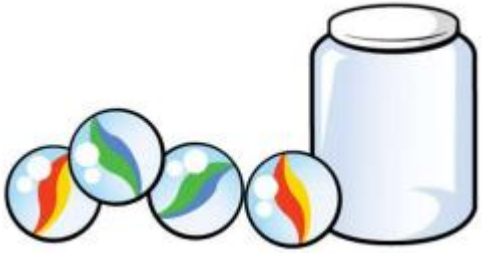
Cusgarne School Calculation Policy 2022-2023

EYFS



During the Early Years Foundation Stage the children follow the White Rose Maths curriculum that embeds mathematical thinking and talk. The children are exposed to a mathematically rich curriculum which allows for key mathematical concepts to be taught, revisited and developed further across they year.

It is essential that during the early years children understand the five key counting principles which form the foundations of mathematics:

1. **The one-one principle** – this involves children assigning one number name to each object that is being counted. Children need to ensure that they count each object only once ensuring that they have counted every object.
2. **The stable-order principle** – children understand when counting, the numbers have to be said in a certain order.
3. **The cardinal principle** – children understand that the number name assigned to the final object in a group is the total number of objects in that group.
4. **The abstraction principle** – children understand that anything can be counted including things that cannot be touched including sounds and movements -e.g. jumps and claps.
5. **The order-irrelevance principle** – children understand that the order we count a group of objects is irrelevant and that there will still be the same number.

The children are provided with a variety of opportunities to develop the understanding of number, shape, measure and spatial thinking. Calculations will be taught in a purposeful, practical way and children will use play and exploration to acquire the relevant mathematical skills to solve them. A large majority of mathematical work is practical and

learning will happen in many different contexts around the classroom and outside. Some mathematical concepts relating to calculations will be teacher led and the children can also freely explore these concepts through a variety of different activities and resources. Learning is repeated using different resources and representations to embed understanding.

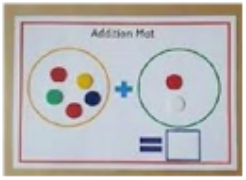
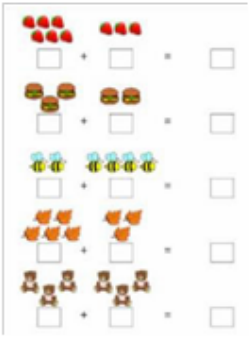
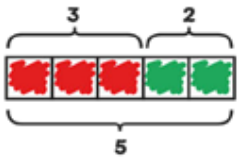
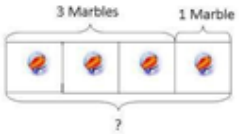
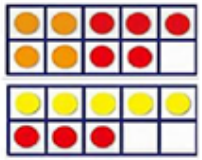
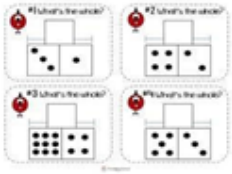
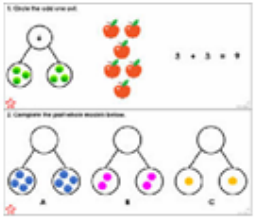
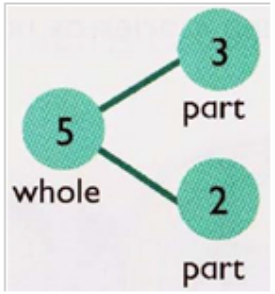
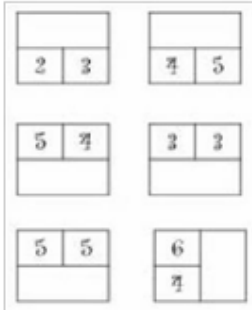
It is our intention that at the end of the EYFS children will be able to:

- Recall facts and procedures quickly
- Move between different contexts and representations of mathematics easily
- Recognise relationships and make connections in mathematics
- Gain the confidence and belief that they can achieve
- Gain the knowledge that maths underpins most of our daily lives
- Gain the skills and concepts that have been mastered
- Establish a positive and inquisitive attitude to mathematics

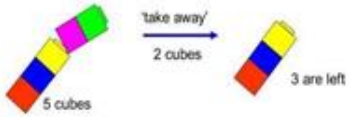
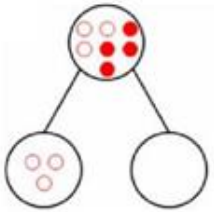
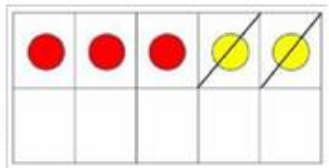
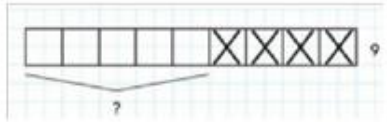
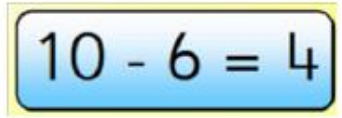
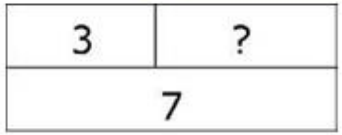
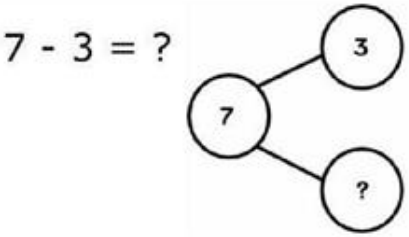
We believe that a mathematical concept or skill has been mastered when a child can show in in multiple ways, using the mathematical language to explain their ideas and can independently apply the concept to new problems in unfamiliar situations and this is the goal for our children.

The children will initially learn through concrete manipulatives before moving onto pictorial representations and then the abstract representation – mirroring the pedagogy in Years 1 – Year 6. An overview of the four operations and the resources used can be found on the next few pages.

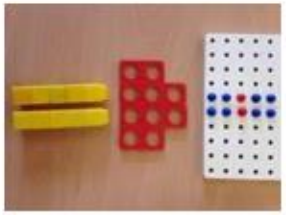
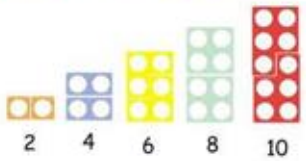
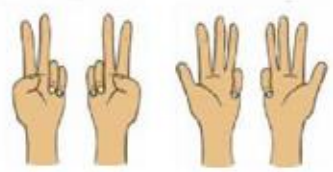
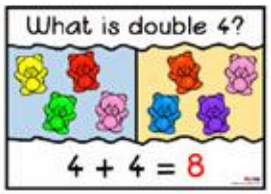
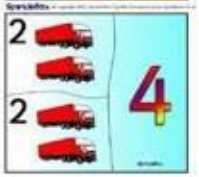
Addition - EYFS

Objectives	Concrete	Pictorial	Abstract
Know that a group of things change in quantity when something is added. Find the total number of items in two groups by counting all of them. Say the number that is one more than a given number. Find one more from a group of up to five objects, then ten objects. In practical activities and discussion, beginning to use the vocabulary involved in adding. Using quantities and objects, they add two single digit numbers and count on to find the answer. Solve problems including doubling.	   Use toys and general classroom resources for children to physically manipulate, group/regroup.  Use specific maths resources such as counters, snap cubes, Numicon etc.   Use  visual supports such as ten frames, part-part whole and addition mats, with the physical objects and resources that can be manipulated.	  Two groups of pictures so children are able to count the total.  Bar model using visuals, pictures/icons or colours.   Use visual supports such as ten frames, part-part whole and addition mats with pictures/icons.  	A focus on symbols and numbers to form a calculation. 5+2=7   *No expectation for children to be able to record a number sentence/addition calculation.

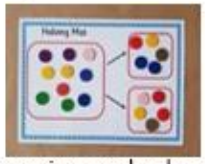
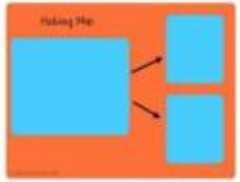
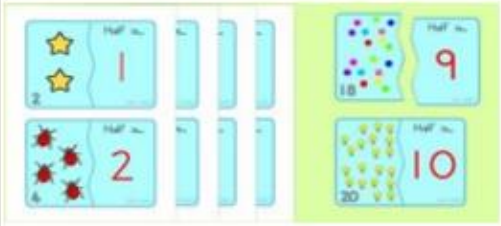
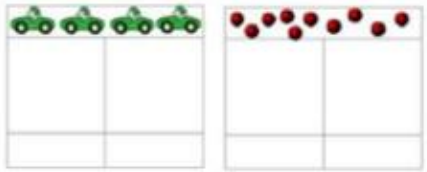
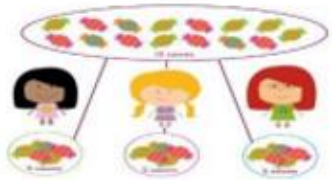
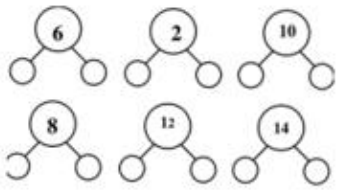
Subtraction - EYFS

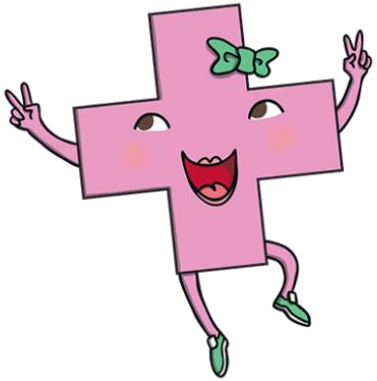
Objectives	Concrete	Pictorial	Abstract
Know that a group of things change in quantity when something is taken away Find one less from a group of five objects, then ten objects. In practical activities and discussion, beginning to use the vocabulary involved in subtracting. Using quantities and objects, they subtract two single digit numbers and count back to find the answer.	   Use toys and general classroom resources for children to physically manipulate, group/regroup.    Use specific maths resources such as snap cubes, Numicon, bead strings etc.   Use visual supports such as ten frames, part-part whole and subtraction mats, with the physical objects and resources that can be manipulated.	     A group of pictures for children to cross out or cover quantities to support subtraction.    Use visual supports such as ten frames, part-part whole and bar model with pictures/icons.	A focus on symbols and numbers to form a calculation.     *No expectation for children to be able to record a number sentence/subtraction calculation.

Multiplication - EYFS

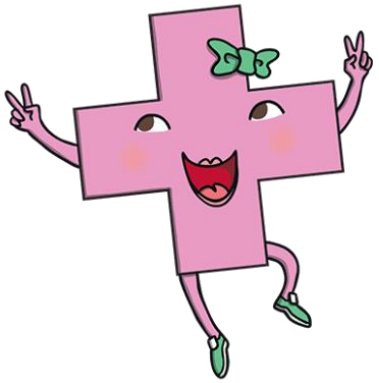
Objectives	Concrete	Pictorial	Abstract
Solve problems including doubling	  Counting and other maths resources for children to make 2 equal groups.   Physical and real-life examples that encourage children to see concept of doubling as adding two equal groups.  	    Pictures and icons that encourage children to see concept of doubling as adding two equal groups.	1+1= 7+7= 2+2= 8+8= 3+3= 9+9= 4+4= 10+10= 5+5= 11+11= 6+6= 12+12= Addition calculations to model adding two equal groups.

