

Wolston St Margaret's C of E Primary School



Calculation Policy

INTRODUCTION

This calculation policy has been written in line with the programmes of study taken from the revised National Curriculum for Mathematics (2014). It provides guidance on appropriate calculation methods and progression.

The content is set out in yearly blocks under the following headings: addition, subtraction, multiplication and division.

Statements taken directly from the programmes of study are listed in blue within each section.

Addition

Objective and Strategies	Concrete	Pictorial	Abstract
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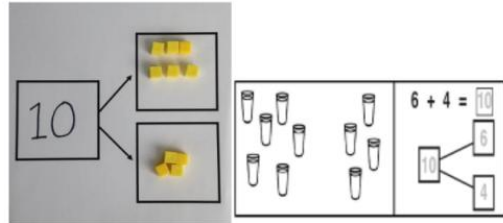
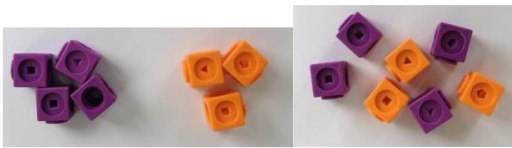
Early Years

Combining two parts to make a whole: part-whole model

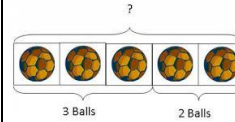
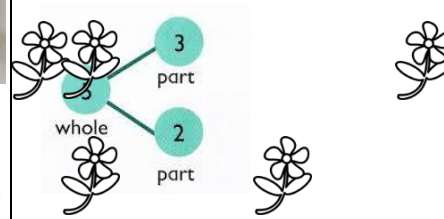
Joining two groups and then recounting all objects using one-to-one correspondence

Early Learning Goals

Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.



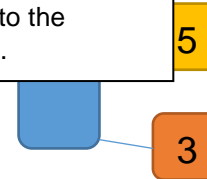
$$\begin{aligned} 10 &= 6 + 4 \\ 10 - 6 &= 4 \\ 10 - 4 &= 6 \\ 10 &= 4 + 6 \end{aligned}$$



Use pictures to add two numbers together as a group or in a bar.



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



$$4 + 3 = 7$$

$$10 = 6 + 4$$

Year 1

Starting at the bigger number and counting on

As a strategy, this should be limited to adding small quantities only (1, 2 or 3) with pupils understanding that counting on from the greater is more efficient. Pupils should be encouraged to rely on number bonds knowledge as time goes on, rather than using counting on as their main strategy.

Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.

Represent and use number bonds and related subtraction facts within 20.

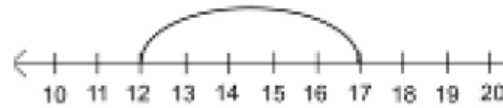
Add and subtract one-digit and two-digit numbers to 20, including zero.

Solve one-step problems that involve addition and subtraction, using concrete objects and



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.

Bar Model:



$$5 + 12 = 17$$

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

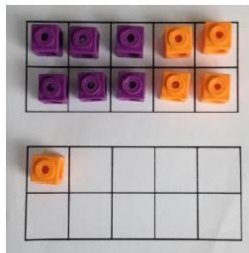
pictorial representations, and missing number problems such as $7 = \square - 9$.

Regrouping to make 10.
This is an essential skill that will support column addition later on

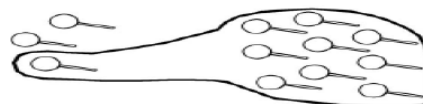
Chd should be able to link addition to making 10 first and then adding remaining amount.



$$6 + 5 = 11$$

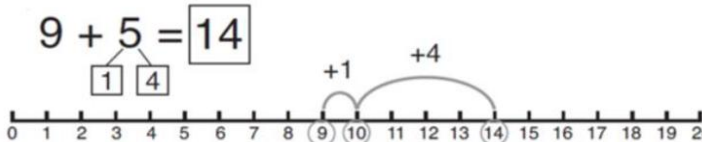


Start with the bigger number and use the smaller number to make 10.

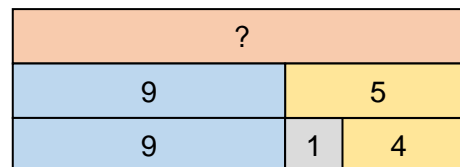


$$3 + 9 =$$

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



Bar model:



$$7 + 4 = 11$$

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

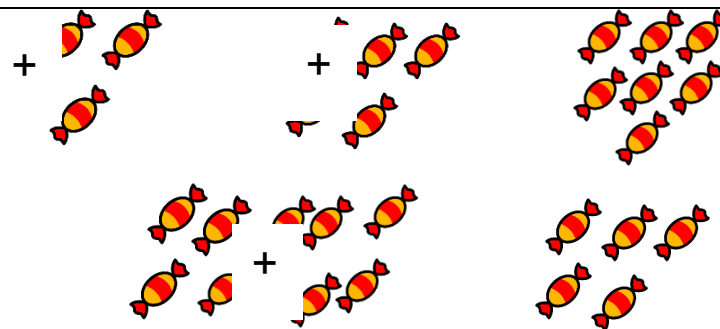
Adding three single digits

Here the emphasis should be on the language rather than the strategy.

$4 + 7 + 6 = 17$
Put 4 and 6 together to make 10. Add on 7.



As pupils are using the bead string, ensure that they are explaining



$$\begin{aligned} (4) + 7 + (6) &= 10 + 7 \\ &= 17 \end{aligned}$$

Combine the two numbers that make 10 and then add on the remainder.

using language such as; '1 more than 5 is equal to 6.'
 '2 more than 5 is 7.'
 '8 is 3 more than 5.'

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.

