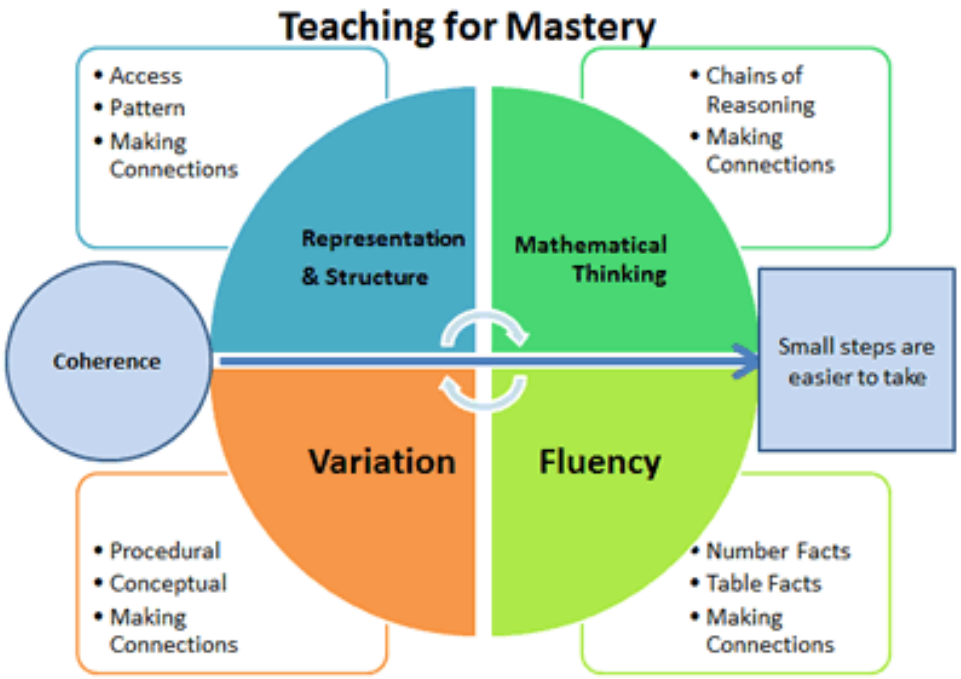
At Nova Primary School, we want to ensure our pupils: experience a variety of manipulatives; use accurate mathematical talk; and consolidate fluency facts in meaningful contexts. Our calculation policy has been adapted from the **White Rose Maths** calculation policy; this will support use of manipulatives and representations for the Concrete, Pictorial Abstract approach. Mathematical language (sentence focus) and key vocabulary have been taken from the Department of Education **Ready to Progress** materials. *It is important to read the teaching points for each unit prior to planning (found in the expanded Ready to Progress documents).*



Addition

Year 1: Adding 1-digit number within 10.

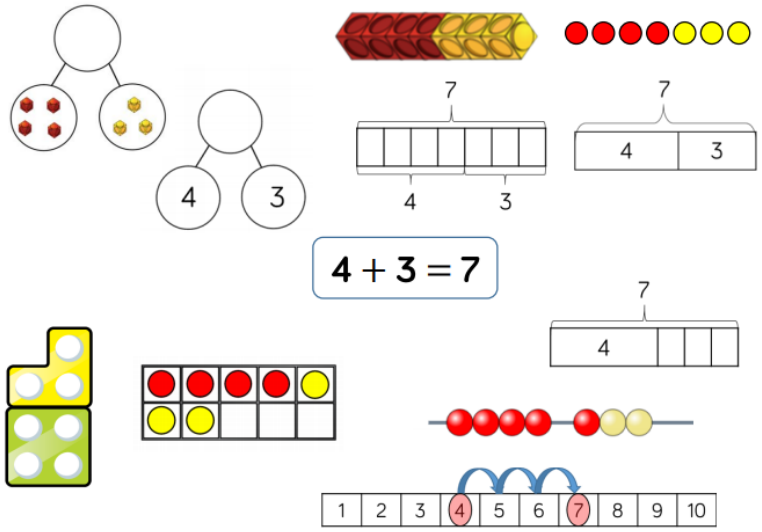
When adding numbers to 10, children can explore both aggregation (combining quantities) and augmentation (increasing by another quantity).

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 support augmentation.

Ready to Progress sentences:

We can write the addends in either order.
Addition can tell us about combining objects.
Addition can tell us about a quantity increasing.
A number can be made of different parts
If we know how many objects there are in total, we can find a missing part.
Example: Five is the whole, 3 is a part and 2 is a part.



Year 1/2: Add 1 and 2-digit numbers to 20.

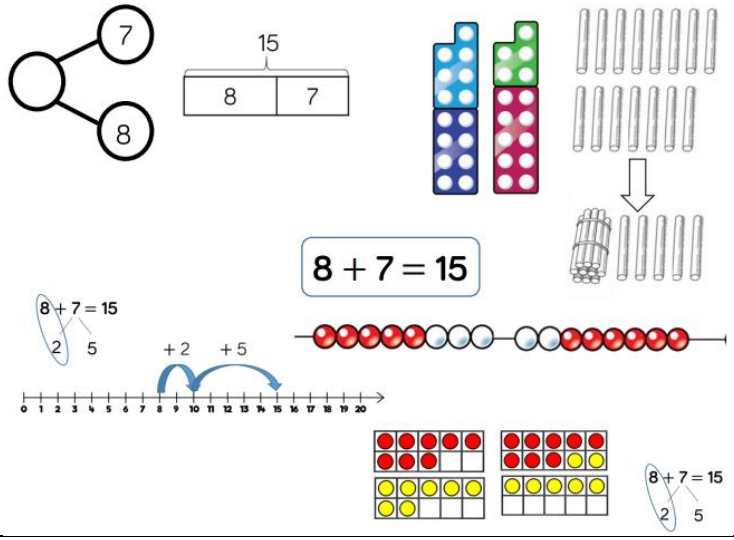
When adding 1-digit numbers that cross 10, it is important to highlight the importance of the ten ones equalling one ten.
Different manipulatives can be used to represent this exchange. Use concrete resources alongside number lines to support children in understanding how to partition their jumps.