Division - EYFS

Objectives	Concrete	Pictorial	Abstract
Solve problems including halving and sharing. Halving a whole, halving a quantity of objects. Sharing a quantity of objects.	   Children have the opportunity to physically cut objects, food or shapes in half.  Use visual supports such as halving mats and part-part whole with the physical objects and resources that can be manipulated.   Counting and other maths resources for children to share into two equal groups.  Counting and other maths resources for children to share into three or more groups.	 Pictures and icons that encourage children to see concept of halving in relation to subitising, addition and subtraction knowledge. i.e., Knowing 4 is made of 2 groups of 2, so half of 4 is 2.  Bar model with pictures or icons to support understanding of finding 2 equal parts of a number, to further understand how two halves make a whole.  Pictures for children to create and visualise 3 or more.	 Once children have a strong and secure understanding of sharing into 2 equal groups. They can begin to solve halving and sharing abstract number problems

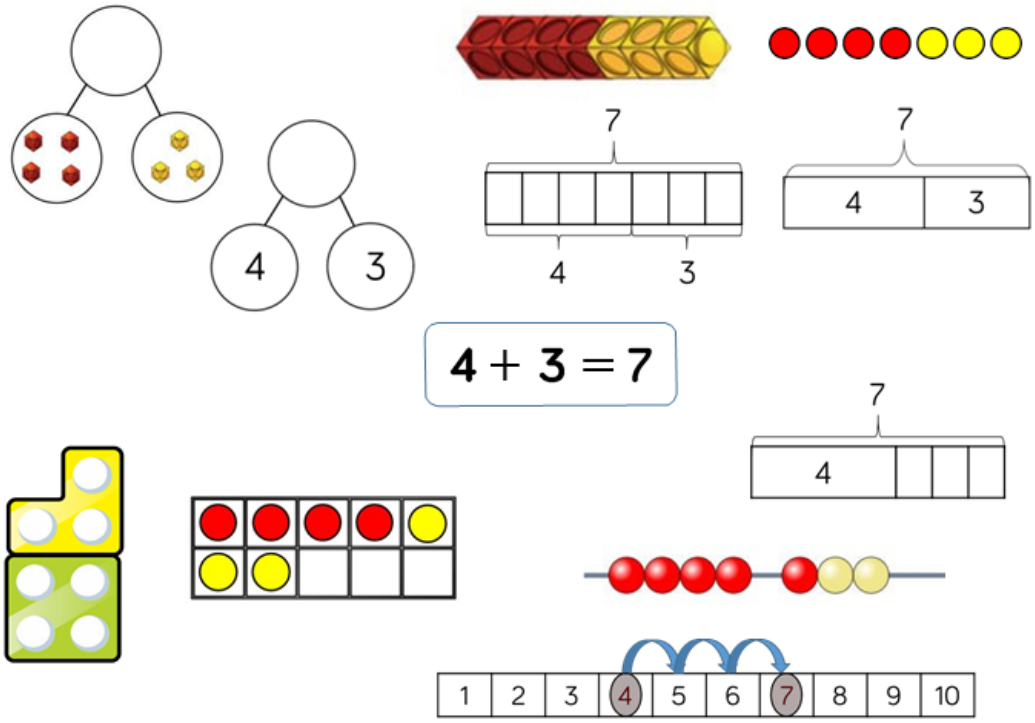


Addition Y1-6

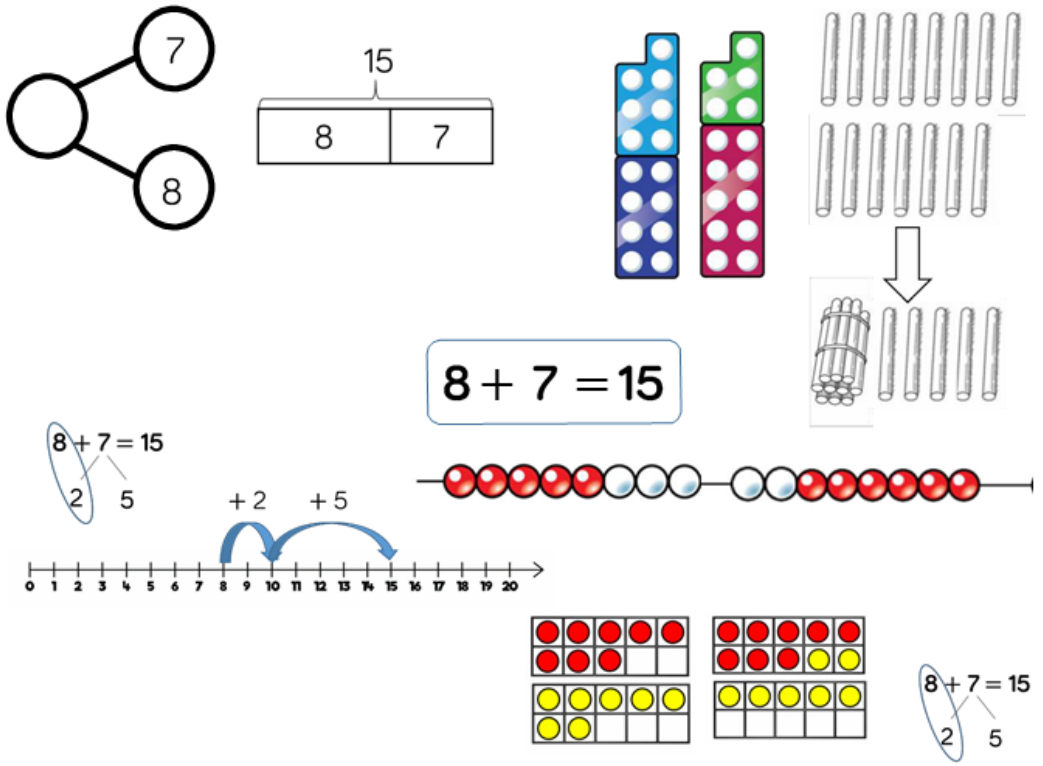


Skill	Year	Representations and models			Key Vocabulary
Add two 1-digit numbers to 10	1	Part-whole model Number shapes	Bar model Bead strings (10)	Ten frames (within 10) Number tracks	Number, part, whole, plus, add, and, bigger, larger, join, combine, greatest, least, biggest, smallest, count, jump, altogether, tens, ones, more, above
Add 1 and 2-digit numbers to 20	1	Part-whole model Number shapes Number lines (labelled)	Bar model Bead strings – Rekenrek (20) Straws	Ten frames (within 20) Number tracks	
Add three 1-digit numbers	2	Part-whole model Number shapes	Bar model	Ten frames (within 20)	Part, whole, more, above, biggest, smallest, combine, greatest, least, exchange, total, altogether, tens, ones, hundred
Add 1 and 2-digit numbers to 100	2	Part-whole model Number lines (blank)	Bar model Straws	Number lines (labelled) Hundred square	
Add two 2-digit numbers	2	Part-whole model Straws	Bar model Base 10	Number lines (blank) Place value counters	
Add with up to 3-digits	3	Part-whole model Bar model	Base 10 Place value counters	Column addition	Exchange, total, altogether, ones, tens, hundreds, thousands, tens of thousands, hundreds of thousands, millions, tens of millions, numerator, denominator, mixed number, convert, improper
Add with up to 4-digits	4	Part-whole model Bar model	Base 10 Place value counters	Column addition	
Add with more than 4-digits	5	Part-whole model Bar model	Place value counters	Column addition	
Add with up to 3 decimal places	5	Part-whole model Bar model	Place value counters	Column addition	Total, tenths, hundredths, thousandths, remaining, decimal, place holder, represent

Skill: Add 1-digit numbers within 10



Skill: Add 1 and 2-digit numbers to 20



Year 1

When adding numbers to 10, children can explore both aggregation and augmentation.

The part-whole model, discrete and continuous bar model, number shapes and ten frame support aggregation.

The combination bar model, ten frame, bead string and number track all support augmentation.

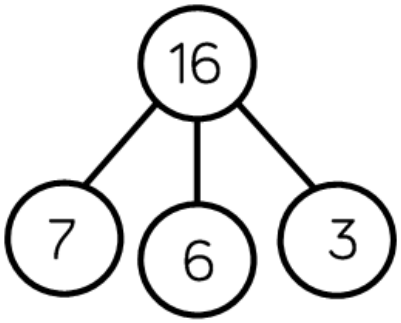
Year 1/2

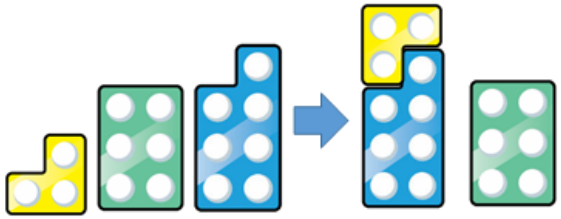
When adding one-digit numbers that cross 10, it is important to highlight the importance of ten ones equalling one ten.

In Year 1, this is only done just by counting on.

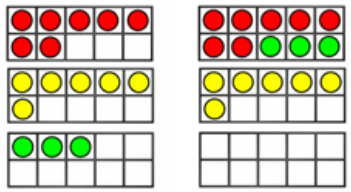
From Year 2, different manipulatives can be used to represent this exchange alongside number lines to support children in understanding how to partition their jumps.

Skill: Add three 1-digit numbers



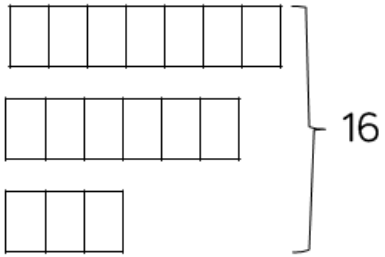


$7 + 6 + 3 = 16$

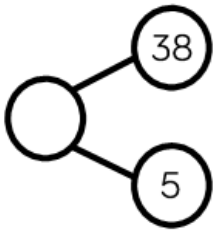


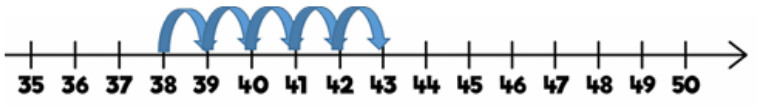
$7 + 6 + 3 = 16$

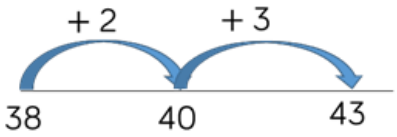
10

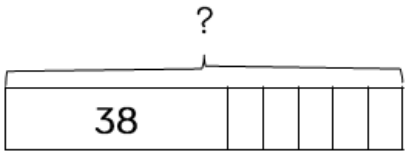


Skill: Add 1-digit and 2-digit numbers to 100

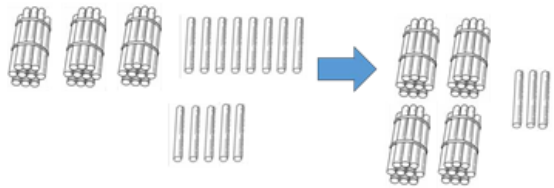








$38 + 5 = 43$



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
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Year 2

When adding three 1-digit numbers, children should be encouraged to look for number bonds to 10 or doubles to add the numbers more efficiently.

