**	Add numbers using concrete objects, pictorial representations and mentally Including: ***a two-digit number and ones*** ***a two-digit number and tens*** ***two two-digit numbers*** ***adding three one-digit numbers*** Show that addition of two numbers can be done in any order (commutative). Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. **Partitioning to add** **Column method (regrouping)**	Add numbers with up to 3-digits. **Use column method (up to 3 digits) with regrouping.** Estimate the answer to a calculation and use inverse operations to check answers. Solve problems, including missing number problems, using number facts, place value, and more complex addition.	**Add numbers with up to 4 digits using column method-regrouping** Estimate and use inverse operations to check answers to a calculation. Solve addition and subtraction two-step problems in contexts.	**Add whole numbers with more than 4 digits using column addition-regrouping.** Addition with decimals with the same amount of decimal places.	**Column method-regrouping. Add decimals with different amount of decimal places.**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Subtraction	Subtract single digit numbers and then 2 digit numbers (working within 1-20). Solve problems using concrete objects and pictorial representation Take away by counting back Find the difference Make 10-bar model	Subtract numbers using concrete objects, pictorial representations and mentally Including: ***a two-digit number and ones*** ***a two-digit number and tens*** ***two two-digit numbers*** Show that subtraction is not commutative. Counting back Find the difference Part whole model Make 10 Column method-no regrouping	Subtract numbers with up to 3-digits. **Use column method (up to 3 digits) with regrouping.** Estimate the answer to a calculation and use inverse operations to check answers. Solve problems, including missing number problems, using number facts, place value, and more complex subtraction.	Subtract numbers with up to 4 digits using column method-regrouping Estimate and use inverse operations to check answers to a calculation. Solve subtraction two-step problems in contexts.	**Subtract whole numbers with more than 4 digits using column subtraction-regrouping.** Subtraction with decimals with the same amount of decimal places.	Column method-regrouping. Subtract decimals with different amount of decimal places.

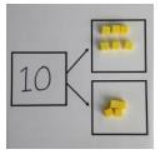
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Multiplication	Solve one-step problems involving multiplication *(by 2 and 5)* using concrete and pictorial objects. **Doubling** **Counting in multiples** **Repeated Addition**	**Doubling** **Counting in multiples** **Repeated addition with array which shows that** **X is commutative**	Counting in multiples of 2,3,4,5,8,10 **Repeated addition** **Arrays-showing commutative multiplication** **Grid method**	Recall multiplication facts for multiplication tables up to 12 × 12. Use place value, known and derived facts to multiply and divide mentally. multiplying together three numbers e.g, 5x4x10 and understand commutatively in mental calculations. Recognise and use factor pairs. **Multiply two-digit and three-digit numbers by a one-digit number using column multiplication.** Use the distributive law to multiply two digit numbers by one digit.	**Column multiplication using up to 4 digits multiplied by 1 or 2 digits.** Multiply whole numbers and decimals by 10, 100 or a thousand	**Long multiplication (multi-digit numbers up to 4 digits by a two-digit whole number).**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Division	Solve one-step problems involving division *(by 2 and 4*) using pictorial representations and concrete objects. **Sharing objects into groups** **Division as grouping**	**Grouping within arrays** **Division as grouping**	**Division with arrays** **Division with a remainder** **Short division** (2 digit by 1 digit- concrete and pictorial)	Recall division facts for multiplication tables up to 12 × 12. **Division with arrays** **Division with a remainder.** **Short division** (up to 3 digits by 1 digit)	**Short division** (up to 4 digits by a 1digit number, interpreting remainders for the context)	**Short and long division** (up to 4 digits by a two-digit whole number) Interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

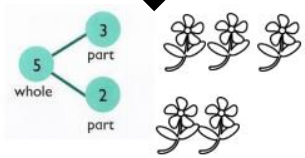
Addition

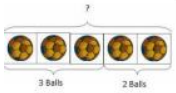
Year 1

Combine 2 parts to make a whole part.



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.

4 + 3 = 7

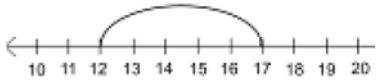
10= 6 + 4

Use the part-part whole diagram as shown above to move into the abstract.

Add by starting at the biggest number and counting on.

Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.

12 + 5 = 17



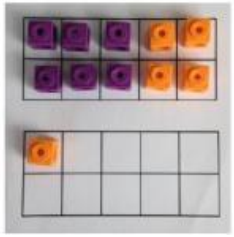
Start at the larger number on the number line and count on in ones or in one jump to find the answer.

5 + 12 = 17

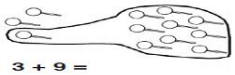
Place the larger number in your head and count on the smaller number to find your answer.

Regrouping to make 10 and then 20.

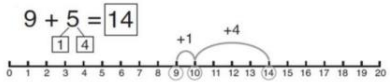
6 + 5 = 11



Start with the bigger number and use the smaller number to make 10.

