Progression in Calculation

Fairisle Junior School

Key Stage One

Children in Years 1 and 2 will be gain an understanding of the basic building blocks of mental and written methods in maths. This is done through learning about place value, being able to partition numbers into tens and ones. In doing so, they will develop an understanding of how numbers work, so that they are confident in 2-digit numbers and will be able to read and say numbers above 100.

There is a focus on number bonds, first via practical hands-on experiences and subsequently through memorisation, to ensure that all children leave Year 2 knowing the complements of all numbers up to 10 at least. They will also have experienced and been taught pairs to 20.

Children will be taught to count in 2s, 3s, 5s and 10s and will have related this skill to repeated addition. By the end of Year 2, children should be able to recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.

The children will also be taught to double and halve numbers and will also experience scaling up or down as a further aspect of multiplication and division. Fractions will be introduced as numbers and as operators, specifically in relation to halves, quarters and thirds.

Lower Key Stage 2 (Years 3 and 4)

In Years 3 and 4, children build on their concrete and conceptual understanding of the for operations, particularly their competence with larger numbers. They will use place value and number facts to add and subtract mentally and will develop strategies replacing 'finger based' methods. They will learn to add and subtract multiples of 10, 100 and 1000.

They will learn standard written methods for adding and subtracting larger numbers and during these two years, multiplication and division facts should be memorised up to 12 x 12. The children will develop their skills by learning efficient written methods for multiplying and dividing 2-digit by 1-digit numbers alongside mental strategies to cope with dividing by 5 or multiplying by 20.

Children will learn to reduce a fraction to its simplest form as well as finding non-unit amount of amounts and quantities. Decimal numbers are introduced and consolidated.

Upper Key Stage 2 (Years 5 and 6)

Children in Years 5 and 6 develop their understanding of place value further. By the time they leave Year 6, they should be able to read, write, order and compare numbers up to 10,000,000 and determine the value of each digit. They will move on to performing arithmetic operations with both decimals and fractions. Children will become confident in applying all four operations whilst working with fraction and decimal problems.

They will continue to consolidate their use of written methods with adding and subtracting whole number and decimals. They will also extend their confidence and knowledge with written methods for multiplication and division.

Children will draw upon their understanding of place value and number facts to develop their mental strategies further to include increasingly larger numbers. Efficient strategies for mental calculations are taught to enable children to perform calculations such as 60,000 x 4. They will also now calculate percentages and ratios as well as add and subtract negative numbers.

The National Curriculum for Mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

<u>Progression in the use of formal written methods for the four operations</u>

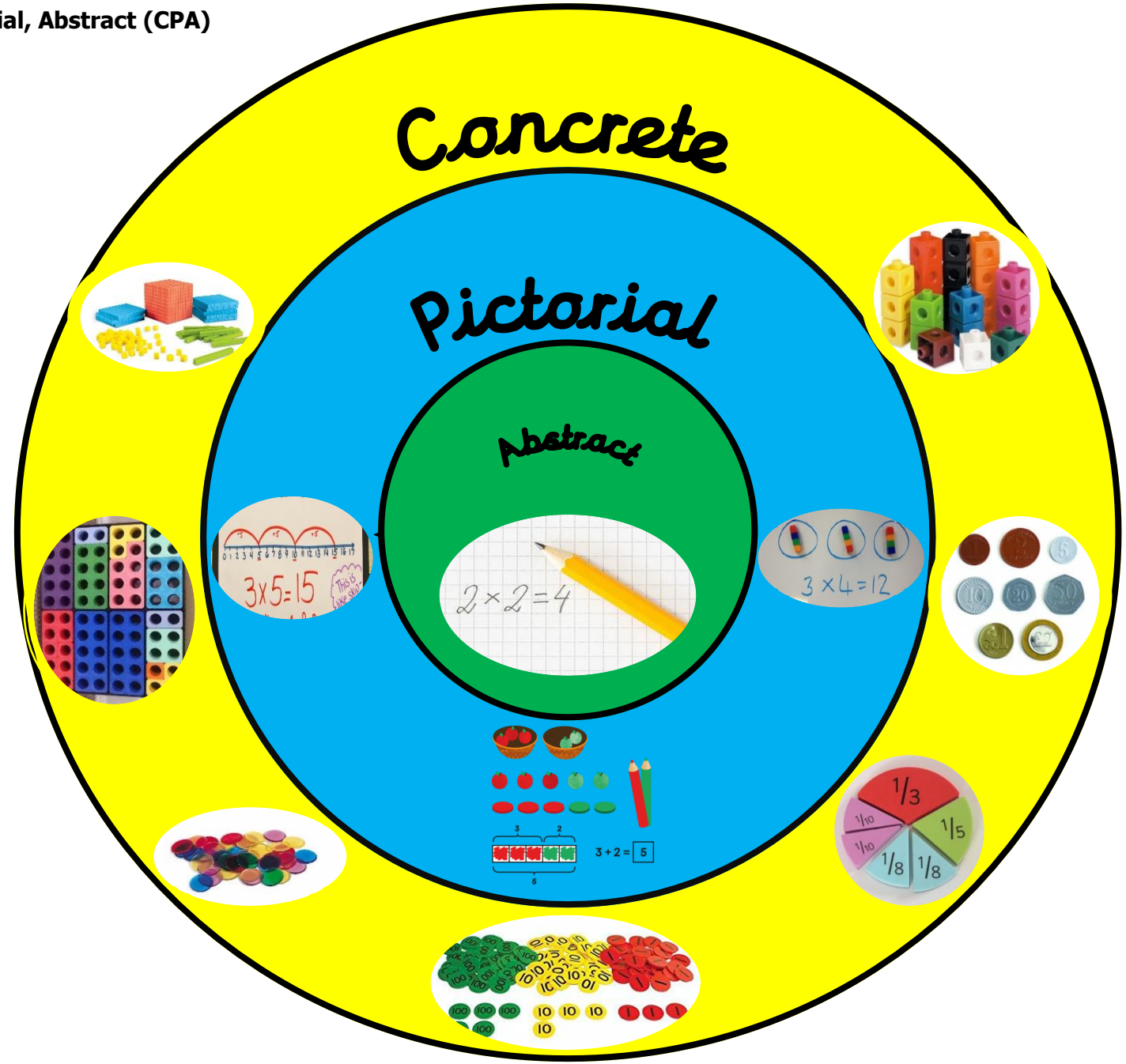
By the end of Year 3, most children should be able to:
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods

By the end of Year 4, most children should be able to:
- add and subtract numbers with up to 4 digits using the formal written methods of column addition and subtraction where appropriate
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout

By the end of Year 5, most children should be able to:
- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- 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
- 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

By the end of Year 6, most children should be able to:
- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- 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

Concrete, Pictorial, Abstract (CPA)



Children (and adults) can find maths difficult because it is abstract (symbolic). The CPA approach builds on children's existing knowledge by introducing abstract concepts in a concrete and tangible way. It involves moving from concrete materials, to pictorial representations, to abstract symbols and problems.

Concrete representation
The children are first introduced to an idea or a skill by acting it out with real objects. In division, for example, this might be done by separating apples into groups of red ones and green ones or by sharing 12 biscuits amongst 6 children. This is a 'hands on' approach using real objects and it is the basis for conceptual understanding.

Pictorial representation
This is used when a child has sufficiently understood the hands-on experiences performed and can now relate them to representations, such as a diagram or picture of the problem. In the case of a division exercise this could be the action of circling objects. This is the 'seeing' stage.

Abstract representation
The symbolic stage – a child is now capable of representing problems by using mathematical notation, for example: $12 \div 6 = 2$. This is clearly the more confusing and mysterious of the three and without the 'hands on' and pictorial steps can be very hard for children to understand.

Add

...and...make

Double

More

Altogether

Sum

Total

Near double

Commutative law

Add

Number bonds

Plus

Number facts

Boundaries

Combine

...and...equals

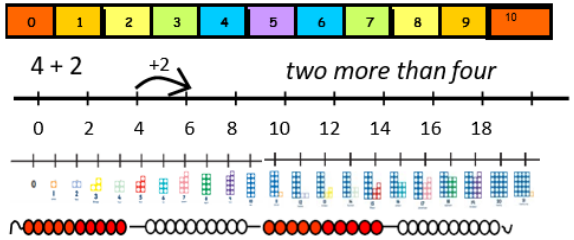
Increase

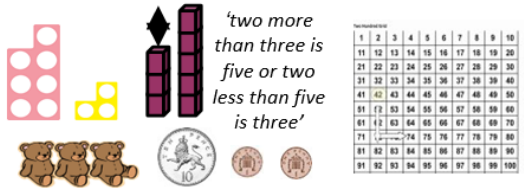
Inverse

Number pairs

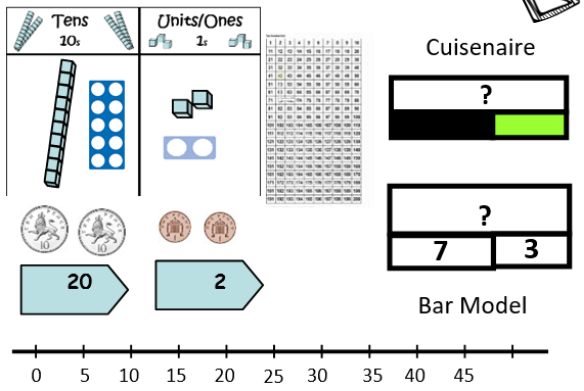
Key Stage One (Prior Learning)

Possible Concrete and Pictorial Representations





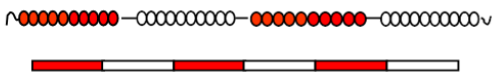
Use practical resources such as bears, counters, cubes and number lines/hundred grids and progress to a resource such as Numicon to encourage counting in groups rather than ones



Cuisenaire

Bar Model

Numbered and ***partially numbered*** number lines



Use Numicon, number grids, place value apparatus/Dienes, place value grids, place value cards. Encourage children to partition numbers rather than counting in ones.