This supports children in their understanding of commutativity.

Manipulatives that highlight number bonds to 10 are effective when adding three 1-digit numbers.

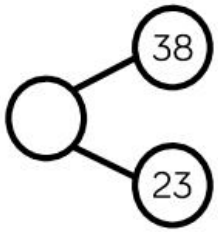
Year 2/3

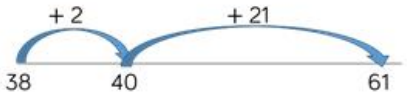
When adding single digits to a 2-digit number, children should be encouraged to count on from the larger number.

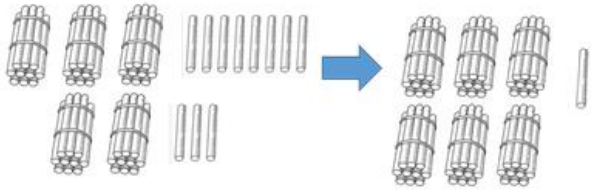
They should also apply their knowledge of number bonds to add more efficiently e.g. 8 + 5 = 13 so, 38 + 5 = 43.

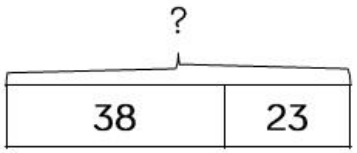
Hundred squares and straws can support children to find the number bond to 10.

Skill: Add two 2-digit numbers to 100

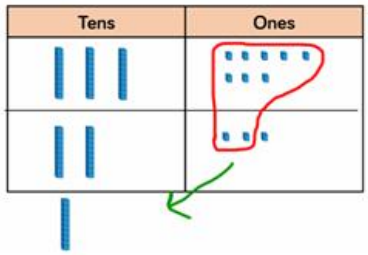




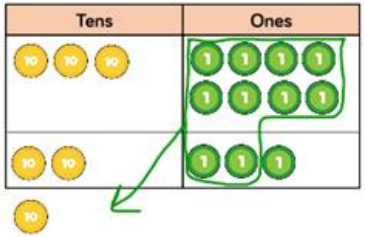




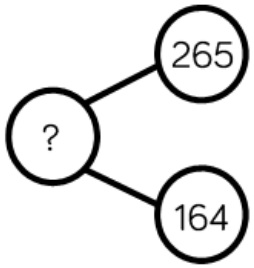
38 + 23 = 61

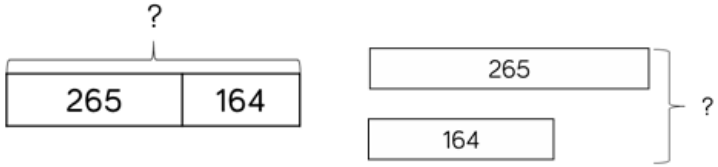


$$\begin{array}{r} 38 \\ +\ 23 \\ \hline 61 \\ \hline 1 \end{array}$$

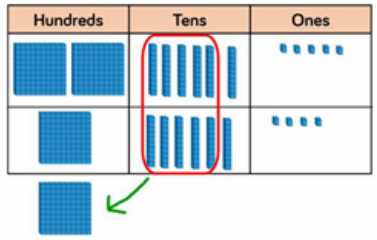


Skill: Add numbers with up to 3 digits

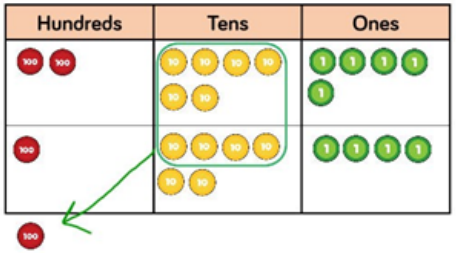




265 + 164 = 429



$$\begin{array}{r} 265 \\ +\ 164 \\ \hline 429 \\ \hline 1 \end{array}$$



Year 2/3

Children can use a blank number line and other representations to count on to find the total. Encourage them to jump to multiples of 10 to become more efficient.

From Year 3, encourage children to use the formal column method when calculating alongside straws, base 10 or place value counters.

As numbers become larger, straws become less efficient.

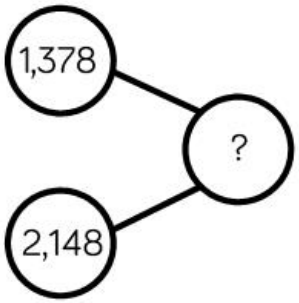
Year 3

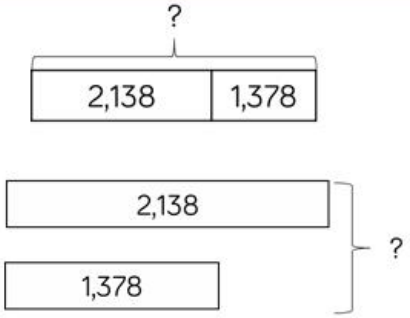
Base 10 and place value counters are the most effective manipulatives when adding numbers with up to 3-digits.

Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method.

Plain counters on a place value grid can also be used to support learning.

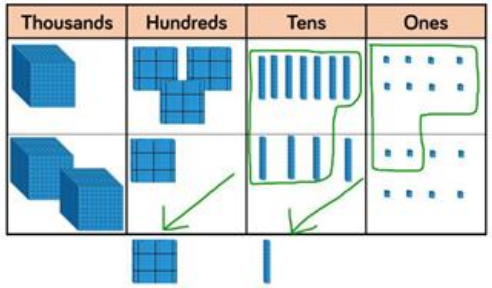
Skill: Add numbers with up to 4 digits

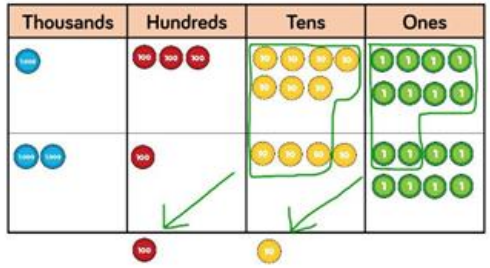




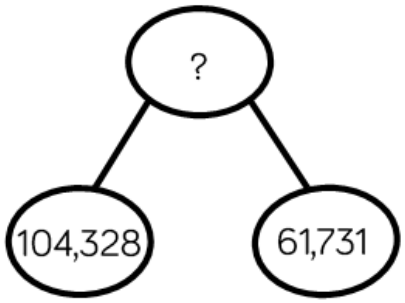
	1	3	7	8
+	2	1	4	8
	3	5	2	6
	1	1		

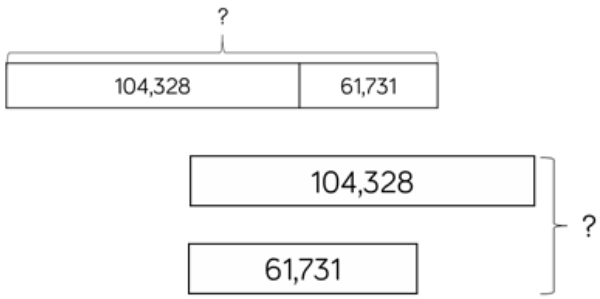
1,378 + 2,148 = 3,526



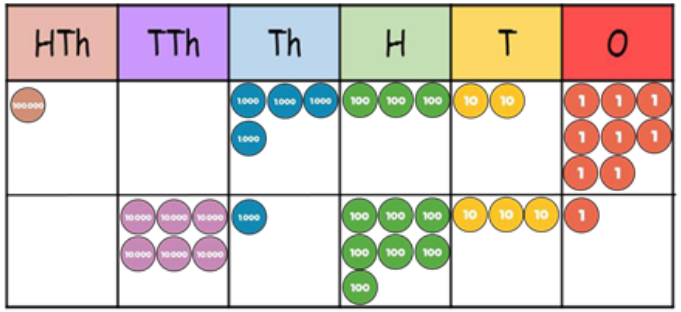


Skill: Add numbers with more than 4 digits





104,328 + 61,731 = 166,059



1	0	4	3	2	8
+	6	1	7	3	1
1	6	6	0	5	9
			1		

Year 4

When adding numbers to 10, children can explore both aggregation and augmentation.

The part-whole model, discrete and continuous bar model, number shapes and ten frame support aggregation.

The combination bar model, ten frame, bead string and number track all support augmentation.

Year 5

Place value counters or plain counters on a place value grid are the most effective concrete resources when adding numbers with more than 4 digits.

At this stage, children should be encouraged to work in the abstract, using the total. Encourage to add larger numbers efficiently.

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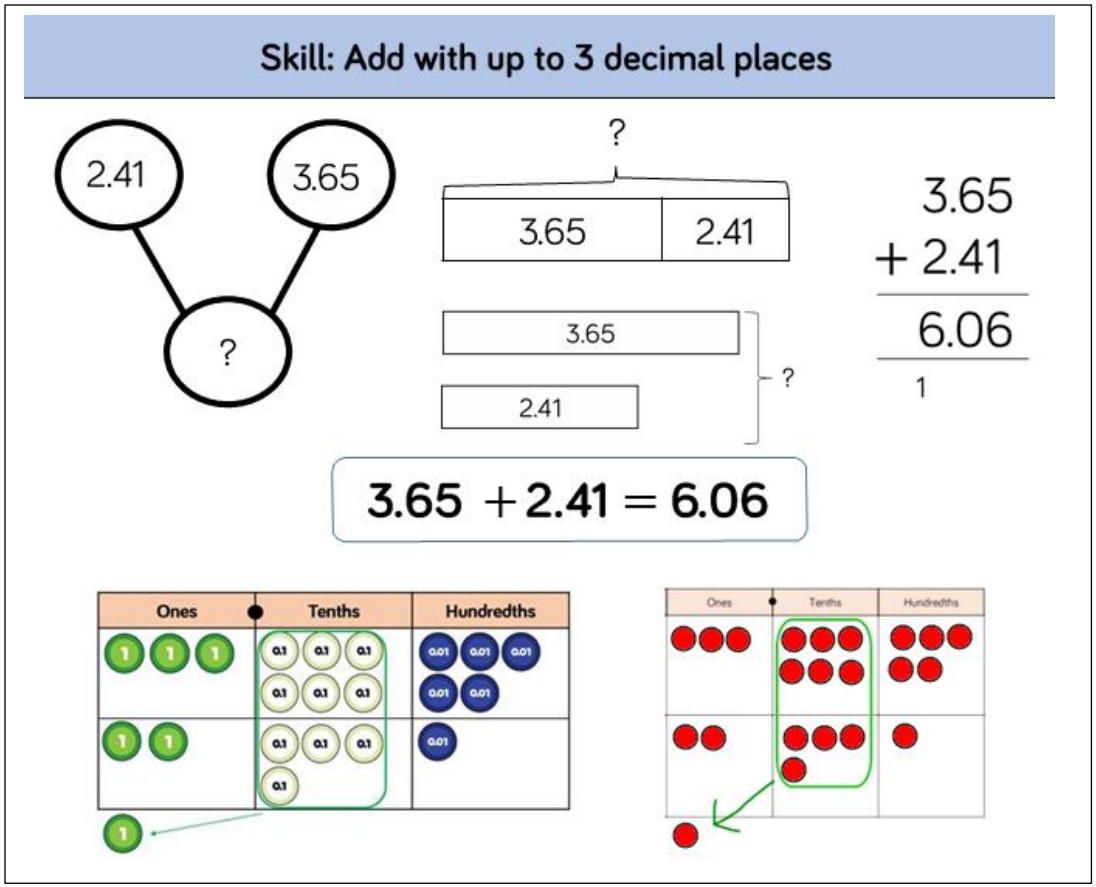
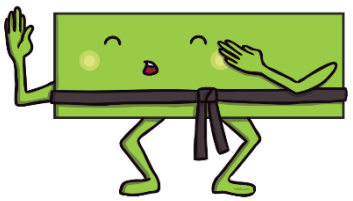


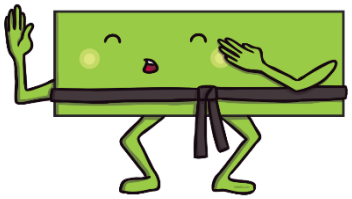
Year 5

Place value counters and plain counters on a place value grid are the most effective manipulatives when adding decimals with 1, 2 and then 3 decimal places.