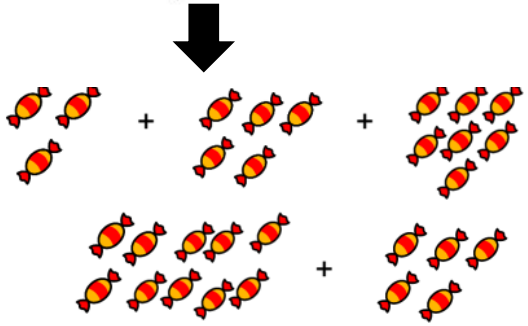
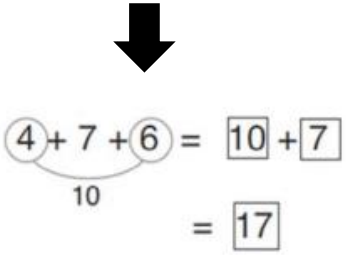
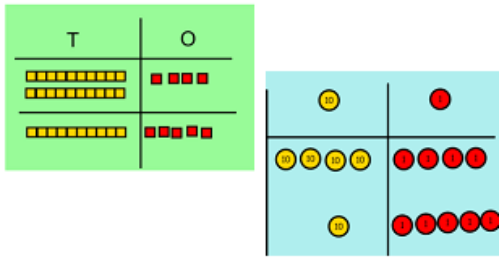
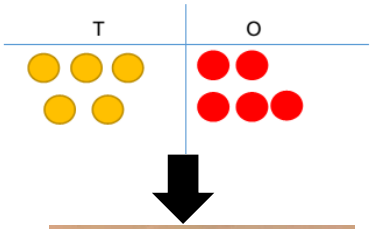
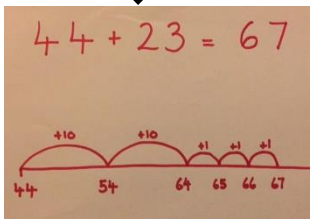
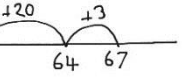
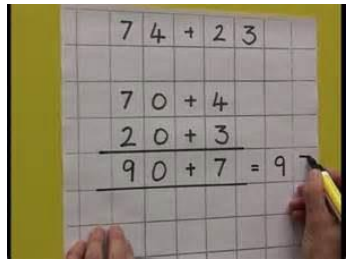


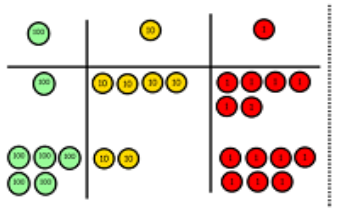
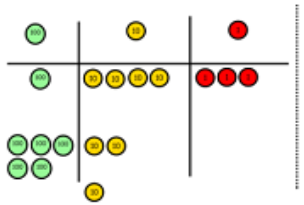
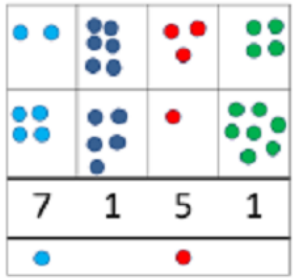
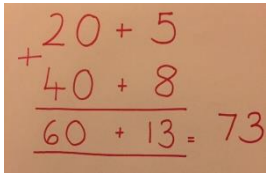
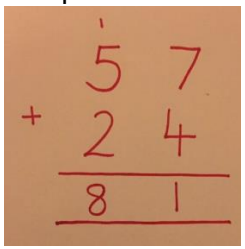
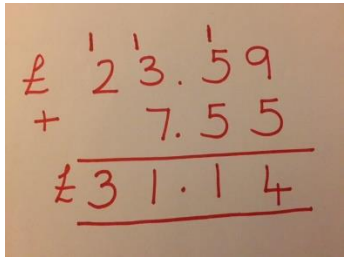
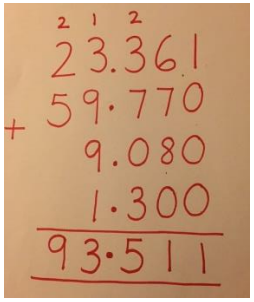
Use pictures or a number line. Regroup or partition the smaller number to make 10.



7 + 4= 11

If I am at seven, how many more do I need to make 10. How many more do I add on now?

	Year 2		
Addition	**Adding 3 single digits** 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.  Combine the two numbers that make 10 and then add on the remainder.	**Partitioning** 24 + 15= Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters.  After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.   	**Column method with regrouping**  Calculations 21 + 42 = 21 + 42

	Year 3 (up to 3 digits) Year 4 (up to 4 digits) Year 5 (with more than 4 digits. Decimals with the same amount of decimal places) Year 6 (Decimals with different amount of decimal places)		
Addition	**Column method with regrouping** Make both numbers on a place value grid.  146 + 527 Add up the units and exchange 10 ones for one 10.  146 + 527 Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added. This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100. As children move on to decimals, money and decimal place value counters can be used to support learning.	Children can draw a pictoral representation of the columns and place value counters to further support their learning and understanding.  	Start by partitioning the numbers and adding the ones and then the tens. before recombining  As the children move on, introduce carrying. Please note carriers are placed on top of the calculation.  When decimals are introduced, begin by adding numbers with the same number of decimal placed before adding those with a different number of dps.  

Vocabulary Associated with Addition commonly used in Calcot Schools			
total	calculation	number sentence	
addition	add	plus	sum of
more	commutative	double	number bond
equal to	how many more are needed		

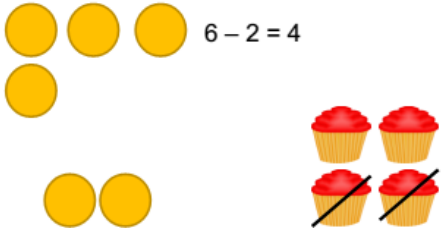
Written methods are referred to as calculations or number sentences. We do not call them sums as this vocabulary is commonly used in addition to mean **total** e.g. What is the sum of 7 and 3? (10)

Year 1
Subtract single digit numbers and then 2 digit numbers (working within 1-20).

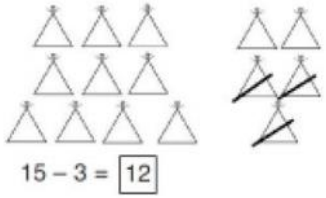
Subtraction

Taking Away ones using concrete objects and pictorial representations

Use physical objects, counters, cubes etc to show how objects can be taken away.



Cross out drawn objects to show what has been taken away.



18 -3= 15

8 – 2 = 6

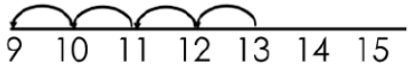
Taking away by counting back

Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.

13 – 4

Use counters and move them away from the group as you take them away counting backwards as you go.

Count back on a number line or number track



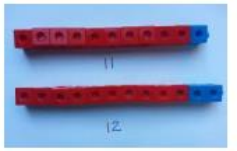
Start at the bigger number and count back the smaller number showing the jumps on the number line.