Year 2
Column method- with grouping

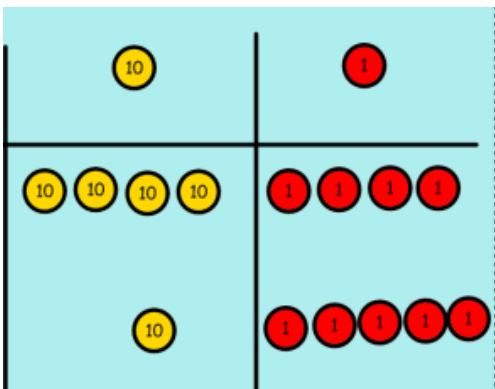
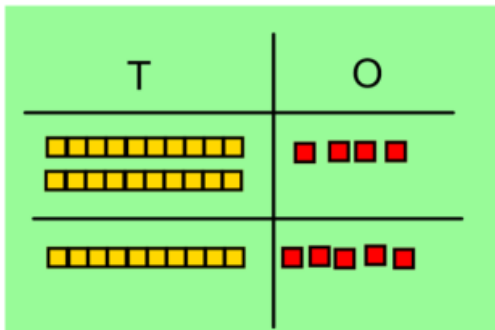
Solve problems with addition and subtraction:

- i. using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- ii. applying their increasing knowledge of mental and written methods.

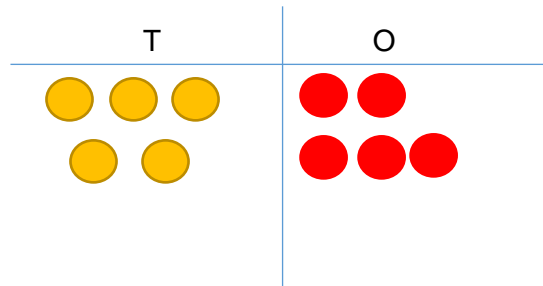
Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.

Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:

$24 + 15 =$
 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.



Calculations

$21 + 42 =$

21
 + 42

 63

- i. a two-digit number and ones
- ii. a two-digit number and tens
- iii. two two-digit numbers
- iv. adding three one-digit numbers.

Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.

Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Year 3

Column method- regrouping with up to 3 digits and carrying

Add and subtract numbers mentally, including:

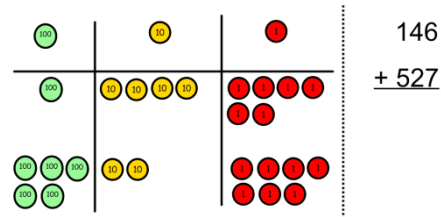
- i. a three-digit number and ones
- ii. a three-digit number and tens
- iii. a three-digit number and hundreds.

Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.

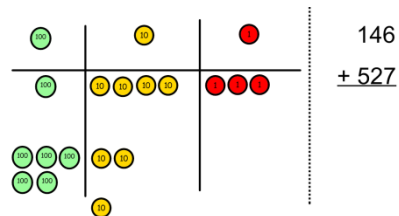
Estimate the answer to a calculation and use inverse operations to check answers.

Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

Make both numbers on a place value grid.

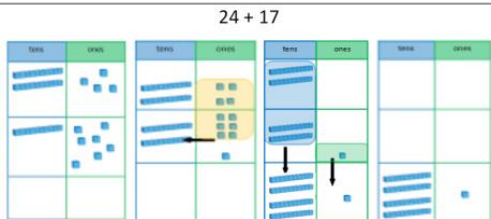


Add up the units and exchange 10 ones for one 10.



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.

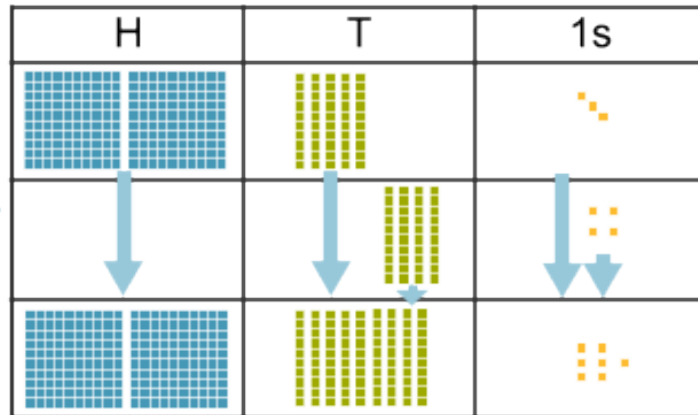
This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100.



$$\begin{array}{r}
 \text{Tens} \quad \text{Ones} \\
 24 \\
 + 17 \\
 \hline
 41
 \end{array}$$

First add the ones.
Re-group 10 ones to 1 ten.
Next add the tens.

Draw representations of 3 digit column addition both with and without carry.



Start by partitioning the numbers before moving on to clearly show the exchange below the addition.

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

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

Year 4

Column method- regrouping with up to 4 digits and carrying

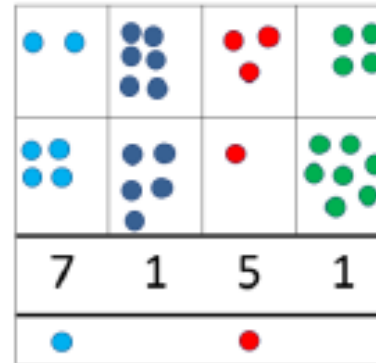
Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.

Estimate and use inverse operations to check answers to a calculation.

Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

As year 3 but with up to 4 digit numbers and with carrying.

Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.



Chd will be able to add any digit number with more than one carry if needed.

Th	H	T	O
2	3	1	4
+3	8	8	6
6	2	0	0

1 1 1

Year 5 and 6

Column method with regrouping. Dealing with larger numbers and decimals numbers. Children should also be able to solve inverse problems related to the column method.

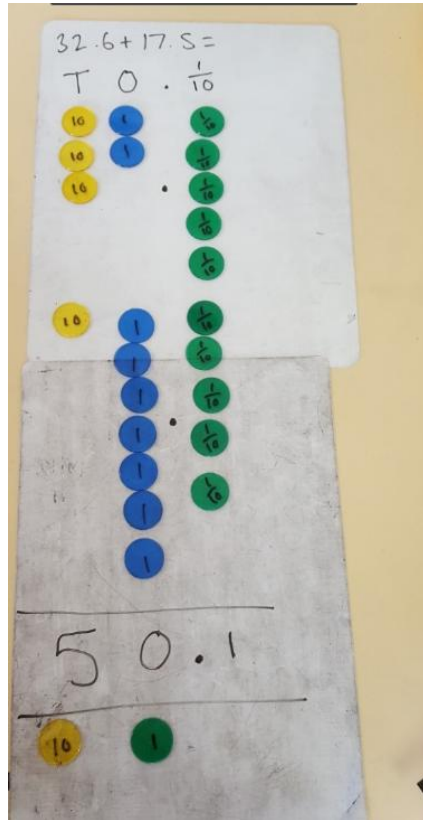
Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).