Ensure children have experience of adding decimals with a variety of decimal places. This includes putting this into context when adding money and other measures.

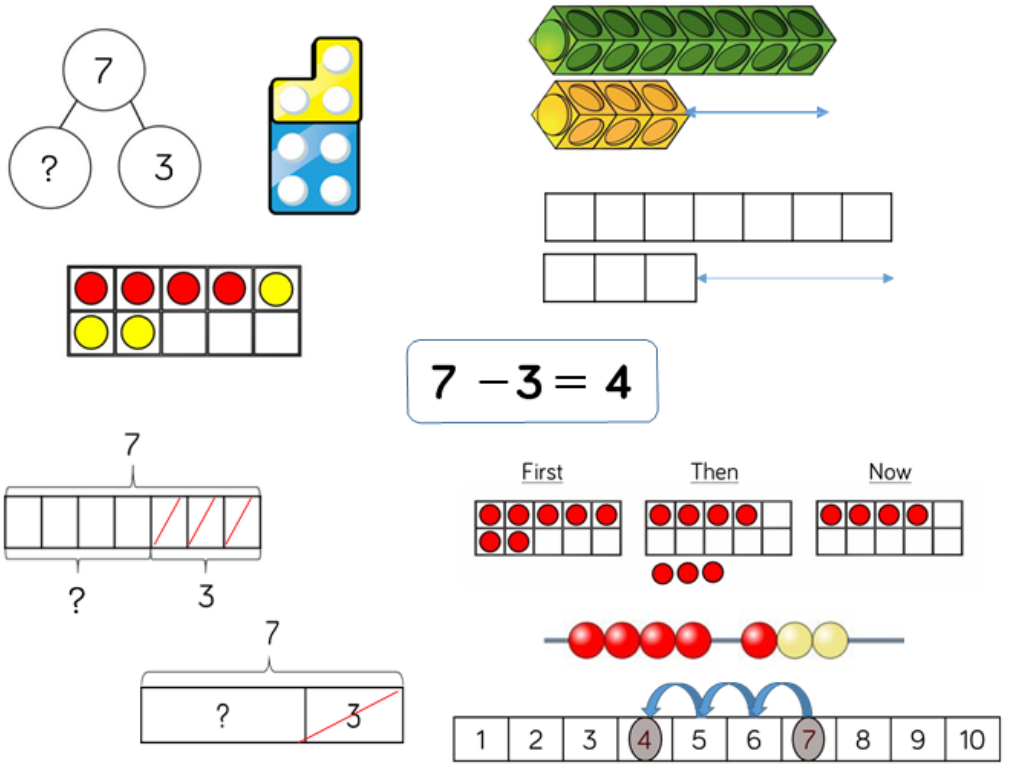


Subtraction Y1-6

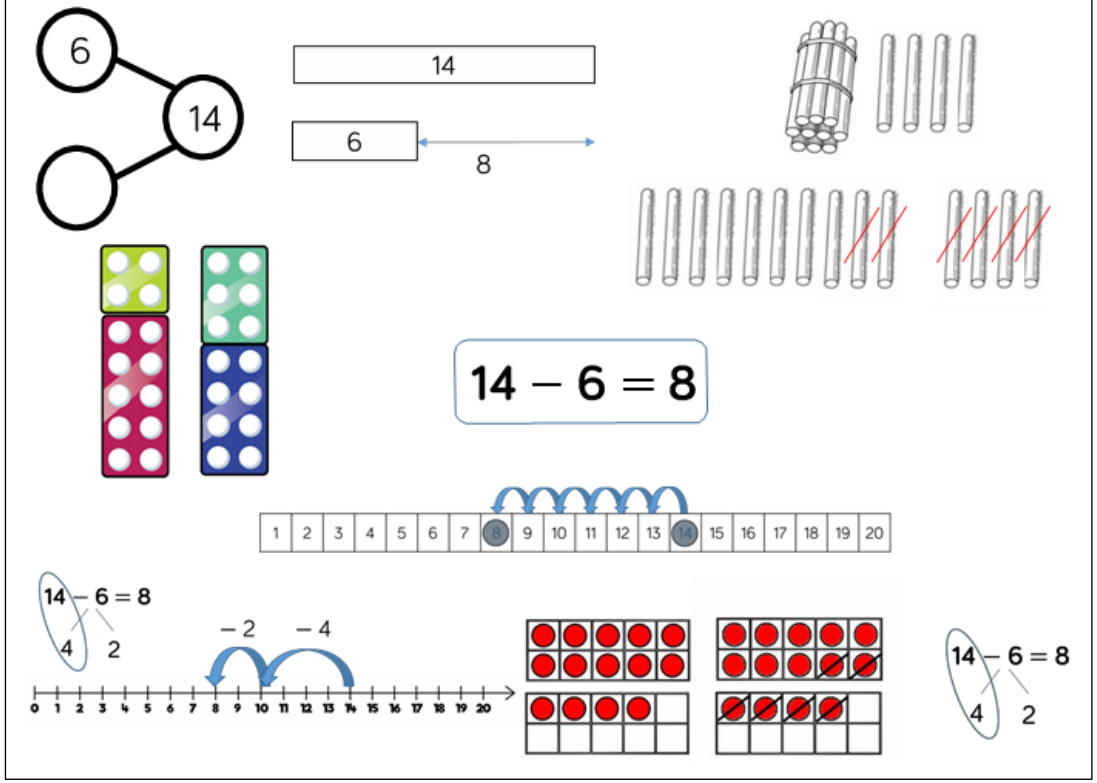


Skill	Year	Representations and models			Key Vocabulary
Subtract two 1-digit numbers to 10	1	Part-whole model Number shapes	Bar model Bead strings (10)	Ten frames (within 10) Number tracks	Take away, subtract, minus, less than, difference, jump, tens, ones, greatest, least bigger, smaller, count back. whole, part, fewer than, more than, greater than, biggest, smallest
Subtract 1 and 2-digit numbers to 20	1	Part-whole model Number shapes Number lines (labelled)	Bar model Bead strings - Rekenrek (20) Straws	Ten frames (within 20) Number tracks	
Subtract 1 and 2-digit numbers to 100.	2	Part-whole model Straws	Bar model Hundred Square	Number lines (blank) Number lines (labelled)	Take away, subtract, minus, less than, fewer than, more than, greater than, difference, jump, tens, ones, bigger, smaller, biggest, smallest greatest, least partition
Subtract two 2-digit numbers	2	Part-whole model Base 10 Column subtraction	Bar model Straws	Number lines (blank) Place Value Counters	
Subtract with up to 3-digits	3	Part-whole model Bar model	Base 10 Place value counters	Column subtraction	Take away, subtract, minus, less than, fewer than, more than, greater than, difference, jump, thousands, hundreds, tens, ones, bigger, smaller, biggest, smallest, partition, greatest, least, tens of thousands, hundreds of thousands, millions, tens of millions, tenths, hundredths, thousandths, numerator, denominator, convert, mixed number, improper
Subtract with up to 4-digits	4	Part-whole model Bar model	Base 10 Place value counters	Column subtraction	
Subtract with more than 4-digits	5	Part-whole model Bar model	Place value counters	Column subtraction	
Subtract with up to 3 decimal places	5/6	Part-whole model Bar model	Place value counters	Column subtraction	Take away, subtract, minus, tenths, hundredths, thousandths, decimal, place holder, represent

Skill: Subtract 1-digit numbers within 10



Skill: Subtract 1 and 2-digit numbers to 20



Year 1

Part-whole models, bar models, ten frames and number shapes support partitioning.

Ten frames, number tracks, single bar models and bead strings support reduction.

Cubes and bar models with two bars can support finding the difference.

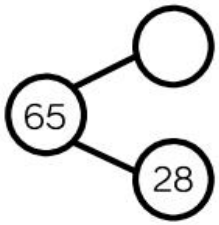
Year 1/2

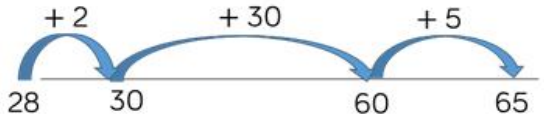
When subtracting one-digit numbers that cross 10, it is important to highlight the importance of ten ones equalling one ten.

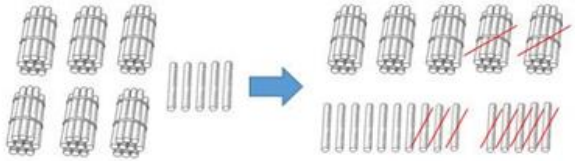
Children should be encouraged to find the number bond to 10 when partitioning the subtracted number.

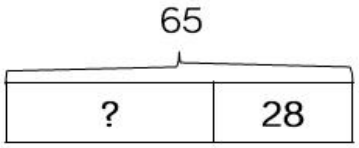
Ten frames, number shapes and number lines are particularly useful for this.

