



CALCULATION POLICY

Review Due:	September 2026
Last Review	September 2024
Applicable to:	Brook Green
Reviewed by:	MW
Approved by:	SH

Rationale

This policy has been designed to teach children through the use of concrete, pictorial and abstract methods. This calculation policy should be used to support children to develop a deep understanding of number and calculation.

Policy Procedures

Using the concrete-pictorial-abstract approach:

Children develop an understanding of a mathematical concepts through the three steps (or representations), known as a concrete-pictorial-abstract approach. Reinforcement is achieved by going back and forth between these representations.

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

Pictorial representation The iconic stage - a pupil 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 The symbolic stage - a pupil is now capable of representing problems by using mathematical notation, for example: $12 \div 2 = 6$.

Guidance

This is document provides guidance and examples for key objectives for each Progression Stage but is not to be followed as a complete planning aid as not all objectives are exemplified.

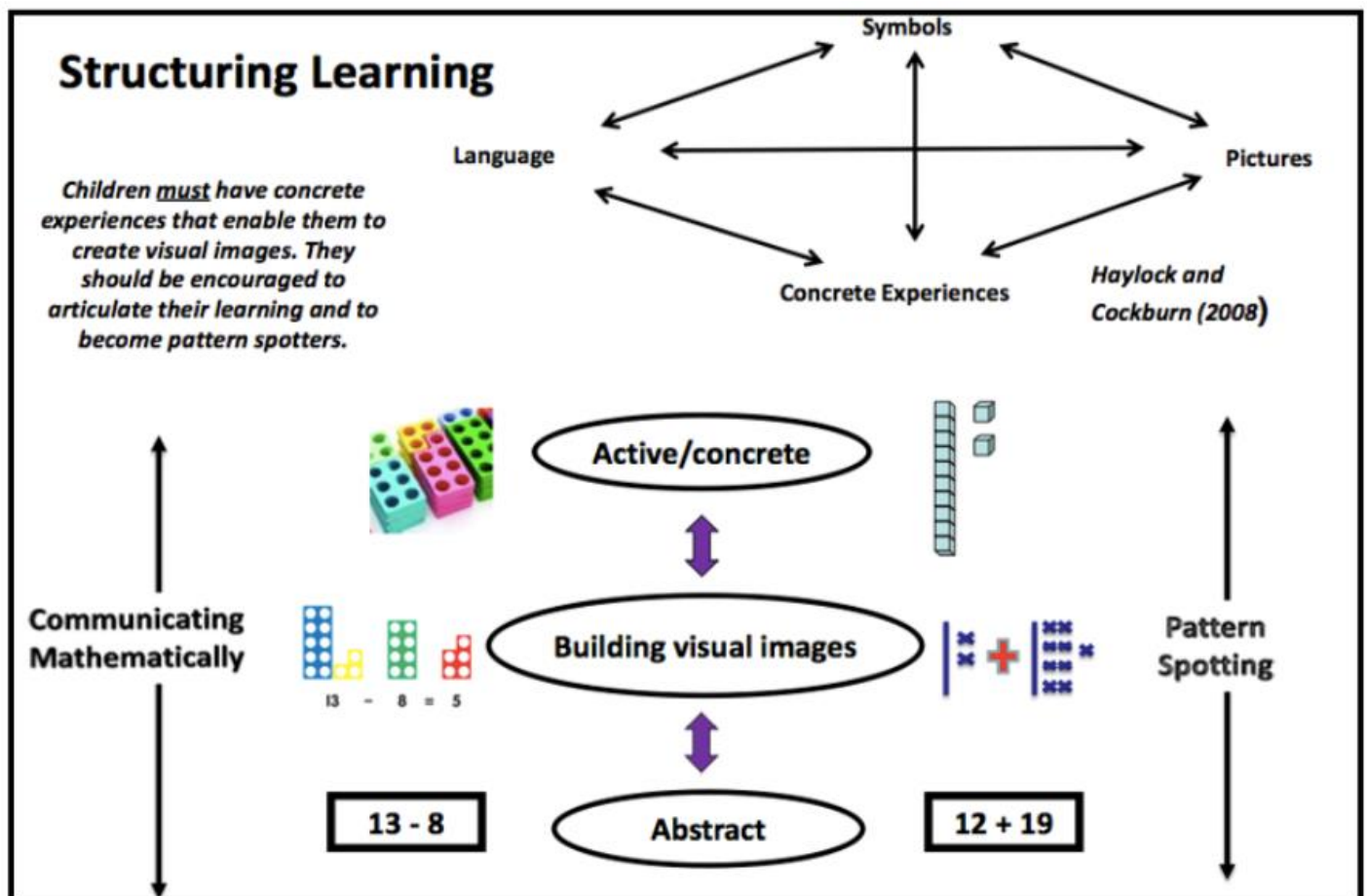
B Squared continuum

Mastered

Gaining skills and understanding

Involvement

Engagement



Progression Steps 1-3

Prior to learning the following counting strategies, pupils must be secure in the 5 principles of counting (Gelman and Gallistel 1978)

1. The one-one principle. – I say a number for every item that I count.
2. The stable-order principle – The number order does not change.
3. The cardinal principle – the last number that I say describes the whole group.
4. The abstraction principle - I can count things that I cannot touch (for example sounds)
5. The order-irrelevance principle – It does not matter which order I count items in (link to conservation of number).

Pupils must also be confident in subitizing to 5 (recognizing small quantities without counting).

For more information on cardinality and counting, please see the following information on the NCETM website.