Add and subtract numbers mentally with increasingly large numbers.

Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

As children move on to decimals, money and decimal place value counters can be used to support learning.



As Year 4 if required based on decimal values.

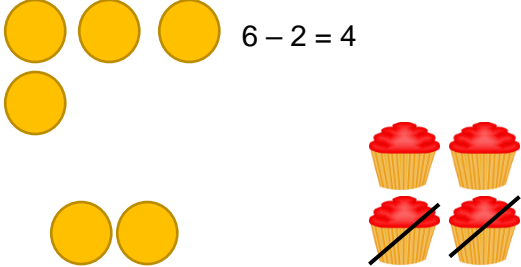
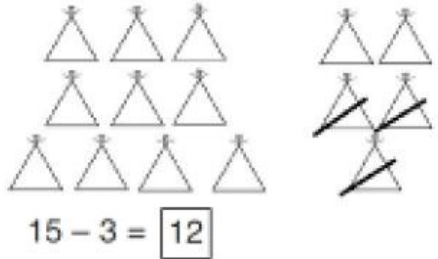
As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here.

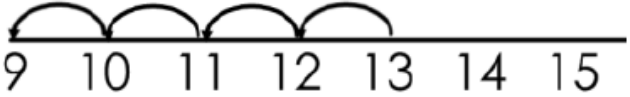
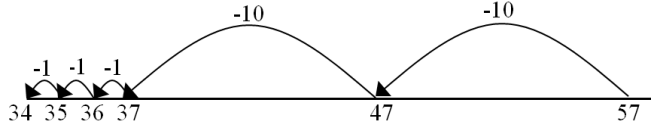
$$\begin{array}{r} 72.8 \\ + 54.6 \\ \hline 127.4 \\ 11 \end{array}$$

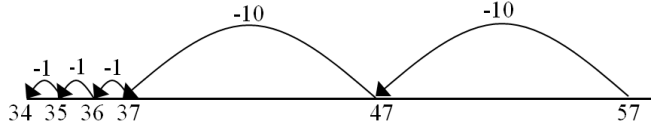
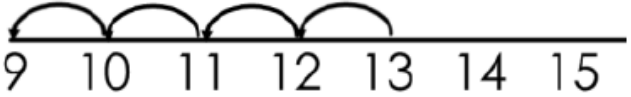
$$\begin{array}{r} \pounds 23.59 \\ + \pounds 7.55 \\ \hline \pounds 31.14 \\ \hline 1 \quad 1 \quad 1 \end{array}$$

$$\begin{array}{r} 23.361 \\ 9.080 \\ 59.770 \\ + 1.300 \\ \hline 93.511 \\ \hline 21.2 \end{array}$$

<p>Use their knowledge of the order of operations to carry out calculations involving the four operations.</p> <p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. Solve problems involving addition, subtraction, multiplication and division.</p> <p>Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.</p>			
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Objective and Strategies	Concrete	Pictorial	Abstract
<p>EY Taking away ones When this is first introduced, the concrete representation should be based upon the diagram. Real objects should be placed on top of the images as one – to – one correspondence so that pupils can take them away, progressing to representing the group of ten with a tens rod and ones with ones cubes</p> <p>Early Learning Goals Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and</p>	<p>Use physical objects, counters, cubes etc to show how objects can be taken away.</p>  <p>The concrete representation shows 6 yellow circles arranged in two rows of three. Two circles are crossed out with diagonal lines. Below the circles are two red cupcakes, with two more red cupcakes crossed out with diagonal lines. The equation $6 - 2 = 4$ is written next to the circles.</p>	<p>Cross out drawn objects to show what has been taken away.</p>  <p>The pictorial representation shows 15 triangles arranged in three rows of five. Three triangles are crossed out with diagonal lines. Below the triangles is the equation $15 - 3 = 12$, where the number 12 is enclosed in a box.</p>	<p>$8 - 1 = 7$</p> <p>$5 - 1 = 4$</p>

<p>count on or back to find the answer.</p>			
<p>Year 1 Counting back Subtracting 1, 2, or 3 by counting back Pupils should be encouraged to rely on number bonds knowledge as time goes on, rather than using counting back as their main strategy</p> <p>Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.</p> <p>Represent and use number bonds and related subtraction facts within 20.</p>	<p>Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.</p> <p>13 - 4</p> <p>Use counters and move them away from the group as you take them away counting backwards as you go.</p>	<p>Count back on a number line or number track</p>  <p>Start at the bigger number and count back the smaller number showing the jumps on the number line.</p>  <p>This can progress all the way to counting back using two 2 digit numbers.</p>	<p>Put 13 in your head, count back 4. What number are you at? Use your fingers to help.</p>



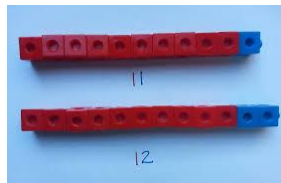
Add and subtract one-digit and two-digit numbers to 20, including zero. Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$.

Year 2
Find the difference

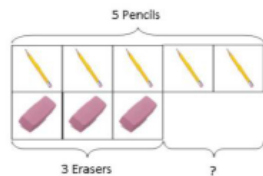
Solve problems with addition and subtraction:
i. using concrete objects and pictorial representations, including those involving numbers, quantities and measures
ii. applying their increasing knowledge of mental and written methods.

Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.

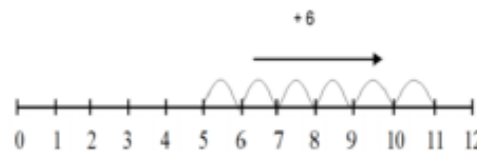
Compare amounts and objects to find the difference.