Skill: Subtract 1 and 2-digit numbers to 100

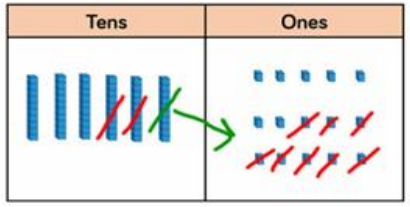




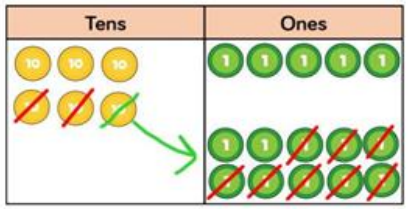




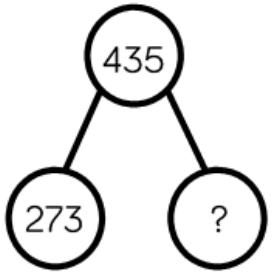
$65 - 28 = 37$

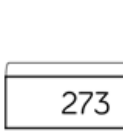


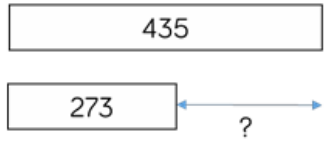
$$\begin{array}{r} {}^{5}\not{6}\,{}^{1}\not{5} \\ -\ 2\ 8 \\ \hline 3\ 7 \end{array}$$



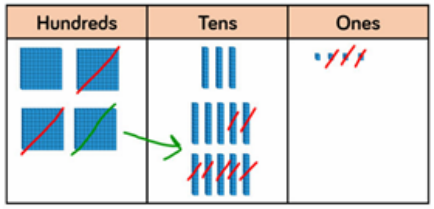
Skill: Subtract numbers with up to 3 digits



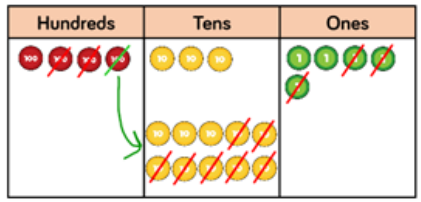




$435 - 273 = 262$



$$\begin{array}{r} {}^{3}\not{4}\,{}^{1}\not{3}\,5 \\ -\ 2\ 7\ 3 \\ \hline 2\ 6\ 2 \end{array}$$



Year 2

At this stage, encourage children to use the formal column method when calculating alongside straws, base 10 or place value counters. As numbers become larger straws become less efficient.

Children can also use a blank number line to count on to find the difference.

Encourage them to jump to multiples of 10 to become more efficient.

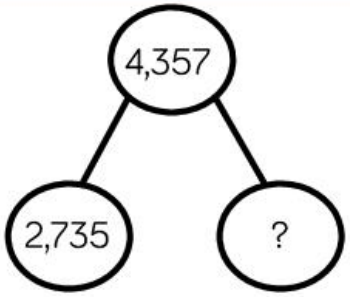
Year 3

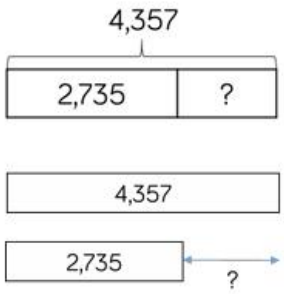
Base 10 and place value counters are the most effective manipulatives when subtracting numbers with up to 3 digits.

Ensure the children write out their calculation alongside any concrete resources so they can see the links to the written column method.

Plain counters on a place value grid can also be used to support learning.

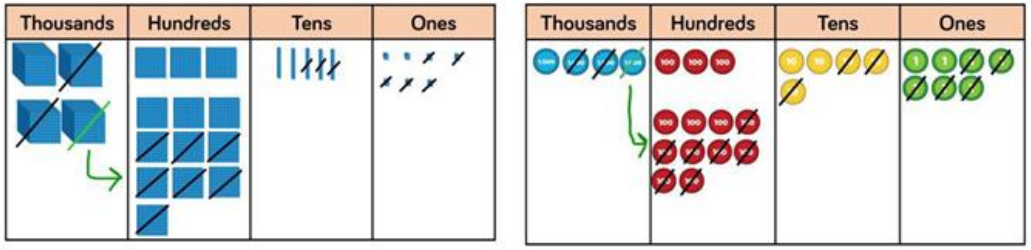
Skill: Subtract numbers with up to 4 digits



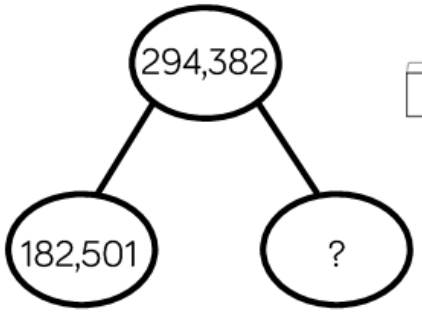


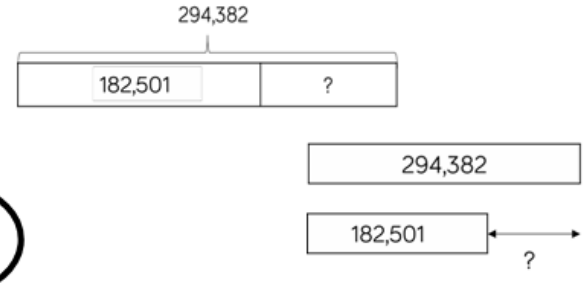
$$\begin{array}{r} {}^{3}\not{4}\,{}^{1}\not{3}\not{5}\not{7} \\ -\ 2735 \\ \hline 1622 \end{array}$$

4,357 − 2,735 = 1,622

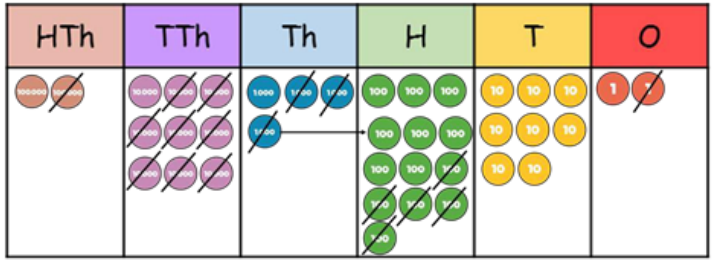


Skill: Subtract numbers with more than 4 digits





294,382 − 182,501 = 111,881



	2	9	$^{3}\not{4}$	$^{1}3$	8	2
−	1	8	2	5	0	1
	1	1	1	8	8	1

Year 4

Base 10 and place value counters are the most effective manipulatives when subtracting numbers with up to 4 digits.

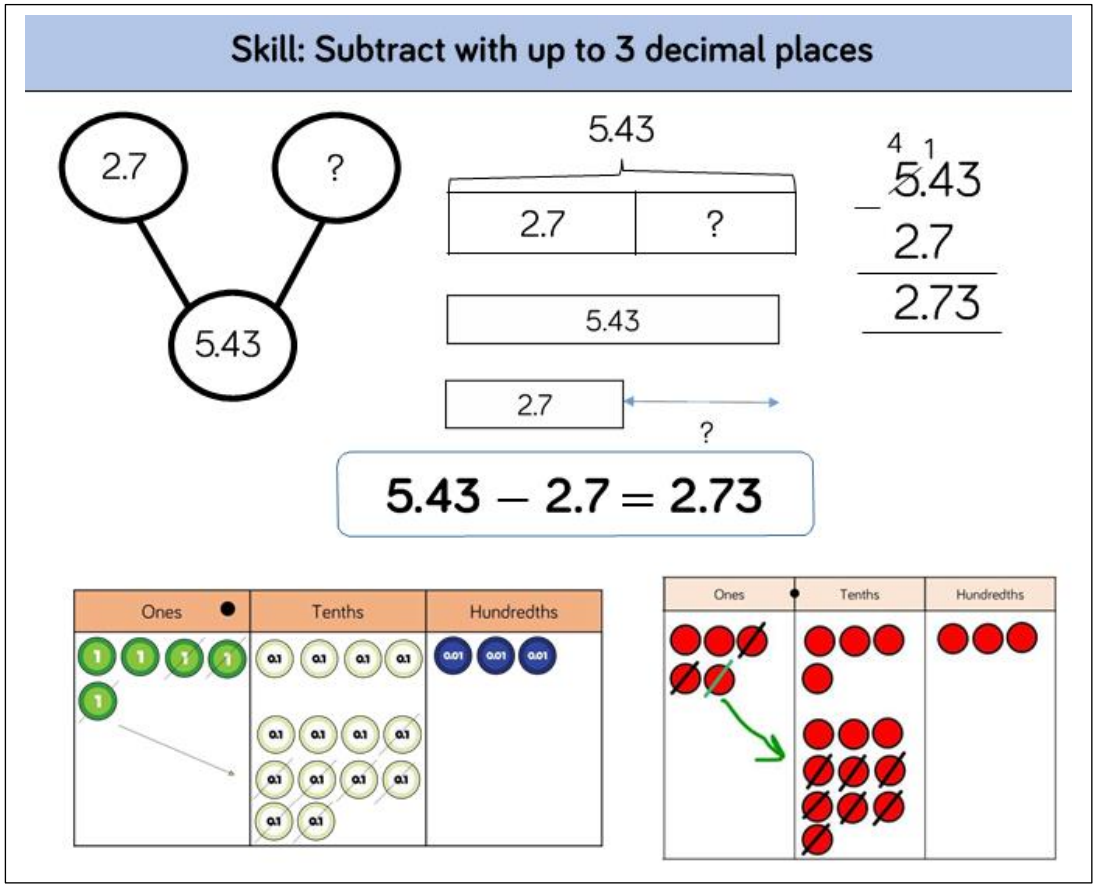
Ensure the children write out their calculation alongside any concrete resources so they can see the links to the written column method.

Plain counters on a place value grid can also be used to support learning.

Year 5

Place value counters or plain counters on a place value grid are the most effective concrete resource when subtracting numbers with more than 4 digits.

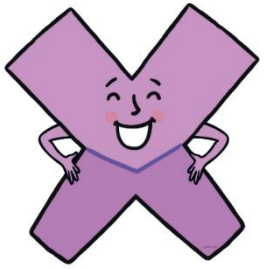
At this stage, children should be encouraged to work in the abstract, using column method to subtract larger numbers efficiently.



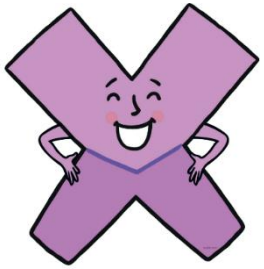
Year 5/6

Place value counters and plain counters on a place value grid are the most effective manipulative when subtracting decimals with 1, 2 and then 3 decimal places.

Ensure children have experience of subtracting decimals with a variety of decimal places. This includes putting this into context when subtracting money and other measures.