This can progress all the way to counting back using two 2 digit numbers.

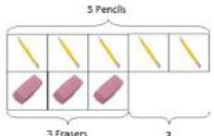
Put 13 in your head, count back 4. What number are you at? Use your fingers to help.

Finding the Difference

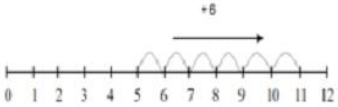
Compare amounts and objects to find the difference.



Use cubes to build towers or make bars to find the difference



Use basic bar models with items to find the difference

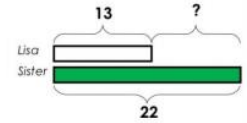


Count on to find the difference.

Draw bars to find the difference between 2 numbers.

Comparison Bar Models

Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them.

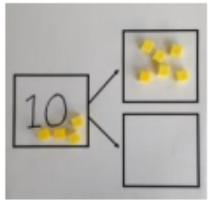


Hannah has 23 sandwiches, Helen has 15 sandwiches. Find the difference between the number of sandwiches.

Subtraction (Continued)

Year 1
Subtract single digit numbers and then 2 digit numbers (working within 1-20).

Part Made Whole

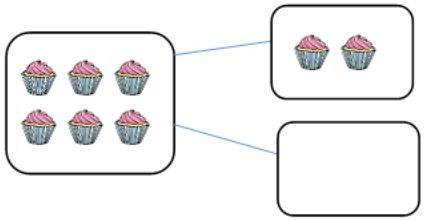


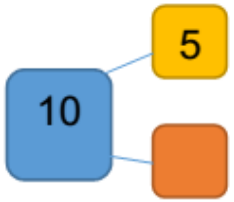
Link to addition- use the part whole model to help explain the inverse between addition and subtraction.

If 10 is the whole and 6 is one of the parts. What is the other part?

10 - 6 =

Use a pictorial representation of objects to show the part part whole model.



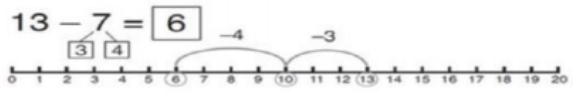


Move to using numbers within the part whole model.

Make 10

14 – 9 =

Make 14 on the ten frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.



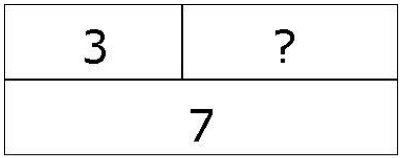
Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer.

16 – 8=

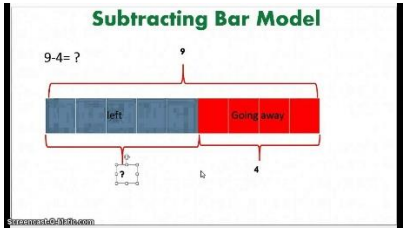
How many do we take off to reach the next 10?

How many do we have left to take off?

Bar Model



7 - 3 = ?

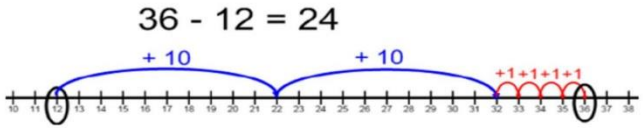


Year 2
(Counting back, finding the difference, part whole model, making 10 as in Year 1) AND finding the difference on a number line by counting on and column method-no regrouping

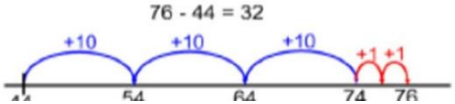
Subtraction

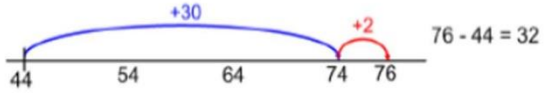
Finding the difference by counting on, on a number line

Find the difference between two 2-digit numbers by counting on, in tens first and then in ones, on a marked number line.Circle both the numbers on the line, then count on from the smallest to the largest. Add together the 10's and 1's to find the difference.

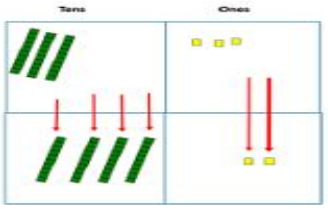


As the children progress to larger 2-digit numbers, or 2-digit numbers with a larger difference between them, they should be introduced to using a blank number line. Finally, using their knowledge of number, they should be encouraged to combine jumps.



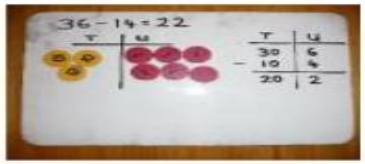


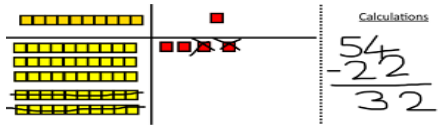
Column method-no regrouping



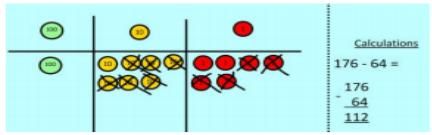
Use Base 10 to make the bigger number then take the smaller number away.

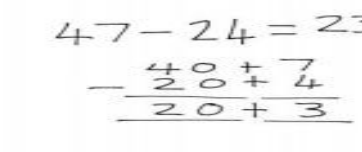
Show how you partition numbers to subtract. Again make the larger number first.



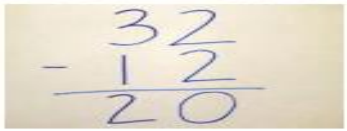


Draw the Base 10 or place value counters alongside the written calculation to help to show working.





This will lead to a clear written column subtraction.



