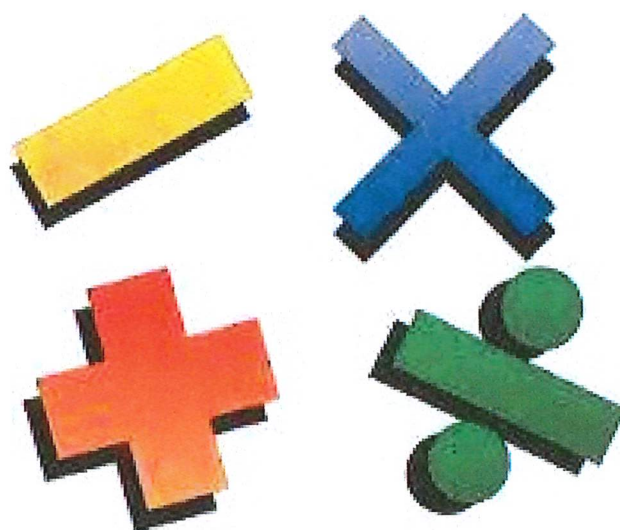




**PARKSIDE COMMUNITY
PRIMARY SCHOOL**

**Mathematics
Calculation Policy
2020-2021
Reception to Year 6**



Maths calculation Policy 2020-2021

This policy supports the Herts for Learning 'Maths Essential' scheme used throughout the school.

Progression within each area of calculation is in line with the programme of study in the 2014 National Curriculum.

This calculation policy is used to support children in developing a deep understanding of number and calculation. The policy has been designed to teach children through the use of concrete, pictorial and abstract representations often referred to as CPA.

Concrete representation— a pupil is first introduced to an idea or skill by acting it out with real objects. This is a 'hands on' component using real objects and is the foundation for conceptual understanding.

Pictorial representation – a pupil who has sufficiently understood the 'hands on' experiences performed and can now relate them to representations, such as a diagram or picture of the problem.

Abstract representation—a pupil is now capable of representing problems by using mathematical notation for example $12 \times 2 = 24$.

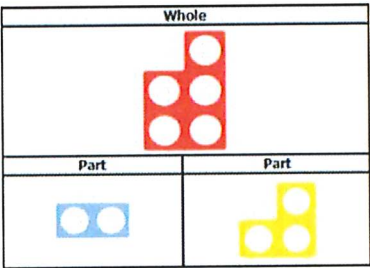
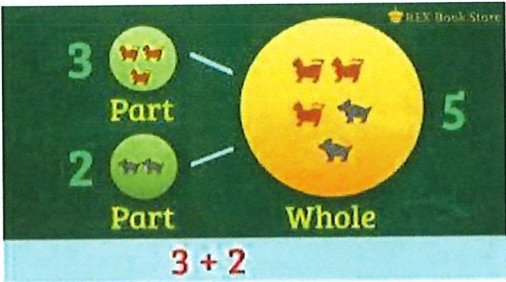
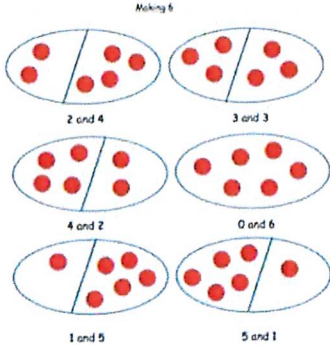
It is important that conceptual understanding, supported by the use of representation, is secure for all procedures. Reinforcement is achieved by going back and forth between these representations.

Reception

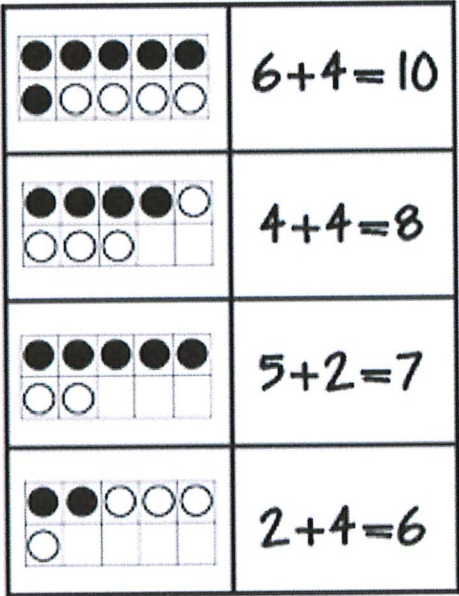
Addition (Reception)

Explore part part/whole relationship— combining two parts to make a whole.

They develop ways of recording calculations using pictures

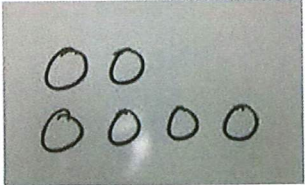
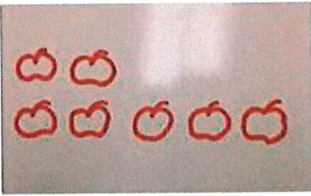
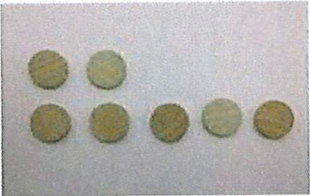
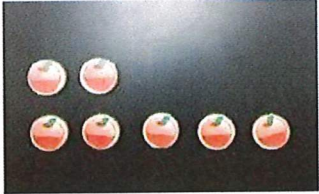


Using the ten frame/egg boxes to support addition of single digits— counting all/ combining two groups

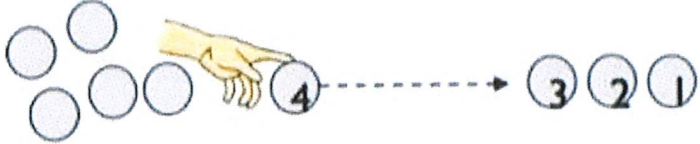
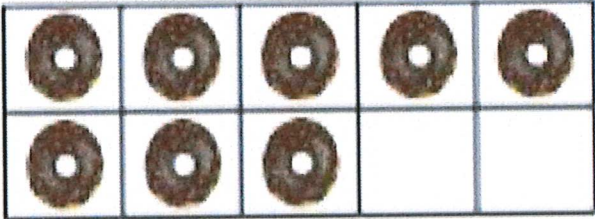
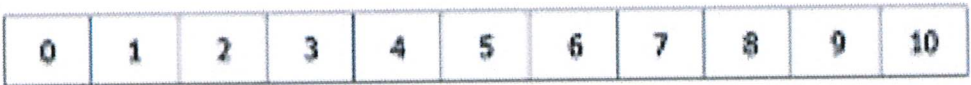
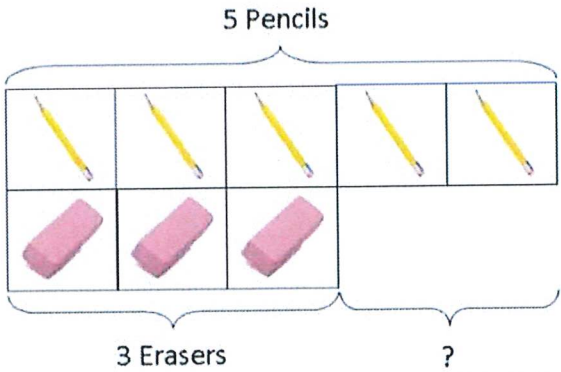


Solving problems using concrete, pictorial images.