<https://www.ncetm.org.uk/classroom-resources/ey-cardinality-and-counting/>

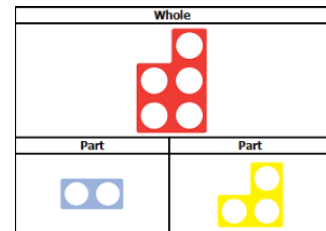
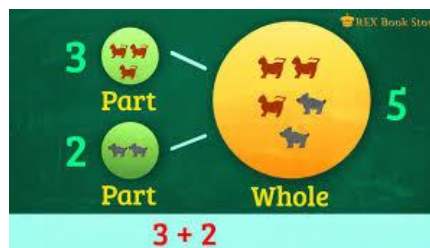
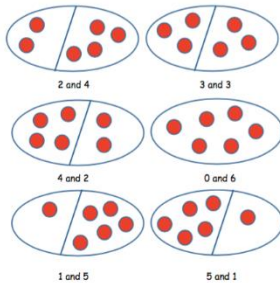
Progression Steps 3-4

Addition

Explore part whole relationship

They develop ways of recording calculations using pictures

Making 6

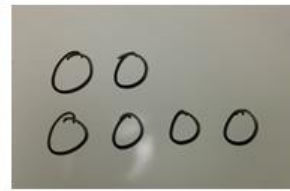


Using the ten frame to support addition of single digits – counting all/combining two groups

	$6 + 4 = 10$
	$4 + 4 = 8$
	$5 + 2 = 7$
	$2 + 4 = 6$

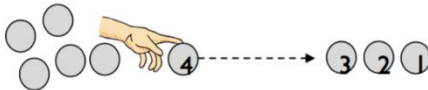
Solving problems using concrete and pictorial images.

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



Subtraction

Taking away after counting out practical equipment. Children would be encouraged to physically remove these using touch counting.



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.

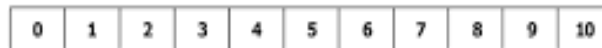
donut

donuts

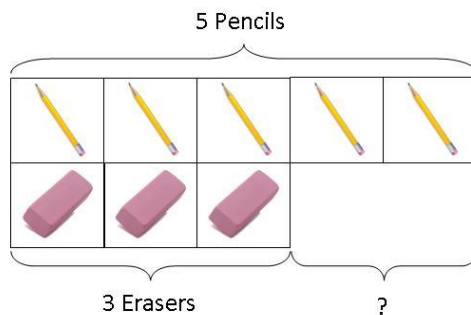


$$8 - 4 = \underline{\quad}$$

Those who are ready may record their own calculations



Using the ten frame to support subtraction by taking away



Peter has 5 pencils and 3 erasers. How many more pencils than erasers does he have?
 Solving problems using concrete and pictorial images.

Multiplication

Double 2

boots

$$2 + 2 = 4$$

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

Half is...

10

5

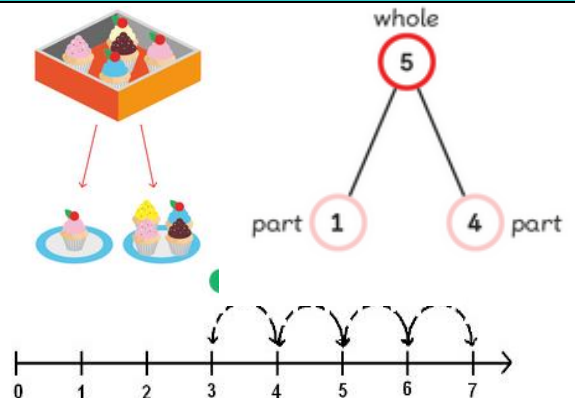
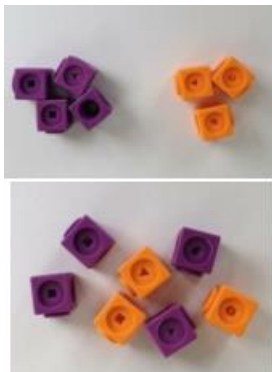
Halving Mat

Progression Steps 4-6

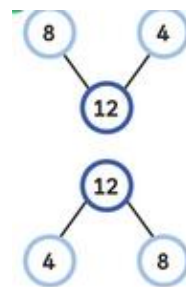
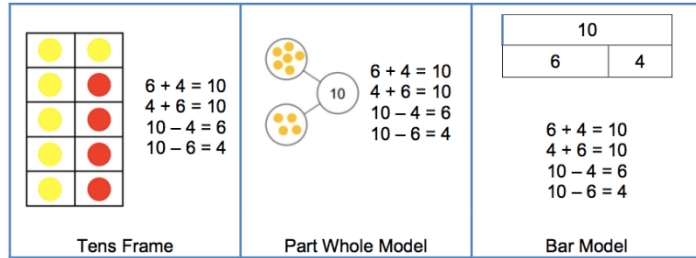
Addition

Joining two groups and then recounting all objects using one-to-one
Correspondence
(lots of practice making 10 and numbers to 10 e.g. $6 + 4 = 10$ or $3 + 5 = 8$)

$$3 + 4 = 7$$



Learn number bonds to 20 and demonstrate related facts
Teach addition and subtraction alongside each other as pupils need to see the relationship between the facts.



$$8 + 4 = 12$$

$$4 + 8 = 12$$

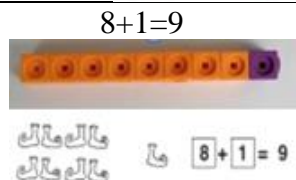
This is a family of addition and subtraction facts.