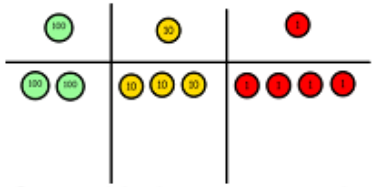
Subtraction

Year 3
Column Method with regrouping (up to 3 digit numbers)

Column method-with regrouping

Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges.

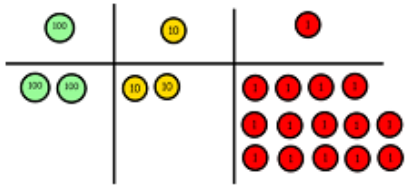
Make the larger number with the place value counters



Calculations

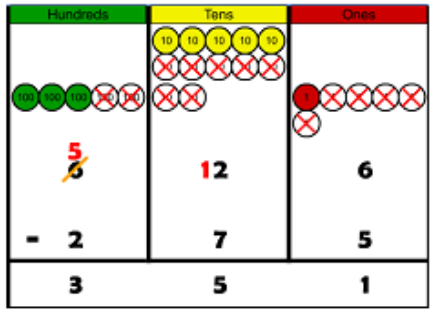
234
- 88

Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.

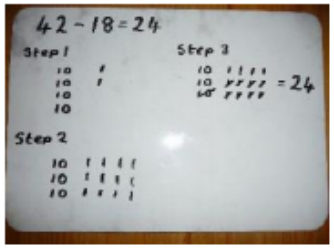


Calculations

234
- 88



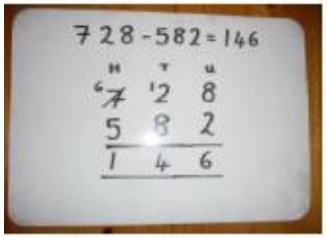
Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.



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.



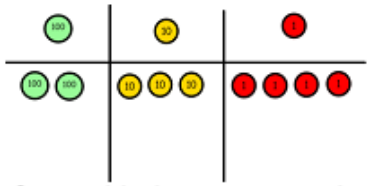
Moving forward the children use a more compact method.

Year 4 Column Method with regrouping (up to 4 digit numbers)
Year 5 (With more than 4 digits. Decimals with the same amount of decimal places)
Year 6 (Decimals with different amount of decimal places)

Subtraction

Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges.

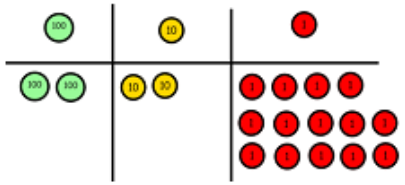
Make the larger number with the place value counters



Calculations

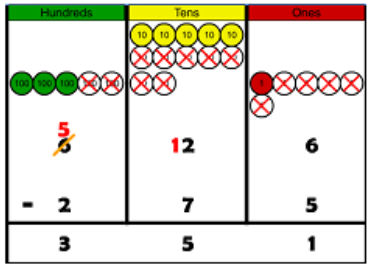
234
- 88

Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.

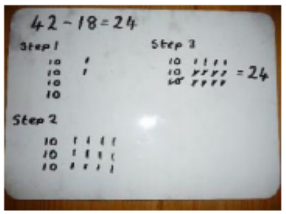


Calculations

234
- 88

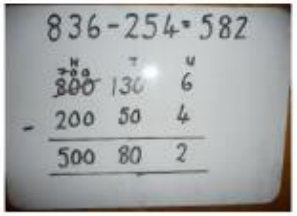


Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.

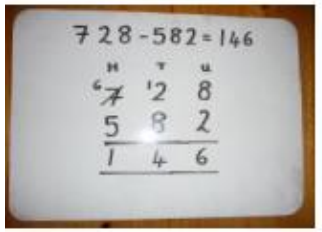


When confident, children can find their own way to record the exchange/regrouping.

Just writing the numbers as shown here shows that the child understands the method and knows when to exchange/regroup.



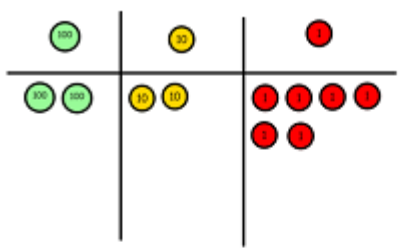
Children can start their formal written method by partitioning the number into clear place value columns.



Moving forward the children use a more compact method.

Subtraction (Continued)

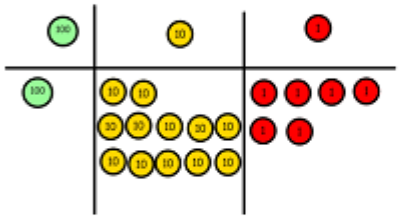
Now I can subtract my ones.



Calculations

234
- 88

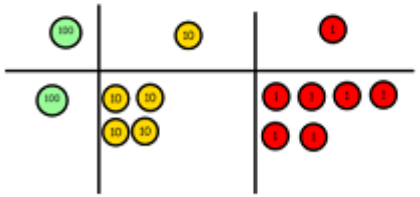
Now look at the tens, can I take away 8 tens easily? I need to exchange one hundred for ten tens.



Calculations

234
- 88

Now I can take away eight tens and complete my subtraction



Calculations

234
- 88
146

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.

This will lead to an understanding of subtracting any number including decimals.

$$\begin{array}{r} \,5\;\;12\;\;\;1 \\ 2\;\;\cancel{6}\;\;\cancel{3}\;\;.\;\;\mathbf{0} \\ -\quad 2\;\;6\;\;.\;\;5 \\ \hline 2\;\;3\;\;6\;\;.\;\;5 \end{array}$$

Vocabulary Associated with Subtraction commonly used in Calcot Schools			
subtract	take away	minus	less
fewer	halve	difference	inverse
exchange			

Written methods are referred to as calculations or number sentences. We do not call them sums as this vocabulary is commonly used in addition to mean **total** e.g. What is the sum of 7 and 3? (10)

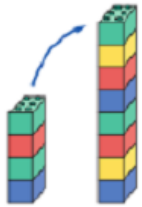
In the written column method we use the vocabulary 'exchange' when explaining how to manipulate numbers from other columns. Many people refer to this as borrowing but at Calcot Schools this will be known as exchanging.

