Path to Proficiency in Maths

Aim: To allow our pupils to be efficient and fluent with written calculation methods, to enable them to problem solve with large numbers and decimals.

To build up pupils' number facts, step by step, by spending time practising and learning the key facts.

Formal written methods are taught purposely, using physical objects alongside meaningful images, with an initial focus of mental calculations with jottings. These need to be mastered before moving onto formal written methods.

PELE TRUST

How to use this pathway

This pathway has been written, following the recommendation of the Mathematics Guidance: Key Stages 1 and 2 (2020).

Ready-to-progress criteria strands	Code
Number and place value	NPV
Number facts	NF
Addition and subtraction	AS
Multiplication and division	MD
Fractions	F
Geometry	G

Ready-to-progress criteria, organised into 6 strands, are the most important conceptual knowledge and understanding that pupils need as they progress from Year 1 to Year 6. These are directly taken form the Mathematics Guidance: Key Stages 1 and 2 (2020). The ready-to-progress criteria will be on the left-hand side of each page of this document. A careful focus on these, in order, will show the sequence necessary to develop a deep understanding. The Ready-to-progress criteria will be written with these code, proceeded by the year group number, e.g. 1NPV–2 is the code for Year 1 number and place value - the second criteria for NPV.

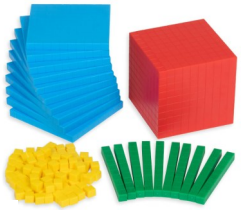
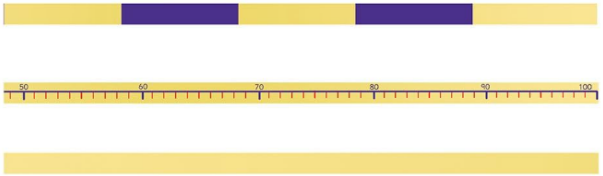
Who is this guide for?

Everyone in the Ponteland partnership.

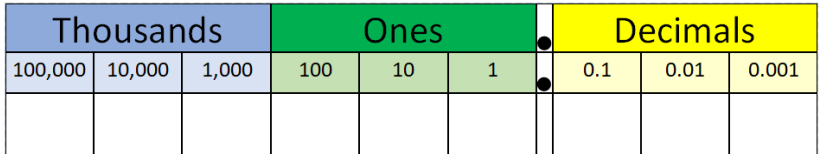
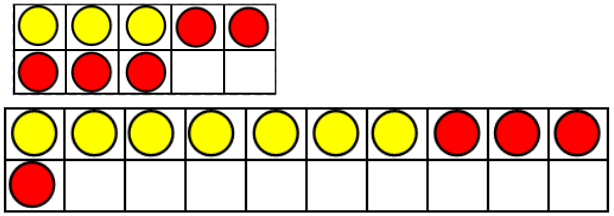
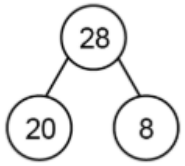
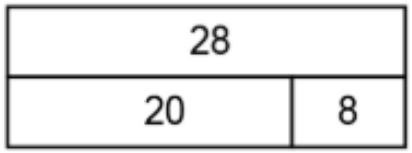
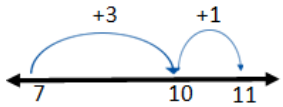
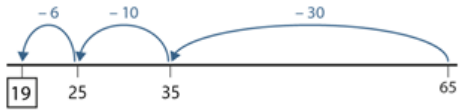
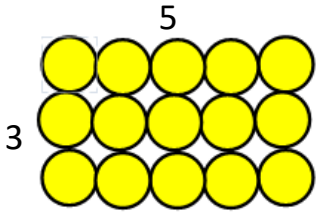
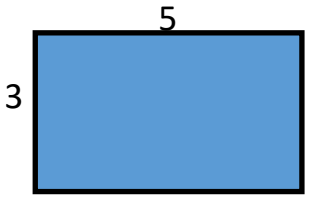
- Teachers to have consistency in procedures from one year group to the next and this gives a concise summary of the Mathematics Guidance: Key Stages 1 and 2 (2020). We still expect that all teachers refer to the original guidance.
- Pupils to know exactly how we are teaching these procedures in each school, aiding your transition from primary to secondary school.
- Parents and carers to know what methods are being used in school.

Illustration in this document are taken from the NCETM Curriculum Prioritisation, White Rose Maths, Oak Academy or created by members of the Pele Trust.