Sara has 2 apples.
Jon has 5 apples.
How many apples do they have altogether?
How many more apples does Jon have than Sara?



Reception

Subtraction (Reception)	
Using concrete strategies for counting	<p>Taking away after counting out practical equipment. . Children would be encouraged to physically remove these using touch counting.</p>  <p>By touch counting and dragging in this way, it allows children to keep track of how many they are removing so they don't have to keep recounting. They will then touch count the amount that are left to find the answer.</p> <p>Those who are ready may record their own calculations</p>
Using the ten frames to support subtraction by taking away	 $8 - 4 = \underline{\quad}$ 
Solving problems using concrete, pictorial images.	<p>Peter has 5 pencils and 3 erasers. How many more pencils than erasers does he have?</p> 

Reception

Multiplication (Reception)

Experiencing equal groups of objects

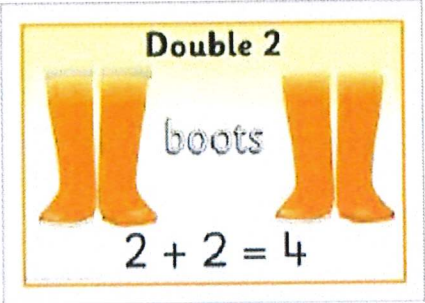
They will think about doubling when solving practical problems.

Children will experience equal groups of objects.

They will work on practical problem solving activities involving



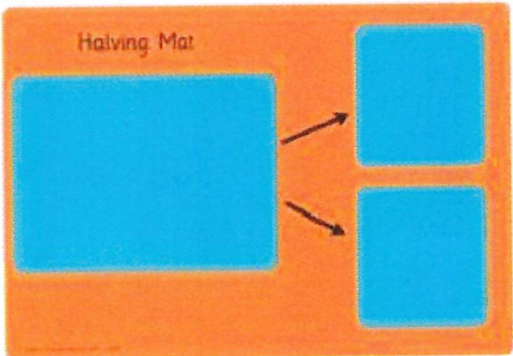
There are 6 pairs of socks. How many socks are there altogether?



Division (Reception)

Sharing practical objects.

Hearing and being exposed to language to describe half and seeing visual representations.

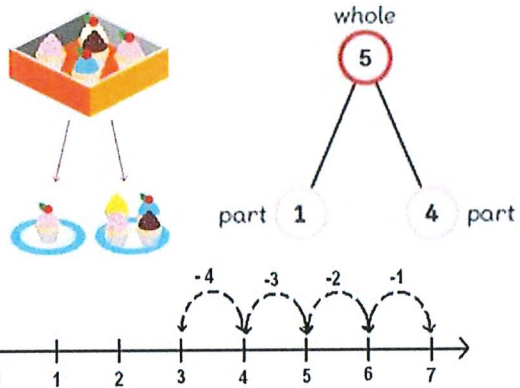
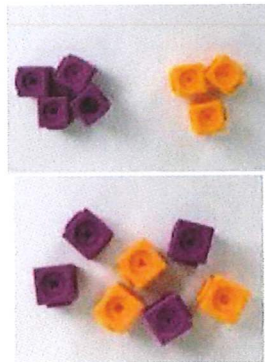


Year 1

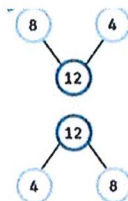
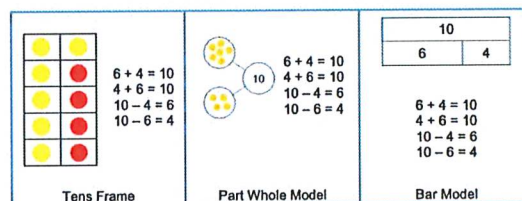
Addition (Year 1)

Combining two parts to make a whole: part whole model.
Joining two groups and then recounting all objects (lots of practice making 10 and numbers to 10 e.g. $6 + 4 = 10$ or $3 + 5 = 8$)

$$3 + 4 = 7$$



Number Bonds
Learn number bonds to 20 and demonstrate related facts. Addition and subtraction taught alongside each other as pupils need to see the relationship between the facts.



$$\begin{array}{rcl} 8 & + & 4 = 12 \\ 4 & + & 8 = 12 \end{array}$$

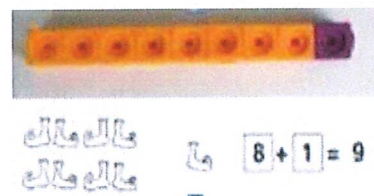
This is a family of addition and subtraction facts.

$$\begin{array}{rcl} 12 & - & 8 = 4 \\ 12 & - & 4 = 8 \end{array}$$

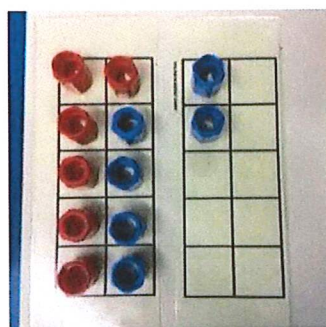


Add and subtract one digit numbers and two digit numbers to 20, including zero

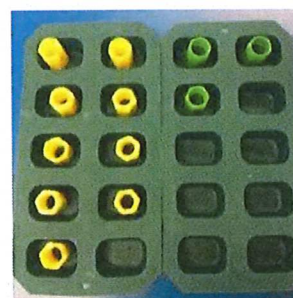
$$8 + 1 = 9$$



Bridging 10; $6 + 6 = 12$ Make 9 in one and 3 in the other. Take one from the 3 to make the 9 into a ten.... $10 + 2 = 12$ use ten frames, Singapore bars, egg boxes and number lines to practice. Children should start with the larger number and add the smaller number seeing what



$$6 + 6 = 12$$

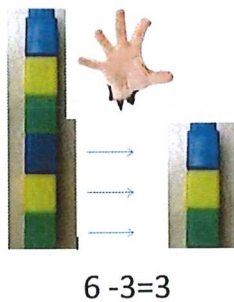


Make 9 in one and 3 in the other. Take one from the 3 to make the 9 into a ten.... $10 + 2 = 12$

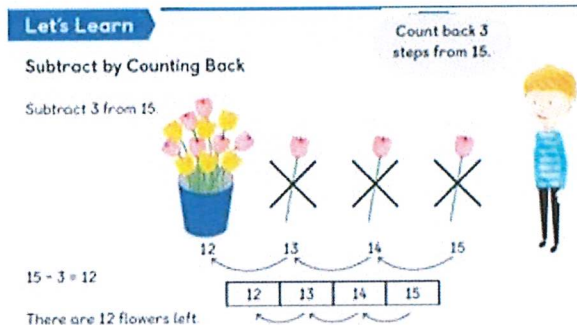
Year 1

Subtraction (Year 1)