Ready to Progress sentences:

We can use a making ten strategy to add past ten.

Vocabulary:

Addend – a number to added to another.
Aggregation – combining two or more quantities to find a total.
Augmentation – increasing a quantity or measure by another quantity.
Commutative – numbers can be added in any order.
Subitise – instantly recognise the number of objects without needing to count.
Sum – the result of addition.



Year 2: Add three 1-digit numbers.

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 their understanding of commutativity.

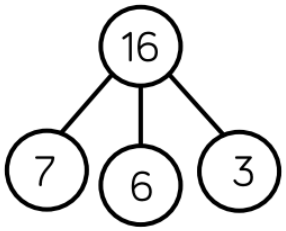
Manipulatives that highlight number bonds to 10 are effective when adding three 1-digit numbers.

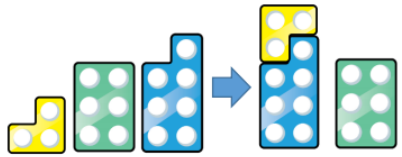
Ready to Progress sentences:

Refer to previous sentences and vocabulary above.

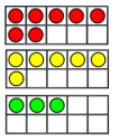
Vocabulary:

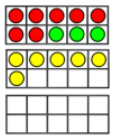
Complement – a number and its complement make a total.
Partition – split a number into its component parts.
Total – the aggregate or the sum found by addition.

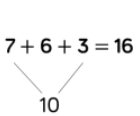


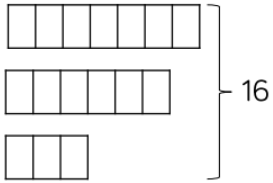


$7 + 6 + 3 = 16$









Year 2/3: Add 1-digit and 2-dight numbers to 100.

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

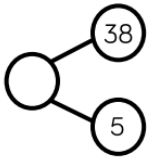
They should also apply their knowledge of number bonds to add more efficiently.
Example: 8 + 5 = 13 so 38 + 5 = 43.

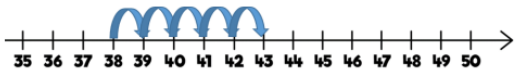
Hundred squares and straws can support children to find the number bonds to 10.

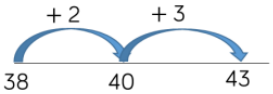
Ready to Progress sentences:

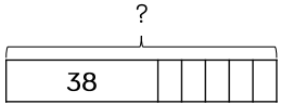
8 plus 5 is equal to 13, so I know that 38 plus 5 is equal to 43.
We can partition both addends to help us add efficiently.

Example: First I partition both numbers.
Then I add the tens. Then I add the ones.
Then I combine all of the tens and all of the ones.

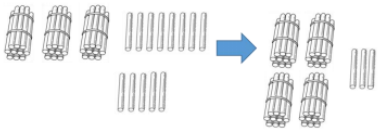








$38 + 5 = 43$



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 2/3: Add two 2-digit numbers to 100.

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

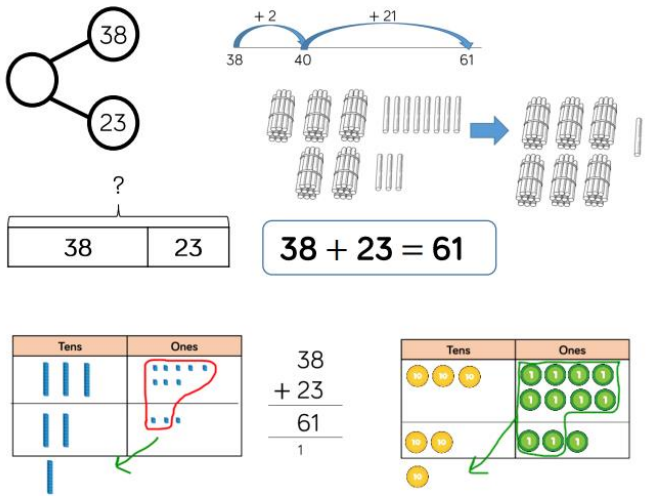
Children can also use a blank number line to count on to find the total. Encourage them to jump in multiples of 10 to become more efficient.

Ready to Progress sentences:

Refer to previous year groups.

If the column sum is equal to 10 or more, we must ***re-group.***

Example: 38 + 23: 8 ones plus 3 ones is equal to 11 ones (1 ten and ***1 one****). 3 tens plus 2 tens equals 5 tens. 5 tens plus 1 ten equals* ***6 tens****.*



Year 3: Add numbers up to 3 digits.

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 to they can see the links to the written column method.