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



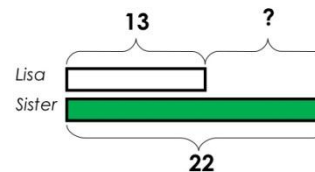
Use basic bar models with items to find the difference



Count on to find the difference.

Comparison Bar Models

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

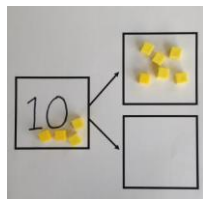
Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:

- i. a two-digit number and ones
- ii. a two-digit number and tens
- iii. two two-digit numbers
- iv. adding three one-digit numbers.

Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.

Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

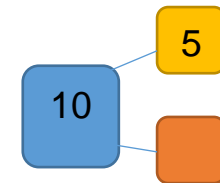
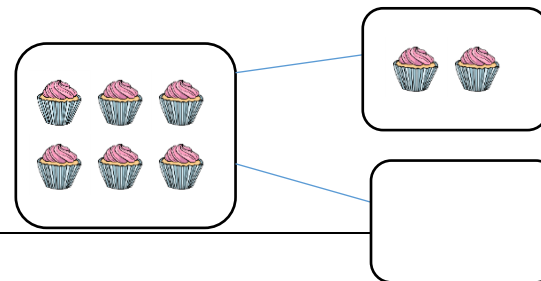
Part Part Whole Model



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?

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



Move to using numbers within the part whole model.

	$10 - 6 =$		
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Make 10
As with addition, chd see that it is more efficient to subtract to get to ten first then subtract again from ten. Knowledge of number bonds to and from ten and twenty are vital.

$14 - 9 =$

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.

$13 - 7 = 6$

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?

Year 3
Column method without regrouping
Subtract numbers with up to three digits, using formal written methods of columnar subtraction.

Add and subtract numbers mentally, including:

- a three-digit number and ones
- a three-digit number and tens
- a three-digit number and hundreds.

Add and subtract numbers with up to three digits, using formal written methods of columnar

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.

Calculations

$$\begin{array}{r} 54 \\ - 22 \\ \hline 32 \end{array}$$

Calculations

$$\begin{array}{r} 176 \\ - 64 \\ \hline 112 \end{array}$$

Start with expanded method to subtract

$$47 - 24 = 23$$

$$\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$$

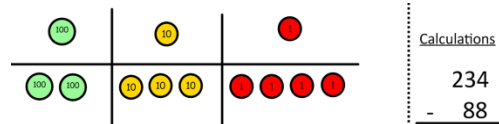
This will lead to a clear written column subtraction.

addition and subtraction.

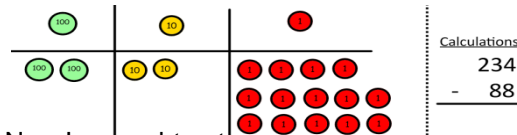
Estimate the answer to a calculation and use inverse operations to check answers.

Solve problems, including missing number problems, using number facts, place value, and more complex addition and 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.

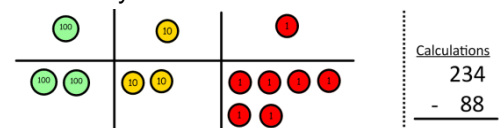


Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.

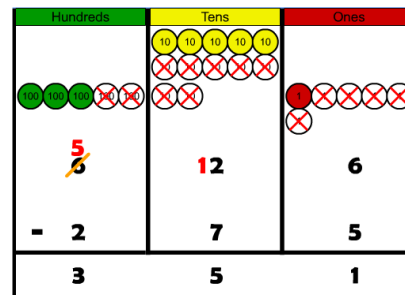


Now I can subtract my ones.

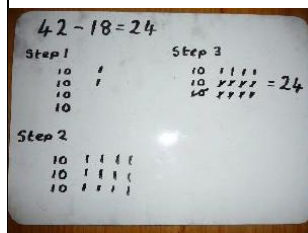
Now look at the tens, can I take away 8 tens easily?



I need to exchange one hundred for ten tens.

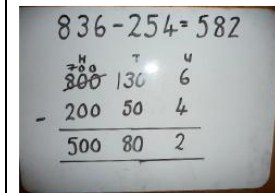


Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.

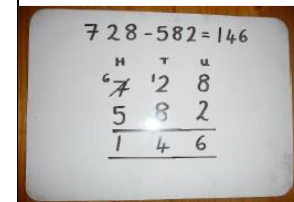


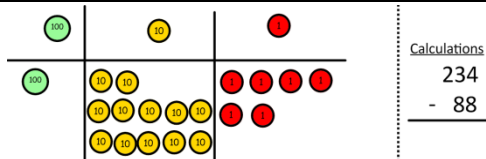
When confident, children can find their own way to record the exchange/regrouping.

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



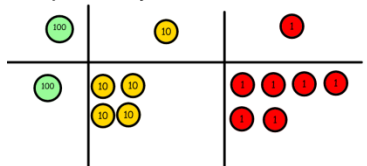
Children can start their formal written method by partitioning the number into clear place value columns.





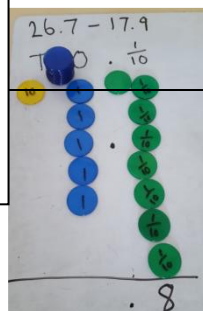
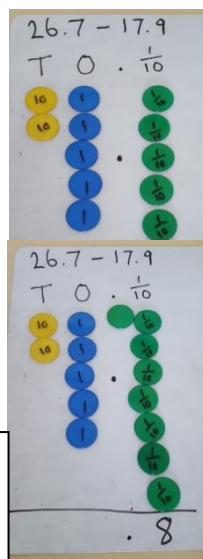
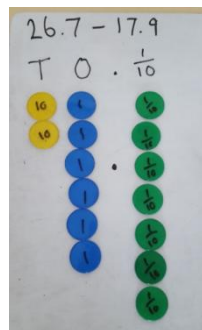
$$\begin{array}{r} \text{Calculations} \\ 234 \\ - 88 \\ \hline \end{array}$$

Now I can take away eight tens and complete my subtraction



$$\begin{array}{r} \text{Calculations} \\ 234 \\ - 88 \\ \hline 146 \end{array}$$

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.