Year 1

Multiplication

Doubling

Use practical activities to show how to double a number.



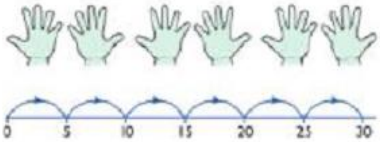
double 4 is 8
4 × 2 = 8

Draw pictures to show how to double a number.

Double 4 is 8

Counting in Multiples

Count in multiples supported by concrete objects in equal groups.



Use a number line or pictures to continue support in counting in multiples.

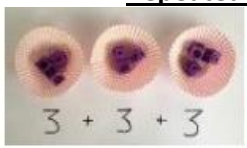
Count in multiples of a number aloud.

Write sequences with multiples of numbers.

2, 4, 6, 8, 10

5, 10, 15, 20, 25 , 30

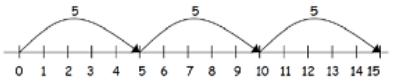
Repeated Addition



Use different objects to add equal groups.

There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?

2 add 2 add 2 equals 6



5 + 5 + 5 = 15

Write addition sentences to describe objects and pictures.

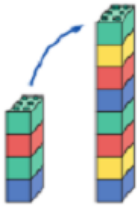
2 + 2 + 2 + 2 + 2 = 10

Year 2
Doubling, Counting in multiples, repeated addition (as in Year 1) AND Arrays

Multiplication

Doubling

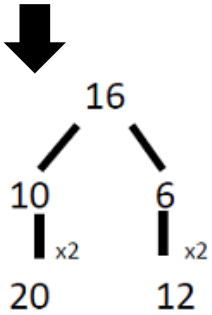
Use practical activities to show how to double a number.



double 4 is 8
4 × 2 = 8

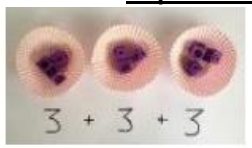
Draw pictures to show how to double a number.

Double 4 is 8



Partition a number and then double each part before recombining it back together.

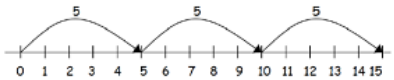
Repeated Addition



Use different objects to add equal groups.

There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?

2 add 2 add 2 equals 6



5 + 5 + 5 = 15

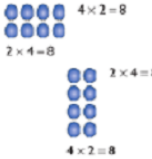
Write addition sentences to describe objects and pictures.

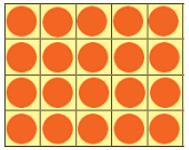
2 + 2 + 2 + 2 + 2 = 10

Arrays

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

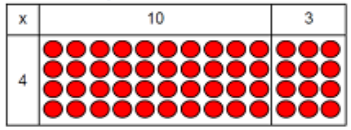
5 x 3 = 15

3 x 5 = 15

Year 3
Counting in multiples, repeated addition, arrays (as in Year 2) AND Grid Method

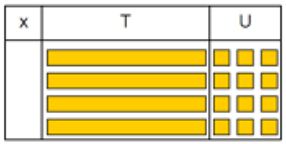
Multiplication

Show the link with arrays to first introduce the grid method.



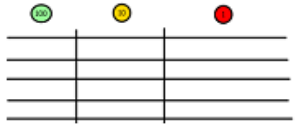
4 rows of 10
4 rows of 3

Move on to using Base 10 to move towards a more compact method.



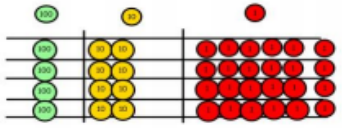
4 rows of 13

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.



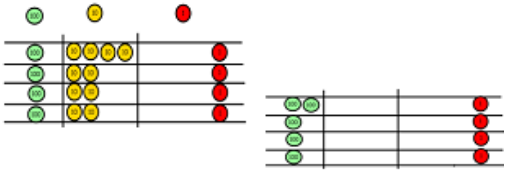
Calculations
4 x 126

Fill each row with 126.



Calculations
4 x 126

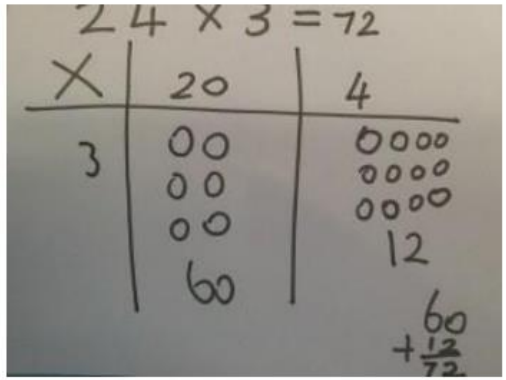
Add up each column, starting with the ones making any exchanges needed.



Then you have your answer.

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.

×	30	5
7	210	35

210 + 35 = 245

Moving forward, multiply by a 2 digit number showing the different rows within the grid method.