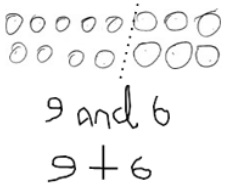
Children's Recording

If using Numicon, children could use printed Numicon icons and stick these in - progressing to recording number sentences alongside

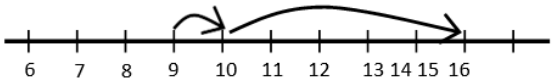
1 + ***2*** = ***3***

Children may record pictorially progressing to recording number sentences alongside

Example

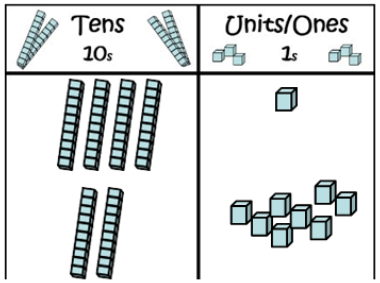


9 + 6



Children apply, develop and secure their understanding of place value

Use jottings and record number sentences



41
+
28

40 + 20 = 60

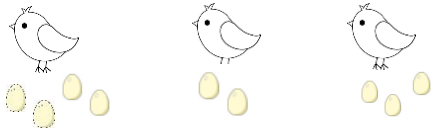
1 + 8 = 9

60 + 9 = 69

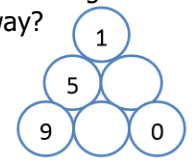
Challenge

5 + 2 = 3 + ☐

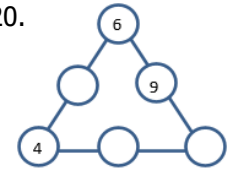
Three birds each lay an odd number of eggs. They have 9 eggs altogether. Can you think of more than one way to do it?



In the triangle, the number above two numbers is the difference between the numbers. E.g. 3 above 7 and 4. Find the missing numbers. Can you do it in more than one way?



Fill in the ○ so the sum of the numbers on each line is 20.



Lily has 3 dogs.

A **B** **C**

Dog A and B weigh 7kg. Dog B and C weigh 8kg. Dog A and C weigh 11kg. What does each dog weigh?

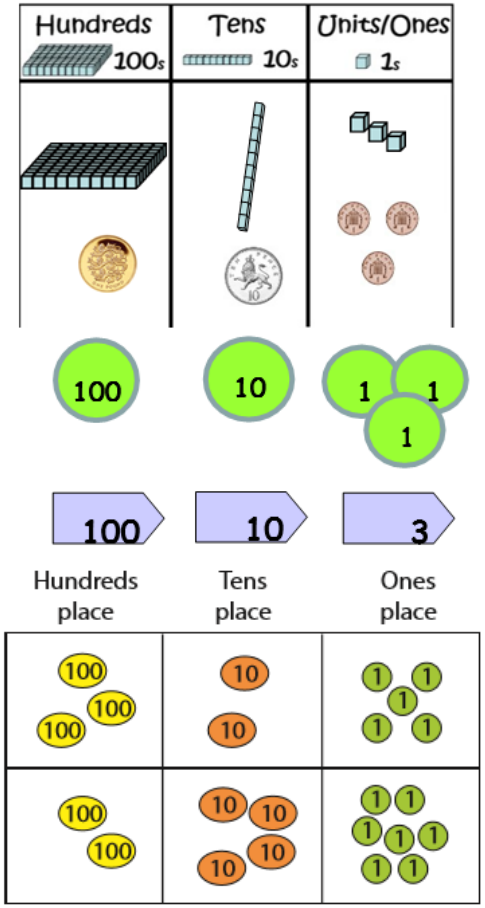
Year 3

Possible Concrete and Pictorial Representations

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80

42 + 25 = 67

Adding on a hundred square



Children's Recording

T O
40 + 1
+ 20 + 8
60 + 9 = 69

T O
40 + 3
20 + 8
70 + 1 = 71
10

Expanded recording without exchange

Expanded recording with exchange

H T O
100 + 40 + 1
+ 100 + 20 + 8
200 + 60 + 9 = 269

Expanded recording

H T O
1 4 1
+ 1 2 8
2 6 9

Compact (column) recording

H T O
1 4 3
+ 1 2 8
2 7 1
1

Column addition (with exchanging)

Challenge

Find the missing numbers in this addition calculation:

□ 4
+ 2 □
6 2

● + ● = 70

● + ▲ + ▲ + ▲ = 161

Work out the value of a circle and a triangle.

● = ▲ =

265 + 87 = 242

Eva

Here is her working out:

	2	6	5
+		8	7
	2	4	2

Is she correct? Explain why.

Dora, Jack and Amir are working out 374 + 37

Dora: I started at 374 on a number line.

Jack: I used column method.

Amir: I added 40 and subtracted 3

Which method is most efficient? Are there any other ways to work this out?

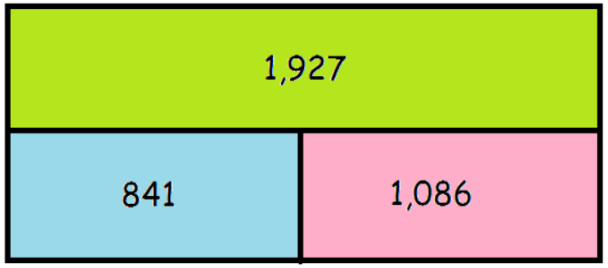
Year 4

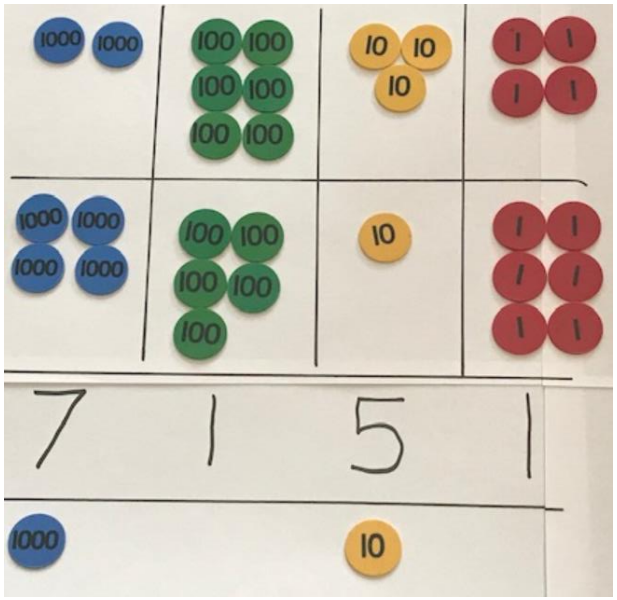
Possible Concrete and Pictorial Representations	Children's Recording	Challenge

Possible Concrete and Pictorial Representations

Use counters and a place value grid to calculate 3,242 + 2,213

1,000s	100s	10s	1s
1000 1000 1000	100 100	10 10 10 10	1 1
1000 1000	100 100	10	1 1 1





Children's Recording

H T O
7 8 9
+ 6 4 2
1 4 3 1
1 1

Compact (column) recording

£ 7. 8 9
+ £ 6. 4 2
£ 1 4. 3 1
1 1

Add decimals in the context of money

Challenge

Anne, Beth and Alex are working out the solution to the calculation 6,374 + 2,823

Anne's Strategy:
6,000 + 2,000 = 8,000
300 + 800 = 110
70 + 20 = 90
4 + 3 = 7
8,000 + 110 + 90 + 7 = 8,207

Beth's Strategy:

	6	3	7	4
+	2	8	2	3
	8	1	9	7

Alex's Strategy:

	6	3	7	4
+	2	8	2	3
				7
			9	0
	1	1	0	0
	8	0	0	0
	9	1	9	7

Who is correct?
Explain.

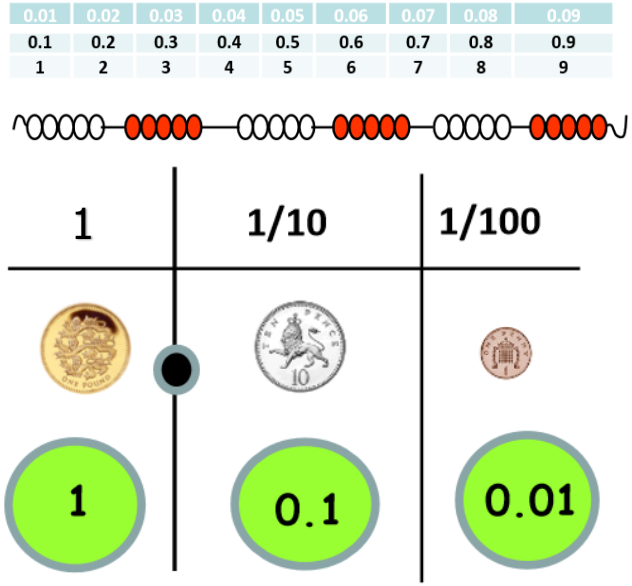
Complete:

	Th	H	T	O
	6	?	?	8
+	?	?	8	?
	9	3	2	5

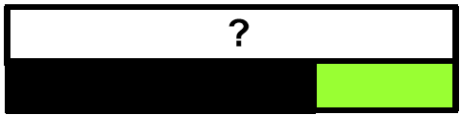
Greg says that there is more than one possible answer for the missing numbers in the hundreds column. Is he correct? Explain.

Year 5

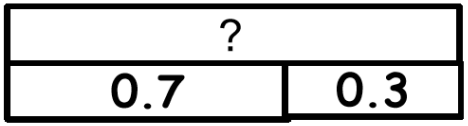
Possible Concrete and Pictorial Representations

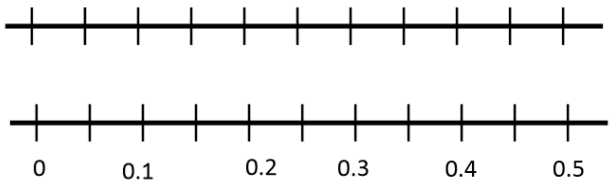


Cuisenaire



Bar Model





Children's Recording

$$\begin{array}{r} 2141 \\ +\ 1128 \\ \hline 3269 \\ \hline \end{array}$$

$$\begin{array}{r} 21.41 \\ +\ \ 1.12 \\ \ \ \ 0.35 \\ \hline 22.88 \\ \hline \end{array}$$

Column addition (no exchanging)

$$\begin{array}{r} 5189 \\ +\ 3128 \\ \hline 8317 \\ \hline 11 \end{array}$$

Column addition (with exchanging)

Challenge

Rank by difficulty

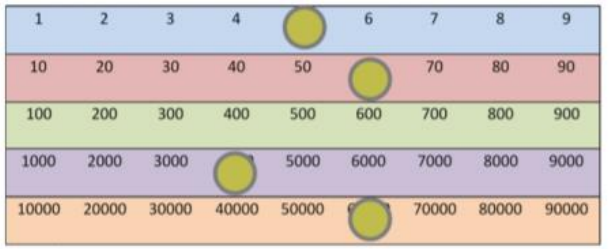
2996 + 1650

3461 + 2537

4837 + 2189

Explain your reasons.