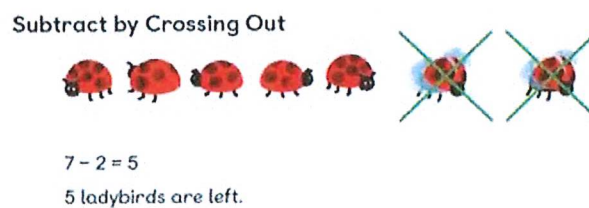
Taking away should begin with physical objects: counters, cubes, Dienes etc



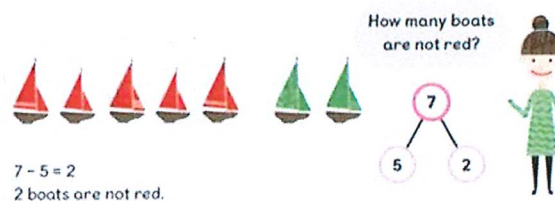
Subtraction by counting back



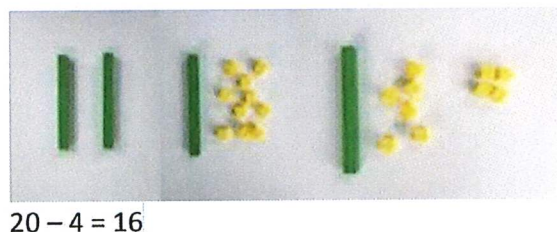
Subtracting a single digit number from a single digit number and a single digit from a two digit by crossing out pictures



Subtracting using the part part whole model (include problem solving with missing digits). $? - 5 = 2$

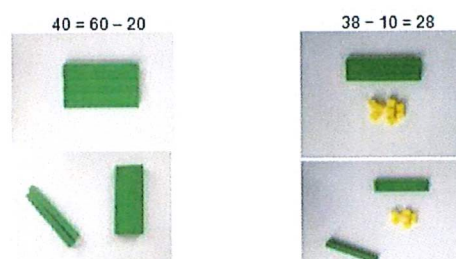


When subtracting using Dienes children should be taught to regroup (rename) a ten rod for 10 ones and then subtract from those



Subtracting Multiples of 10.

Using the vocabulary of 1 ten, two tens, etc, alongside 10, 20, 30 is important



Year 1

Multiplication (Year 1)

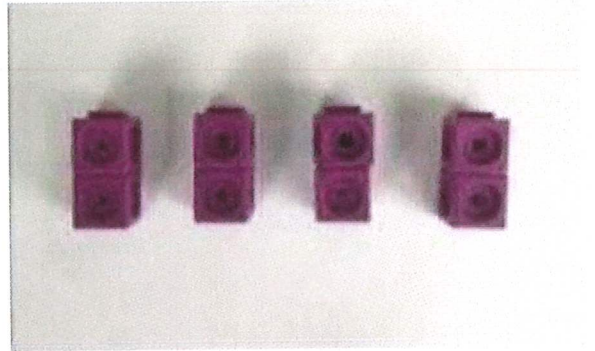
Counting in Multiples of 2, 5 and 10 from zero.

Children should count the number of groups on their fingers as they are skip counting.



4 groups of 2 = 8

$$4 \times 2 = 8$$



$$2 \times 4 = 8$$



2

two

2

two

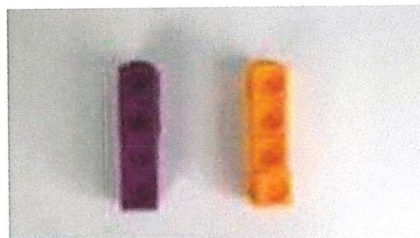
2

two

2

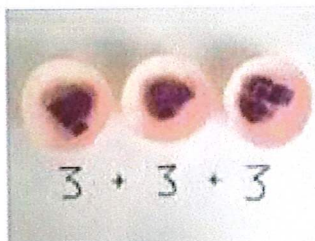
two

When moving to pictorial/written calculations the language is important

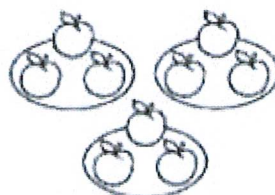


This image represents two groups of 4 or 4 twice

Solving Multiplication Problems using repeated addition



$$3 + 3 + 3$$



How many apples are there altogether?

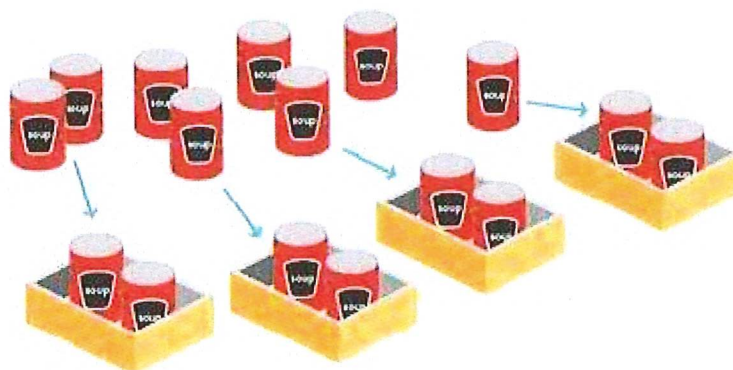
$$3 + 3 + 3 = 9$$

Division (Year 1)

Pupils should be taught to divide by working practically and the sharing should be shown below the whole to familiarise children with the concept of the whole.

$$10 \div 2 = 5$$

1 There are 8 cans.



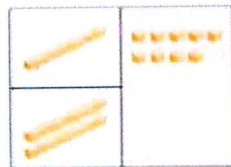
There are 4 boxes of 2 cans.

Addition (Year 2)

Using concrete and pictorial representations to add a 2 digit number to a 1 digit number and a 2 digit number to a tens number.

tens	ones
2	5
+	3
<hr/>	
	8

Step 1 Add the ones.



tens	ones
1	9
+	20
<hr/>	
	9

Step 2 Add the tens.
1 ten + 2 tens = 3 tens



tens	ones
1	9
+	20
<hr/>	
3	9

$$19 + 20 = 39$$

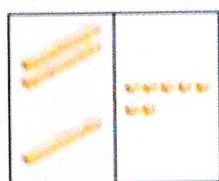
Using concrete and pictorial representations to add two 2 digit numbers.

Step 1 Add the ones.
3 ones + 4 ones = 7 ones



tens	ones
2	3
+	14
<hr/>	
	7

Step 2 Add the tens.
2 tens + 1 ten = 3 tens



tens	ones
2	3
+	14
<hr/>	
3	7

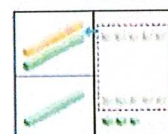
$$23 + 14 = 37$$

Adding with renaming

Add 15 and 18.

Use to help you add.