Key Concrete Manipulatives (physical resources)

Name	Picture	Explanation
Base 10 or Dienes		Used to model the value of one, ten, hundred and thousand. Essential in modelling exchange and regroup in addition & subtraction
Place Value Counters		Used to model the value of whole or decimal digits. Essential in modelling exchange and regroup in addition & subtraction
Coloured Counters		Multipurpose for showing parts and whole, decomposing number as well as positive and negative calculations
Multilink Cubes		Multipurpose for showing parts and whole in all four operations, including fractions and decimals
Counting Stick		Used to model counting, multiplicative facts, doubling, halving, proportions as well as fractions and decimals
Numicon		Ideal for showing odd and even numbers, parts of whole, grouping and sharing

Key Pictorial Representations (meaningful diagrams)

Name	Picture	Explanation
Place Value Chart		To represent the value of each digit. Support reading large numbers, looking for patterns of ones, tens and hundreds. Essential to set out column calculations
Ten or Twenty Frame		Ideal for showing the build-up of numbers as well as addition, subtractions, doubling and halving
Part-whole Models	Cherry-part-whole  Bar-model 	Showing the composition of part, part whole. Essential when modelling any calculations, including fractions
Number Line	 	Ideal for showing position and value of number, including negative numbers. Describing addition and subtraction. Great for explaining rounding.
Array & Area Model	  5 x 3 = 15	The use of counters to make a rectangle, to show the factors that make a multiplication equation. Used to show area, progressing from counting all, to counting rows, to calculating. Shows commutativity and relationship between multiplication & division

Vocabulary Overview

Key Vocabulary Addition

part + part = whole

7 + 4 = 11

4 + 7 = 11

11 is the whole, 7 is a part and 4 is a part.

We can say this as 7 plus 4 is equal to 11.

addend + addend = total or sum

5 + 8 = 13

Expression e.g. 5 + 8, this will not show the whole or total

Equation e.g. 5 + 8 = 13, this will always show the whole or total

Addition, plus, total, sum, more than, greater than, including the inequality symbols < > =

Key Vocabulary Subtraction

whole - part = part or difference

7 - 4 = 3

7 - 3 = 4

7 is the whole, 4 is a part and 3 is a part.

We can say this as 7 subtract 4 is equal to 3.

19 - 8 = 11

Expression e.g. 19 - 8, this will not show the difference

Equation e.g. 19 - 8 = 11, this will always show the whole or difference

Subtract, difference, take-away, reduction, decrease, less than, inverse

Key Vocabulary Multiplication

factor x factor = product

3 x 5 = 15

5 x 3 = 15

There are 3 equal groups of pencils. There are 5 pencils in each group. There are 3 groups of 5.

15 is a **multiple** of 3 & 5 and 15 is a **multiple** of 15

Expression e.g. 3 x 5, this will not show the whole or product

Equation e.g. 3 x 5 = 15, this will always show the whole or product

Multiply, groups of, times, multiple, factor, product commutativity, fact family, doubling, equivalent, array

Key Vocabulary Division

product ÷ factor = factor

15 ÷ 5 = 3

15 ÷ 3 = 5

15 is divided into groups of 5. There are 3 groups. 15 is divided into 3 groups of 5.

Expression e.g. 15 ÷ 5, this will not show the whole or product

Equation e.g. 15 ÷ 3 = 5, this will always show the whole or product

Divide, groups, grouping, share, sharing, halving, remainder, dividend, divisor, quotient

Early Years Addition and Subtraction

Mathematics Number Early Learning Goal

Have a deep understanding of number to 10, including the composition of each number;

Subitise (recognise quantities without counting) up to 5;

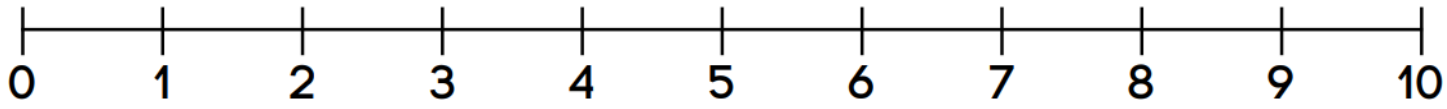
Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