$$12 - 8 = 4$$

$$12 - 4 = 8$$



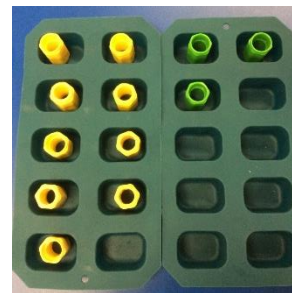
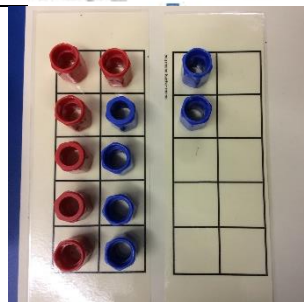
Add and subtract one digit numbers and two digit numbers to 20, including zero



Bridging 10

Use ten frames, Singapore bars, egg boxes and number lines to practice.

Chn should start with the larger number and add the smaller number seeing what makes ten and what is left over.



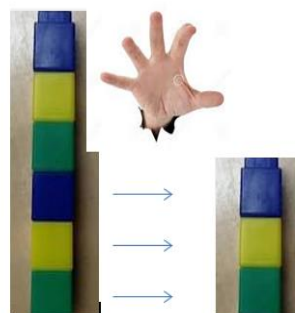
$6 + 6 = 12$
from

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

Subtraction

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

$6 - 3 = 3$



Subtraction by counting back

Let's Learn

Subtract by Counting Back

Subtract 3 from 15.

Count back 3 steps from 15.

$15 - 3 = 12$

There are 12 flowers left.

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

Subtract by Crossing Out

1

$7 - 2 = 5$

5 ladybirds are left.

$7 - 2$

Subtracting using the part-part whole (include problem solving with missing digits).

$? - 5 = 2$

How many boats are not red?

$7 - 5 = 2$

2 boats are not red.

Subtraction by subtracting from 10

Children subtract from 10 and not from ones

$14 - 8 = ?$

Let's Learn

Subtract from 10

$14 - 8 = ?$

Put 10 in a box ↓

$10 - 8 = 2$

$4 + 2 = 6$

$14 - 8 = 6$

Sam has 6 doughnuts left.

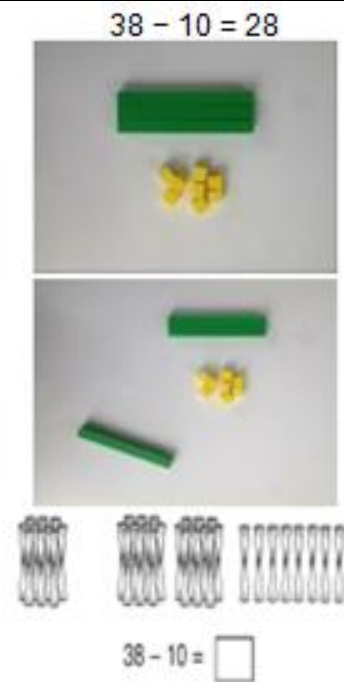
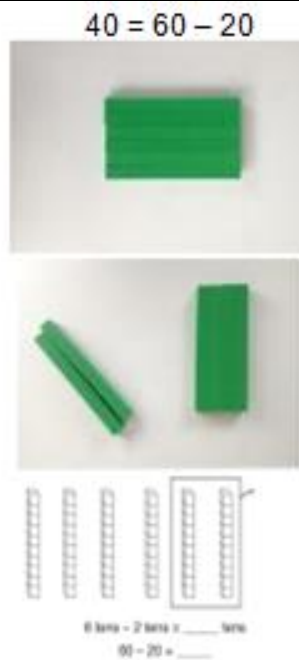
When subtracting using Dienes children should be taught to regroup a ten rod for 10 ones and then subtract from those ones



$$20 - 4 = 16$$

Subtracting multiples of 10

Using the vocabulary of 1 ten, 2 tens etc alongside 10, 20, 30 Is very important here as pupils need to understand that it is a 10 not a 1 that is being taken away



Multiplication

Counting in multiples of 2, 5 and 10 from zero

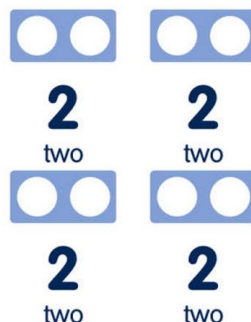
Children should count the number of groups on their fingers as they are skip counting.



4 groups of 2 = 8



$$2 \times 4 = 8$$

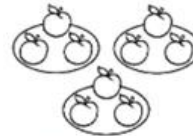
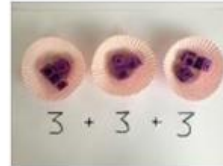


When moving to pictorial/written calculations the vocabulary is important



This image represents two groups of 4 or 4 twice

Solving multiplication problems using repeated addition



How many apples are there altogether?

$$3 + 3 + 3 = 9$$

Division

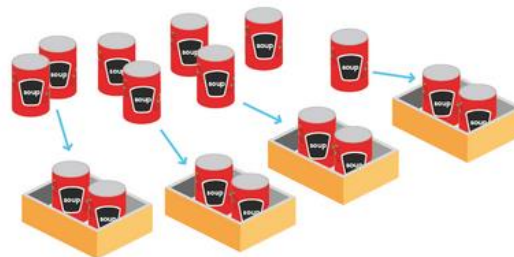
Pupils should be taught to divide through working practically and the sharing should be shown below the whole to familiarize children with the concept of the whole.