Step 1 Add the ones.
5 ones + 8 ones = 13 ones
Regroup the ones.
13 ones = 1 ten and 3 ones



tens	ones
1	5
+	18
<hr/>	
1	3

Step 2 Add the tens.
1 ten + 1 ten + 1 ten = 3 tens

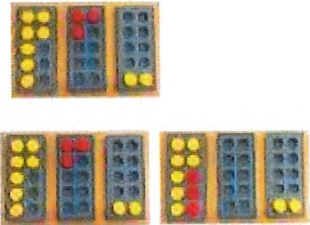
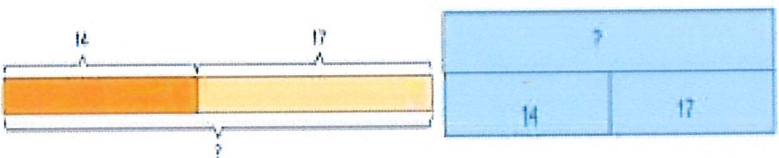


tens	ones
1	5
+	18
<hr/>	
1	3
+	20
<hr/>	
3	3

$$15 + 18 = 33$$



Year 2

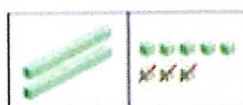
Addition (Year 2)	
Using concrete and pictorial representations to add 3 single digit numbers.	<div>7+3+2 = leads to 10 + 2 =</div> <div></div>
Using the bar model to find missing digits: It is important for the children to use the bar model in this way to encourage the use of it to aid problem solving.	<div>Helen has 14 breadsticks. Her friend has 17. How many do they have altogether?</div> <div></div>

Year 2

Subtraction (Year 2)

Using concrete and pictorial representations to subtract a 1 digit number from a 2 digit number

Step 1 Subtract the ones.
8 ones - 3 ones = 5 ones



tens	ones
2	8
-	3
<hr/>	
	5

Step 2 Subtract the tens.

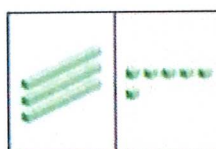


tens	ones
2	8
-	3
<hr/>	
2	5

$$28 - 3 = 25$$

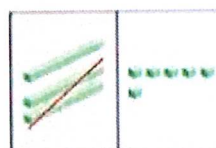
Using concrete and pictorial representations to subtract a 2 digit number from a tens number

Step 1 Subtract the ones.



tens	ones
3	6
-	2
<hr/>	
	4

Step 2 Subtract the tens.
3 tens - 2 tens = 1 ten



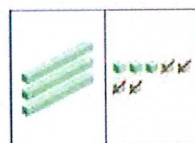
tens	ones
3	6
-	2
<hr/>	
1	6


$$36 - 20 = 16$$

Using concrete and pictorial representations to subtract a 2 digit number from a 2 digit number

Subtract 24 from 37.

Step 1 Subtract the ones.
7 ones - 4 ones = 3 ones

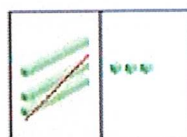


Use  to help you subtract.



tens	ones
3	7
-	4
<hr/>	
	3

Step 2 Subtract the tens.
3 tens - 2 tens = 1 ten



tens	ones
3	7
-	2
<hr/>	
1	3

$$37 - 24 = 13$$

Recognise and use the inverse relationship between addition and subtraction.

?	
23	53

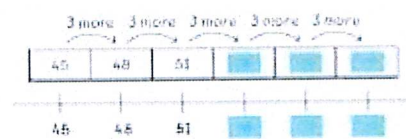
76	
23	?

Use this to check calculations and solve missing number problems.

Year 2

Multiplication (Year 2)

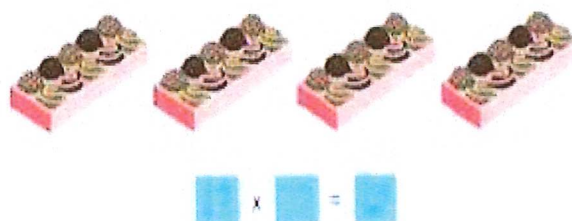
Skip counting in multiples of 2, 3, 5 and 10 from zero.



Recall and reuse multiplication facts for the 2, 5 and 10 times tables.

	$1 \times 5 = 5$
	$2 \times 5 = 10$
	$3 \times 5 = 15$
	$4 \times 5 = 20$
	$5 \times 5 = 25$
	$6 \times 5 = 30$
	$7 \times 5 = 35$
	$8 \times 5 = 40$
	$9 \times 5 = 45$
	$10 \times 5 = 50$

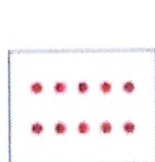
Use multiplication sign (X) and equals sign (=) when writing out multiplication tables.



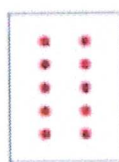
Understand that multiplication is commutative

Pupils should understand that an array can represent different equations and that as multiplication is commutative the order doesn't affect the answer.

How many dots are there?

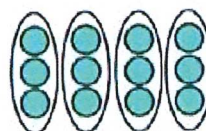


$$2 \times 5 = 10$$

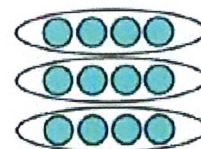


$$5 \times 2 = 10$$

2×5 is equal to 5×2 .



$$12 = 3 \times 4$$

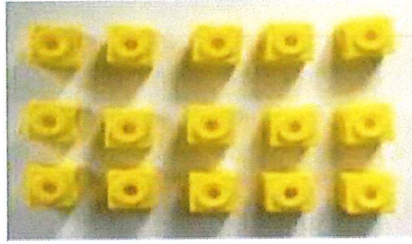


$$12 = 4 \times 3$$

Year 2

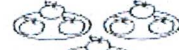
Multiplication (Year 2)

Solve multiplication problems using arrays and repeated addition.



$$3 \times 5 = \square$$

$$5 \times 3 = \square$$



How many apples are there altogether?

$$3 + 3 + 3 = 9$$

Year 2

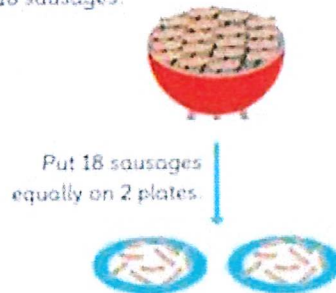
Division (Year 2)

Recall and use the division facts for 2, 5 and 10 multiplication tables.

$10 \div 10 =$	•	•	5
$20 \div 10 =$	•	•	2
$30 \div 10 =$	•	•	3
$40 \div 10 =$	•	•	4
$50 \div 10 =$	•	•	5
$60 \div 10 =$	•	•	6
$70 \div 10 =$	•	•	7
$80 \div 10 =$	•	•	8
$90 \div 10 =$	•	•	9
$100 \div 10 =$	•	•	10

Solve division problems in context by using concrete objects by sharing.

There are 18 sausages.



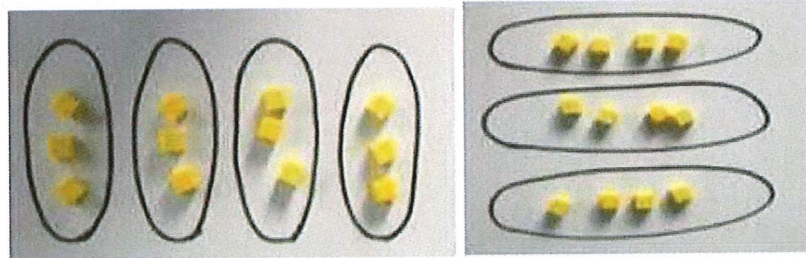
$$2 \times 9 = 18$$



There are 9 sausages on each plate.

$$18 \div 2 = 9$$

Solve division problems in context using arrays.