Numerical Patterns ELG

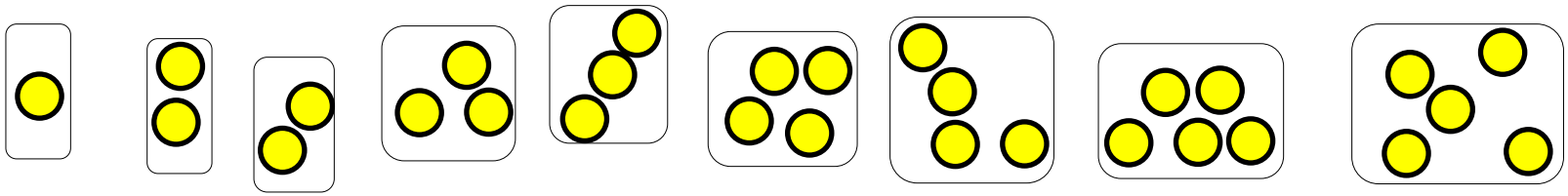
Verbally count beyond 20, recognising the pattern of the counting system;

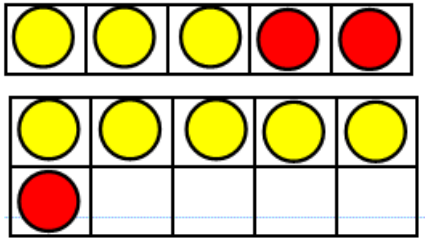
Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;

Explore and represent patterns within numbers up to 10, including evens and odds.



I can recognise the numbers shown, using subitising to look and see what number it is, without counting all the dots. Only to five.





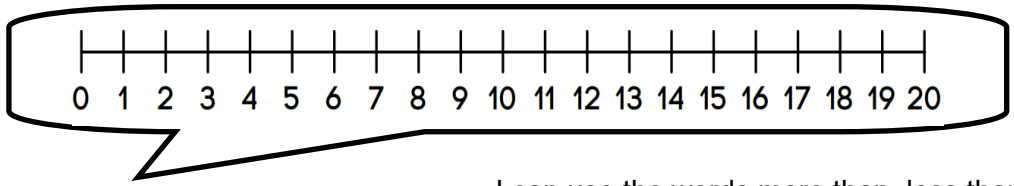
Initially I will learn and become fluent with my number bonds for each number up to and including 5. I can show these in a logical order

e.g.

0 + 5 = 5	5 - 0 = 5
1 + 4 = 5	5 - 1 = 4
2 + 3 = 5	5 - 2 = 3
3 + 2 = 5	5 - 3 = 2,
4 + 1 = 5	5 - 4 = 1
5 + 0 = 5	5 - 0 = 5

Then I will look at each number up to 10, beginning to learn my numbers bonds to 6, 7 , 8, 9 and 10.

I can count **out loud** from 0-20, only speaking, I do not have to write these numbers. I can spot patterns in numbers beyond 20.



I can use the words more than, less than and equal to (or the same as), to describe objects and quantities.

I can see odd and even numbers by recognising the patterns they make and spotting pairs.

Year 1 Addition and Subtraction

1NPV–1 Count within 100, forwards and backwards, starting with any number.

1NPV–2 Reason about the location of numbers to 20 within the linear number system, including comparing using < > and =

1NF–1 Develop fluency in addition and subtraction facts within 10.

1AS–1 Compose numbers to 10 from 2 parts, and partition numbers to 10 into parts, including recognising odd and even numbers.

1AS–2 Read, write and interpret equations containing addition (+), subtraction (-) and equals (=) symbols, and relate additive expressions and equations to real-life contexts.

+	0	1	2	3	4	5	6	7	8	9	10
0	0 + 0	0 + 1	0 + 2	0 + 3	0 + 4	0 + 5	0 + 6	0 + 7	0 + 8	0 + 9	0 + 10
1	1 + 0	1 + 1	1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 7	1 + 8	1 + 9	
2	2 + 0	2 + 1	2 + 2	2 + 3	2 + 4	2 + 5	2 + 6	2 + 7	2 + 8		
3	3 + 0	3 + 1	3 + 2	3 + 3	3 + 4	3 + 5	3 + 6	3 + 7			
4	4 + 0	4 + 1	4 + 2	4 + 3	4 + 4	4 + 5	4 + 6				
5	5 + 0	5 + 1	5 + 2	5 + 3	5 + 4	5 + 5					
6	6 + 0	6 + 1	6 + 2	6 + 3	6 + 4						
7	7 + 0	7 + 1	7 + 2	7 + 3							
8	8 + 0	8 + 1	8 + 2								
9	9 + 0	9 + 1									
10	10 + 0										