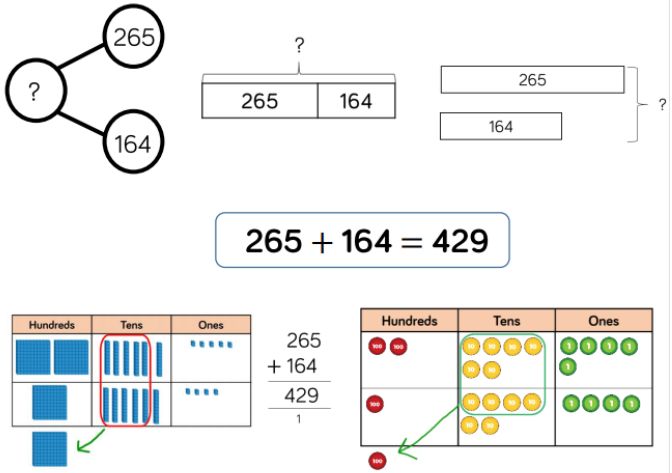
Plain counters on a place value grid can also be used to support learning.

Ready to Progress sentences:

Refer to previous year groups.

There is a missing whole. To find the missing whole, we add the 2 parts.

addend + addend = sum

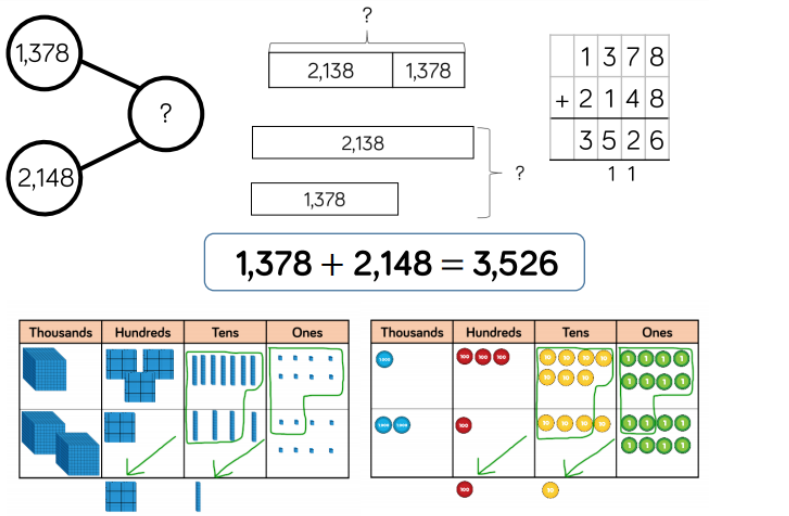


Year 4: Add numbers with up to 4 digits.

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

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

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



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

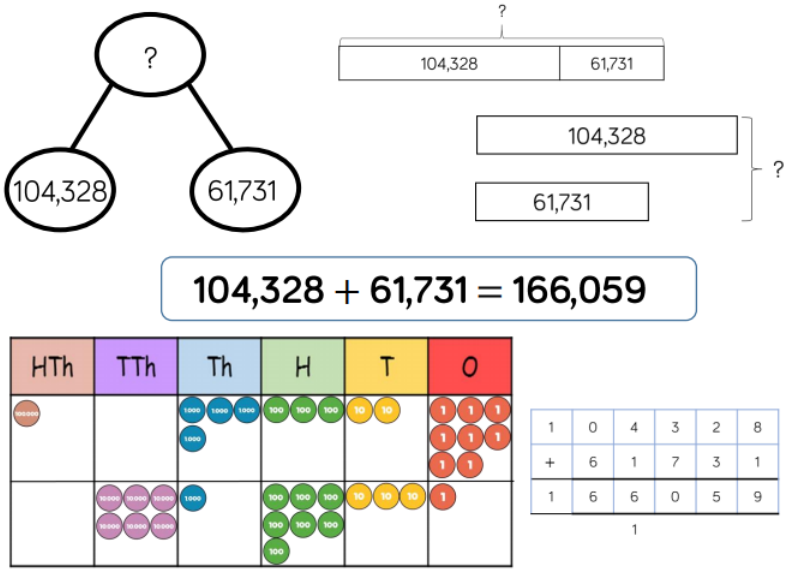
Ready to Progress sentences:

Refer to previous year groups, using increasing place value language.

Year 5/6: Add numbers with more than 4 digits.

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.

Children should be encouraged to work in the abstract, using the column method to add larger numbers efficiently.

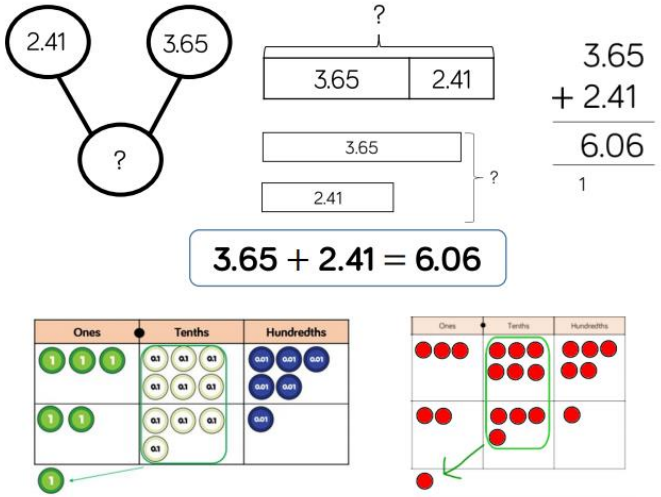


1	0	4	3	2	8
+	6	1	7	3	1
1	6	6	0	5	9
		1			

Year 5/6: Add with up to 3 decimal places.

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

Year 1: Subtract 1-digit numbers within 10.

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 support finding the difference.

Ready to Progress sentences:

If we know how many objects there are in total, we can find a missing part.

Example: Five is a part of 6, 7, 8, 9 and 10.