Carol is discovering numbers on a Gattegno chart. She makes this number:



Carol moves one counter three spaces on a horizontal line to create a new number. When she adds this to her original number, she gets 13,130. Which counter did she move?

Explain the mistakes:

Mistake 1

12.4 + 6.35

18.39

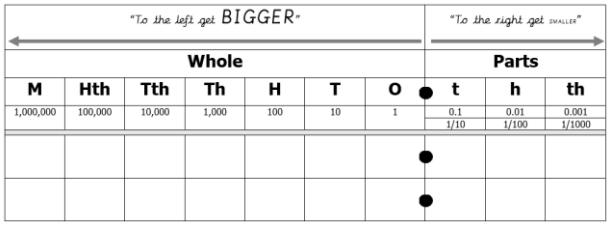
Mistake 2

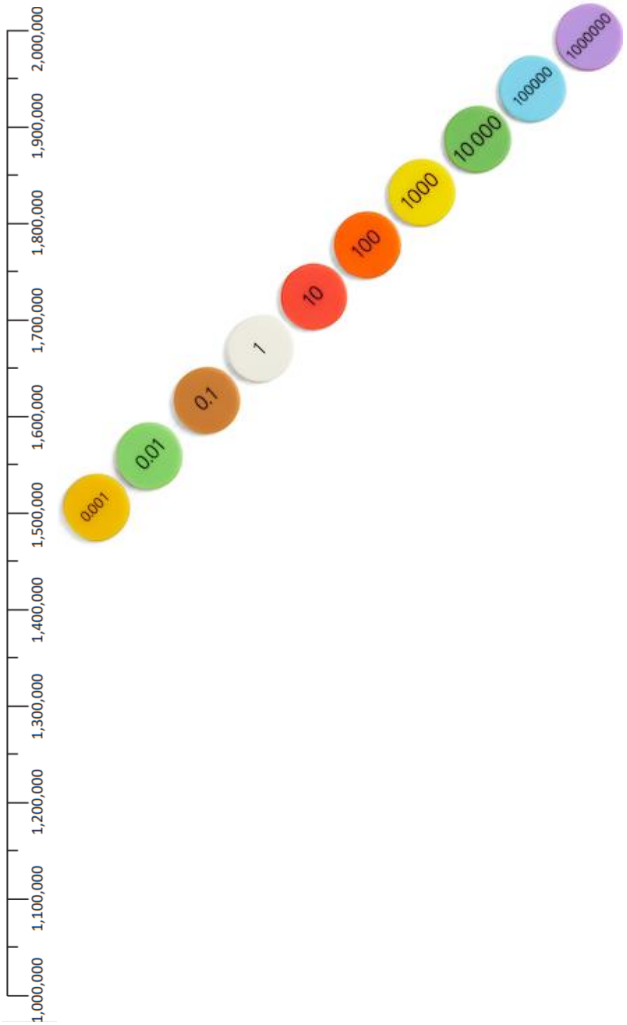
12.4 + 6.35

$$\begin{array}{r} 12.4 \\ +\ 6.35 \\ \hline 7.59 \\ \hline \end{array}$$

Year 6

Possible Concrete and Pictorial Representations





Children's Recording

29,125 + 41,827 =

2	9,	1	2	5
4	1	8	2	7
7	0,	9	5	2
1			1	

Column addition (with exchanging)

$$\begin{array}{r} 51.89 \\ +\ 3.128 \\ \hline 55.018 \\ \hline 1\ \ 1 \end{array}$$

Find the total of 12, 7.905, 0.9 and 816.42.

	H	T	O.	t	h	th
	8	1	6.	4	2	0
		1	2.	0	0	0
			7.	9	0	5
			0.	9	0	0
	8	3	7.	2	2	5
		1	2			

Adding numbers in contexts with a mix of whole numbers and decimals and decimals with different numbers of decimal places.

Challenge

Here is a bar model:

A	B
631,255	

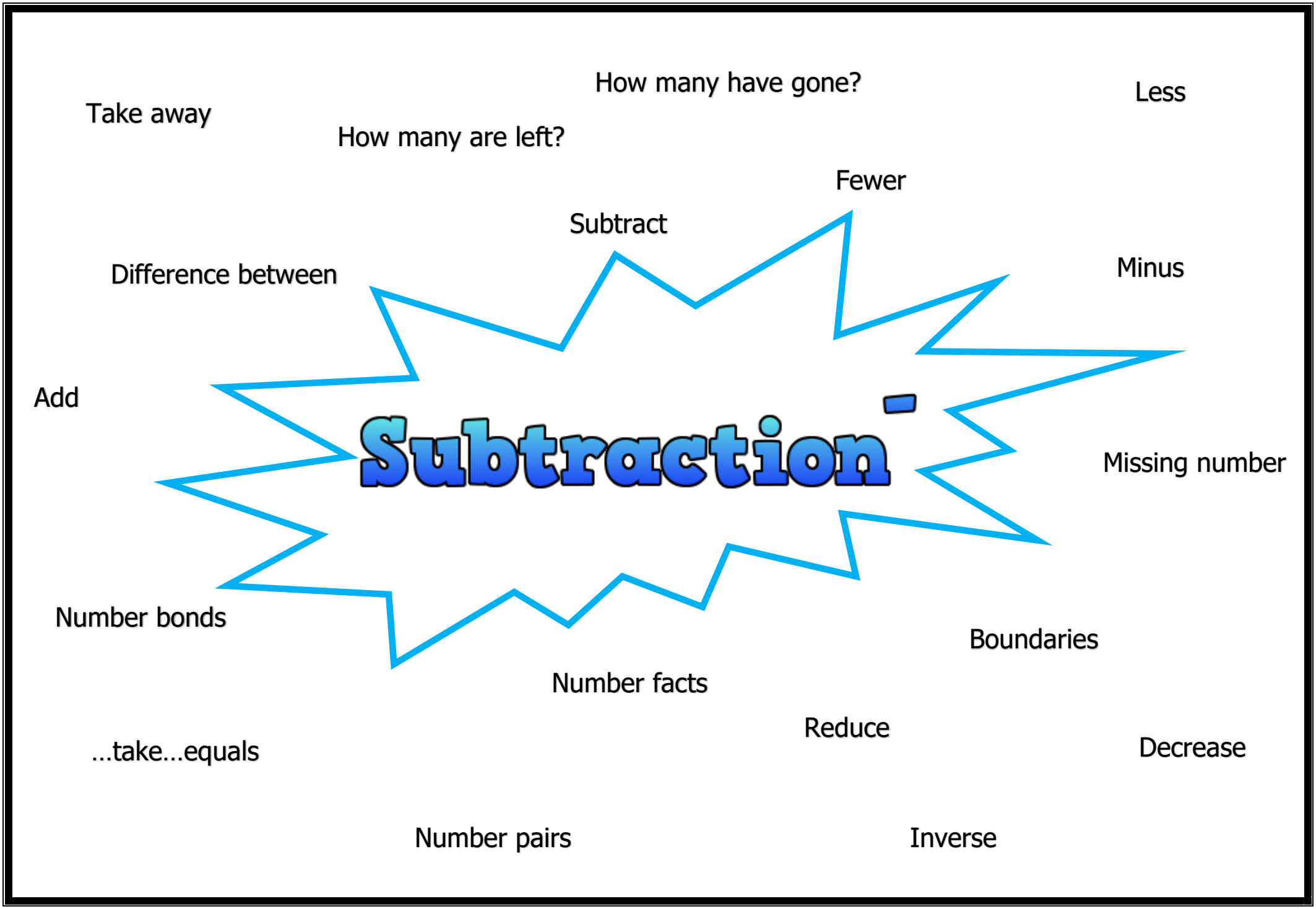
A is an odd number which rounds to 100,000 to the nearest ten thousand. It has a digit total of 30.

B is an even number which rounds to 500,000 to the nearest hundred thousand. It has a digit total of 10.