Adding 1

Adding 2

Bonds to 10

Adding 0

Doubles

Near Doubles

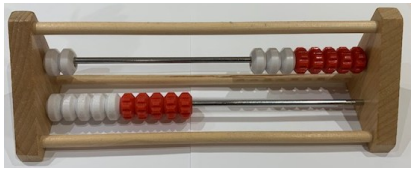
Year 2 Content
left blank

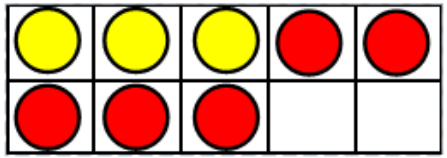
The key focus in Year 1 addition and subtraction is numbers to 10 (1NF-1, 1AS-1, 1AS-2). This grid shows the addition facts within 10 and strategies to recall or derive them. Also include corresponding subtractions. We look at number bonds to 2, 3, 4, 5… up to 10, this is so pupils can easily partition any single number to efficiently add more complex numbers in Year 2.

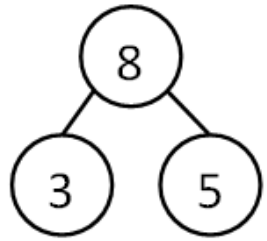
3 + 5 = 8, 5 + 3 = 8, 8 - 3 = 5, 8 - 5 = 3,

Also include the addition of three numbers, e.g. 4 + 2 + 2, understanding these can be added in any order, so 2 + 2 + 4 = 4 + 4

Use rekenreks and tens frames to show these and build understanding e.g. 3 + 5 = 8







Key Vocabulary part + part = whole, whole - part = part

Year 2 Addition and Subtraction

2NPV–1 Recognise the place value of each digit in two-digit numbers, and compose and decompose two-digit numbers using standard and nonstandard partitioning.

2NPV–2 Reason about the location of any two-digit number in the linear number system, including identifying the previous and next multiple of 10.

2NF–1 Secure fluency in addition and subtraction facts within 10, through continued practice.

2AS–1 Add and subtract across 10.

2AS–2 Recognise the subtraction structure of 'difference' and answer questions of the form, "How many more…?".

Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract only ones or only tens to/from a two-digit number.

2AS–4 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract any 2 two-digit numbers.

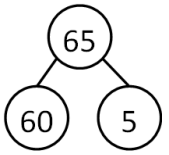
+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9	5+10
6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
10	10+0	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10

2NF–1

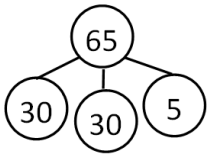
- Adding 1
- Adding 2
- Bonds to 10
- Adding 0
- Doubles
- Near Doubles
- Make 10

2NPV–1

H	T	O
	6	5



I have 6 tens and 5 ones, I have 60 and 5.



I can partition 65 in different ways.

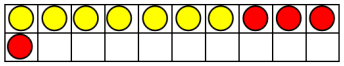
Use a 100 square to deepen understanding of place value as well as addition & subtraction strategies.

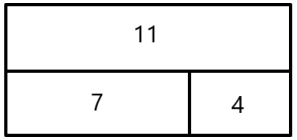
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

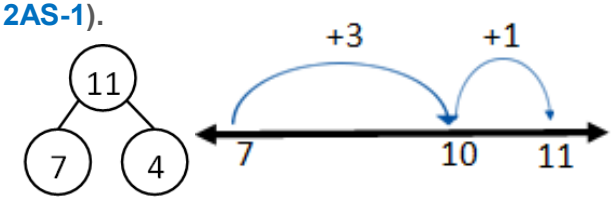
The key focus in Year 2 addition and subtraction is numbers to 20 (2NF-1 & 2AS-1).