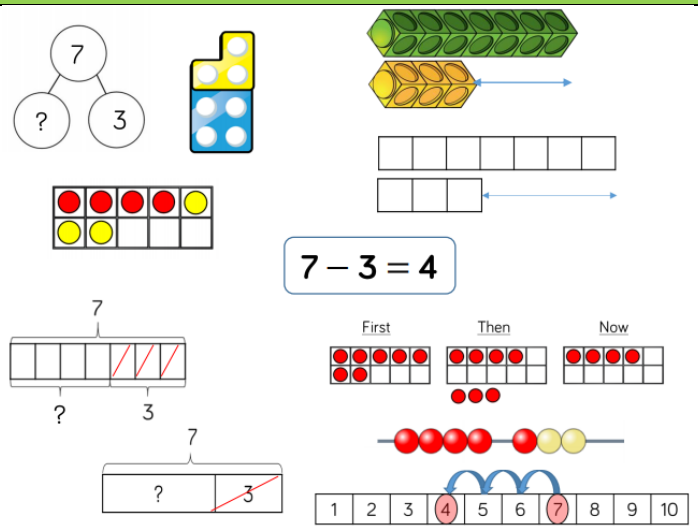
Subtraction can tell us about partitioning.

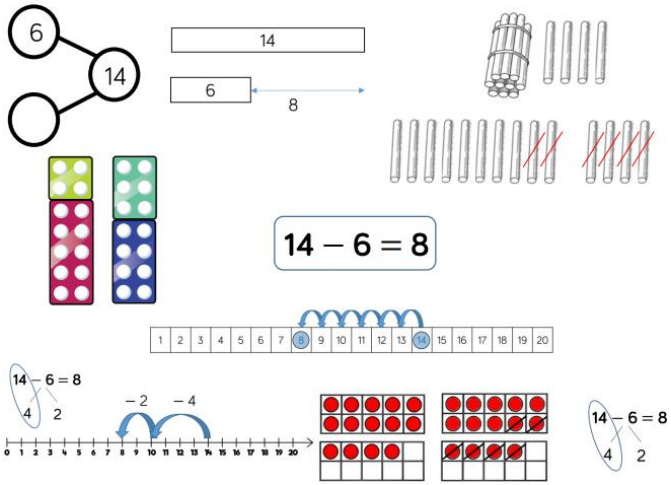
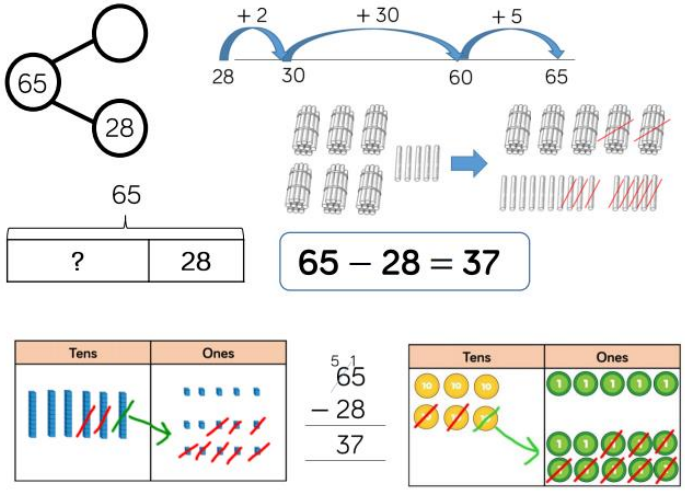
Addition and subtraction undo each other (the inverse).

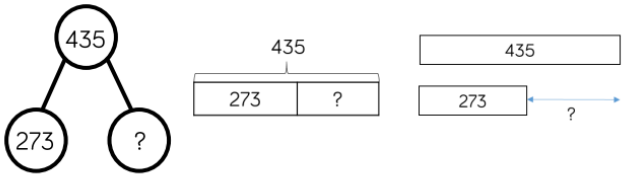
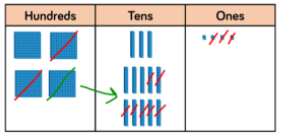
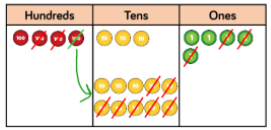
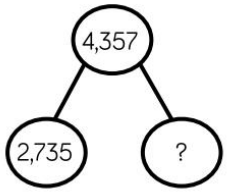
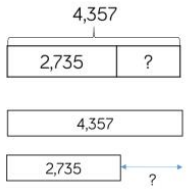
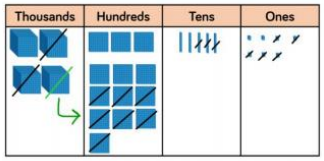
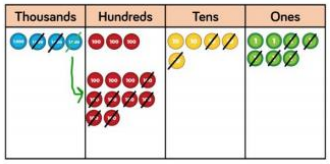
Vocabulary:

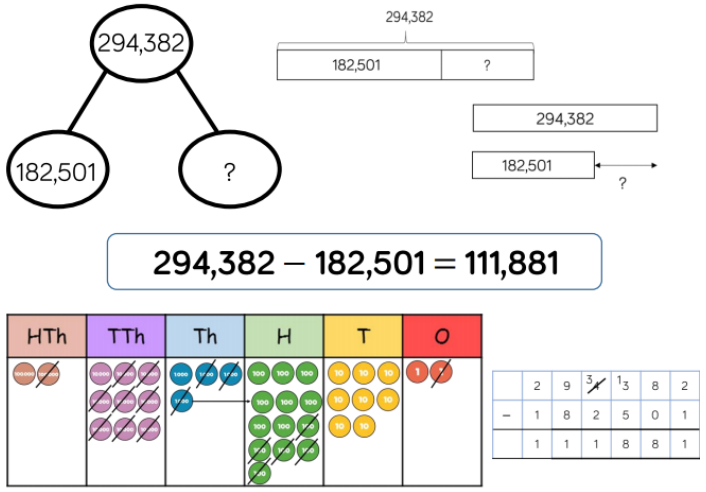
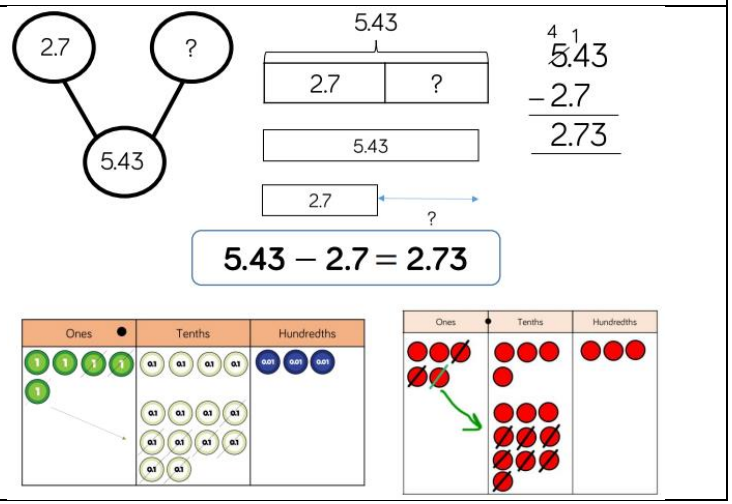
Minuend – A number or quantity from which another is subtracted.

Subtrahend – A number to be subtracted from another.



Difference – The numerical difference between two numbers is found by comparing the quantity in each group. Reduction – Subtraction as a takeaway.	
Year 1/2: Subtract 1 and 2-digit numbers to 20. *When subtracting 1-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.*	
Ready to Progress sentences: *There are 14 pencils altogether.* *6 pencils are sharp. 8 pencils are not sharp.* *We can write this as 14 minus 6 is equal to 8.* *We can partition the subtrahend to help us subtract.* *We can use a subtracting through 10 strategy.*	
Year 2: Subtract 1 and 2-digit numbers to 100. *Children should use the formal column method when calculating alongside straws, base 10 or place value counters. As number becomes 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.*	
Ready to Progress sentences: *There are ___ more red cars than blue cars.* *There are ___ fewer blue cars than red cars.* *7 minus 4 is equal to 3, so 7 tens minus 4 tens is equal to 3 tens.* *So I know that 70 minus 40 is equal to 30.* *If I know that 8 minus 6 is equal to 2, I can use this to help find **8**5 minus **6**0.* *We can subtract from any two-digit number by subtracting tens then ones:*	

First I partition the subtrahend into tens and ones. *Then I subtract the tens, then subtract the ones.*	
Year 3: Subtract numbers with up to 3-digits. *Base 10 and place value counters are the most effective manipulatives when subtracting numbers up to 3-digits.* *Ensure children write out their calculation alongside any concrete resources to they can see the links to the written column method.* *Plain counters on a place value grid can also be used to support learning.*	 **435 – 273 = 262**  3 1 435 – 273 262 
Ready to Progress sentences: *There is a missing part. To find the missing part, we subtract the other part from the whole.* *We subtract the ones. 5 ones minus 3 ones is equal to 2 ones.* *We subtract the tens. 6 tens minus 2 tens is equal to 4 tens.* *10 ones is equivalent to 1 ten. 10 tens is equivalent to 1 hundred.* *minuend – subtrahend = difference*	
Year 4: Subtract numbers with up to 4-digits. *Base 10 and place value counters are the most effective manipulatives when subtracting numbers up to 4-digits.* *Ensure children write out their calculation alongside any concrete resources to they can see the links to the written column method.* *Plain counters on a place value grid can also be used to support learning.*	  3 1 4357 – 2735 1622 **4,357 – 2,735 = 1,622**  
Ready to Progress sentences: *Refer to previous year groups, using place value language.*	

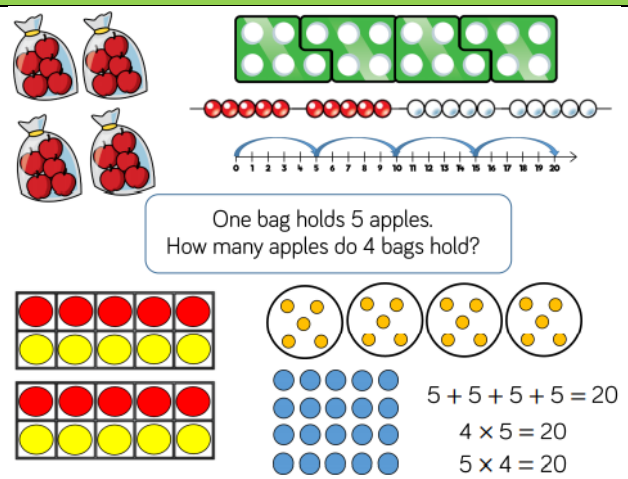
Year 5/6: Subtract numbers with more than 4-digits. *Place value counters or plain counters are the most effective concrete resource when subtracting numbers with more than 4-digits.* *Children should be encouraged to work in the abstract, using column method to subtract larger numbers efficiently.*	
Year 5: Subtract with up to 3 decimal places. *Place value or plain counters on a place value grid are the most effective manipulative when subtracting decimals with 1, 2 and 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

Year 1/2: Solve 1-step problems using multiplication.

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.



Ready to Progress sentences:
Equal groups have the same number of objects in each group.