The language of whole and part should be used.

$$10 \div 2 = 5$$

$$8 \div 4 = 2$$

1 There are 8 cans.

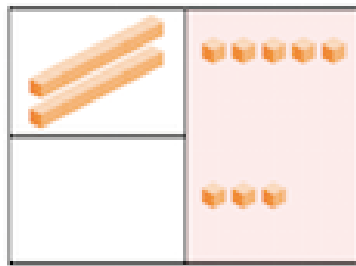


There are 4 boxes of 2 cans.

Progression Steps 5-6

Addition

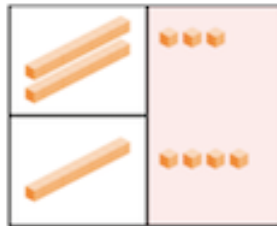
Using concrete objects and pictorial representations to add a 2 digit number with a 1 digit number.



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

Using concrete objects and pictorial representations to add a 2 digit number and 10s number.

Step 1 Add the ones.
 $3 \text{ ones} + 4 \text{ ones} = 7 \text{ ones}$



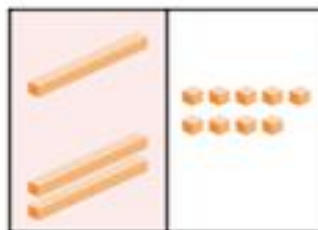
	tens	ones
	2	3
+	1	4
	2	7
	2	7

Step 1 Add the ones.



	tens	ones
	1	9
+	2	0
	3	9
	3	9

Step 2 Add the tens.
 $1 \text{ ten} + 2 \text{ tens} = 3 \text{ tens}$

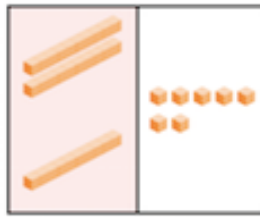


	tens	ones
	1	9
+	2	0
	3	9
	3	9

$19 + 20 = 39$

Using concrete objects and pictorial representations to add a 2 digit numbers.

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



$$23 + 14 = 37$$

	tens	ones
	2	3
+	1	4
	3	7

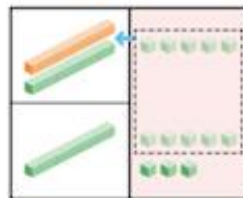
Adding with renaming

Add 15 and 18.

Use to help you add.

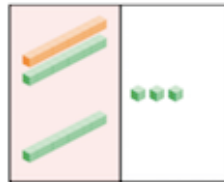


Step 1 Add the ones.
5 ones + 8 ones = 13 ones
Regroup the ones.
13 ones = 1 ten and 3 ones



	tens	ones
	1	5
+	1	8
	1	3

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

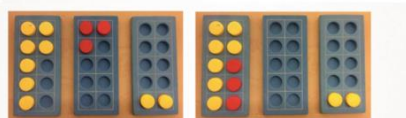


$$15 + 18 = 33$$

	tens	ones
	1	5
+	1	8
	1	3
+	2	0
	3	3

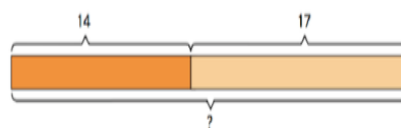
Using concrete objects and pictorial representations to add a 3 single digit numbers.

$$7 + 3 + 2 = \quad \text{leads to } 10 + 2 =$$



Using the bar to find missing digits.
It is important for children to use the bar in this way to encourage the use of it to aid with problem solving.

Helen has 14 breadsticks. Her friend has 17. How many do they have altogether?

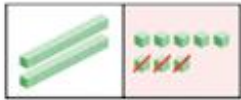


?	
14	17

Subtraction

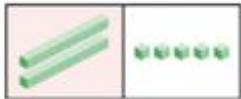
Using concrete objects and pictorial representations to subtract a 1 digit number from 2 digit number.

Step 1 Subtract the ones.
 $8 \text{ ones} - 3 \text{ ones} = 5 \text{ ones}$



tens	ones
2	8
-	3
	5

Step 2 Subtract the tens.

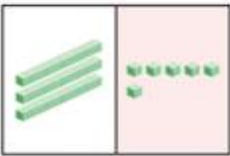


tens	ones
2	8
-	3
2	5

$28 - 3 = 25$

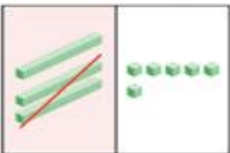
Using concrete objects and pictorial representations to subtract a 10s number from 2 digit number.

Step 1 Subtract the ones.



tens	ones
3	6
-	0
	6

Step 2 Subtract the tens.
 $3 \text{ tens} - 2 \text{ tens} = 1 \text{ ten}$



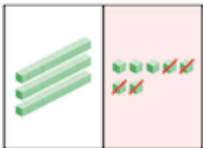
tens	ones
3	6
-	0
1	6

$36 - 20 = 16$

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

Subtract 24 from 37.

Step 1 Subtract the ones.
 $7 \text{ ones} - 4 \text{ ones} = 3 \text{ ones}$



tens	ones
3	7
-	4
	3

Use to help you subtract.



Step 2 Subtract the tens.
 $3 \text{ tens} - 2 \text{ tens} = 1 \text{ ten}$



tens	ones
3	7
-	4
1	3

$37 - 24 = 13$

Recognise and use the inverse relationship between addition and subtraction

?	
23	53

Use this to check calculations and solve missing number problems.