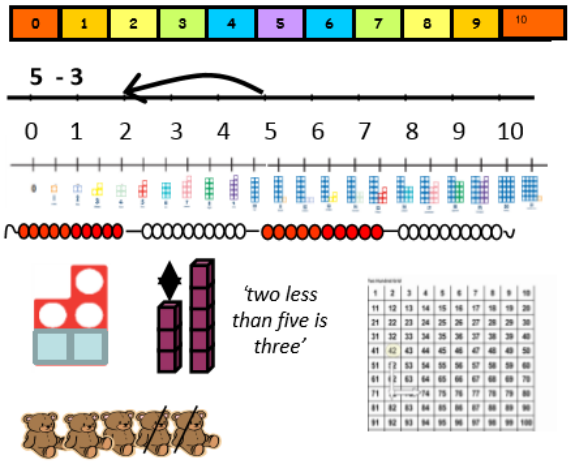
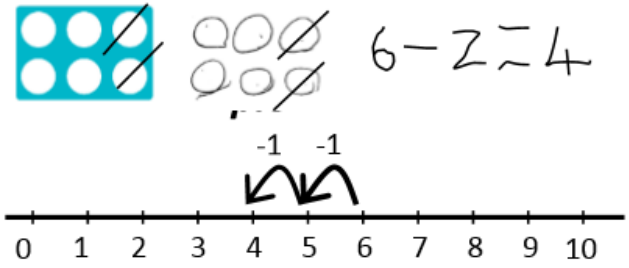
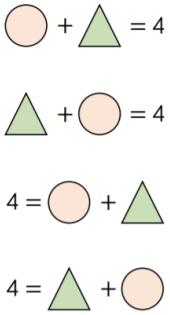
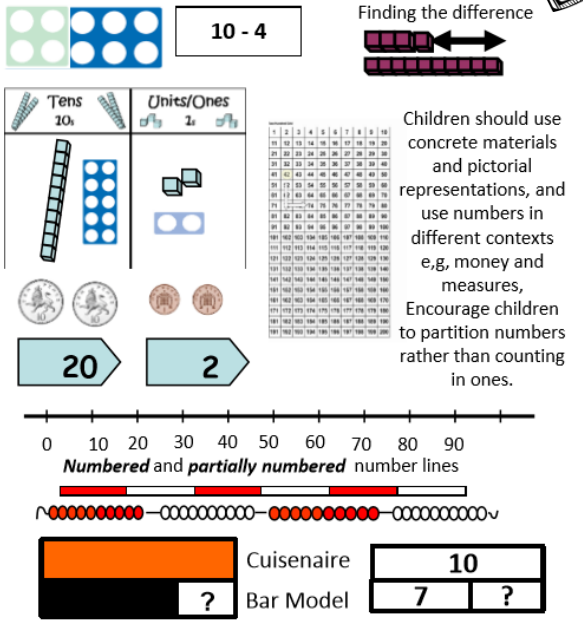
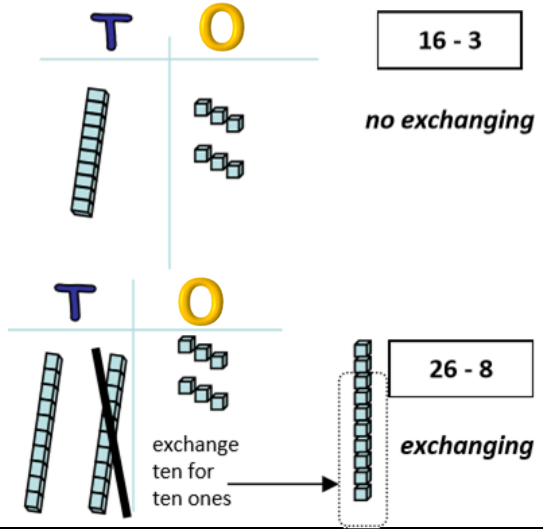
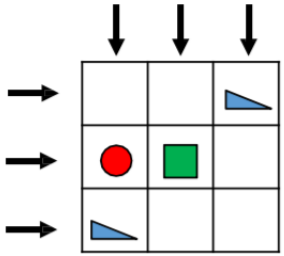
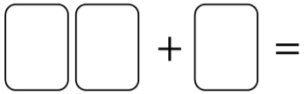
A and B are both multiples of 5 but end in different digits. What are the possible values of A and B?

Can you use five of the digits 1 to 9 to make this number sentence true?

$$\square\ \square \cdot \square + \square \cdot \square = 31{\cdot}7$$

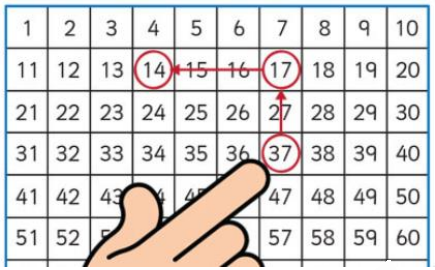

Subtraction
-
Take away
How many have gone?
Less
How many are left?
Fewer
Subtract
Difference between
Minus
Add
Missing number
Number bonds
Boundaries
Number facts
Reduce
…take…equals
Decrease
Number pairs
Inverse

Key Stage One (Prior Learning)

Possible Concrete and Pictorial Representations	Children's Recording	Challenge
 Use practical resources such as bears, counters, cubes and number lines/hundred grids and progress to a resource such as Numicon to encourage counting back in groups rather than ones	Children may begin recording pictorially progressing to recording number sentences alongside  Children could use printed Numicon icons and stick these in, again progressing to recording number sentences alongside	Using the numbers 0 – 9, how many different ways can you fill in the boxes to make the calculation correct? You can only use each number once.  How many different calculations are there?  What could the square and triangle be worth?
 Children should use concrete materials and pictorial representations, and use numbers in different contexts e,g, money and measures, Encourage children to partition numbers rather than counting in ones.	Children apply, develop and secure their understanding of place value and begin to record using jottings and number sentences 	 Can you complete the grid above so that all horizontal and vertical lines equal 60? Here are three digit cards.  How many different totals can you find? 

Year 3

Possible Concrete and Pictorial Representations	Children's Recording	Challenge

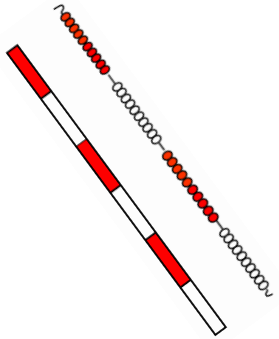


37 - 23 = ?

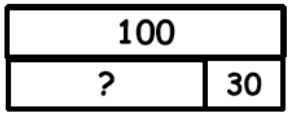
37 - 20 = 17

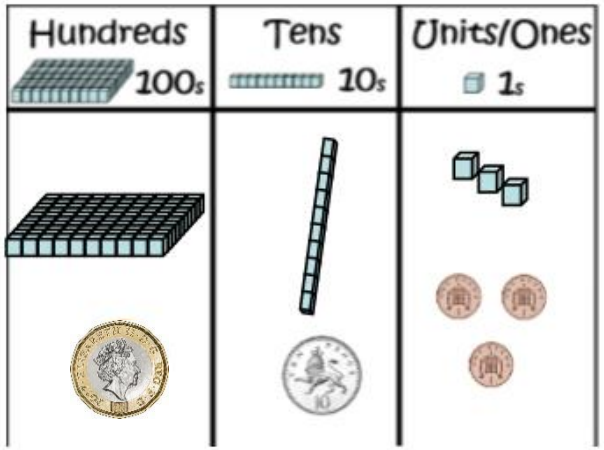
17 - 3 = 14

Cuisenaire



Bar Model





no exchange

68 - 23

60 8

− 20 3

40 + 5 = 45

with exchange

63 - 28

~~50~~ 60 $^{10+}$3

− 20 8

30 + 5 = 35

148 -121

100 40 8

− 100 20 1

0 + 20 + 7 = 27

Column subtraction (no exchange)

148

- 121

27

143

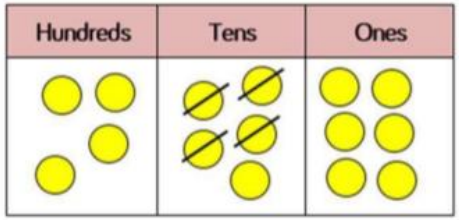
+ 128

271

1

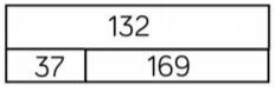
Column addition (with exchanging)

Sara thinks the chart shows 456 – 4. Do you agree? Explain.

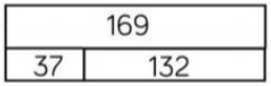


Emma has 169 sweets in a jar. She gives 37 sweets to Bill. Which model represents this problem? Explain.

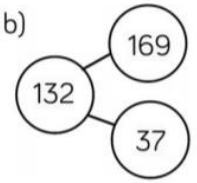
a)



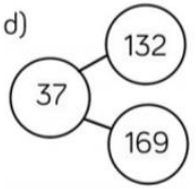
c)



b)

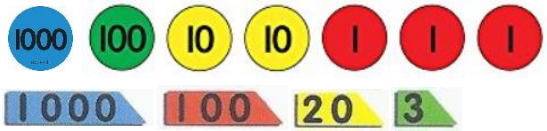


d)



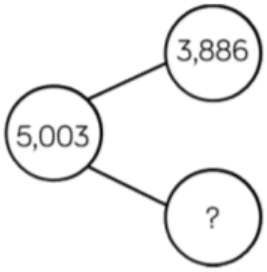
Year 4

Possible Concrete and Pictorial Representations	Children's Recording	Challenge



3,242 + 2,213

1,000s	100s	10s	1s
1,000 1,000 1,000	100 100	10 10 10 10	1 1
1,000 1,000	100 100	10	1 1 1



3,465	
2,980	?

8,435		
367	579	?

Sam, Lucas and Jemima are calculating 7,000 – 3,582. Here are their methods:

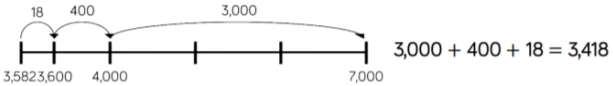
Sam

	Th	H	T	O
	~~6~~ 7	~~9~~ 10	~~9~~ 10	10
–	3	5	8	2
	3	4	1	8

Lucas

	Th	H	T	O
	6	9	9	9
–	3	5	8	1
	3	4	1	8

Jemima



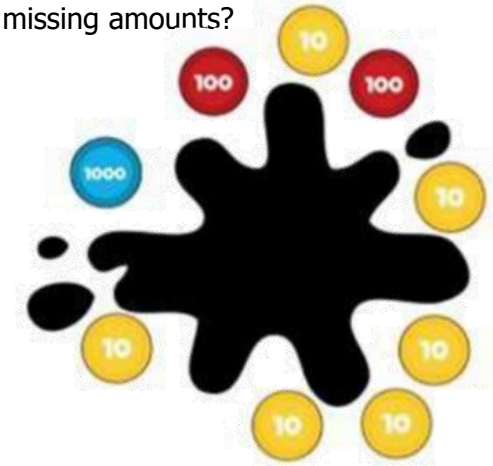
Children will consider the efficiency of different methods and make their own informed choices when choosing a method to calculate.