E.g. 7 + 4 = 11, 11 - 7 = 4, 11 = 4 + 7, 7 = 11 - 4

4 + 7 = 11, 11 - 4 = 7, 11 = 7 + 4, 4 = 11 - 7







Continue to focus on mental strategies, building on each of the strategies taught in Year 1. Introducing the 'make 10' strategy, partitioning one part to make 10, e.g. 7 + 4 = 7 + 3 + 1

Also in corresponding subtraction strategies, partition one part to make 10, 11 - 4 = 11 - 1 - 3

There is no column addition or subtraction in Year 2, we focus on mental strategies with jottings, such as a number line and showing our partitioning, e.g. **43 + 23 = 66**

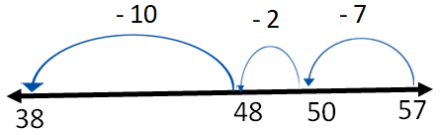
2AS–3 & 2AS-4

40 + 20 = 60
3 + 3 = 6
60 + 6 = 66

(using our known fact that 4 + 2 = 6, so 4 tens + 2 tens = 6 tens)

e.g. **57 - 23 = 34**
50 - 20 = 30
7 - 3 = 4

e.g. 57 - 19 = 38
57 - 7 = 50
50 - 2 = 48
48 - 10 = 38



Key Vocabulary part + part = whole, whole - part = part , addend + addend = sum or total

Year 3 Addition

3NPV–2 Recognise the place value of each digit in three-digit numbers, and compose and decompose three -digit numbers using standard and non-standard partitioning.

3NPV–3 Reason about the location of any three-digit number in the linear number system, including identifying the previous and next multiple of 100 and 10.

3NF–1 Secure fluency in addition and subtraction facts that bridge 10, through continued practice.

3NF–3 Apply place-value knowledge to known additive number facts (scaling facts by 10).

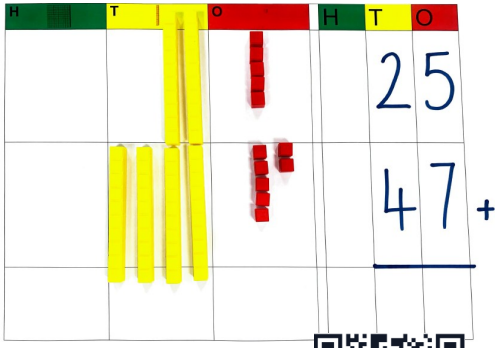
3AS–1 Calculate complements to 100.

3AS–2 Add and subtract up to three -digit numbers using columnar methods.

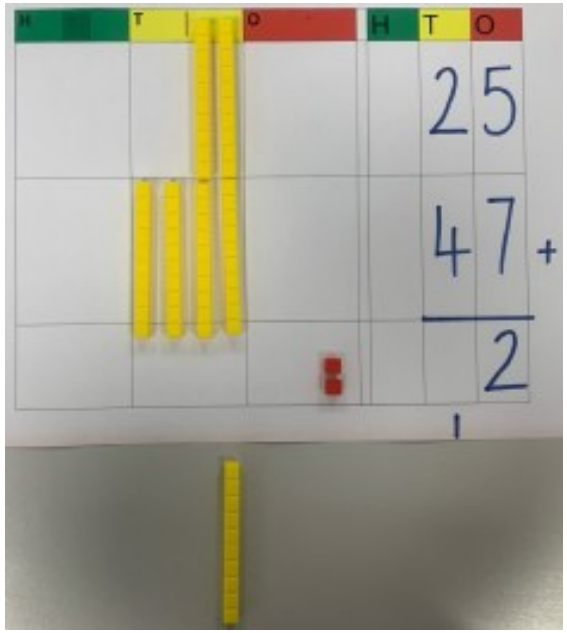
3AS–3 Manipulate the additive relationship: Understand the inverse relationship between addition and subtraction, and how both relate to the part–part–whole structure. Understand and use the commutative property of addition, and understand the related property for subtraction.

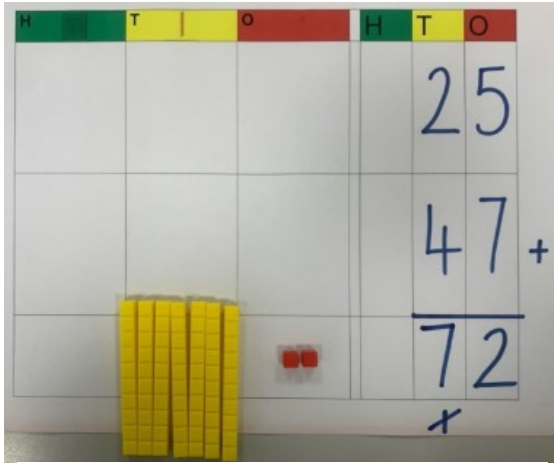
Give pupils the opportunity to recall their addition and subtractions facts from Year 1 & 2, 3NF-1

Begin to teach the column method, 3AS–2, gradually introducing exchange and regroup, with dienes and then number counters. Always start with the ones. A zero place holder can be used to show where there is no value, such as the second example. When regrouping, the additional tens will be written underneath the tens column and crossed off once used.