Solve division using grouping.

Put 10 buns in groups of 2.
How many plates are there?



Put into groups of 5.

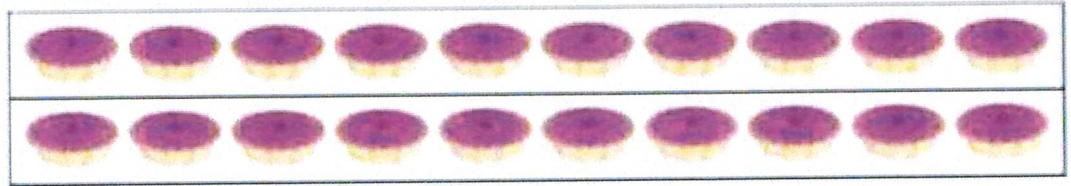
There are groups.

Year 2

Division (Year 2)

Use the inverse This should be taught alongside both multiplication and division.

Make a family of multiplication and division facts.



$$2 \times 10 = 20 \quad \text{—————} \quad 20 \div 10 = \boxed{}$$

$$10 \times 2 = 20 \quad \text{—————} \quad 20 \div 2 = \boxed{}$$

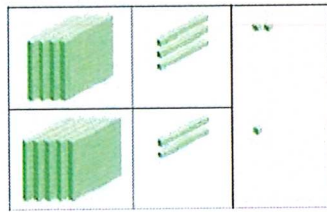
Addition (Year 3)

Add two three digit numbers.

Children need to first use equipment to support understanding of place value. Start without renaming then gradually move onto renaming.

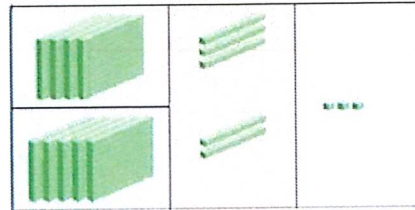
$$432 + 521 =$$

Step 1 Add the ones.
2 ones + 1 one = 3 ones



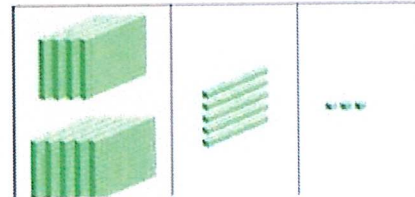
	h	t	o
	4	3	2
+	5	2	1
			3

Step 2 Add the tens.
3 tens + 2 tens = 5 tens



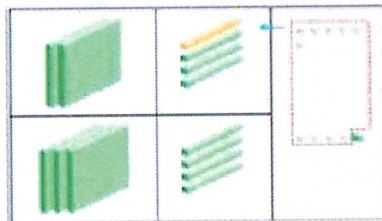
	h	t	o
	4	3	2
+	5	2	1
	9	5	3

Step 3 Add the hundreds.
4 hundreds + 5 hundreds = 9 hundreds



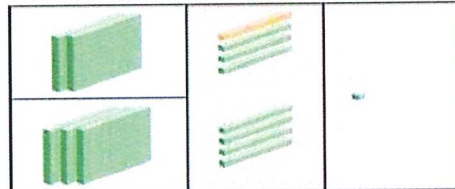
	h	t	o
	4	3	2
+	5	2	1
	9	5	3

$$236 + 345 =$$



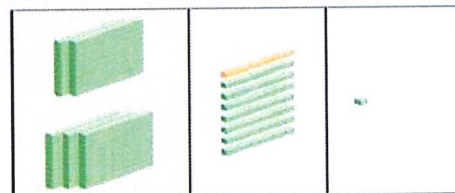
	h	t	o
	2	3	6
+	3	4	5
			1

Step 2 Add the tens.
1 ten + 3 tens + 4 tens = 8 tens



	h	t	o
	2	3	6
+	3	4	5
		8	1

Step 3 Add the hundreds.
2 hundreds + 3 hundreds = 5 hundreds



	h	t	o
	2	3	6
+	3	4	5
	5	8	1

$$236 + 345 = 581$$

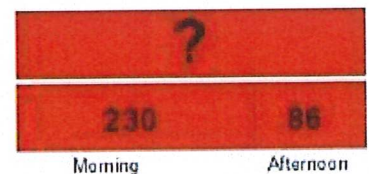
Bar Modelling

It is important for the children to use the bar model in this way to encourage the use of it to aid problem solving.

Bar Model to support understanding of problem solving:



A man sold 230 balloons at a carnival in the morning. He sold another 86 balloons in the evening. How many balloons did he sell in all?



Subtraction (Year 3)

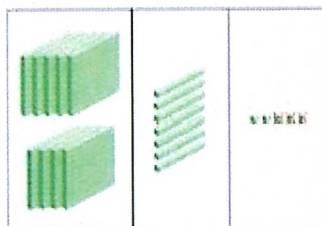
Subtract up to 3 digits from 3 digits.

Children need to first use equipment to support understanding of place value.

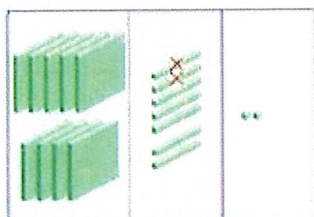
Only when children are secure with method should exchanging be introduced.

Subtract 723 from 975

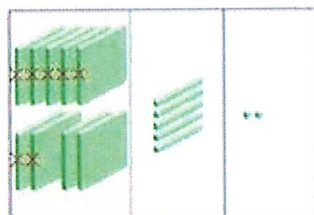
Step 1 Subtract the ones
5 ones - 3 ones = 2 ones



Step 2 Subtract the tens
7 tens - 2 tens = 5 tens



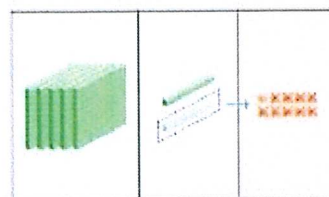
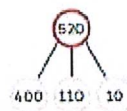
Step 3 Subtract the hundreds
9 hundreds - 7 hundreds = 2 hundreds



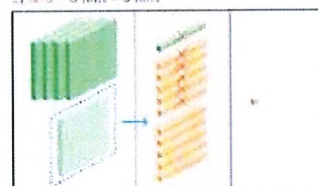
$$975 - 723 = 252$$

Subtract 269 from 520

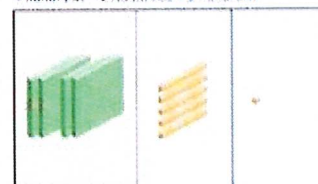
Step 1 Regroup 1 ten into 10 ones.
Subtract the ones.
10 ones - 9 ones = 1 one



Step 2 Regroup 1 hundred into 10 tens.
Subtract the tens.
11 tens - 6 tens = 5 tens



Step 3 Subtract the hundreds
4 hundreds - 2 hundreds = 2 hundreds



$$520 - 269 = 251$$

Bar Modelling

It is important for the children to use the bar model in this way to encourage the use of it to aid problem solving.