Complete:

	Th	H	T	O
	6	?	?	8
+	?	?	8	?
	9	3	2	5

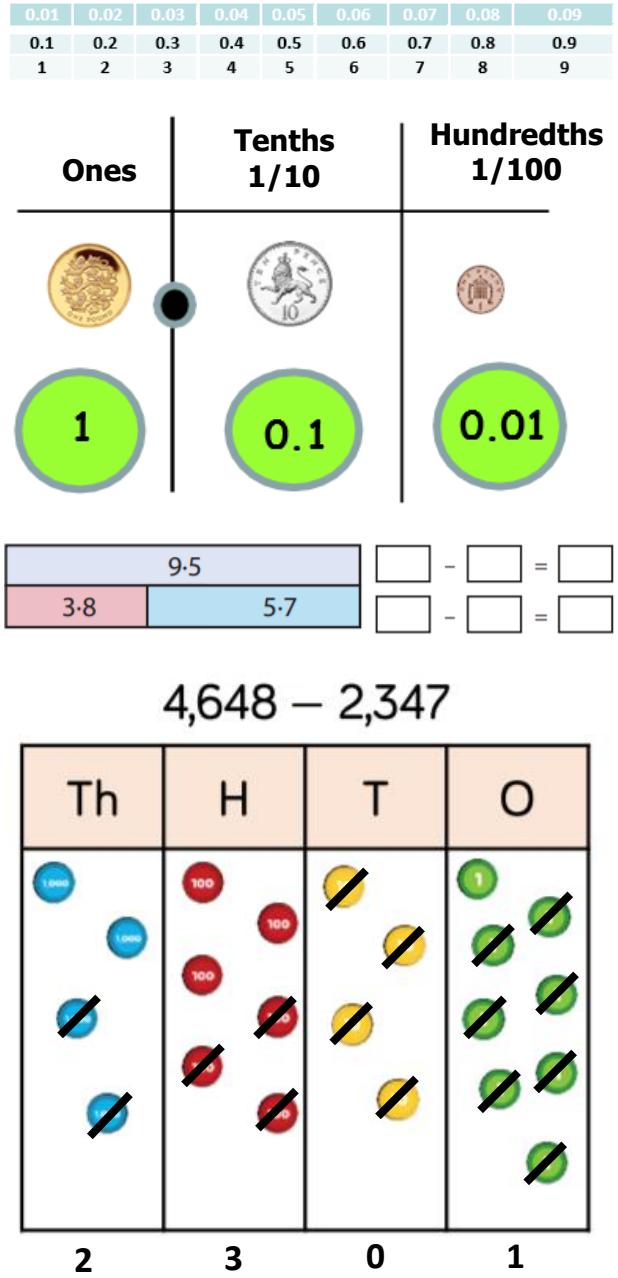
Greg says that there is more than one possible answer for the missing numbers in the hundreds column.
Is he correct?
Explain your answer.

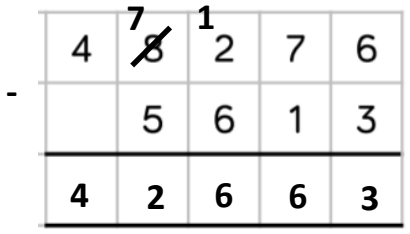
There are counters to the value of 3,4700 on the table but some have been covered by the splat. How many different ways can you make the missing amounts?

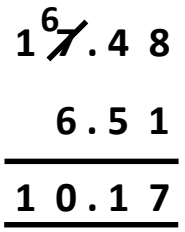


Year 5

Possible Concrete and Pictorial Representations	Children's Recording	Challenge







Mixed place value subtraction with exchanging.

Gina makes a 5-digit number.
Mike makes a 4-digit number.
The difference between their numbers is 3,465.
What could their numbers be?

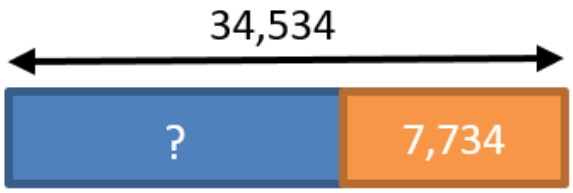
Holly completes this subtraction incorrectly.

$$\begin{array}{r} 28701 \\ -\ 7621 \\ \hline 21180 \\ \hline \end{array}$$

Explain the mistake to Holly and correct it for her.

Year 6

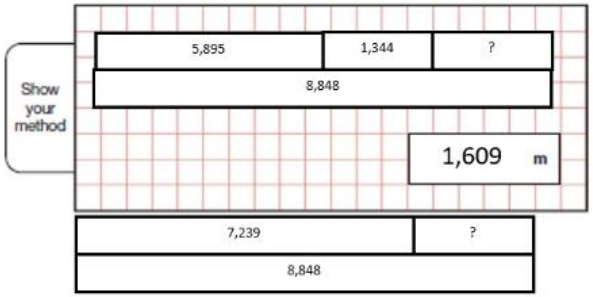
Possible Concrete and Pictorial Representations	Children's Recording	Challenge



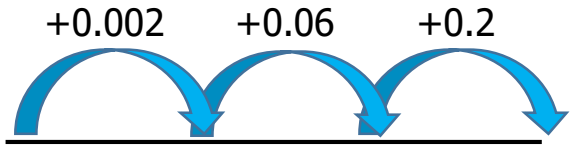
4 This table shows the heights of three mountains.

Mountain	Height in metres
Mount Everest	8,848
Mount Kilimanjaro	5,895
Ben Nevis	1,344

How much higher is Mount Everest than the combined height of the other two mountains?



6 − 5.738 =



5.738 5.74 7.8 8.0

	3 ~~4~~	,	17	~~5 6~~	11	, ~~2 3~~	12 5
−		9	3	8	, 0	5	2
	3	, 8	2	3	, 2	7	3

834,501 − 193,642

Two numbers have a difference of 2.38. What could the numbers be if:

- the two numbers add up to 6?
- one of the numbers is three times as big as the other number?

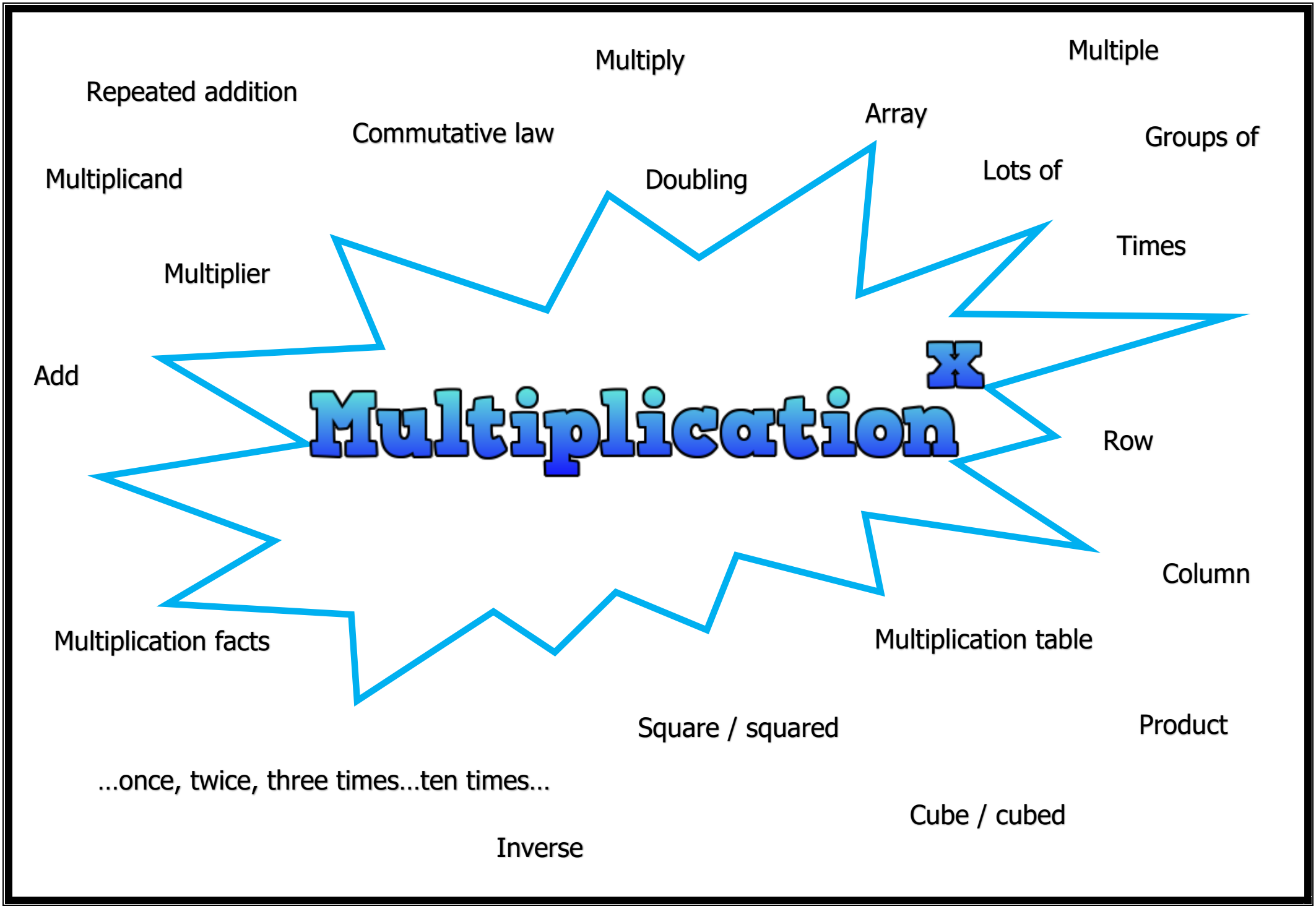
Amina posts three large letters.

The postage costs the same for each letter.

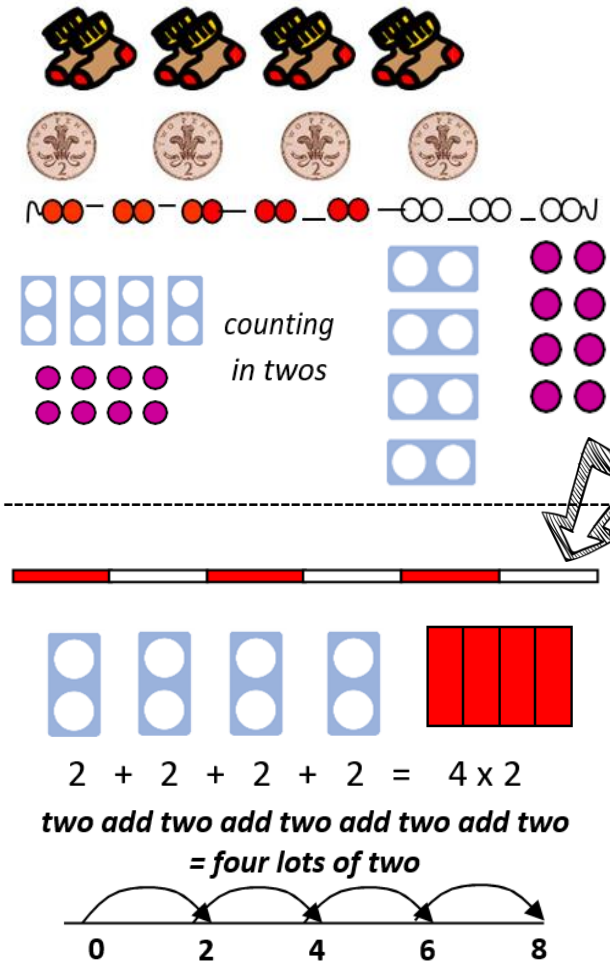
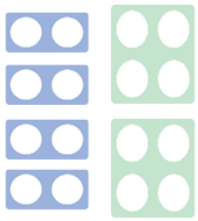
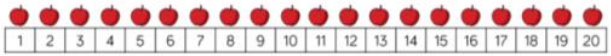
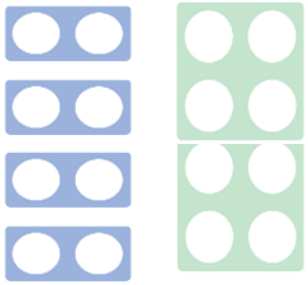
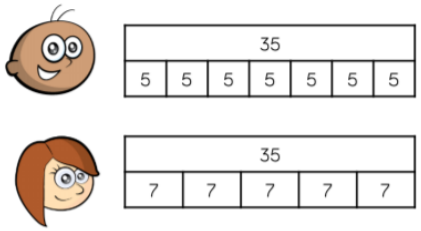
She pays with a £ 20 note.