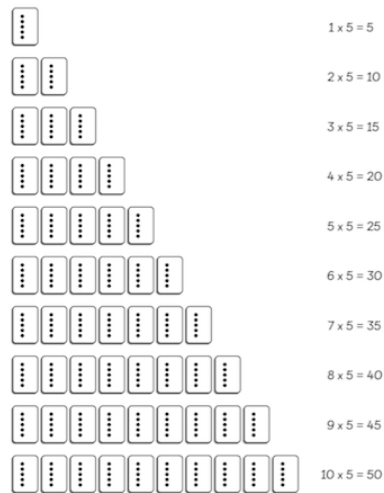
76	
23	?

Multiplication

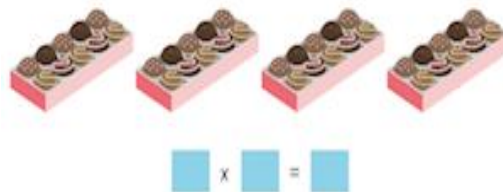
Skip counting in multiples of 2, 3, 5, 10 from 0



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



I can use the multiplication (x) and equal (=) sign when writing out my times tables.



Multiplication is commutative

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

How many dots are there?

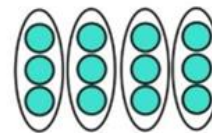


$$2 \times 5 = 10$$

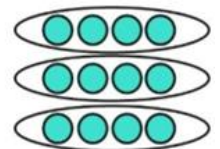


$$5 \times 2 = 10$$

2×5 is equal to 5×2 .

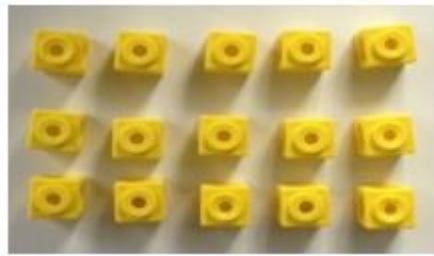


$$12 = 3 \times 4$$



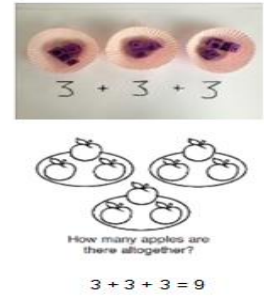
$$12 = 4 \times 3$$

Solve multiplication problems in context using arrays and repeated addition



$3 \times 5 =$

$5 \times 3 =$



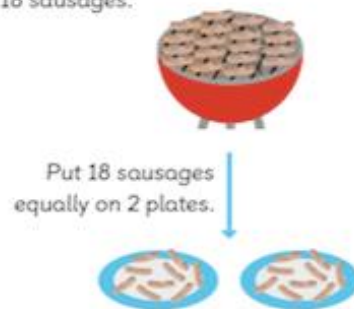
Division

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

$10 \div 10$	•	•	5
$20 \div 10$	•	•	7
$70 \div 10$	•	•	2
$50 \div 10$	•	•	6
$60 \div 10$	•	•	1
$100 \div 10$	•	•	10

Solve division problems in context using concrete objects by sharing

There are 18 sausages.



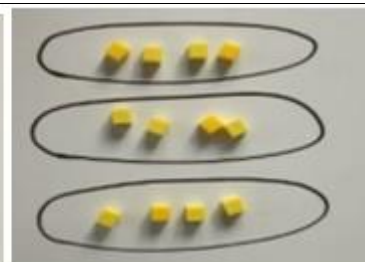
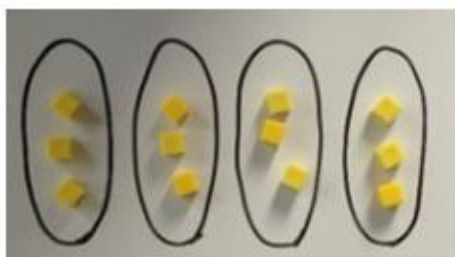
Put 18 sausages equally on 2 plates.

There are 9 sausages on each plate.

$18 \div 2 = 9$



Solve division problems in context using arrays



I can solve division as grouping.

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



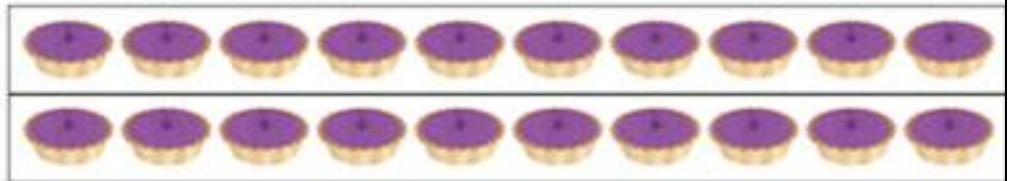
Put into groups of 5.

There are groups.

I can use the inverse.

This should be taught alongside both multiplication and division.

Make a family of multiplication and division facts.



$2 \times 10 = 20$ ————— $20 \div 10 =$

$10 \times 2 = 20$ ————— $20 \div 2 =$

Progression Step 7 – lower Step 8

Addition

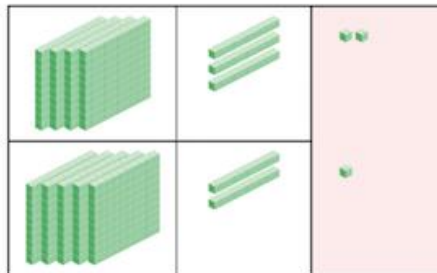
Add two three digit numbers.