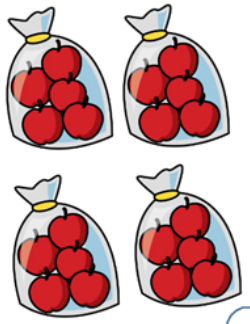


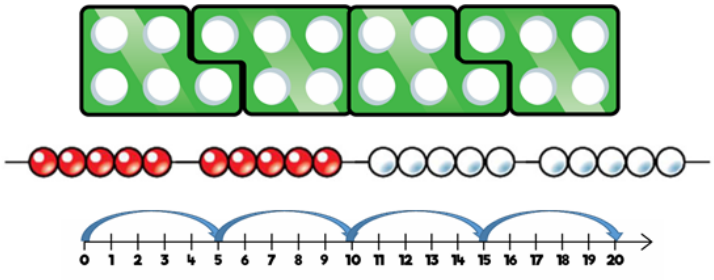
Multiplication Y1-6



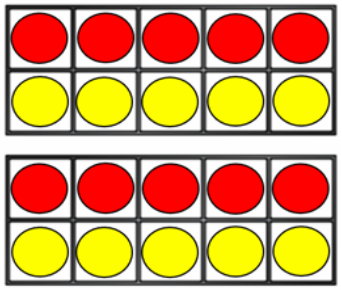
Skill	Year	Representations and models			Key Vocabulary
Solve one-step problems with multiplication	1/2	Bar model Ten frames	Number shapes Bead strings - (Rekenreks)	Counters Number lines	Double, multiply by, times, groups of, lots of, combine, total, multiple, count on, add, jumps of, pattern, arrays, columns, rows
Multiply 2-digit by 1-digit numbers	3/4	Place value counters	Base 10	Short written method Expanded written method	Double, multiply by, times, groups of, lots of, combine, total, multiple, count on, add, jumps of, pattern, arrays, columns, rows, commutativity, commutative, inverse, scale factor of … decimal place, place holder, jump, product
Multiply 3-digit by 1-digit numbers	4	Place value counters	Base 10	Short written method	
Multiply 4-digit by 1-digit numbers	5	Place value counters	Short written method		
Multiply 2-digit by 2-digit numbers	5	Place value counters	Base 10	Short written method Grid method	Groups of, lots of, carry, place holder, multiply, times, product, column, row, total, tens of thousands, hundreds of thousands, millions, tens of millions, tenths, hundredths, thousandths,
Multiply 3-digit by 2-digit numbers	5	Place value counters	Short written method	Grid method	
Multiply 4-digit by 2-digit numbers	5/6	Formal written method			Denominator, numerator, convert, mixed number, improper fraction, product, multiply, times.

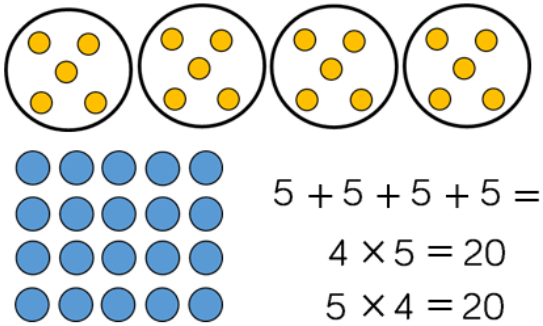
Skill: Solve 1-step problems using multiplication





One bag holds 5 apples.
How many apples do 4 bags hold?



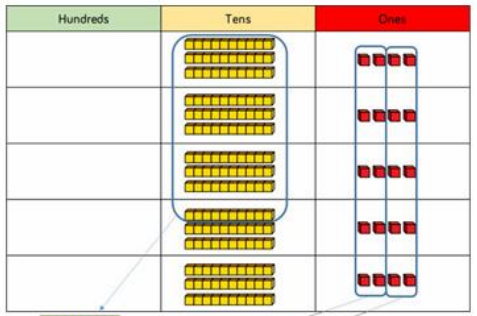


$5 + 5 + 5 + 5 = 20$

$4 \times 5 = 20$

$5 \times 4 = 20$

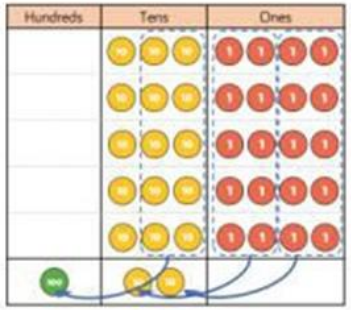
Skill: Multiply 2-digit numbers by 1-digit numbers



	H	T	O	
		3	4	
×			5	
		2	0	(5 × 4)
+	1	5	0	(5 × 30)
	1	7	0	

$34 \times 5 = 170$

	H	T	O	
		3	4	
×			5	
	1	7	0	
	1	2		



Year 1/2

Children represent multiplication as repeated addition in many different ways.

In Year 1, children use concrete and pictorial representations to solve problems. They are not expected to record multiplication formally.

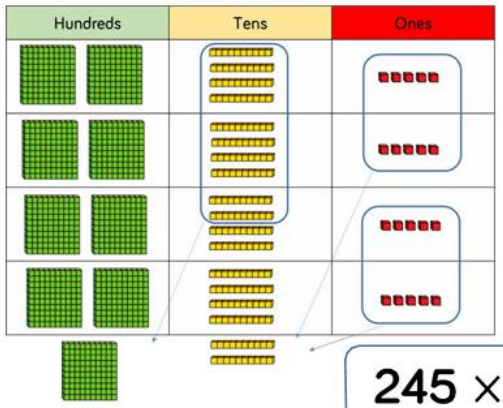
In Year 2, children are introduced to the multiplication symbol.

Year 3/4

Teachers may decide to first look at the expanded column method before moving on to the short multiplication method.

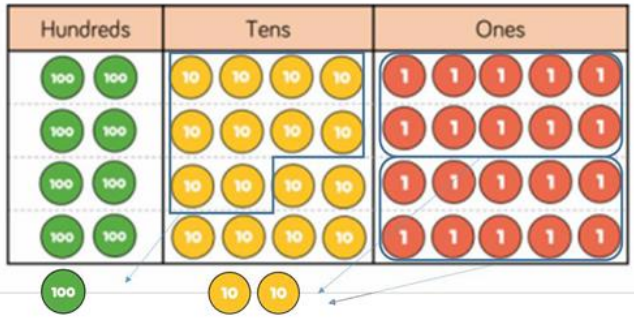
The place value counters should be used to support the understanding of the method rather than supporting the multiplication, as children should use times table knowledge.

Skill: Multiply 3-digit numbers by 1-digit numbers

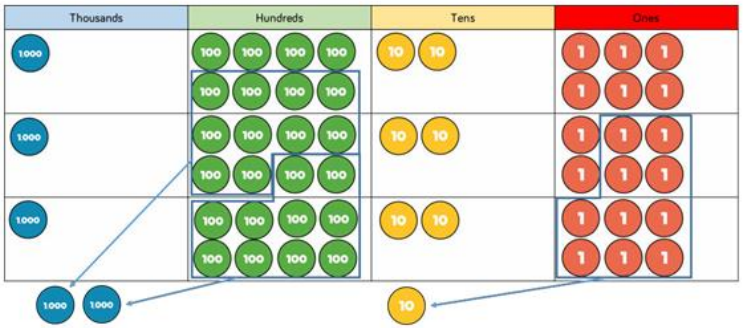


	H	T	O
	2	4	5
×			4
	9	8	0
	1	2	

$245 \times 4 = 980$



Skill: Multiply 4-digit numbers by 1-digit numbers



$1{,}826 \times 3 = 5{,}478$

×	Th	H	T	O
	1	8	2	6
				3
	5	4	7	8
	2		1	

Year 4

When moving to 3-digit by 1-digit multiplication, encourage children to move towards the short, formal written method.

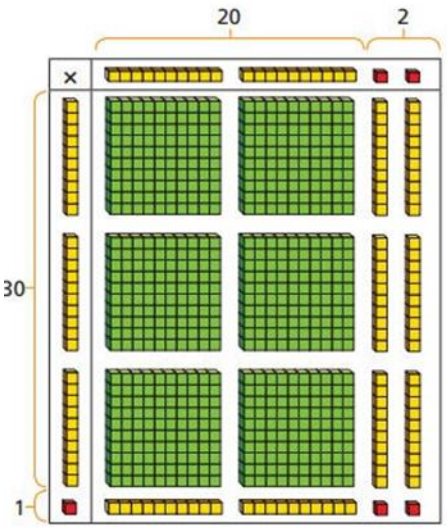
Base 10 and place value counters continue to support the understanding of the written method.

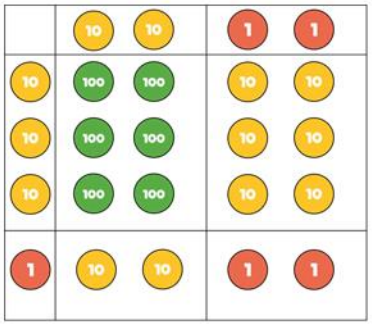
Limit the number of exchanges needed in the questions and move children away from resources when multiplying larger numbers.

Year 5

When multiplying 4-digit numbers, place value counters are the most efficient manipulative to use. This helps the children to understand the importance of ten and supports children in their understanding of the formal written method.

Skill: Multiply 2-digit numbers by 2-digit numbers



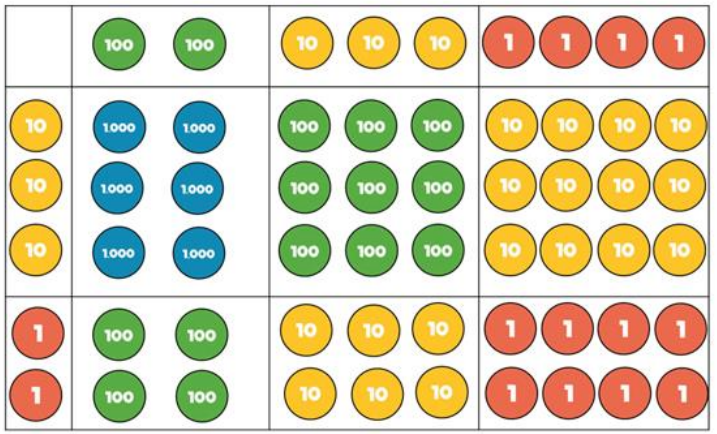


×	20	2
30	600	60
1	20	2

	H	T	O
×		2	2
		3	1
		2	2
	6	6	0
	6	8	2

$22 \times 31 = 682$

Skill: Multiply 3-digit numbers by 2-digit numbers



Th	H	T	O
	2	3	4
×		3	2
	4	6	8
1^{7}	1^{0}	2	0
7	4	8	8

×	200	30	4
30	6,000	900	120
2	400	60	8

$234 \times 32 = 7{,}488$

Year 5

When multiplying a multi-digit number by 2-digits, use the area model to help children understand the size of the numbers they are using. This links to finding the area of a rectangle by finding the space covered by the Base 10.

The grid method matches the area model as an initial written method before moving onto the formal written multiplication method.

Year 5

Children can continue to use the area model when multiplying 3-digits by 2-digits.

Place value counters become more efficient to use but Base 10 can be used to highlight the size of the numbers.

Encourage children to move towards the formal written method, seeing the links with the grid method.