Her change is £14.96

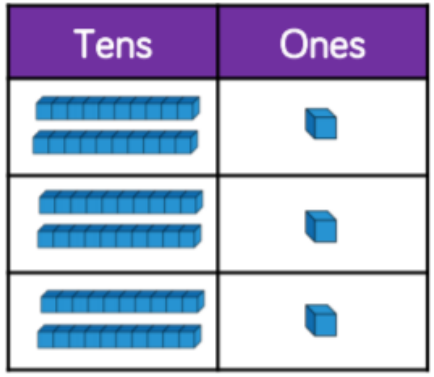
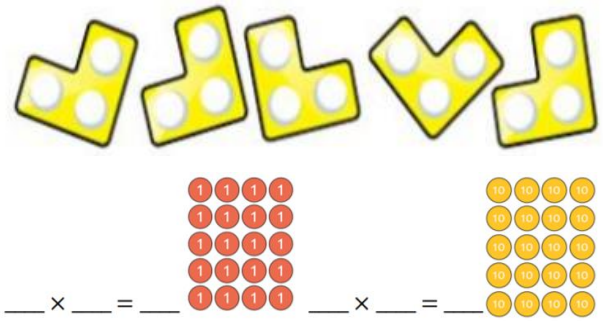
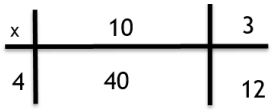
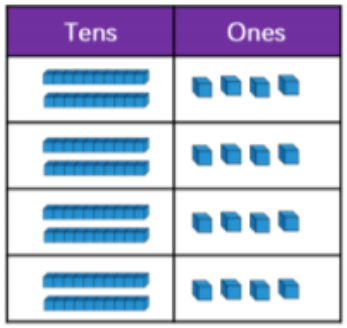
What is the cost of posting **one** letter?


Multiply
Multiple
Repeated addition
Array
Commutative law
Groups of
Multiplicand
Doubling
Lots of
Times
Multiplier
Add
Multiplication
Row
Column
Multiplication facts
Multiplication table
Square / squared
Product
…once, twice, three times…ten times…
Cube / cubed
Inverse

Key Stage One (Prior Learning)

Possible Concrete and Pictorial Representations	Children's Recording	Challenge
	 *four lots of two is eight* *two lots of four is eight* How many apples are there? 5 + 5 + 5 + 5 = ___  There are ___ apples. There are ___ groups of ___apples which is equal to___ --- Record practical work as number sentences  ***4 x 2 = 8*** ***2 x 4 = 8***	Eva begins to make an array with 40 counters. She has finished her first row and column. Complete her array.  Write two difference number sentences to describe the array. --- Use <, > or = to make the statements correct. 3 × 5 ◯ 5 + 5 + 5 + 5 2 × 2 ◯ 2 + 2 10 × 2 ◯ 5 + 5 + 5 Tommy and Rosie have both drawn bar models to show 7 x 5.  What's the same and what's different about their bar models? Draw your own bar model to represent 4 x 5.

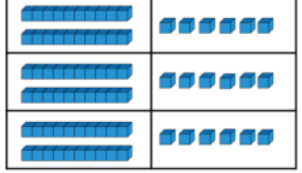
Year 3

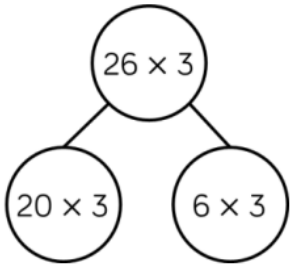
Possible Concrete and Pictorial Representations	Children's Recording	Challenge
21 x 3  5 x ___ = ___  ___ × ___ = ___ ___ × ___ = ___	 **40 + 12 = 52** 34 x 2  T O 3 4 × 2 6 8 24 x 4  T O 2 4 × 4 9 6 1	Explain the mistake: H T O 2 7 × 3 6 2 1 How close can you get to 100? Use each digit card once in the multiplication. 2 3 4 □□ × □ =

Year 4

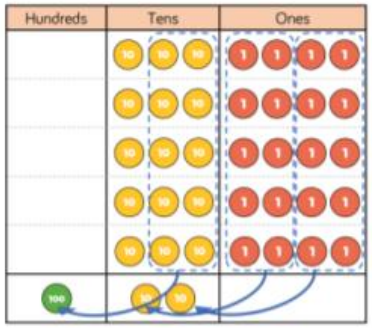
Possible Concrete and Pictorial Representations	Children's Recording	Challenge

26 × 3

Tens	Ones
	



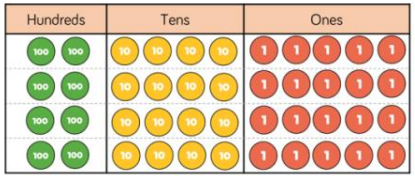
34 x 5



	T	O
	3	4
×		5
1	7	0

1 2

A school has 4 house teams.
There are 245 children in each house team.
How many children are there altogether?



	H	T	O
	2	4	5
×			4

	T	O
	6	1
×		5
3	0	5

3

	T	O
	7	4
×		7
5	1	8

2

Alex and Dexter have both completed the same multiplication.

Alex

Dexter

	H	T	O
	2	3	4
×			6
1	2	0	4

2 2

	H	T	O
	2	3	4
×			6
1	4	0	4

2 2

Who has the correct answer?
What mistake has been made by one of the children?

Always, sometimes, never?

- When multiplying a two-digit number by a one-digit number, the product has 3 digits.
- When multiplying a two-digit number by 8 the product is odd.
- When multiplying a two-digit number by 7 you need to exchange.

Prove it.

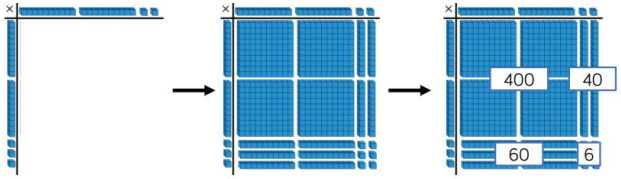
Year 5

Possible Concrete and Pictorial Representations	Children's Recording	Challenge

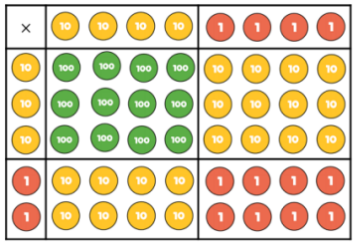
Annie earns £1,325 per week.
How much would he earn in 4 weeks?

Thousands	Hundreds	Tens	Ones
1000	100 100 100	10 10	1 1 1 1 1
1000	100 100 100	10 10	1 1 1 1 1
1000	100 100 100	10 10	1 1 1 1 1
1000	100 100 100	10 10	1 1 1 1 1

23 × 22



44 × 32



×	40	4
30	1,200	120
2	80	8

		2	3	
×		1	4	
		9 (1)	2	(23 × 4)
	2	3	0	(23 × 10)
	3	2	2	

1

		1	3	2	
×			1	4	
		5	2 (1)	8	(132 × 4)
	1	3	2	0	(132 × 10)
	1	8	4	8	

Pencils come in boxes of 64
A school bought 270 boxes.
Rulers come in packs of 46
A school bought 720 packs.
How many more rulers were ordered than pencils?

Teddy has spilt some paint on his calculation.

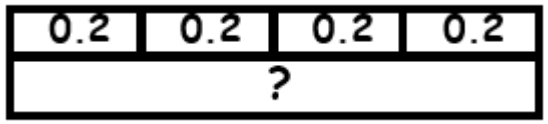
		2		6	9
×				2	
	2	6 2	5 9	7 5	2
	1 5	1 7	1 3		0
	1	1 0	1 3	3	2

What are the missing digits?

What do you notice?

Year 6

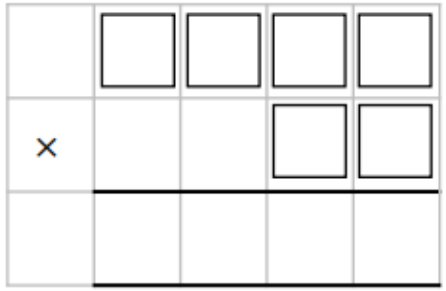
Possible Concrete and Pictorial Representations	Children's Recording	Challenge



$$\begin{array}{r} 1324 \\ \times\ 26 \\ \hline 7944 \\ 26480 \\ {\scriptstyle 1\ 1\ 2} \\ \hline 34424 \\ \hline {\scriptstyle 1\ 1\ 1} \end{array}$$