Vocabulary
Array – An ordered collection of counters, cubes or other item in rows and columns (demonstrate equal groups).
Commutative – Numbers can be multiplied in any order.
Factor – A number that multiplies with another to make a product.
Multiplicand – In multiplication, a number to be multiplied by another.

Additional: odd, even, lots of, groups of, double, repeated addition.

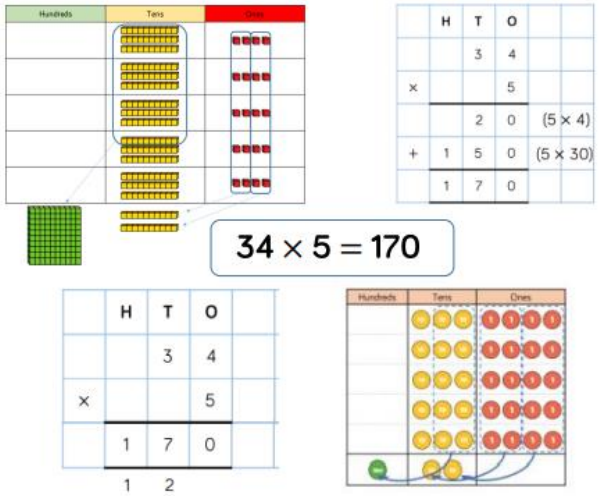
Year 3/4: Multiply 2-digit numbers by 1-digit numbers.
Look first at the expanded column method before moving onto the short multiplication method.

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.

Ready to Progress sentences:

Factor times factor is equal to product.
The order of the factors does not affect the product.

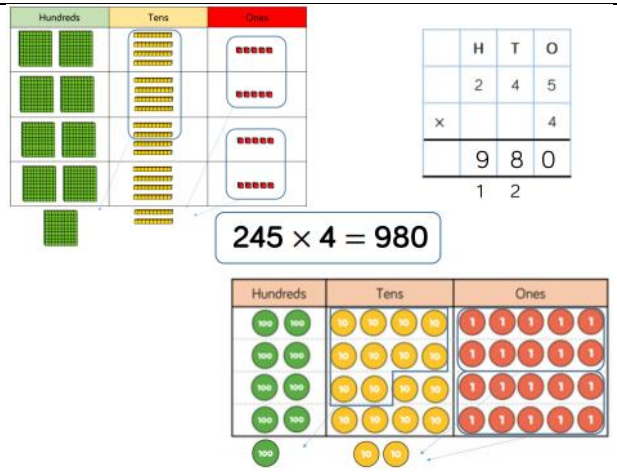
4 x 7 = 28
4 times 7 ones = 28 ones.
28 ones = 2 tens and 8 ones.
2 is recorded below the tens column and 8 is recorded in the ones column.
(and so on using place value vocabulary)



Year 3/4 : Multiply 3-digit numbers by 1-digit numbers.

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 away from resources when multiplying larger numbers.



Ready to Progress sentences:

Use previous sentences with increasing place value language.

Vocabulary

Exchange – Change a number or expression for another of an equal value.
Product – The result of multiplying one number (factor) by another.
Scaling – Enlarging or reducing a number by a given amount, called the scale factor.

Additional: inverse, derive.

Year 5: Multiply 4-digit numbers by 1-digit numbers.

Place value counters are the best manipulative to use to support children in their understanding of the formal written method.

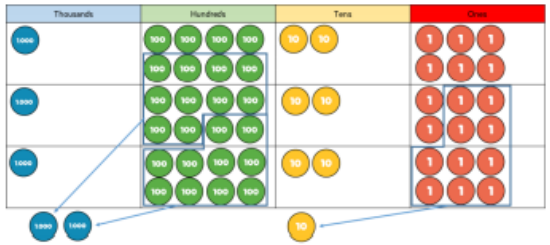
If children struggle with their times tables, encourage the use of multiplication grids so children can focus on the method.

Ready to Progress sentences:

Use previous sentences with increasing place value language.

Additional vocabulary

Factor pairs, composite numbers, prime number, prime factors, square number, cubed number formal written method, common factors, common multiples.



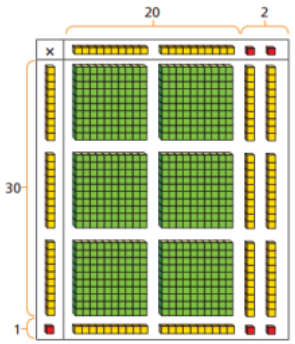
$1{,}826 \times 3 = 5{,}478$

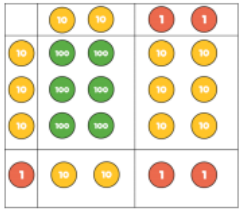
	Th	H	T	O
	1	8	2	6
×				3
	5	4	7	8
	2		1	

Year 5: Multiply 2-digit numbers by 2-digit numbers.

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





×	20	2
30	600	60
1	20	2

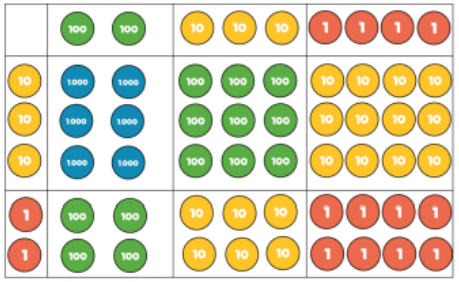
	H	T	O
		2	2
×		3	1
		2	2
	6	6	0
	6	8	2

$22 \times 31 = 682$

Year 5: Multiply 3-digit numbers by 2-digit numbers.

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 numbers.

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



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 5/6: Multiply 4-digit numbers by 2-digit numbers.

Children should be confident with the written method. If they are still struggling with times tables, provide them a multiplication grid when they are focussing on the method.