315	
185	?

$$315 - 185 = ?$$

$$185 + ? = 315$$

?	315
185	

$$185 + 315 = ?$$

$$? - 185 = 315$$

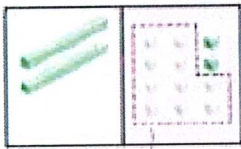
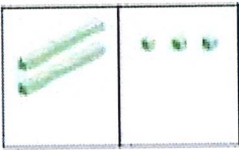
Multiplication (Year 3)

Children should be able to recall the 2, 5, 10, 3, 4 and 8 multiplication tables.

Multiply a 2 digit number by a 1 digit number.

Let's Learn

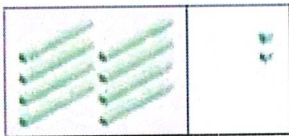
1 There are 4 groups of 23 fish. How do we multiply 23 by 4?



4 ones \times 3 = 12 ones
12 ones = 1 ten 2 ones

Step 1 Multiply the ones by 4.

	t	o
	2	3
\times		4
	1	2



2 tens \times 4 = 8 tens

Step 2 Multiply the tens by 4.

	t	o
	2	3
\times		4
	1	2
	8	0



12 + 80 = 92

Step 3 Add the products

	t	o
	2	3
\times		4
	1	2
+	8	0
	9	2



$23 \times 4 = 92$

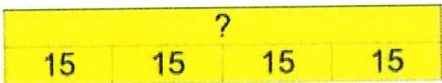
There are 92 fish in 4 tanks.

Bar Modelling

It is important for the children to use the bar model in this way to encourage the use of it to aid problem solving.

4 children go to the cinema. They each pay £15. How much do they spend altogether?

Whole unknown



Year 3

Division (Year 3)

Dividing and grouping understanding the concept of remainders.

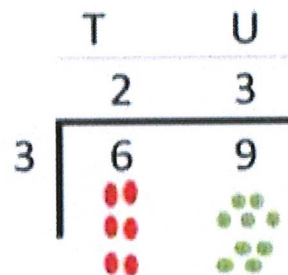
Start with using the real objects-or objects that represent the calculation.



$$13 \div 4 = 3 \text{ Remainder } 1$$

Dividing using short division

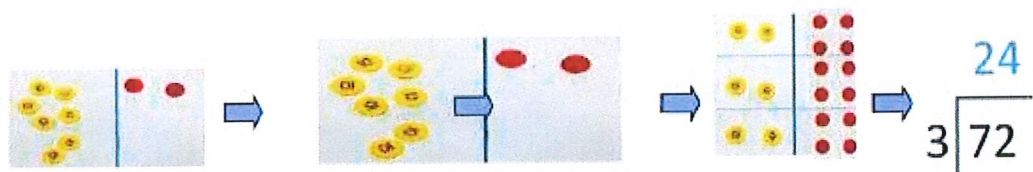
Once the children are secure with division as grouping and can demonstrate this on number lines, arrays etc. short division should be introduced for dividing larger 2 digit numbers. Initially with carefully chosen calculations requiring no remainders. Compare the layout of short division o that of an array.



Remind children of correct place value, that 69 is equal to 60 and 9, but in short division, pose:

- How many 3's in 6? = 2, and record it above the 6 tens.
- How many 3's in 9? = 3, and record it above the 9 ones.

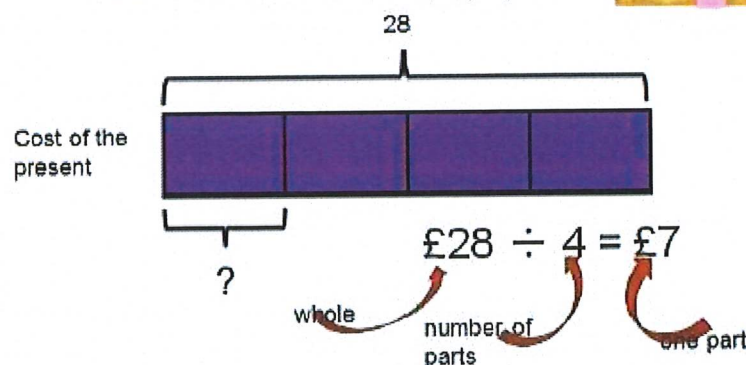
Once children demonstrate a full understanding of remainders, and also the short division method taught, they can be taught how to use the method when remainders occur within the calculation (e.g. $72 \div 3$), and be taught to 'carry' the remainder onto the next digit.



Bar Modelling

It is important for the children to use the bar model in this way to encourage the use of it to aid problem solving.

Four children bought a present for £28. They shared the costs equally. How much did each child pay?



Addition (Year 4)

Adding numbers with up to 4 digits.

Again this should start with the children using equipment to support and lots of discussion about the values of digits.

$$\begin{array}{r} 2 \ 3 \ 1 \ 4 \\ + 4 \ 2 \ 4 \ 0 \\ \hline 6 \ 5 \ 5 \ 4 \end{array}$$



Step 1

Add the ones.

$$4 \text{ ones} + 0 \text{ ones} = 4 \text{ ones}$$

Step 2

Add the tens.

$$1 \text{ tens} + 4 \text{ tens} = 5 \text{ tens}$$

Step 3

Add the hundreds.

$$3 \text{ hundreds} + 2 \text{ hundreds} = 5 \text{ hundreds}$$

Step 4

Add the thousands.

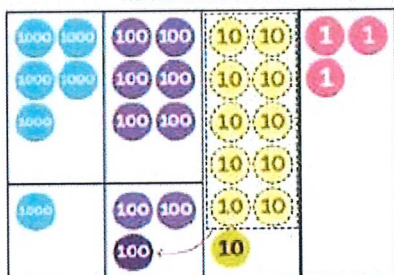
$$2 \text{ thousands} + 4 \text{ thousands} = 6 \text{ thousands}$$

$$2314 + 4240 = 6554$$

Step 2

Add the tens. 7 tens + 3 tens + 1 ten = 11 tens

Rename the tens. 11 tens = 1 hundred and 1 ten

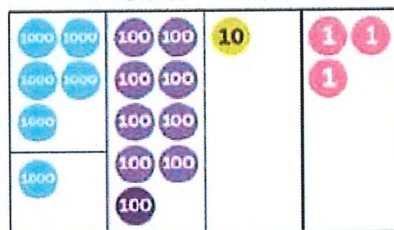


$$\begin{array}{r} 5 \ 6 \ 7 \ 8 \\ + 1 \ 2 \ 3 \ 5 \\ \hline 1 \ 3 \end{array}$$

Step 3

Add the hundreds.

$$6 \text{ hundreds} + 2 \text{ hundreds} + 1 \text{ hundred} = 9 \text{ hundreds}$$

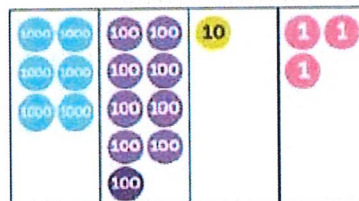


$$\begin{array}{r} 5 \ 6 \ 7 \ 8 \\ + 1 \ 2 \ 3 \ 5 \\ \hline 9 \ 1 \ 3 \end{array}$$

Step 4

Add the thousands.

$$5 \text{ thousands} + 1 \text{ thousand} = 6 \text{ thousands}$$



$$\begin{array}{r} 5 \ 6 \ 7 \ 8 \\ + 1 \ 2 \ 3 \ 5 \\ \hline 6 \ 9 \ 1 \ 3 \end{array}$$

Using the bar model to find missing digits.