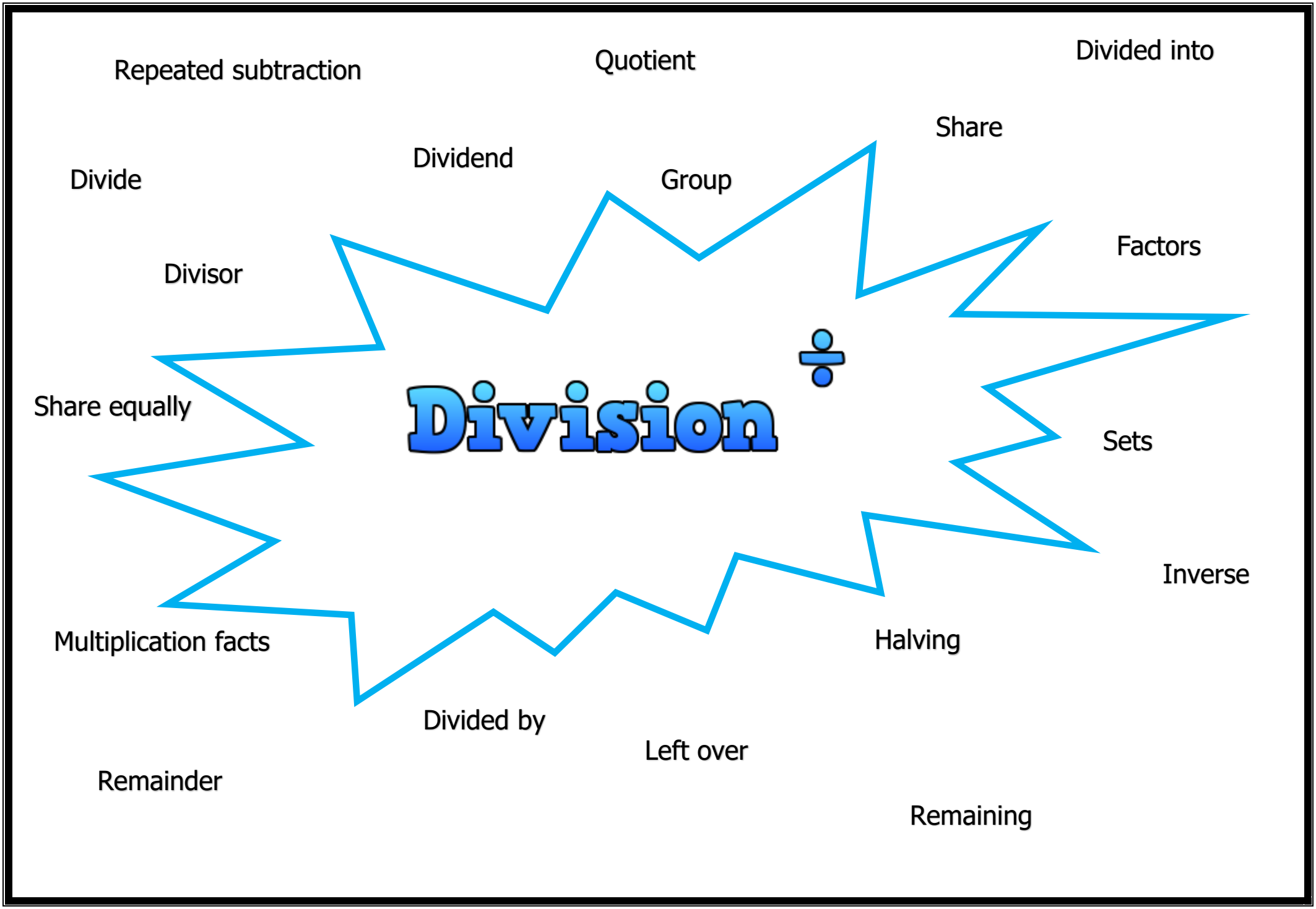
$$\begin{array}{r} 3.24 \\ \times\ 26 \\ \hline 19.44 \\ 64.80 \\ {\scriptstyle 1\ 2} \\ \hline 84.24 \\ \hline {\scriptstyle 1\ 1} \end{array}$$

Place the digits in the boxes to make the largest product.

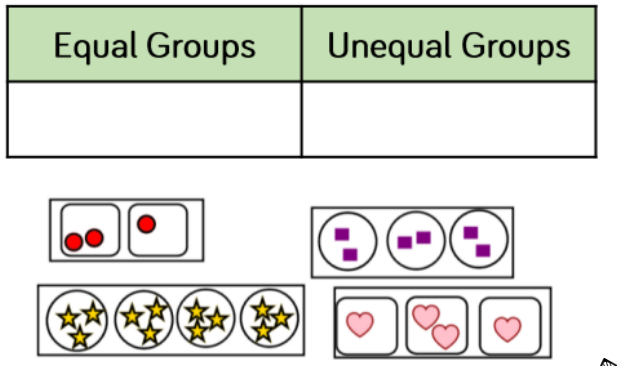
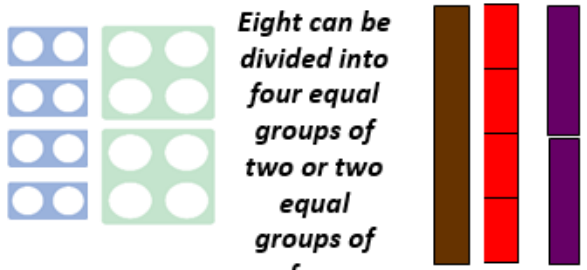
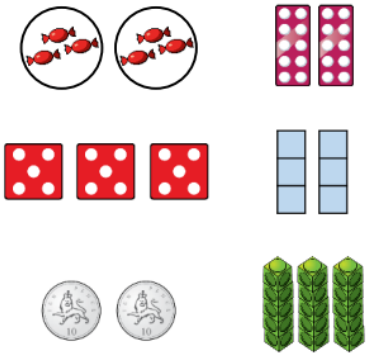
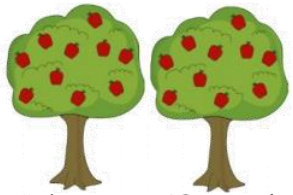
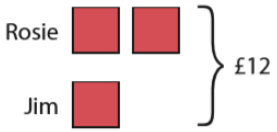


True or False?

- $5{,}463 \times 18 = 18 \times 5{,}463$
- I can find the answer to $1{,}100 \times 28$ by calculating $1{,}100 \times 30$ and subtracting 2 lots of 1,100
- $702 \times 9 = 701 \times 10$


Repeated subtraction
Quotient
Divided into
Share
Dividend
Divide
Group
Factors
Divisor
÷
Division
Share equally
Sets
Inverse
Multiplication facts
Halving
Divided by
Left over
Remainder
Remaining

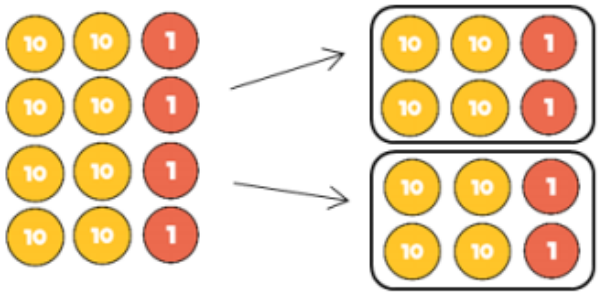
Key Stage One (Prior Learning)

Possible Concrete and Pictorial Representations	Children's Recording	Challenge
Share the muffins equally between the two plates. Complete the sentence. ___ cakes shared equally between 2 is ___ 	Sort into equal and unequal groups. 	Sarah is filling party bags with sweets. She has 20 sweets altogether and decides to put 5 in every bag. How many bags can she fill? How else could 20 sweets be put into bags so that every bag had the same number of sweets? How many bags would be packed each time?
 ***Eight can be divided into four equal groups of two or two equal groups of four***  There are ____ equal groups with ____ in each group.	Match the equal groups.  Three 5s Two 10s Two 3s 15 split into three equal groups of 5 equals ___. 20 split into two equal groups of 10 equals ___. 6 split into two equal groups of 3 equals ___.	Spot the mistake.  Alex says, "There are 10 equal groups with 2 in each group. There are ten 2s." Together Rosie and Jim have £12. Rosie has twice as much as Jim. How much does Jim have? *The bar model can be helpful in solving these types of problems.*  Rosie Jim £12 $12 \div 3 = 4$ Jim has £4

Year 3

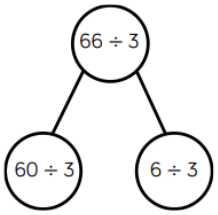
Possible Concrete and Pictorial Representations	Children's Recording	Challenge

84 ÷ 2

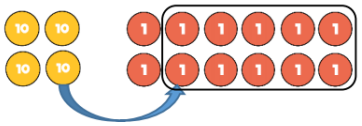


66 ÷ 3

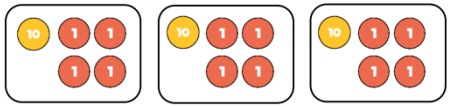
Tens	Ones
10 10	1 1
10 10	1 1
10 10	1 1



Ron uses place value counter to divide 42 into three equal groups.

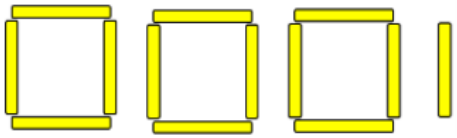


He shares the tens first and exchanges the remaining ten for ones.



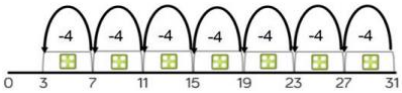
Then he shares the ones.
42 ÷ 3 = 14

How many squares can you make with 13 lollipop sticks?



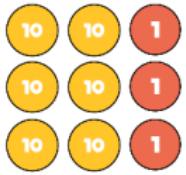
There are ___ lollipop sticks.
There are ___ groups of 4.
There is ___ lollipop stick remaining.
13 ÷ 4 = ___ remainder ___

Tommy uses repeated subtraction to solve 31 ÷ 4.



31 ÷ 4 = 7 r 3

Alex uses place value counters to help her calculate 63 ÷ 3.