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

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		

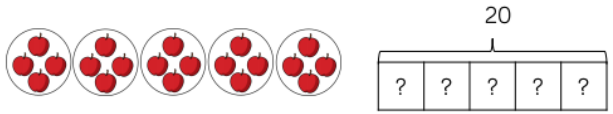
$2{,}739 \times 28 = 76{,}692$

Division

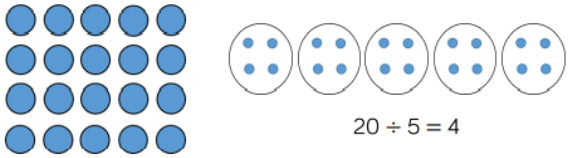
Year 1/2: Solve 1-step problems using multiplications (sharing).

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.



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



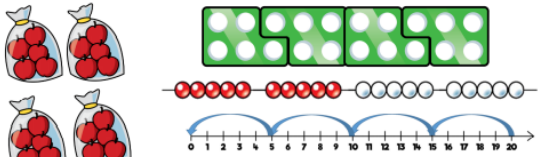
$20 \div 5 = 4$

Vocabulary

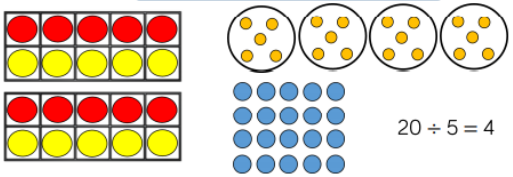
Array – An ordered collection of counters, cubes or other item in rows and columns (demonstrate equal groups).
Dividend – In division, the number that is divided.
Divisor – In division, the number by which another is divided.
Quotient – The result of division.
Remainder – The amount left over after a division when the divisor is not a factor of the dividend.
Exchange – Change a number or expression for another of an equal value.

Year 1/2: Solve 1-step problems using division (grouping).

Children solve problems by grouping and counting the number of groups. Grouping encourages children to count in multiples and links to repeated addition on a number line. They can use concrete representations in fixed groups such as number shapes, which shows the link between multiplication and division



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

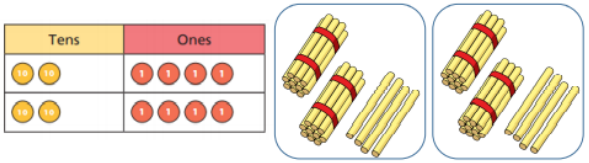
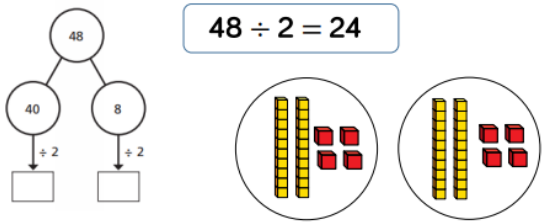
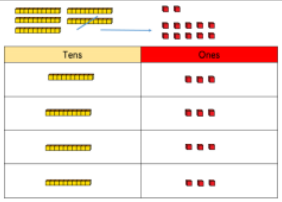
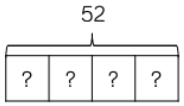
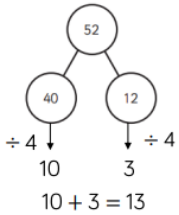
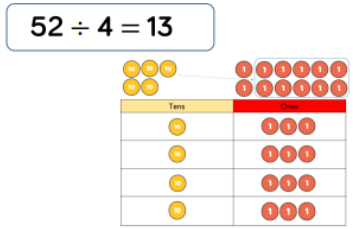


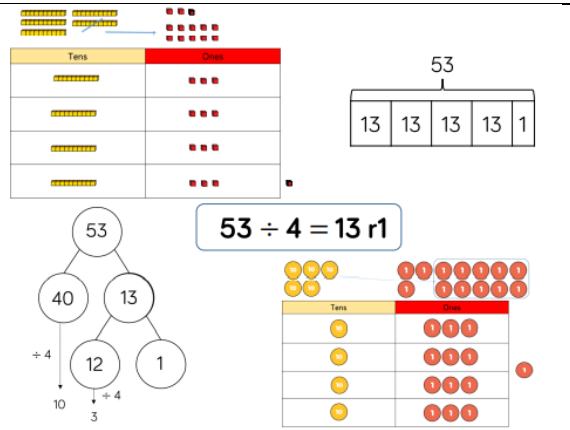
$20 \div 5 = 4$

Ready to Progress sentences:

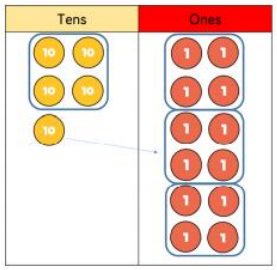
e.g. ***15 ÷ 5 = 3***
The 15 represents the number of biscuits.
The 5 represents the number of biscuits in each bag.
The 3 represents the number of bags.

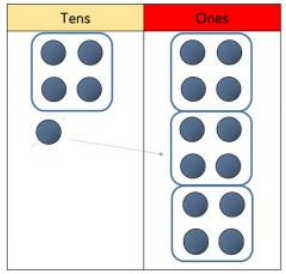
Or ***14 ÷ 2 = 7***
The 14 represents the number of seeds.