Use concrete materials to represent columnar subtraction with decimal numbers. Decimal numbers can also be represented with base equipment.

As year 4 if needed with decimal numbers.

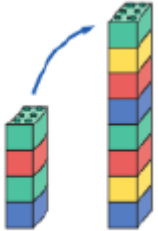

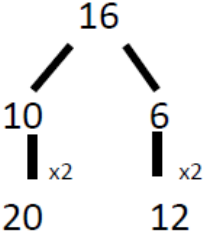
Move chd onto using the column method to subtract increasingly larger numbers. Including those where more than one borrow is required.

$$\begin{array}{r} ^3 ^9 ^1 3 \\ - 2 8 4 \\ \hline 1 1 9 \end{array}$$

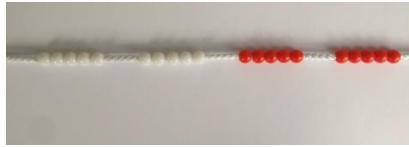
Then, develop an understanding of subtracting any number including decimals.

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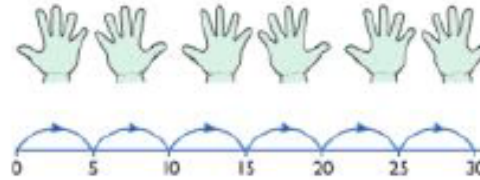
Multiplication

Objective and Strategies	Concrete	Pictorial	Abstract
<p><u>Year 1</u> Doubling Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.</p>	<p>Use practical activities to show how to double a number.</p>  <p>double 4 is 8 $4 \times 2 = 8$</p>	<p>Draw pictures to show how to double a number.</p> <p>Double 4 is 8</p> 	 <p>Partition a number and then double each part before recombining it back together.</p>

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

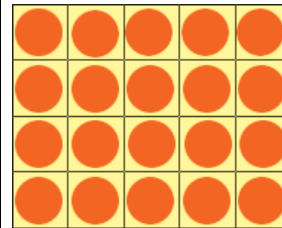
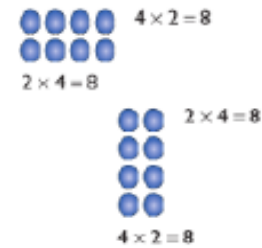
5, 10, 15, 20, 25, 30

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.



$$5 + 5 + 5 = 15$$

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

$$5 \times 3 = 15$$

$$3 \times 5 = 15$$

Year 2

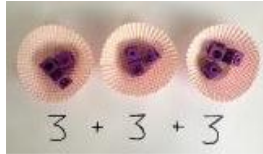
Repeated addition

Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.

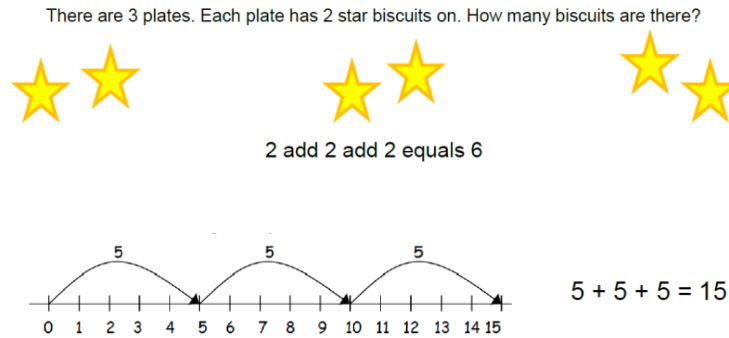
Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals ($=$) signs.

Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.

Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts,



Use different objects to add equal groups.



Write addition sentences to describe objects and pictures.



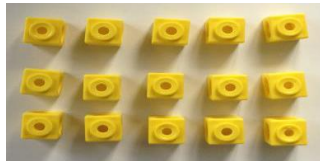
including problems in contexts.

Arrays- showing commutative multiplication

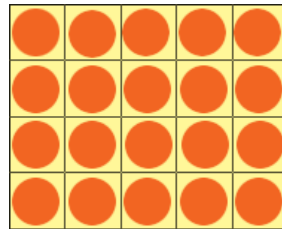
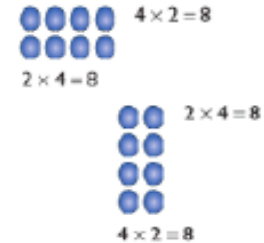
Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.

Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

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.



$$5 + 5 + 5 = 15$$

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

$$5 \times 3 = 15$$

$$3 \times 5 = 15$$

Year 3

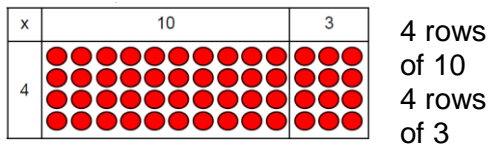
Grid Method

Children should always consider whether partitioning is the best strategy –if it is possible to use strategies such as doubling (some may use doubling twice for $\times 4$), they need to choose the most efficient strategy.

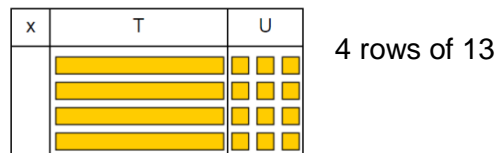
Children may wish to make jottings, including a full grid as exemplified here – but grid method is not a formal method and its only purpose is to record mental calculations. This supports the development of the necessary mental calculating skills but does not hinder the introduction of formal written methods in Year 4. Concrete manipulatives are essential to develop understanding.

Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.

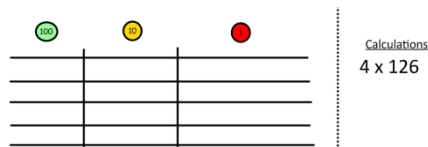
Show the link with arrays to first introduce the grid method.