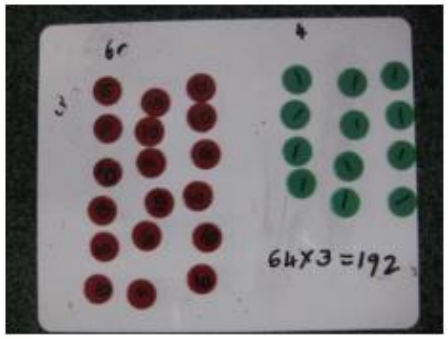
	10	8
10	100	80
3	30	24

X	1000	300	40	2
10	10000	3000	400	20
8	8000	2400	320	16

Year 4 Column Multiplication (2 and 3 digits multiplied by 1 digit)
Year 5 (Up to 4 digits multiplied by 1 or 2 digits

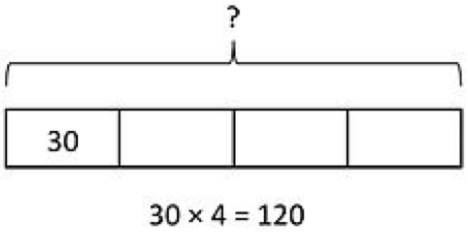
Multiplication

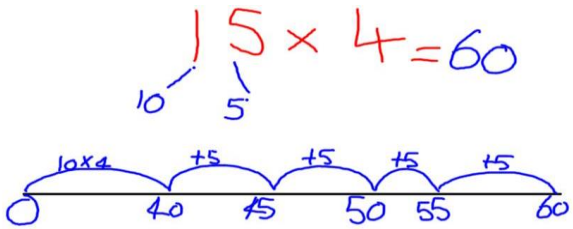
Children can continue to be supported by place value counters at the stage of multiplication.



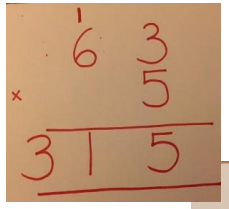
It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.

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

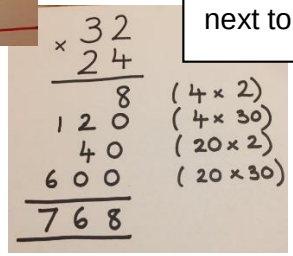




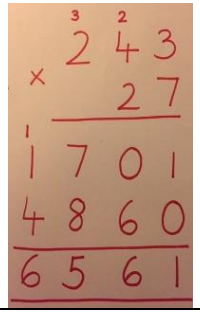
When starting with long multiplication, reminding the children about lining up their numbers clearly in columns.



If it helps, children can write out what they are solving next to each step.



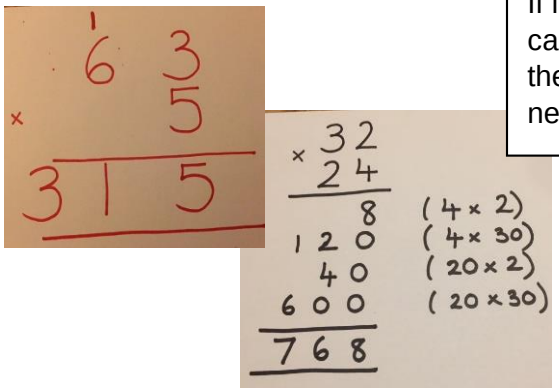
This moves on to the more compact method. Please not that carriers (as in addition) are put on top of the calculation. It is recommended that a small space is left between the calculation line and the solution so during the addition process there is space to put the carriers.



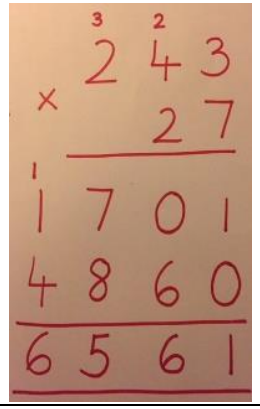
	Year 6 (multiply digits up to 4 digits by a 2 digit number) and multiply one digit number by one digit numbers with up to two decimal places
Multiplication	

When starting 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 each step.



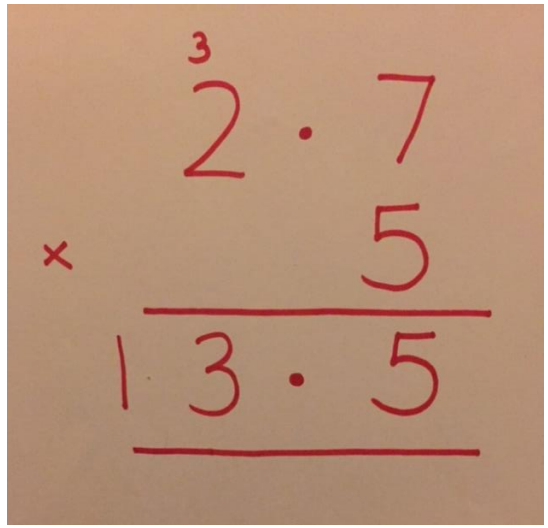
This moves on to the more compact method. Please not that carriers (as in addition) are put on top of the calculation. It is recommended that a small space is left between the calculation line and the solution so during the addition process there is space to put the carriers.



Use compact short multiplication to multiply decimal number by whole number.

Estimate first! Try 3 x 5 to get a feel for what the answer may be.

3x5=15 then you can check against your answer. If the decimal point was in the wrong place it would be 135 or 1.35. Both of these are not near our estimate so we know that 13.5 is correct!



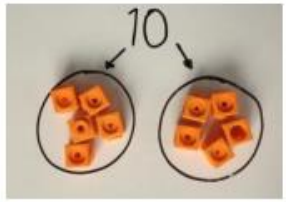
When using this method, the place value columns are not required to be in line. However, it is important to make sure that the decimal point is in line between the question and the answer.

It would also be acceptable to demonstrate to the children that, due to them already being able to multiply whole numbers using this method, that they could remove the decimal point and treat it as a whole number. It is essential though that they understand that, in the above case for example, you are making the question 100 times larger, therefore the answer would need to then be divided by 100

Vocabulary Associated with Multiplication commonly used in Calcot Schools				
multiply	multiple	groups of		array
times	double	lots of		factors
scale up	product	prime	square	cubed
commutative				

Written methods are referred to as calculations or number sentences. We do not call them sums as this vocabulary is commonly used in addition to mean **total** e.g. What is the sum of 7 and 3? (10)

	Year 1	
Division	**Sharing object into groups**	**Division as grouping.**



I have 10 cubes, can you share them equally in 2 groups?

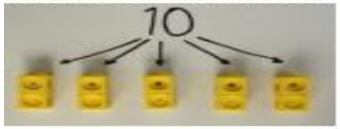
Children use pictures or shapes to share quantities.