The 2 represents the number of seeds in each pot. *The 7 represents the number **of** pots.* **Vocabulary** Lots of, groups of, halve, share equally, equal groups of.	
Year 1/2: Divide 2-digits by 1-digit (sharing with no exchange). *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.*	
Ready to Progress sentences: *Use previous sentences with increasing place value language.*	
Year 3/4: Divide 2-digits by 1-digit (sharing with 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 ten and ones equally between the rows.* *Flexible partitioning in a part-whole model supports this method.*	 
Ready to Progress sentences: *20 divided into groups of 5 is equal to 4.* *20 divided by 5 is equal to 4 each.* *7 times 2 is 14, so 14 divided by 2 is 7.* *14 divided into groups of 2 is equal to 7.*	 

Year 3/4: Divide 2-digits by 1-digit (sharing 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.*	
Ready to Progress sentences: *The product of __ and __ is equal to the product of __ and __.* *__ times __ is equal to __ times __.* *e.g. 14 is divided into groups of 4. There are 3 groups and a remainder of 2.* *The remainder is always less than the divisor.* *If the dividend is a multiple of the divisor, there is no remainder.* *If the dividend is not a multiple of the divisor, there is a remainder.* *The 30 represents the total number of scouts.* *The 4 represents the number of scouts in each tent.* *The 7 represents the number of full tents.* *The 2 represents the number of scouts left over.* *We need another tent for the 2 left over scouts.*	
Year 4/5: Divide 2-digits by 1-digit (grouping). *When using the short division method, children use grouping.* *Start with the largest place value then 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 be seen as they are left ungrouped.*	

84	÷	4	=	21	4) 8 4 (2 1
dividend	÷	divisor	=	quotient	divisor) dividend (quotient





52 ÷ 4 = 13

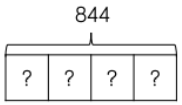
Year 4: Divide 3-digits by 1-digit (sharing).

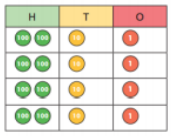
Children can continue to use place value counters to share 2-digit numbers into equal groups.

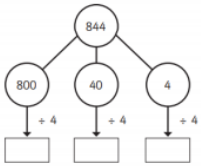
Children should start with the equipment outside the place value grid before sharing the hundreds, tens and ones equally between the rows. Thi method can also be used to highlight remainders.

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

844 ÷ 4 = 211



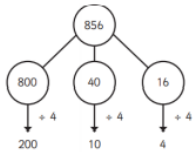


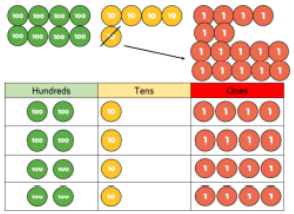


Ready to Progress sentences:

Use previous sentences with increasing place value language.

844 ÷ 4 = 211



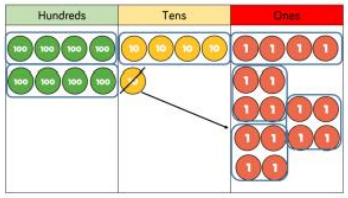
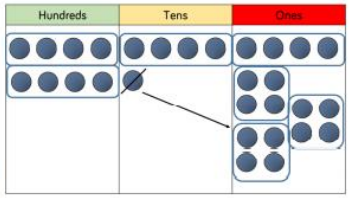
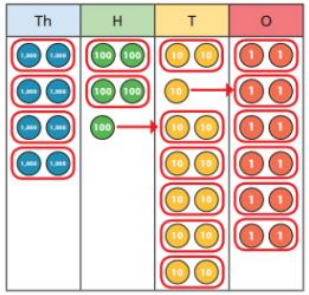


Year 5: Divide 3-digits by 1-digit (grouping).

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 understanding.

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

215 ÷ 5 = 43 2 hundreds ÷ 5 = 0 hundreds r 2 hundreds 2 hundreds = 20 tens 21 tens ÷ 5 = 4 tens r 1 ten 1 ten = 10 ones 15 ones ÷ 5 = 3 ones	 2 1 4 4 8 5 $^{1}6$  856 ÷ 4 = 214
Year 5: Divide 4-digits by 1-digit (grouping). *Place value counters or plain counters can be used on a place value grid to support understanding.* *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 numbers with multiple exchanges.*	 4 2 6 6 2 8 5 $^{1}3$ $^{1}2$
Ready to Progress sentences: *Use previous sentences with increasing place value language.*	8,532 ÷ 2 = 4,266
Year 6: Divide multi digits by 2-digits (short division). *Written methods become the most accurate representation. 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.*	

Ready to Progress sentences:

If the dividend is *a multiple of the divisor, there is* no *remainder.*

If the dividend is not *a multiple of the divisor, there* is *a remainder.*

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

$432 \div 12 = 36$

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

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

15	30	45	60	75	90	105	120	135	150

Year 6: Divide multi digits by 2-digits (long division).

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

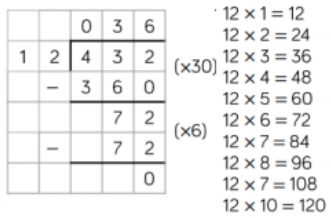
Children can write out multiples to support their calculations with larger remainders Children will also solve problems with remainders where the quotient can be rounded as appropriate.

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 context of the question).

Ready to Progress sentences:

If the dividend is *a multiple of the divisor, there is* no *remainder.*

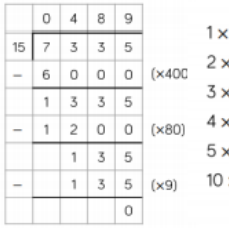
If the dividend is not *a multiple of the divisor, there* is *a remainder.*



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

$432 \div 12 = 36$

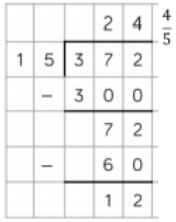
$7{,}335 \div 15 = 489$



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

$372 \div 15 = 24$ r12

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



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