Skill: Multiply 4-digit numbers by 2-digit numbers

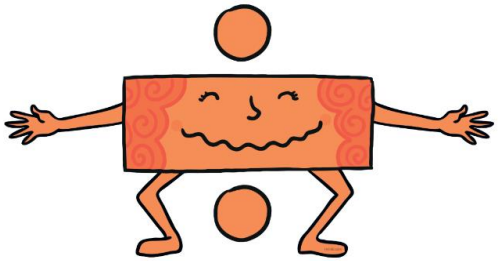
TTh	Th	H	T	O
	2	7	3	9
×			2	8
2 (2)	1 (5)	9 (3)	1 (7)	2
5 (1)	4	7 (1)	8	0
7	6	6	9	2
		1		

$2{,}739 \times 28 = 76{,}692$

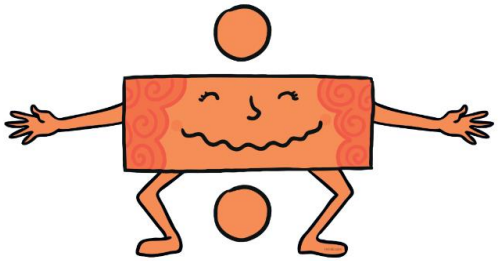
Year 5/6

When multiplying 4-digits by 2-digits, children should be confident in the written method.

Consider where exchanged digits are placed and make sure this is consistent.

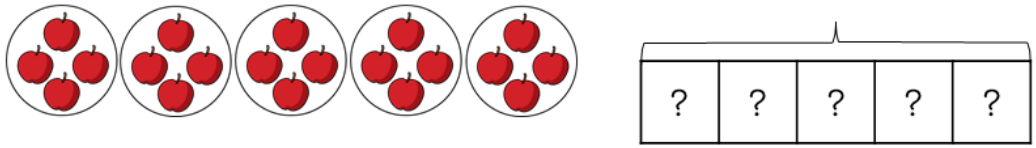


Division

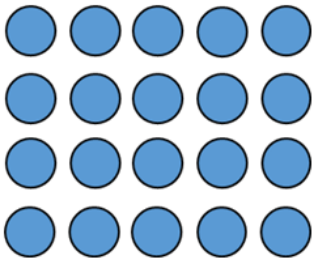


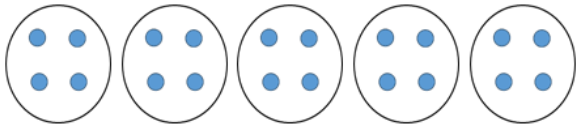
Skill	Year	Representations and models			Key Vocabulary
Solve one-step problems with division (sharing)	1/2	Bar model Arrays	Real life objects	Counters	Share, divide, part, whole, fair, groups of, lots of, inverse, divisor, factor, multiple, arrays
Solve one-step problems with division (grouping)	1/2	Real life objects Ten frames Arrays	Number shapes Bead strings (Rekenreks)	Counters Number lines	
Divide 2-digits by 1-digit numbers (sharing no exchange)	1/2	Part-whole model Bar model	Base 10 Straws	Place value counters	
Divide 2-digits by 1-digit numbers (sharing with exchange)	3	Part-whole model Bar model	Base 10 Straws	Place value counters	Share, divide, part, whole, fair, groups of, lots of, inverse, remainder, divisor, factor, multiple array, columns, rows, commutativity, commutative, inverse, scale factor of ..., thousands, hundreds, tens, ones, partition, tens of thousands, hundreds of thousands, millions, tens of millions, tenths, hundredths, thousandths, decimal place, place holder, jump, move, spaces
Divide 2-digits by 1-digit numbers (sharing with remainders)	3/4	Part-whole model Bar model	Base 10 Straws	Place value counters	
Divide 2-digits by 1-digit numbers (grouping)	4/5	Place value counters Place value grid	Counters	Written short division	
Divide 3-digit by 1-digit numbers (sharing with exchange)	4	Part-whole model Bar model	Base 10	Place value counters	
Divide 3-digit by 1-digit numbers (sharing)	4/5	Place value counters Place value grid	Counters	Written short division	
Divide 3-digit and 4-digit by 1-digit numbers (grouping)	5	Place value counters Place value grid	Counters	Written short division	
Divide multi-digit by 2-digit numbers (short division)	6	Written short division	List of multiples		
Divide multi-digit by 2-digit numbers (long division)	6	Written long division	List of multiples		Divisor, denominator, numerator, mixed number, improper fraction, divide, share, keep, flip, share

Skill: Solve 1-step problems using multiplication (sharing)



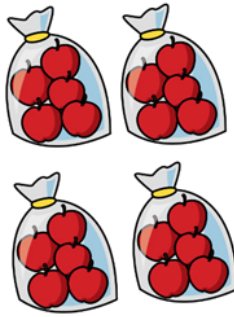
There are 20 apples altogether.
They are shared equally between 5 bags.
How many apples are in each bag?

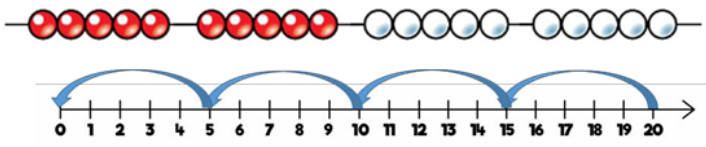




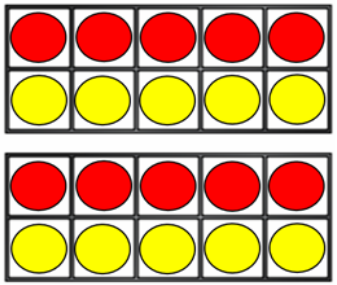
$20 \div 5 = 4$

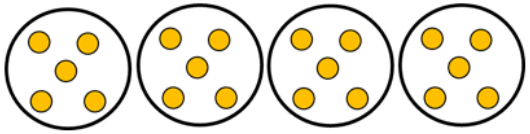
Skill: Solve 1-step problems using division (grouping)

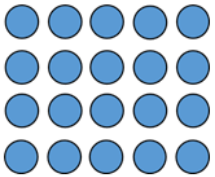




There are 20 apples altogether.
They are put in bags of 5.
How many bags are there?







$20 \div 5 = 4$

Year 1/2

Children solve problems by sharing amounts into equal groups.

In Year 1, children use concrete and pictorial representations to solve problems. They are not expected to record division formally.

In Year 2, children are introduced to the division symbol.

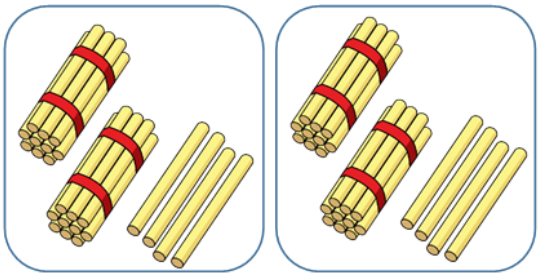
Year 1/2

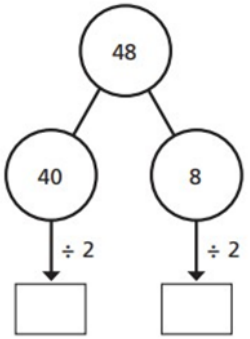
Children solve problems by grouping and counting the number of groups. Grouping encourages children to count in multiples and links to repeated subtraction on a number line.

They can use concrete representations in fixed groups such as number shapes which helps to show the link between multiplication and division.

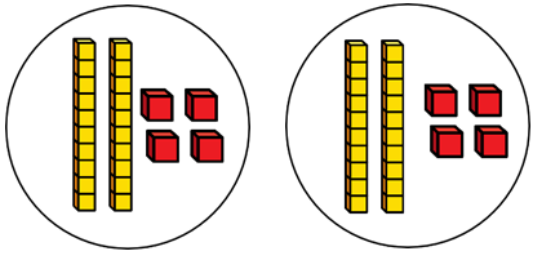
Skill: Divide 2-digits by 1-digit (sharing with no exchange)

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

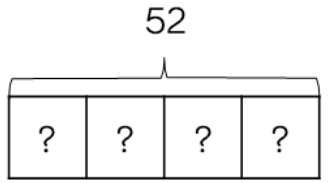


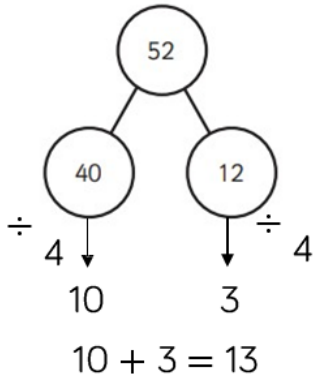


$48 \div 2 = 24$

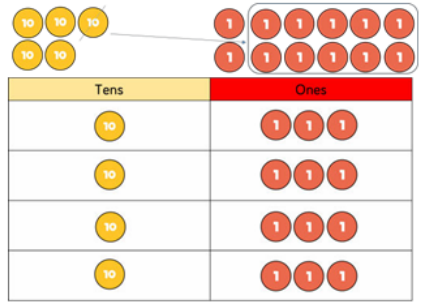


Skill: Divide 2-digits by 1-digit (sharing with exchange)





$52 \div 4 = 13$



Year 1/2

When dividing larger numbers, children can use manipulatives that allow them to partition into tens and ones.

Straws, Base 10 and place value counters can all be used to share numbers into equal groups.

Part-whole models can provide children with a clear written method that matches the concrete representation.

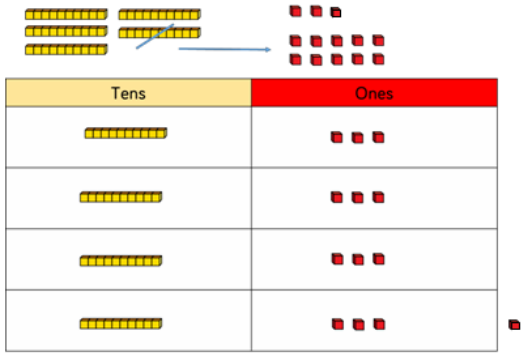
Year 3/4

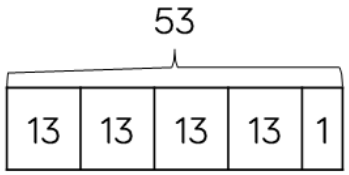
When dividing numbers involving an exchange, children can use Base 10 and place value counters to exchange one ten for ten ones.

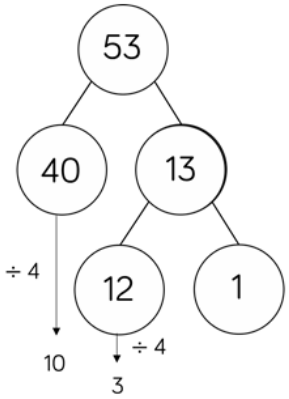
Children should start with the equipment outside the place value grid before sharing the tens and ones equally between the rows.

Flexible partitioning in a part-whole model supports this method.