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

Children to word gradually to three digit + three digit starting without carrying and gradually moving towards carrying.

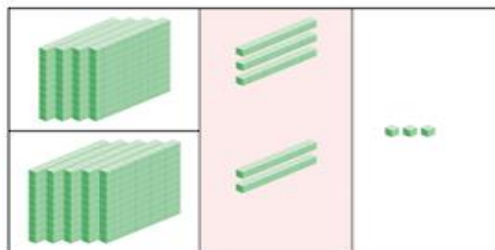
$$432 + 521 =$$

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



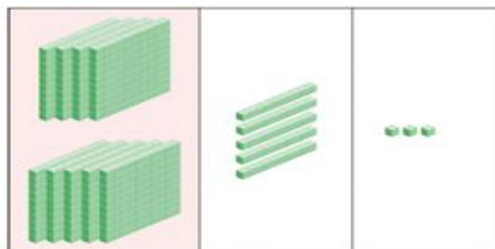
	h	t	o
	4	3	2
+	5	2	1
			3

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

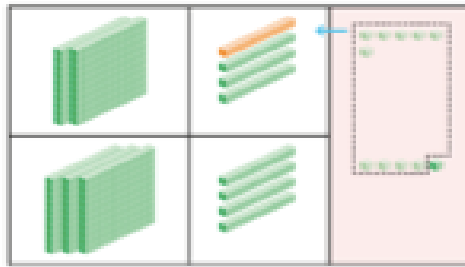


	h	t	o
	4	3	2
+	5	2	1
	9	5	3

$$432 + 521 = 953$$

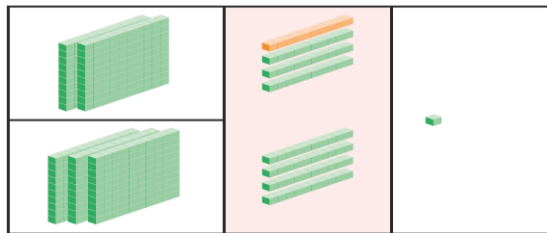
There are 953 flowers altogether.

$$236 + 345 =$$



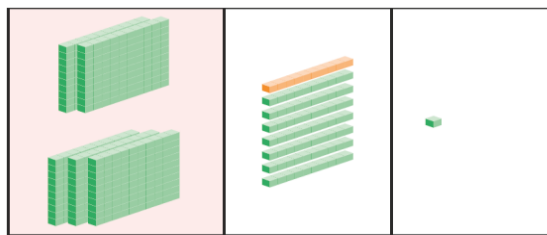
	h	t	o
	2	3	6
+	3	4	5
			1

Step 2 Add the tens.
 $1 \text{ ten} + 3 \text{ tens} + 4 \text{ tens} = 8 \text{ tens}$



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

Step 3 Add the hundreds.
 $2 \text{ hundreds} + 3 \text{ hundreds} = 5 \text{ hundreds}$



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

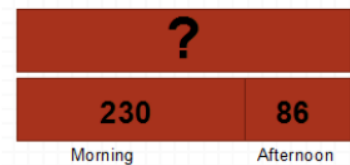
$$236 + 345 = 581$$

Using the bar to find missing digits. It is important for children to use the bar in this way to encourage the use of it to aid with 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

Subtract up to 3 digits from 3 digits.

Very important for children to use dienes equipment along with a place value chart to support.

Only when secure with the method should exchanging be introduced.

Subtract 723 from 975.

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

h	t	o
9	7	5
-	7	2
		3
		2

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

h	t	o
9	7	5
-	7	2
		3
		2
5		

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

h	t	o
9	7	5
-	7	2
		3
		2
2	5	2

975 - 723 = 252

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

h	t	o
5	2	0
-	2	6
		9
		1
5	1	1

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

h	t	o
5	2	0
-	2	6
		9
		1
2	5	1

520 - 269 = 251

Subtract 269 from 520.

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

h	t	o
5	2	0
-	2	6
		9
		1

Using the bar to find missing digits.

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

315	
185	?

$315 - 185 = ?$

$185 + ? = 315$

?	
185	315

$185 + 315 = ?$

$? - 185 = 315$

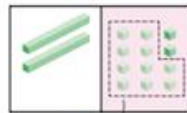
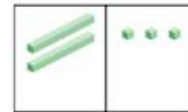
Multiplication

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

Multiply a two-digit number by a one digit.

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.

Using the bar to solve multiplication problems.

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

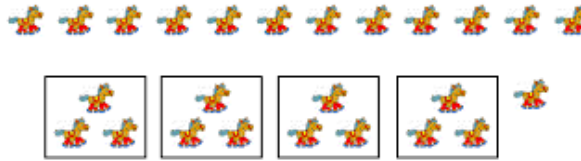
Whole unknown

?			
15	15	15	15

Division

Dividing by grouping understanding the concept of remainders.

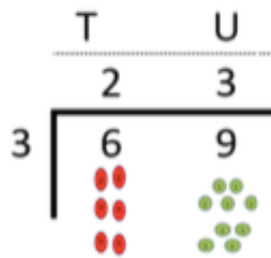
Start with using the real objects-or objects that represent the calculation.



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

Dividing using short division.