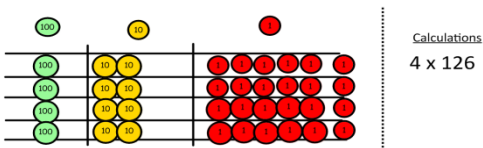
Move on to using Base 10 to move towards a more compact method.



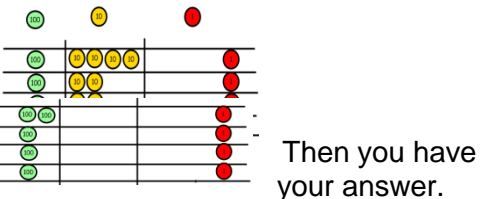
Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.



Fill each row with 126.

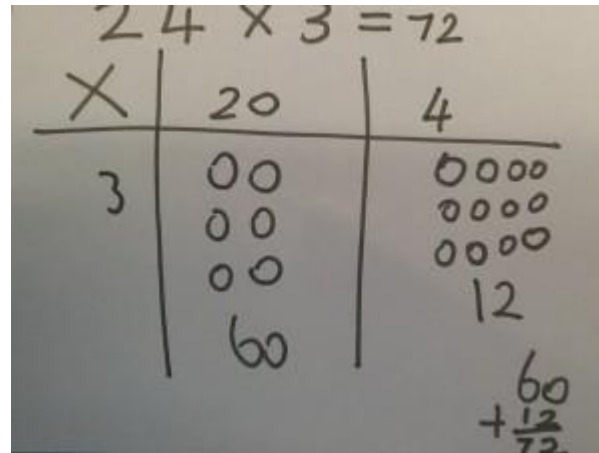


Add up each column, starting with the ones making any exchanges needed.



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.

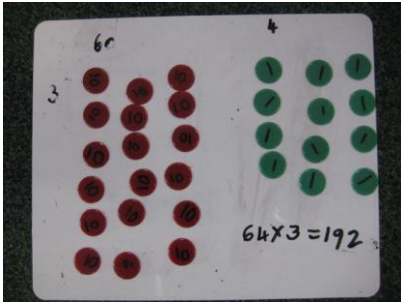
x	30	5
7	210	35

$$210 + 35 = 245$$

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

<p>Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods. Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.</p>			
<p>Year 4 Column multiplication Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.</p> <p>Recall multiplication and division facts for multiplication tables up to 12×12.</p> <p>Use place value, known and derived facts to multiply and</p>	<p>Children can continue to be supported by place value counters at the stage of multiplication.</p>  <p>It is important at this stage that they always multiply the ones first and note</p>	<p>Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.</p>	$ \begin{array}{r} \text{T} \quad \text{U} \\ 1 \quad 5 \\ \times \quad 4 \\ \hline 2 \quad 0 \quad (5 \times 4) \\ \hline 4 \quad 0 \quad (10 \times 4) \\ \hline 6 \quad 0 \end{array} $

divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers.

Recognise and use factor pairs and commutativity in mental calculations.

Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.

Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

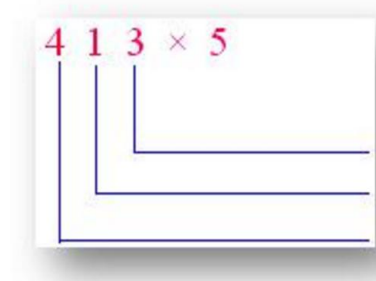
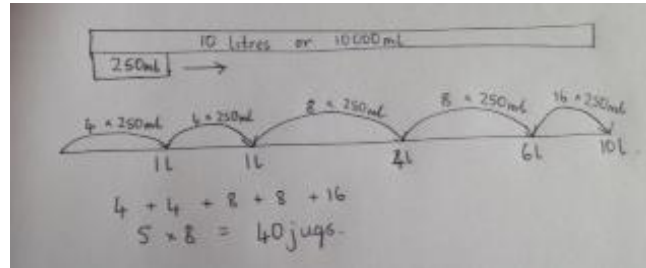
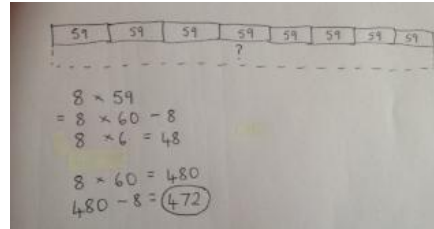
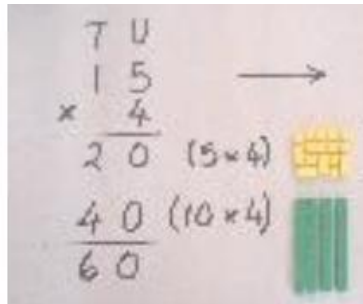
Year 5

Column multiplication

Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.

down their answer followed by the tens which they note below.

Use concrete apparatus to develop understanding of multiplication of 2 digits by 1 digit using the expanded method



Moving onto 3 digits by 1 digit

$$\begin{aligned} 3 \times 5 &= 15 \\ 10 \times 5 &= 50 \\ 400 \times 5 &= + 2000 \\ &= 2065 \end{aligned}$$

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.

Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.
 Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.
 Multiply and divide numbers mentally drawing upon known facts.
 Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
 Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.
 Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.

$$\begin{array}{r}
 32 \\
 \times 24 \\
 \hline
 8 \quad (4 \times 2) \\
 120 \quad (4 \times 30) \\
 40 \quad (20 \times 2) \\
 600 \quad (20 \times 30) \\
 \hline
 768
 \end{array}$$

Move away from noting down when ready

$$\begin{array}{r}
 7 4 \\
 \times 6 3 \\
 \hline
 1 2 \\
 2 1 0 \\
 2 4 0 \\
 + 4 2 0 0 \\
 \hline
 4 6 6 2
 \end{array}$$

Move chd onto short method of multiplying TU X U

H	T	U
2	1	5
8	6	0
2		

Chd should be confident with using expanded notation to multiply

H	T	U
2	2	6
1	8	(6 x 3)
6	0	(20 x 3)
6	0	0 (200 x 3)
6	0	(6 x 10)
2	0	0 (20 x 10)
2	0	0 0 (200 x 10)

Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

Year 6

Column multiplication

Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long and short multiplication.