This is not a form of getting the correct answer but helping to guide children to the correct operation.

Alison jogs 6,860 metres and Calvin jogs 5,470 metres. How far do they jog altogether?

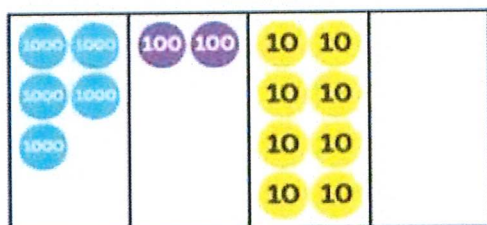
?	
6860m	5470m

Subtraction (Year 4)

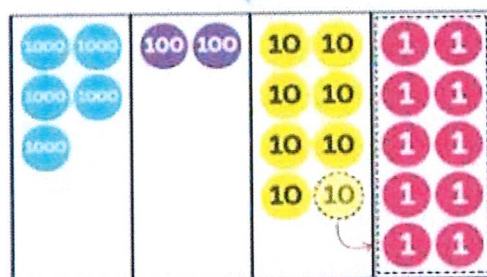
Subtract with numbers up to four digits, including exchanging.

$$\begin{array}{r} 3437 \\ - 2016 \\ \hline 1421 \end{array}$$

- Step 1** Subtract the ones.
7 ones - 6 ones = 1 one
- Step 2** Subtract the tens.
3 tens - 1 ten = 2 tens
- Step 3** Subtract the hundreds.
4 hundreds - 0 hundreds = 4 hundreds
- Step 4** Subtract the thousands.
3 thousands - 2 thousands = 1 thousand



There aren't enough ones.

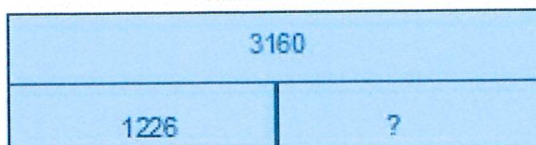


$$\begin{array}{r} 52\overset{7}{8}\overset{10}{0} \\ - 3169 \\ \hline \end{array}$$

$$\begin{array}{r} 2\overset{6}{7}54 \\ - 1562 \\ \hline 1192 \end{array}$$

Using the bar model to find missing digits.

There are 3,160 books in a shop. 1,226 are in English and the rest are in French. How many French books are there?

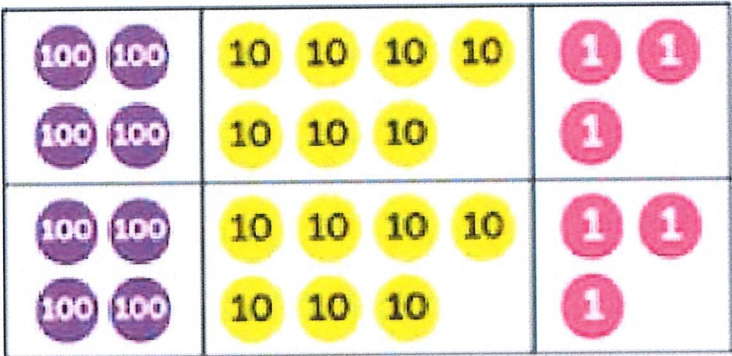


Year 4

Multiplication (Year 4)

Children know all times tables up to 12 x 12.
Children use expanded column multiplication

$$\begin{array}{r} 314 \\ \times 3 \\ \hline 12 \quad (3 \times 4) \\ 30 \quad (3 \times 10) \\ + 900 \quad (3 \times 300) \\ \hline 942 \end{array}$$



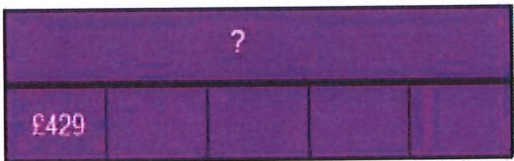
$$\begin{array}{r} 4 \quad 7 \quad 3 \\ \times \quad \quad 2 \\ \hline \end{array}$$

Multiply using the bar model

A computer costs 5 times as much as a television, The television costs £429.

Cost of the computer

How much does the computer cost?

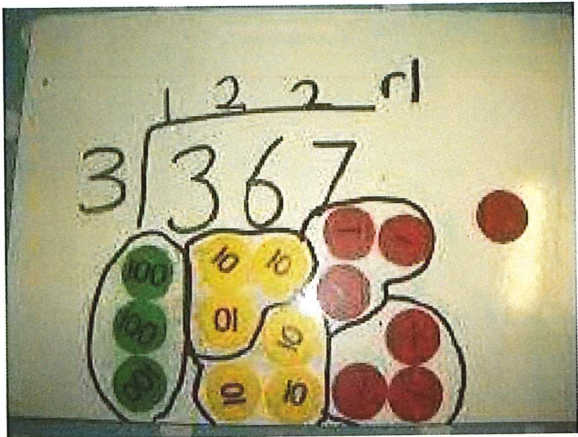


Year 4

Division (Year 4)

Dividing 3 digit numbers by a 1 digit number using short division.

	H	T	U	
	0	2	5	r1
5	1	2	6	
		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div></div>



Divide using the bar model

Desmond and Melissa collect cards. They have 192 cards in all. Melissa has three times as many cards as Desmond. How many cards does Desmond have?

192			
D = ?	M	M	M

Year 5

Addition (Year 5)

Adding numbers with more than 4 digits including decimals.

Using place value charts and place value counters is key when understanding adding decimals.

$$\begin{array}{r} £23.59 \\ + £7.55 \\ \hline £31.14 \end{array}$$

$$\begin{array}{r} 23481 \\ + 1362 \\ \hline 24843 \end{array}$$

$$\begin{array}{r} 19.01 \\ 3.65 \\ + 0.7 \\ \hline 23.36 \end{array}$$

Using the bar model to find missing digits.

This is not a form of getting the correct answer but helping to guide children to the correct operation.

MacDonalds sold £9957.68 worth of hamburgers and £1238.5 worth of chicken nuggets. How much money did they take altogether?