$8 \div 2 = 4$

Share 9 buns between three people.

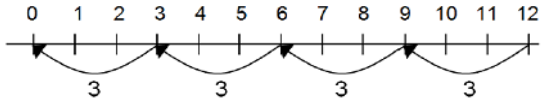
$9 \div 3 = 3$

Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.

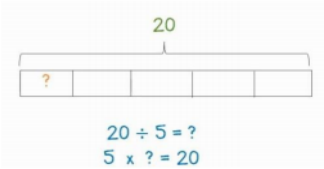


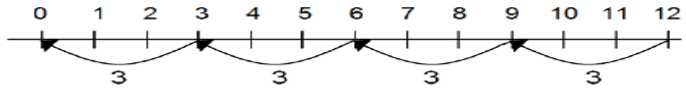
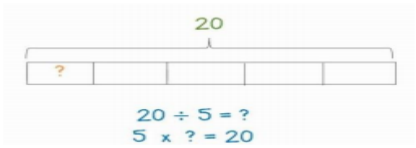
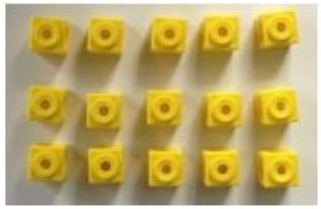
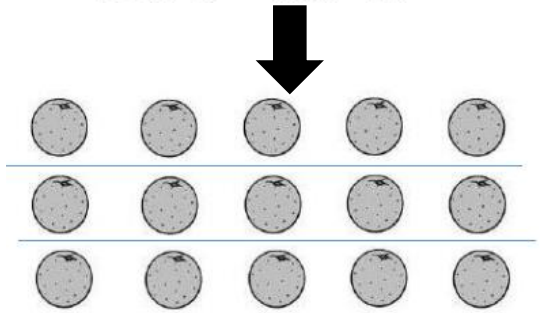
$96 \div 3 = 32$

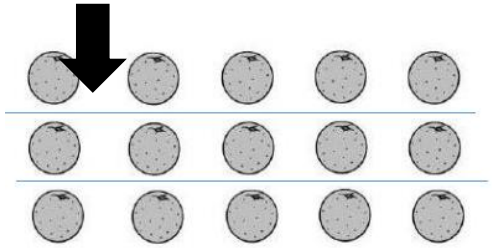
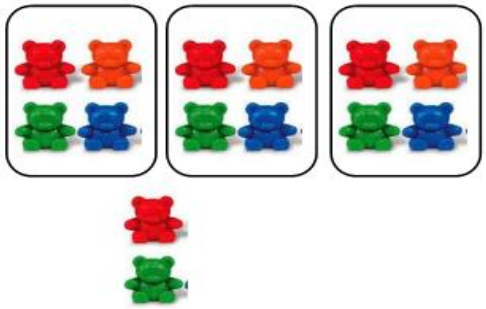
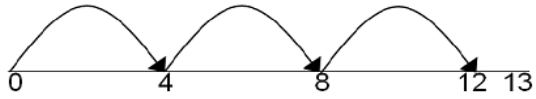
Use a number line to show jumps in groups. The number of jumps equals the number of groups.

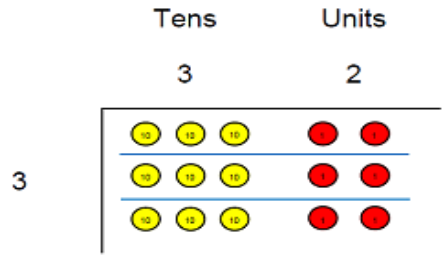
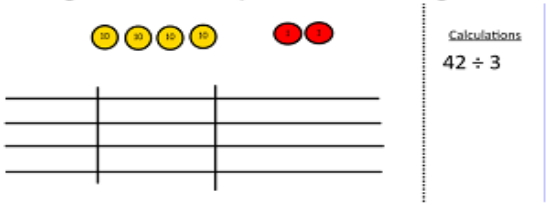
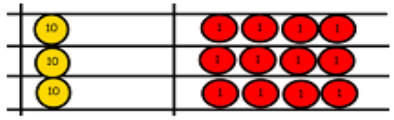
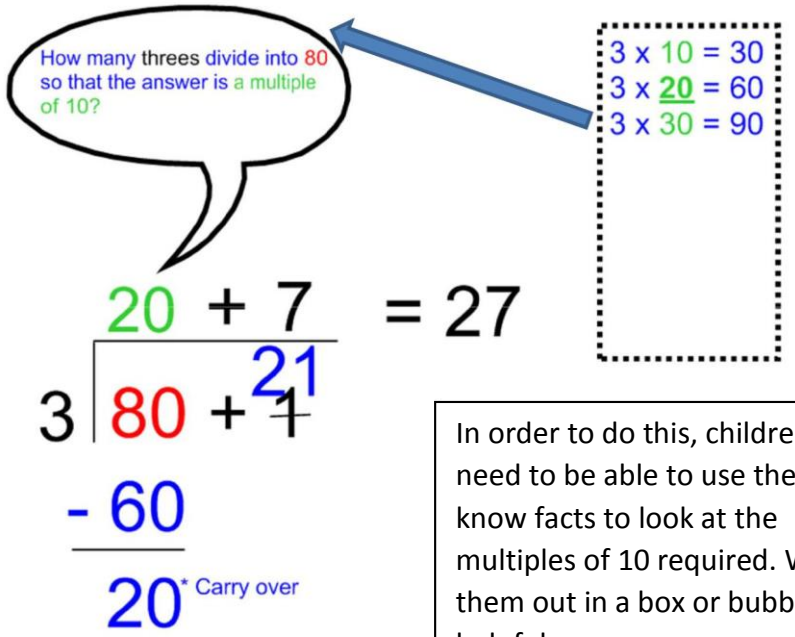


Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.