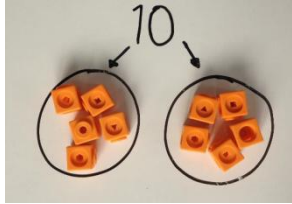
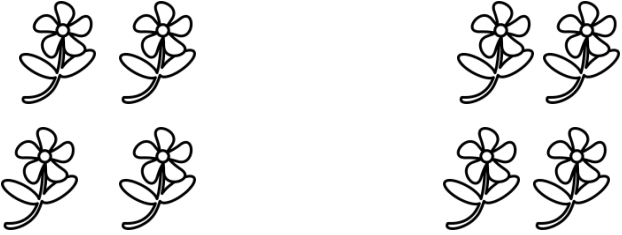
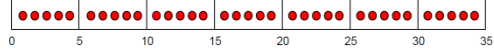
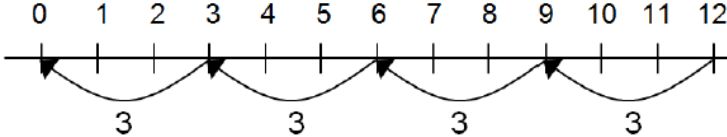
Develop short method of multiplying with up to 4 digits by 1 or 2 digits including use of decimals

$$\begin{array}{r} ^2 ^3 ^1 \\ 1342 \\ \times 18 \\ \hline 10736 \\ 13420 \\ \hline 24156 \\ ^1 \end{array}$$

Show chd the importance of lining up numbers including the decimal point. Talk about disregarding the decimal point and replacing it by however many decimal places if this is easier for chd.

$$\begin{array}{r} 2.43 \\ \times 7 \\ \hline 17.01 \\ ^3 ^2 \end{array}$$

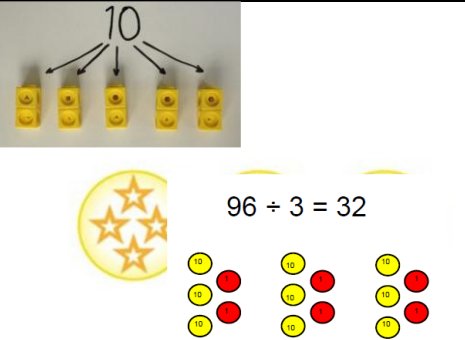
Division

Objective and Strategies	Concrete	Pictorial	Abstract
<p>Year 1 Sharing objects into groups Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.</p>	 <p>I have 10 cubes, can you share them equally in 2 groups?</p> 	<p>Children use pictures or shapes to share quantities.</p>  <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $8 \div 2 = 4$ </div>	<p>Share 9 buns between three people.</p> $9 \div 3 = 3$
<p>Year 2 Division as grouping Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.</p> <p>Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times),</p>	<p>Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.</p> 	<p>Use a number line to show jumps in groups. The number of jumps equals the number of groups.</p> 	<p>$28 \div 7 = 4$</p> <p>Divide 28 into 7 groups. How many are in each group?</p>

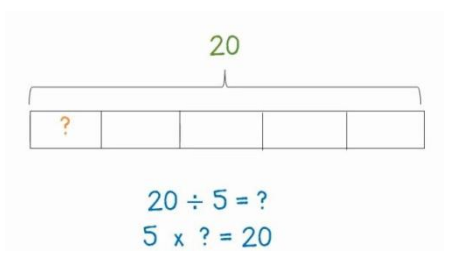
division (\div) and equals ($=$) signs.

Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.

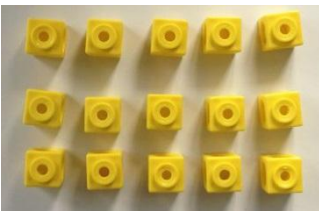
Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.



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.



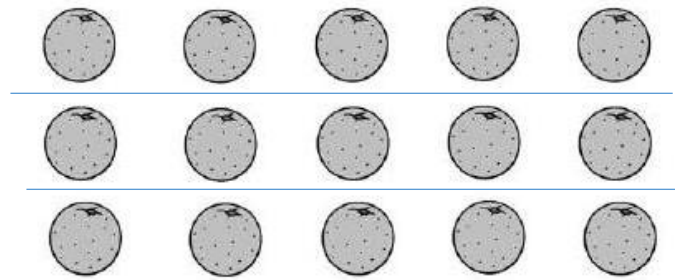
Division within arrays



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 four linking number sentences.

$7 \times 4 = 28$
 $4 \times 7 = 28$
 $28 \div 7 = 4$
 $28 \div 4 = 7$

Year 3

Division with a remainder

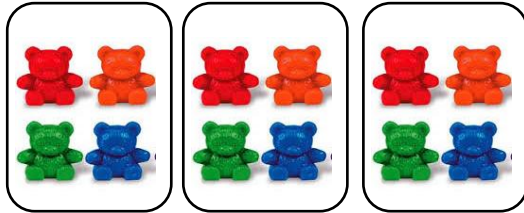
Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.

Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.

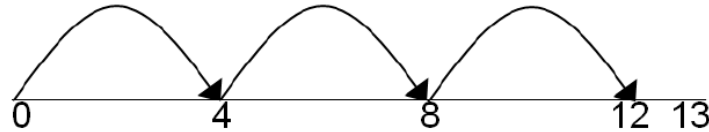
Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

$$14 \div 3 =$$

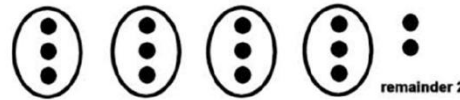
Divide objects between groups and see how much is left over



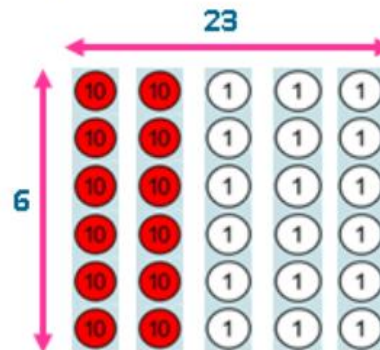
Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.