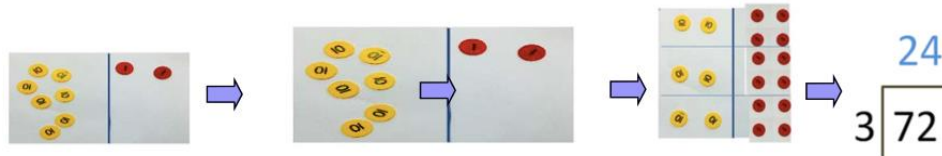
Once children are secure with division as grouping and demonstrate this using number lines, arrays etc., short division for larger 2-digit numbers should be introduced, initially with carefully selected examples requiring no calculating of remainders at all. Start by introducing the layout of short division by comparing it to an array.



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

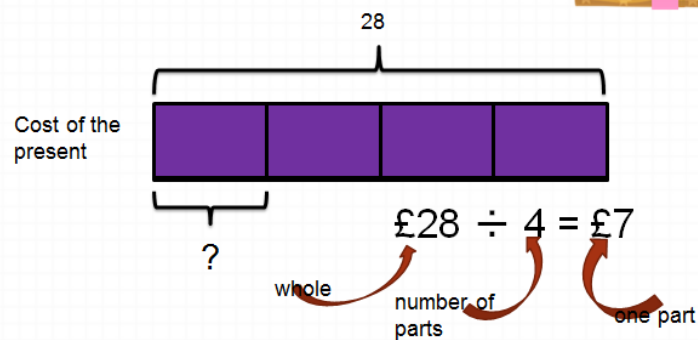
- How many 3's in 6? = 2, and record it above the **6 tens**.
- How many 3's in 9? = 3, and record it above the **9 ones**.

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.



Using the bar to aid the solving of division problems.

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



Progression Step 8

Addition

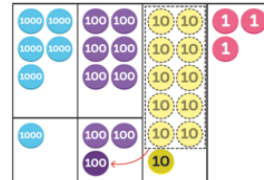
Adding numbers with up to 4 digits.

Again this should start with the children using dienes to support them with lots of discussion about the value of each digit.

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

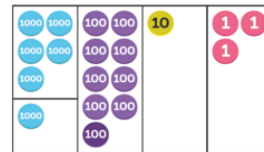
- Step 1 Add the ones.
4 ones + 0 ones = 4 ones
 - Step 2 Add the tens.
1 tens + 4 tens = 5 tens
 - Step 3 Add the hundreds.
3 hundreds + 2 hundreds = 5 hundreds
 - Step 4 Add the thousands.
2 thousands + 4 thousands = 6 thousands
- 2314 + 4240 = 6554

Step 2 Add the tens. 7 tens + 3 tens + 1 ten = 11 tens
Rename the tens. 11 tens = 1 hundred and 1 ten



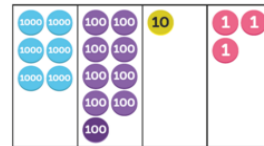
$$\begin{array}{r} 5\ 6\ 7\ 8 \\ + 1\ 2\ 3\ 5 \\ \hline 1\ 3 \end{array}$$

Step 3 Add the hundreds.
6 hundreds + 2 hundreds + 1 hundred = 9 hundreds



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

Step 4 Add the thousands.
5 thousands + 1 thousand = 6 thousands



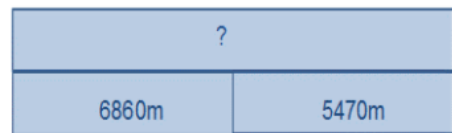
$$\begin{array}{r} 5\ 6\ 7\ 8 \\ + 1\ 2\ 3\ 5 \\ \hline 6\ 9\ 1\ 3 \end{array}$$

Using the bar to find missing digits.

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

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?



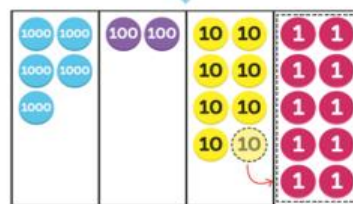
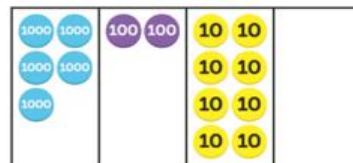
Subtraction

To subtract with numbers up to four digits including exchanging when children are secure.

Again children need to use dienes to support their learning.

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

- 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.



$$\begin{array}{r} 5\ 2\ 7\ 10 \\ - 3\ 1\ 6\ 9 \\ \hline \end{array}$$

Division

Dividing up to three digit numbers by a one-digit number using short division.

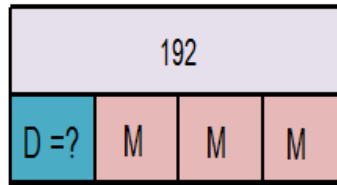
Only when the children are secure with dividing a two-digit number should they move onto a 3-digit number.



	H	T	U	
	0	2	5	r1
5	1	'2	'6	
		●●●●●	●●●●	●

Dividing using the bar.

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?



Progression Step 8-lower Step 9

Addition

Adding numbers with more than 4 digits including decimals

Using place value charts are key to this as well as place value counters to help with the decimals.

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

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

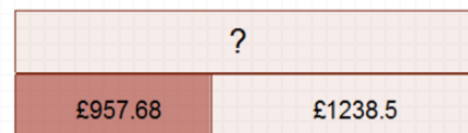
$$\begin{array}{r} 19.01 \\ 3.65 \\ + 0.7 \\ \hline 23.36 \end{array}$$

Using the bar to find missing digits.

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

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?



Subtraction

Subtract with at least four digit numbers including two decimal places.

Include money, measures and decimals ensuring that children do this practically before the abstract.