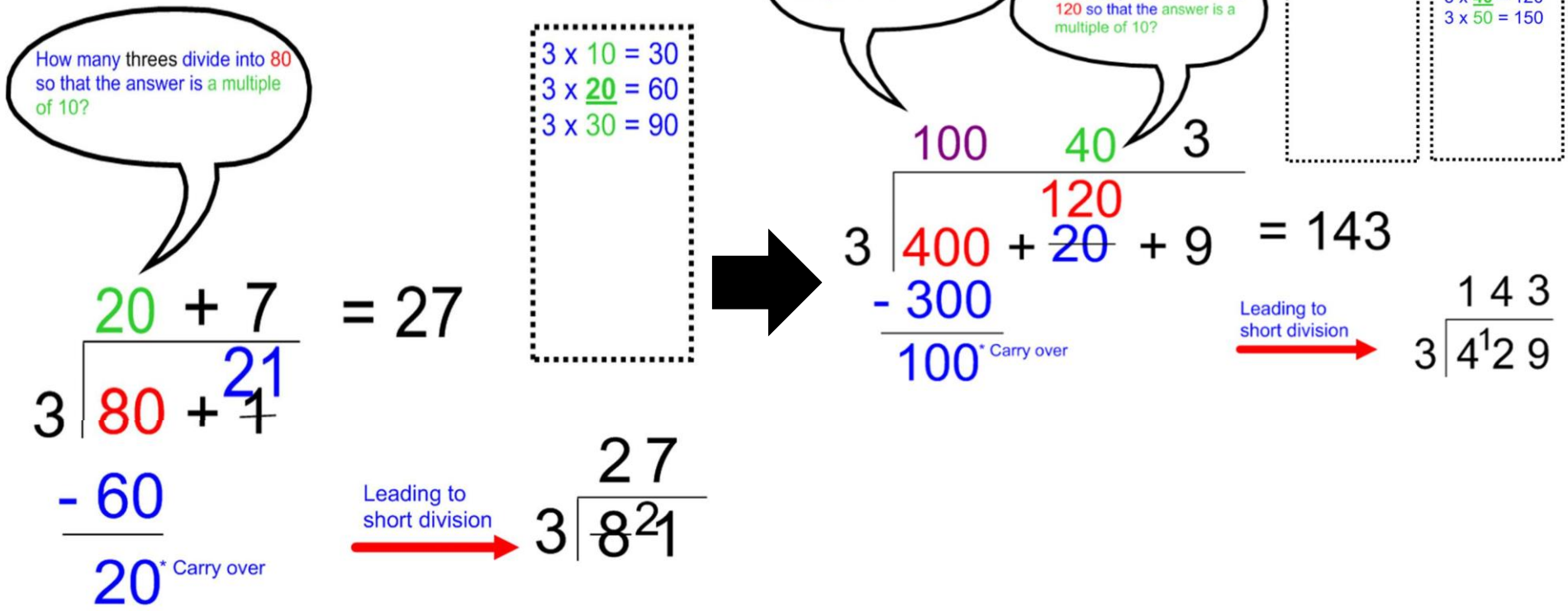


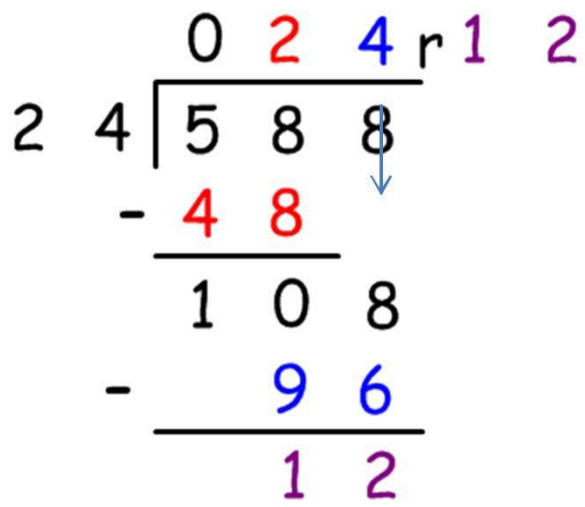
	Year 2	
Division	**Division as grouping** Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.   96 ÷ 3 = 32  Use a number line to show jumps in groups. The number of jumps equals the number of groups.  Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.  28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?	**Division with arrays**  Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 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 four linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7

	Year 3 (Division with arrays, division with remainders as in Year 2) AND short division	
Division	**Division with arrays**  Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 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 four linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7	**Division with a remainder** 14 ÷ 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 remainder

	Year 3 (Division with arrays, division with remainders as in Year 2) AND short division	
Division Yr 3 Continued	**Short Division**  Use place value counters to divide using the bus stop method alongside  42 ÷ 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 ten ones and then share the ones equally among the groups.  We look how much in 1 group so the answer is 14.	 In order to do this, children need to be able to use their know facts to look at the multiples of 10 required. Writing them out in a box or bubble is helpful.

	Year 4 (Division with arrays, division with remainders as in Year 3) AND short division up to 3 digits by 1 digit
Division	Continue to model expanded short division method but show link to compact short division.



	Year 5 (Short division up to 4 digits by a 1 digit number and interpreting remainders) Year 6 Short division and long division (up to 4 digits by a 2 digit number)	
Division	**Short Division** $8\overline{)2^{2}1^{5}8}$ = 27 r 2 Extend to expressing results in different ways according to the context, including with remainders as fractions, as decimals or by rounding. For example: • Whole number remainder = 27 r 2 • Fraction remainder = $27\frac{2}{8} = 27\frac{1}{4}$ • Decimal remainder = $27\frac{1}{4} = 27\frac{25}{100} = 27.25$	**Long Division** 

Vocabulary Associated with Division commonly used in Calcot Schools			
share	divide	groups of	halve
factors	common factors	prime	
scale down	simplify	remainder	

Written methods are referred to as calculations or number sentences. We do not call them sums as this vocabulary is commonly used in addition to mean **total** e.g. What is the sum of 7 and 3? (10)