Draw dots and group them to divide an amount and clearly show a remainder.



Result of grouping/sharing counters during 'concrete' stage.



Check using multiplication inverse.

Complete written divisions and show the remainder using r .

$$\begin{array}{ccccccc} 29 \div 8 = 3 \text{ REMAINDER } 5 \\ \uparrow \quad \uparrow \quad \uparrow \quad \quad \quad \uparrow \\ \text{dividend} \quad \text{divisor} \quad \text{quotient} \quad \quad \quad \text{remainder} \end{array}$$

Year 4






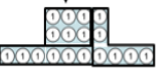
Division through vertical method focussing on grouping

Recall multiplication and division facts for multiplication tables up to 12×12 .

Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers.

Grouping and sharing using place value counters.
Exchanging counters which cannot be grouped.

$$138 \div 6 = 23$$

Hundreds	Tens	Units
		
		
		

Teach chd vertical method through grouping multiples of the divisor. Examples to include remainders.

$$\begin{array}{r} 23 \text{ e)} \\ 7 \overline{) 161} \\ \underline{-70} \quad \text{a)} \\ 91 \\ \underline{-70} \quad \text{b)} \\ 21 \\ \underline{-21} \quad \text{c)} \\ 0 \quad \text{d)} \end{array}$$

Link to work done on concrete and pictorial learning done previously

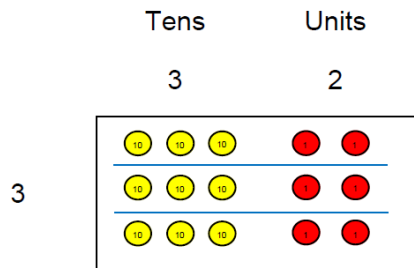
Year 5

Short division

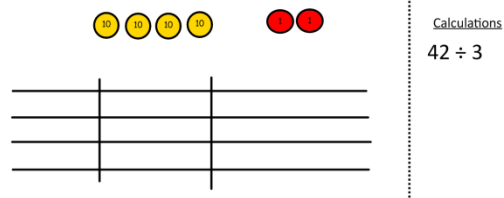
Pupils start with dividing 4-digit numbers by 2, 3 and 4, where no regrouping is required. Place value counters are used simultaneously in a place value chart, to develop conceptual understanding. They progress to calculations that require regrouping in the hundreds or tens columns. Pupils build on their conceptual knowledge of division to become confident with dividing numbers where the tens digit is smaller than the divisor, extending this to any digit being smaller than the divisor.

Multiply and divide numbers mentally drawing upon known facts.

Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.

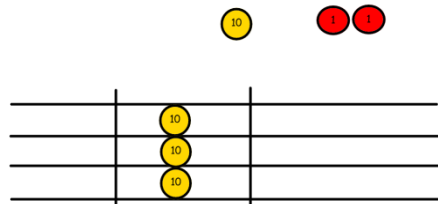


Use place value counters to divide using the bus stop method alongside

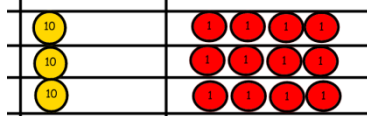


$$42 \div 3 =$$

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.

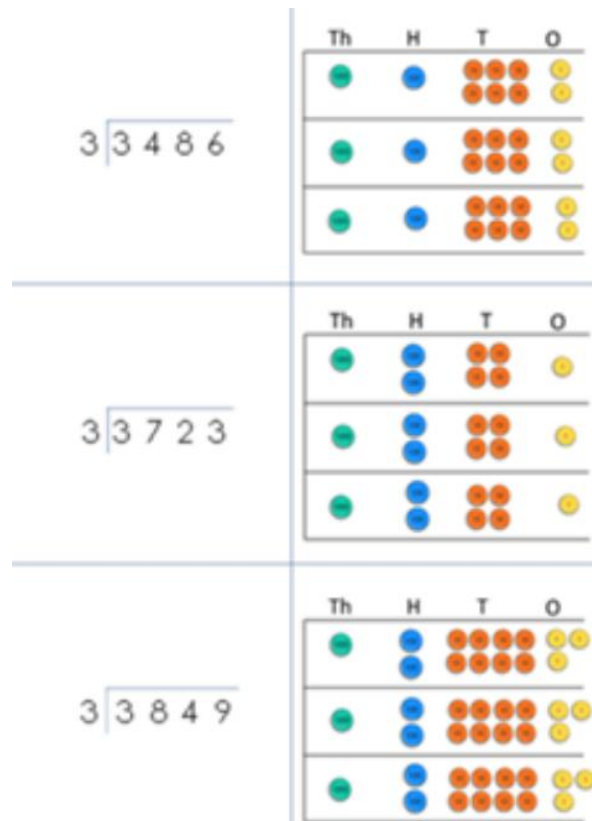


We exchange this ten for ten ones and then share the ones equally among the groups.



We look how much in 1 group so the answer is 14.

Students move onto representing concept learn using concrete apparatus to drawing to represent different values:



Moving onto short division; begin with divisions that divide equally with no remainder.

$$\begin{array}{r} 218 \\ 3 \overline{) 654} \\ \underline{6} \\ 0 \\ \underline{0} \\ 0 \end{array}$$

Move onto divisions with a remainder.

$$\begin{array}{r} 86 \text{ r } 2 \\ 3 \overline{) 259} \\ \underline{6} \\ 0 \\ \underline{0} \\ 0 \end{array}$$

Pupils should be encouraged to note down multiples when dividing by a 2 digit number

Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.

Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.

Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

Year 6

Short division

Children to be able to divide so that there are no remainders, going into the decimal values if needed.

Use written division methods in cases where the answer has up to two decimal places.

Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long

$$\begin{array}{r} 14.6 \\ 35 \overline{) 511.0} \\ \underline{35} \\ 16 \\ \underline{14} \\ 21 \\ \underline{21} \\ 0 \end{array}$$

35
70
105
140
...

<p>division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.</p> <p>Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.</p>			
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--	--	--