Subtract with decimal values, including mixtures of integers and decimals, aligning the decimal point.

$$\begin{array}{r} \overset{2}{3} \overset{10}{\cancel{7}} \overset{10}{0} \overset{5}{\cancel{8}} \overset{6}{6} \\ - \quad \quad 2 \quad 1 \quad 2 \quad 8 \\ \hline 2 \quad 8 \quad 9 \quad 2 \quad 8 \end{array}$$

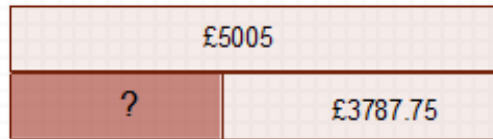
Approximate, Calculate, Check.

$$\begin{array}{r} \overset{6}{\cancel{7}} \overset{10}{\cancel{7}} \overset{6}{\cancel{9}} \overset{8}{\cancel{8}} \cdot \overset{0}{0} \\ - \quad \quad 3 \quad 7 \quad 2 \cdot 5 \\ \hline 6 \quad 7 \quad 9 \quad 6 \cdot 5 \end{array}$$

Using the bar to find missing digits.

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

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?



Multiplication

Multiplying up to four digit numbers by two digits using long multiplication.

Children need to be taught to approximate first, e.g. for 72×38 , they will use rounding: 72×38 is approximately $70 \times 40 = 2800$, and use the approximation to check the reasonableness of their answer.

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

Approximate, Calculate, Check.

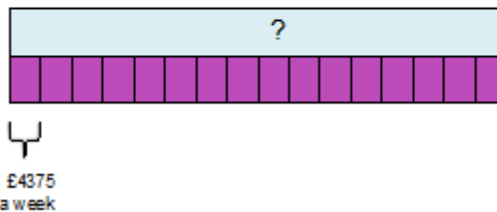
- Explain that first we are multiplying the top number by 7 starting with the units. (any carrying needs to be done underneath the numbers).
- Now explain that we need to put a 0 underneath—explain that this is because we are multiplying the number by 20.. (2 tens) which is the same as multiplying 10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

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

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

Using the bar to support multiplication.

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



Division

Diving with up to four digit numbers by one digit including numbers where remainders are left.

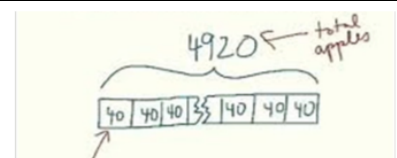
$$\begin{array}{r}
 0663 \text{ r } 5 \\
 \hline
 8 \overline{) 5350^2 9}
 \end{array}$$

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**, i.e. as a fraction, a decimal, or as a rounded number or value, depending upon the context of the problem.

Using the bar to support division problems.

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?



Progression Step 9

Addition

Adding several numbers with up to three decimal places.

$$\begin{array}{r}
 23.361 \\
 9.080 \\
 59.770 \\
 + 1.300 \\
 \hline
 93.511 \\
 \begin{array}{l} 2 \quad 1 \quad 2 \end{array}
 \end{array}$$

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.

Empty decimal places should be filled with zero to show

Adding using the bar.

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

Subtraction

Subtracting with increasingly large and more complex numbers and decimal values.

$$\begin{array}{r}
 80699 \\
 - 89949 \\
 \hline
 60750
 \end{array}$$

$$\begin{array}{r}
 1015.419 \text{ kg} \\
 - 36.080 \text{ kg} \\
 \hline
 69.339 \text{ kg}
 \end{array}$$

Very important to use in a range of contexts- measures and money.

Using the bar for subtraction.

Chloe wants to buy a new car for £6450. She has £4885.87 in her savings account. Her Dad gives her £150 for her birthday. How much more money does she need to save?

£6450		
£4885.87	£150	?

Multiplication

Short and long multiplication with up to two decimal places.

$$\begin{array}{r} 3.19 \\ \times 25.52 \\ \hline \end{array}$$

Approximate,
Calculate,
Check.

Using the bar to help with multiplication.

If 5 friends went on holiday and each paid £579.75 what was the total cost of the holiday?

Cost of the holiday



Division

Divide at least 4 digits by both single-digit and 2-digit numbers (including decimal numbers and quantities)

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

the remainder.

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

Long division this is for when dividing by two digit numbers.

Try this equation; $848 \div 16$

Approximation $800 \div 16 =$ 50

$$\begin{array}{r} 053 \\ 16 \overline{)848} \\ \underline{-80} \\ 48 \\ \underline{-48} \\ 0 \end{array}$$

48 - 16 = 3 No remainder

Start with the largest place holder in this case it will be the hundreds column.

8 - 16 not possible. So put a 0 above the hundreds column.

Carry the 8 digit over to the Tens column!

$84 - 16 =$

$16 \times 5 = 80$

$84 - 80 = 4$

Division



$564 \div 13$

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

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

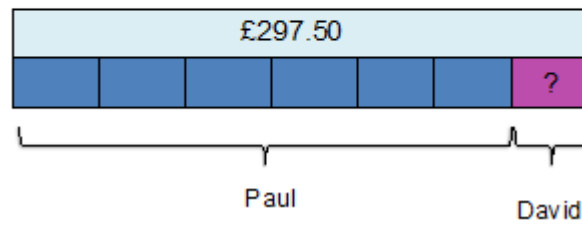
Using known multiplication facts

$564 \div 13$

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

Using the bar to help divide.

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?



Additional Relevant Documents

Mathematics Policy