?	
£957.68	£1238.5

Year 5

Subtraction (Year 5)	
<p>Subtract with at least 4 digit numbers including two decimal places.</p> <p>Include money, measures and decimals.</p>	<p>Subtract with decimal values, including mixtures of integers and decimals, aligning the decimal point.</p> <div><div><div>10</div><div>281056</div><div>- 2128</div><div>28928</div></div><div><div>8</div><div>7169.0</div><div>- 372.5</div><div>6796.5</div></div></div> <p>A whole to Lapland costs £5005 for a family of four, the Smith's have only saved £3787.75, how much money do they still need to find?</p> <div><div>£5005</div><div><div>?</div><div>£3787.75</div></div></div>
<p>Using the bar model to find missing digits.</p>	

Year 5

Multiplication (Year 5)

Multiply up to 4 digit numbers by 2 digit numbers using long division.

Children need to be taught to approximate first to check the reasonableness of their answers.

So 56×27 could be $60 \times 30 = 1800$

$$\begin{array}{r} 56 \\ \times 27 \\ \hline 392 \quad (56 \times 7) \\ 1120 \quad (56 \times 20) \\ \hline 1512 \end{array}$$

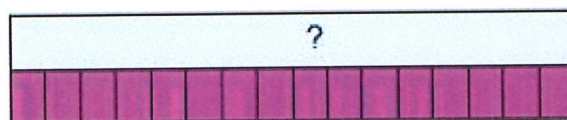
- Explain that first we are multiplying the top number by 7 starting with the units. (any carrying needs to be done underneath the numbers).
- Now explain that we need to put a 0 underneath—explain that this is because we are multiplying the number by 20.. (2 tens) which is the same as multiplying 10 and 2.
 - Now add the 2 numbers together to give you the answer.
 - This will need lots of modeling to show the children.

$$\begin{array}{r} 3652 \\ \times 8 \\ \hline 29216 \\ \text{5 4 1} \end{array}$$

$$\begin{array}{r} 1234 \\ \times 16 \\ \hline 7404 \quad (1234 \times 6) \\ 12340 \quad (1234 \times 10) \\ \hline 19744 \end{array}$$

Using the bar model to support multiplication

The cost to run a sports centre is £4375 a week, how much would it cost to run for 16 weeks?



£4375
a week

Year 5

Division (Year 5)

Divide up to 4 digit numbers by 1 digit numbers using short division. Also numbers that have remainders.

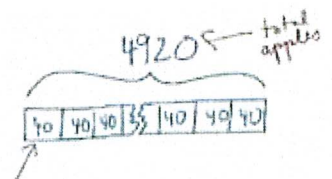
$$\begin{array}{r} 0663r5 \\ 8 \overline{) 535029} \end{array}$$

Short division with remainders: Now that pupils are introduced to examples that give rise to remainder answers, division needs to have a real life problem solving context, where pupils consider the meaning of the remainder and how to express it, ie. as a fraction, a decimal, or as a rounded number or value, depending upon the context of the problem.

Using the bar model to support division

Bar Model to support understanding of problem solving:

Frank has 4920 apples. He needs to put them into baskets of 40. How many baskets does he need?



Year 6

Addition (Year 6)

Adding several numbers with up to 3 decimal places.

$$\begin{array}{r}
 23.361 \\
 9.080 \\
 59.770 \\
 + 1.300 \\
 \hline
 93.511 \\
 \begin{array}{r}
 212
 \end{array}
 \end{array}$$

Empty decimal places should be filled with zero to show

Adding several numbers with different numbers of decimal places (including money and measures):

- Tenths, hundredths and thousandths should be correctly aligned, with the decimal point lined up vertically including in the answer row.

Using the bar model to support addition

Jack went on holiday. His flight cost £70.50, the hotel £1295 and spending money £427.89. How much did Jack spend on his holiday?

?		
£70.50	£427.89	£1295

Year 6

Subtraction (Year 6)	
Subtracting with increasingly more complex numbers including decimals.	<p>Very important to use in a range of contexts- measures and money.</p> <div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>0</div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>0</div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>0</div></div></div> <div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>0</div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>0</div></div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>0</div></div></div>

Year 6

Multiplication (Year 6)	
Short and long multiplication with up to 2 decimal places.	<div><div><div>319</div><div>8</div><div>x</div><div>25.52</div></div></div>
Using the bar model to support multiplication	<div><div><div>If 5 friends went on holiday and each paid £579.75 what was the total cost of the holiday?</div><div>Cost of the holiday</div><div><div>?</div><div>£579.75</div><div></div><div></div><div></div><div></div></div></div></div>

Year 6

Division (Year 6)

Short division to divide by a 1 digit number.

$$\begin{array}{r} 0812.125 \\ 8 \overline{) 6497.000} \end{array}$$

Short division with remainders: Pupils should continue to use this method, but with numbers to at least 4 digits, and understand how to express remainders as fractions, decimals, whole number remainders, or rounded numbers. Real life problem solving contexts need to be the starting point, where pupils have to consider the most appropriate way to express the remainder.

Long division to divide by 2 digit number.

Try this equation: $848 \div 16 =$
Approximation $800 \div 16 =$ 50

$$\begin{array}{r} 053 \\ 16 \overline{) 848} \\ \underline{-8} \\ 48 \\ \underline{-48} \\ 0 \end{array}$$

$48 - 16 = 3$
No remainder

Start with the largest place holder in the case it will be the hundreds column.
 $8 - 16$ is not possible. So put a 0 above the hundreds column.
Carry the 8 over to the Tens column.
 $84 - 16 =$
 $82 - 16 = 66$
 $66 - 80 = 4$



Division

$$\begin{array}{r} 43.38 \\ 13 \overline{) 564.00} \end{array}$$

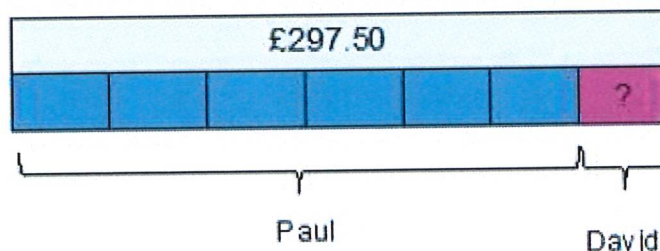
$$564 \div 13 = 43 \text{ r } 5 = 43 \frac{5}{13} = 43.4 \text{ (to 1dp)}$$

1	13
2	26
4	52
5	65
8	104
10	130
20	260

Using known multiplication facts

Using the bar model to support division

Paul and David hire a car together at a cost of £297.50. Paul pays 6 times more than David. How much does David pay?



Recommended Maths Websites:

BBC KS1 Maths

<http://www.bbc.co.uk/education/subjects/zixhfg8>

BBC KS2 Maths

<http://www.bbc.co.uk/education/subjects/z826n39>

Singapore Maths (Using 'Bar Method' Modelling To Solve Word Problems)

<http://www.mathplayground.com/thinkingblocks.html>

(also available as free i-pad apps)

General Curriculum Games Sites – with Maths

<http://www.topmarks.co.uk/Search.aspx?Subject=16&AgeGroup=2>

<http://www.crickweb.co.uk/>

<http://resources.woodlands-junior.kent.sch.uk/maths/index.html>

Problem Solving and Reasoning

N'Rich KS1

<http://nrich.maths.org/9077>

N'Rich KS2

<http://nrich.maths.org/9084>