Skill: Divide 2-digits by 1-digit (sharing with remainders)

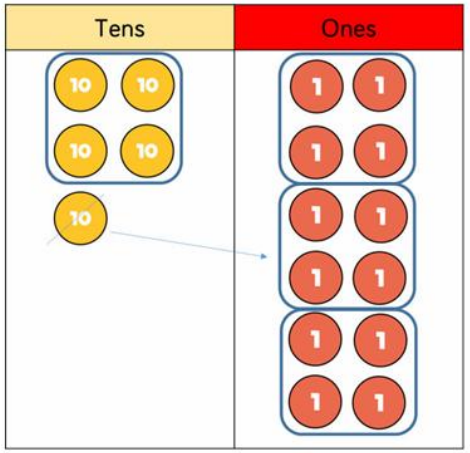


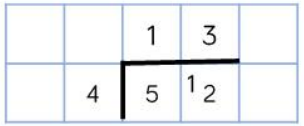


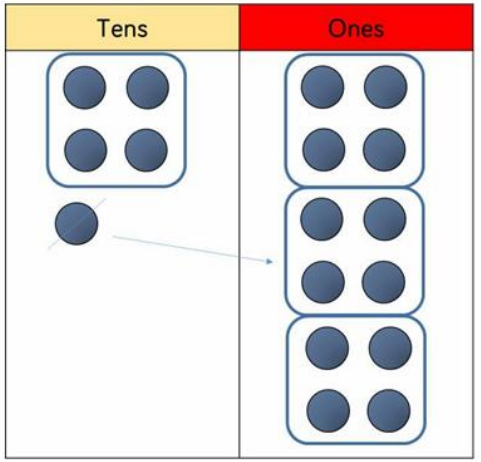


$53 \div 4 = 13$ r1

Skill: Divide 2-digits by 1-digit (grouping)







$52 \div 4 = 13$

Year 3/4

When dividing numbers with remainders, children can use Base 10 and place value counters to exchange one ten for ten ones.

Starting with the equipment outside the place value grid will highlight remainders, as they will be left outside the grid once the equal groups have been made.

Flexible partitioning in a part-whole model supports this method.

Year 4/5

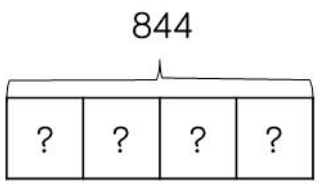
When using the short division method, children use grouping. Starting with the largest place value, they group by the divisor.

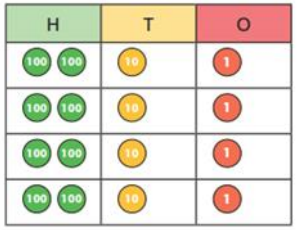
Language is important here – children should consider "How many groups of 4 tens can we make?" and "How many groups of 4 ones can we make?"

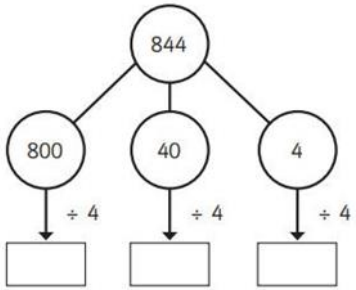
Remainders can also been seen as they are left ungrouped.

Skill: Divide 3-digits by 1-digit (sharing)

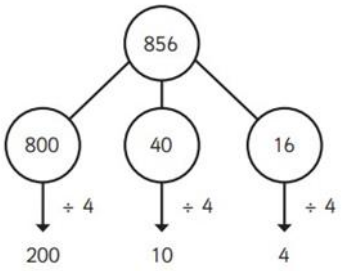
844 ÷ 4 = 211

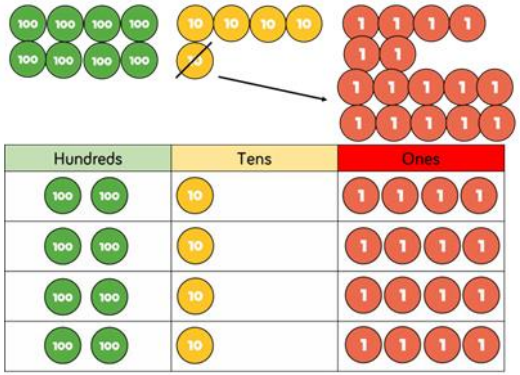




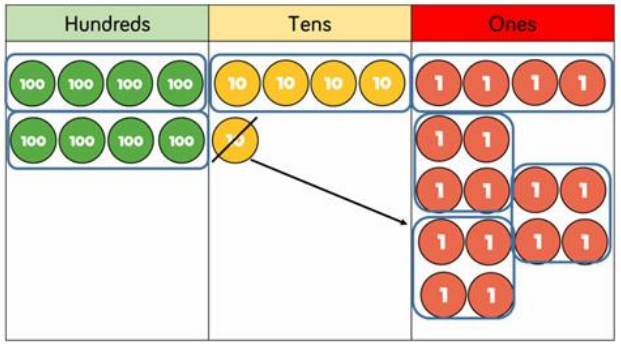


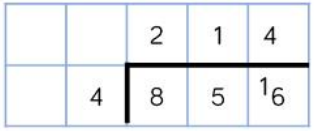
844 ÷ 4 = 211

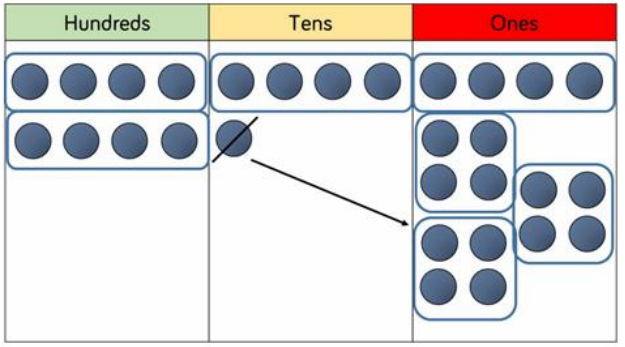




Skill: Divide 3-digits by 1-digit (grouping)







856 ÷ 4 = 214

Year 3

Children can continue to use place value counters to share 3-digit numbers into equal groups.

Children should start with the equipment outside the place value grid before sharing the hundreds, tens and ones equally between the rows.

This method can also help to highlight remainders.

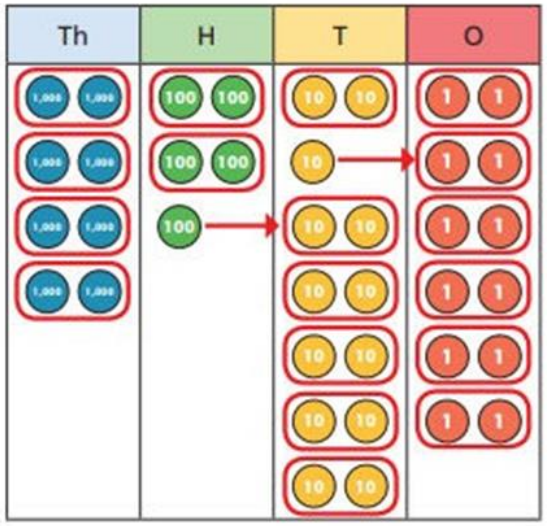
Flexible partitioning in a part-whole model supports this method.

Year 5

Children can continue to use grouping to support their understanding of short division when dividing a 3-digit number by a 1-digit number.

Place value counters or plain counters can be used on a place value grid to support this understanding. Children can also draw their own counters and group them through a more pictorial method.

Skill: Divide 4-digits by 1-digit (grouping)



	4	2	6	6
2	8	5	$^{1}3$	$^{1}2$

8,532 ÷ 2 = 4,266

Skill: Divide multi digits by 2-digits (short division)

		0	3	6
	12	4	$^{4}3$	$^{7}2$

432 ÷ 12 = 36

7,335 ÷ 15 = 489

	0	4	8	9
15	7	$^{7}3$	$^{13}3$	$^{13}5$

15	30	45	60	75	90	105	120	135	150

Year 5

Place value counters or plain counters can be used on a place value grid to support children.

Children can also draw their own counters and group them through a more pictorial method.

Children should be encouraged to move away from the concrete and pictorial when dividing with exchanges.

Year 6

When children begin to divide up to 4-digits by 2-digits, written methods become the most accurate as concrete and pictorial representations become less effective.

Children will also solve problems with remainders where the quotient can be rounded as appropriate.

Skill: Divide multi-digits by 2-digits (long division)

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

(×30)

(×6)

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

$432 \div 12 = 36$

$7{,}335 \div 15 = 489$

	0	4	8	9	
15	7	3	3	5	
–	6	0	0	0	(×400
	1	3	3	5	
–	1	2	0	0	(×80)
		1	3	5	
–		1	3	5	(×9)
				0	

$1 \times 15 = 15$
$2 \times 15 = 30$
$3 \times 15 = 45$
$4 \times 15 = 60$
$5 \times 15 = 75$
$10 \times 15 = 150$

Year 6

Children can also divide by 2-digit numbers using long division.

Children can write out multiples to support their calculations with larger remainders.

Children will also solve problems with remainders where the quotient can be rounded as appropriate.

Skill: Divide multi digits by 2-digits (long division)

$372 \div 15 = 24 \text{ r}12$

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

$1 \times 15 = 15$
$2 \times 15 = 30$
$3 \times 15 = 45$
$4 \times 15 = 60$
$5 \times 15 = 75$
$10 \times 15 = 150$

			2	4	$\frac{4}{5}$
1	5	3	7	2	
	–	3	0	0	
			7	2	
	–		6	0	
			1	2	

$372 \div 15 = 24\frac{4}{5}$

Year 6

When a remainder is left at the end of a calculation, children can either leave it as a remainder or convert it to a fraction.

This will depend on the question.

Children can also answer questions where the quotient needs to be rounded according to the context.

Glossary

Addend – a number to be added to another.

Aggregation – combining two or more quantities or measures to find a total.

Array – an ordered collection of counters, cubes or other items in rows and columns.

Augmentation – increasing a quantity or measure by another quantity.

Cardinal – the number that indicates how many there are in a set.

Classification – the identification of an object by specific attributes, such as colour, texture, shape or size.

Commutative – numbers that can be added and multiplied in any order.

Complement – in addition, a number and its complement make a total – e.g. 300 is the complement to 700 to make 1,000.

Conservation (of number) – the recognition that the number stays the same if none have been added or taken away.

Difference – the numerical difference between two numbers is found by comparing the quantity in each group.

Dividend – in division, the number that is divided.

Divisor – in division, the number by which another is divided.

Exchange – change a number or expression for another of an equal value.

Factor – a number that multiplies with another to make a product.

Minuend – a quantity or number from which another is subtracted.

Multiplicand – in multiplication, a number to be multiplied by another.

Number – can be a count of a collection of items, a measure of time, length or weight, a label – e.g. the number 17 bus.

Numeral – the written symbol for a number – e.g. 1, 2, 3.

Ordinal – a number denoting the position in a sequence – e.g. 1st, 2nd, 3rd etc or page 1, page 2, page 3...

Partitioning – splitting a set or number into its component parts.

Product – the result of multiplying one number by another.

Quantity – the amount you have of something – e.g. a cup of flour, three boxes, half an hour.

Quotient – the result of a division.

Reduction – subtraction as take away.

Remainder – the amount left over after a division when the divisor is not a factor of the dividend.

Scaling – enlarging or reducing a number by a given amount, called the scale factor.

Subitise – instantly recognise the number of objects in a small group without needing to count.

Subtrahend – a number to be subtracted from another.

Sum – the result of an addition.

Total – the aggregate or the sum found in addition.