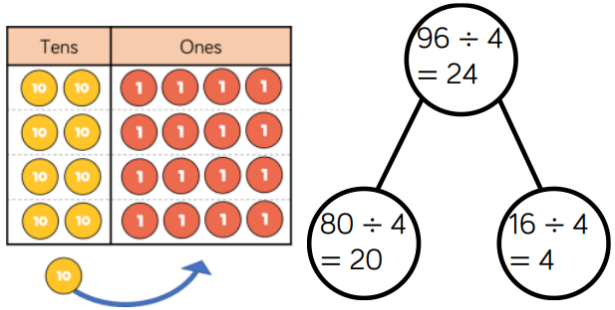
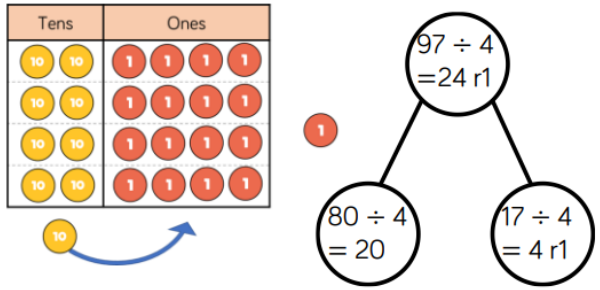
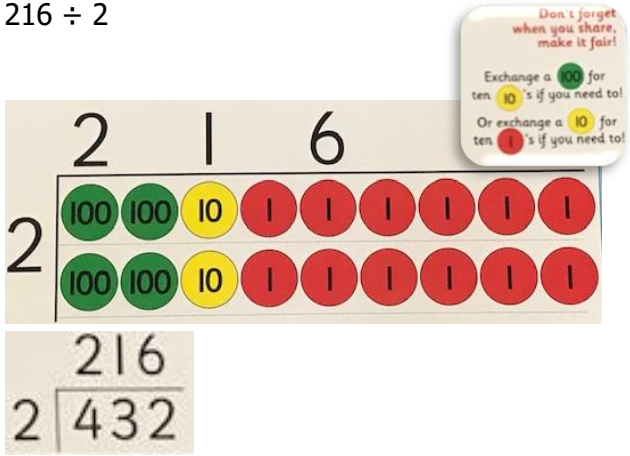
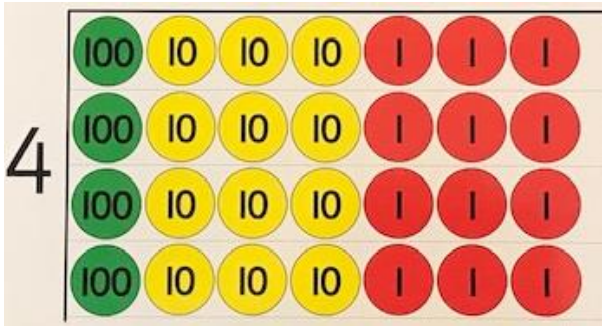
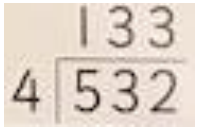
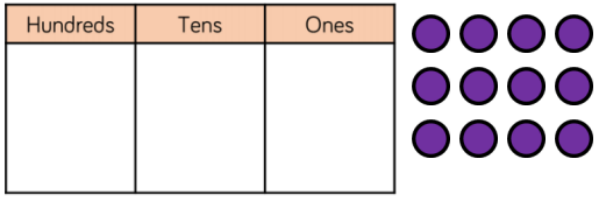
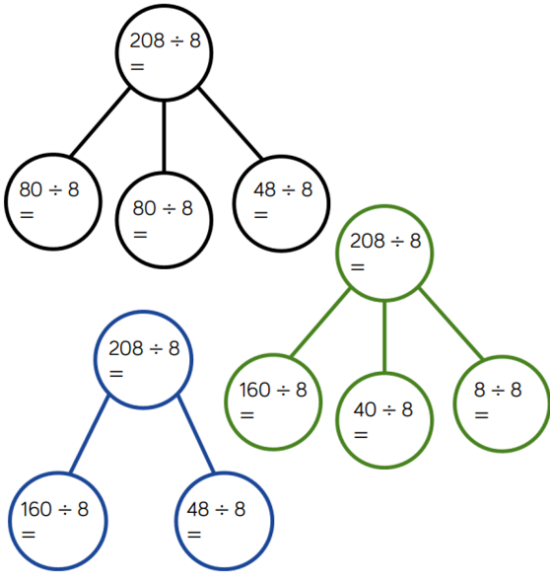
Tens	Ones
10	10 1
10	10 1
10	10 1

She gets an answer of 12. Is she correct?

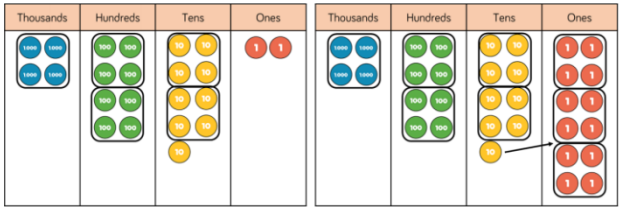
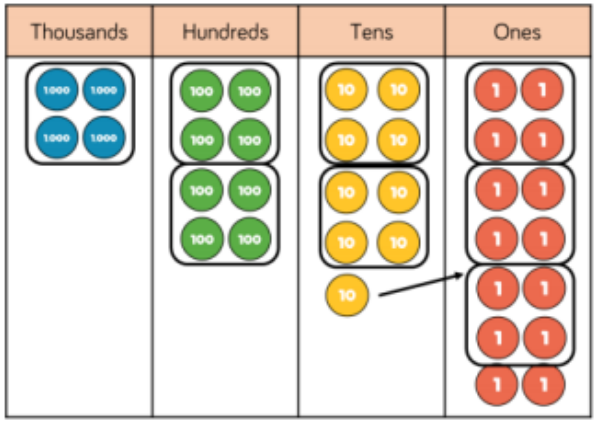
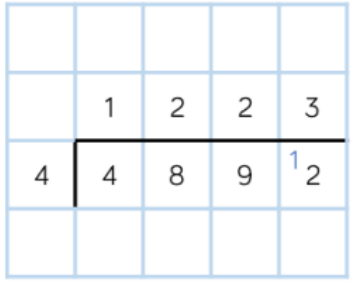
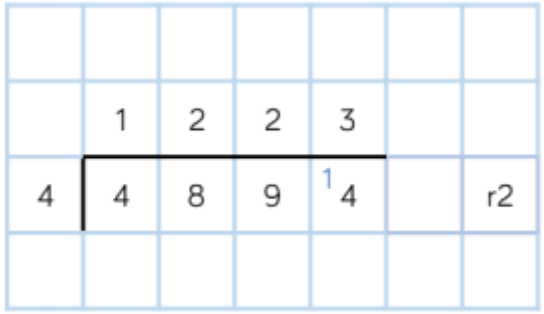
Which calculation is the odd one out?

64 ÷ 8	77 ÷ 4
49 ÷ 6	65 ÷ 3

Year 4

Possible Concrete and Pictorial Representations	Children's Recording	Challenge
Rosie is calculating 96 divided by 4 using place value counters. First, she divides the tens. She has one ten remaining so she exchanges one ten for ten ones. Then, she divides the ones.  	216 ÷ 2  532 ÷ 4  	You have 12 counters and the place value grid. You must use all 12 counters to complete the following.  Create a 3-digit number divisible by 2. Create a 3-digit number divisible by 3. Create a 3-digit number divisible by 4. Create a 3-digit number divisible by 5. Can you find a 3-digit number divisible by 6, 7, 8 or 9? Dexter is calculating 184 ÷ 8 using part-whole models. Can you complete each model? 

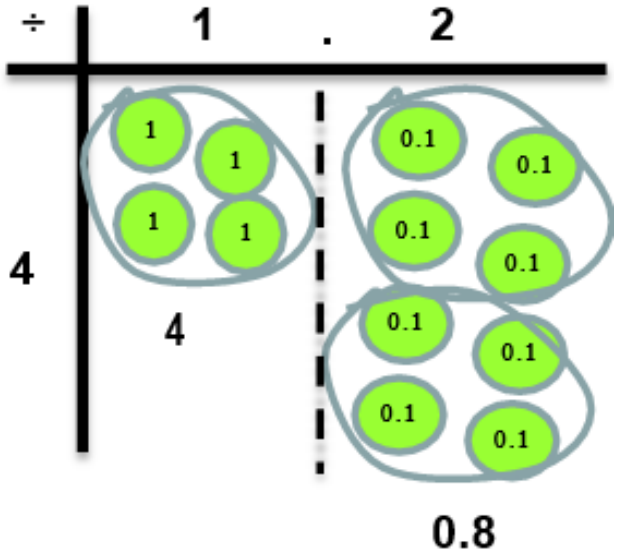
Year 5

Possible Concrete and Pictorial Representations	Children's Recording	Challenge
4,892 ÷ 4  4,894 ÷ 4  	  	Jack is calculating: 2,240 ÷ 7 He says you can't do it because 7 is larger than all of the digits in the number. Do you agree with Jack? Explain your answer. Muffins are packed in trays of 6 in a factory. In one day, the factory makes 5,623 muffins. How many trays do they need? How many trays will be full? Why are your answers different? **Always, Sometimes, Never?** A three-digit number made of consecutive descending digits divided by the next descending digit always has a remainder of 1 765 ÷ 4 = 191 remainder 1 How many possible answers can you find?

Year 6

Possible Concrete and Pictorial Representations	Children's Recording	Challenge

4.8 ÷ 4



142 ÷ 4 = 35·5

r2

2/4 = 1/2 = 0.5

$$4\overline{)142.0} \quad 35.5$$

		0	3	6	
1	2	4	3	2	(×30)
	–	3	6	0	
			7	2	(×6)
	–		7	2	
				0	

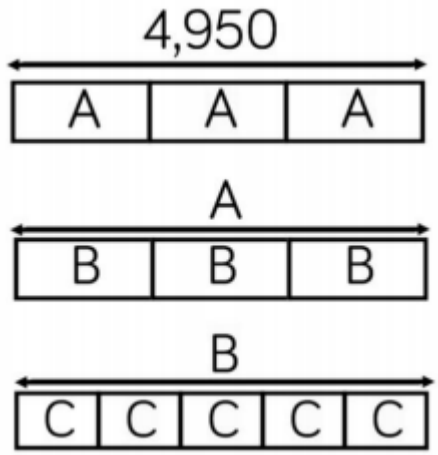
Multiples of 12:

12 × 1 = 12
12 × 2 = 24
12 × 3 = 36
12 × 4 = 48
12 × 5 = 60
12 × 6 = 72
12 × 7 = 84
12 × 8 = 96
12 × 7 = 108
12 × 10 = 120

			2	4	r	1	2
1	5	3	7	2			
	–	3	0	0			
			7	2			
	–		6	0			
			1	2			

1 × 15 = 15
2 × 15 = 30
3 × 15 = 45
4 × 15 = 60
5 × 15 = 75
10 × 15 = 150

Work out the value of C. (The bar models are not drawn to scale)



Spot the mistake:

855 ÷ 15 =

			0	5	1	0	
1	5	8	5	5			
	–	7	5		(×4)		
		1	0	5			
	–	1	0	5	(×10)		
				0			