Click here for video demonstration.





Related Facts 3NF–3

If I know 3 + 4 = 7, then 30 + 40 = 70, 3 ones plus 4 ones is 7 ones, so 3 tens plus 4 tens is 7 tens.

Use a bar model to show the whole and each part, this will support the relationship to subtraction and problem solving, 3AS–3 .

Key Vocabulary

part + part = whole

addend + addend = sum or total

exchange, regroup

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

Continue to use a 100 square to show patterns when adding or subtracting multiples of 1 or 10 and compliments to 100

46 + 132 =

H	T	O
1	3	2
	4	6
1	7	8

+

H	T	O
0	4	6
1	3	2
1	7	8

+

178	
132	46

Year 3 Subtraction

3NPV–2 Recognise the place value of each digit in three-digit numbers, and compose and decompose three -digit numbers using standard and non-standard partitioning.

3NPV–3 Reason about the location of any three-digit number in the linear number system, including identifying the previous and next multiple of 100 and 10.

3NF–1 Secure fluency in addition and subtraction facts that bridge 10, through continued practice.

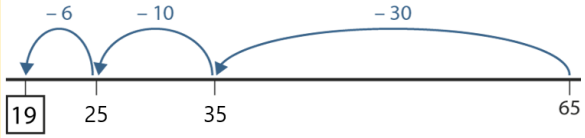
3NF–3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10).

3AS–1 Calculate complements to 100.

3AS–2 Add and subtract up to three-digit numbers using columnar methods.

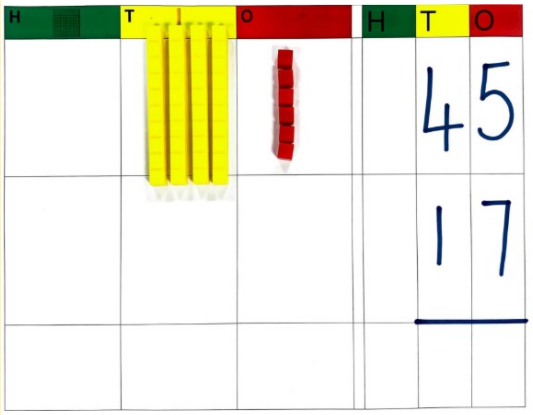
3AS–3 Manipulate the additive relationship: Understand the inverse relationship between addition and subtraction, and how both relate to the part–part–whole structure. Understand and use the commutative property of addition, and understand the related property for subtraction.

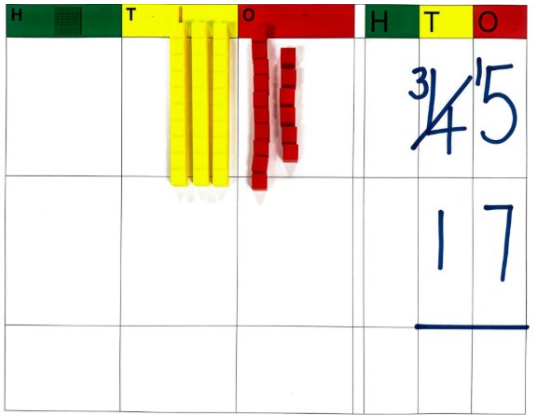
Give pupils the opportunity to recall their addition and subtractions facts from Year 1 & 2, 3NF-1



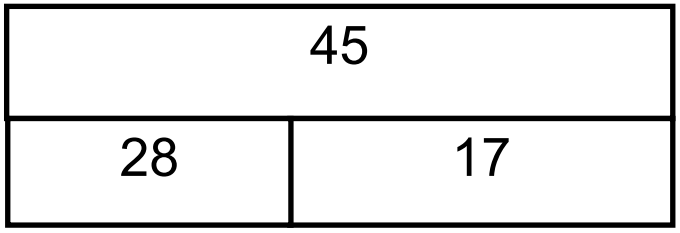
Begin with focus on a number line, 3NPV–3, counting up and counting back. Use alongside a bar model to really explore the relationship between part + part = whole and whole - part = part. Expand to multiple parts.

Begin to teach the column method, 3AS–2, gradually introducing exchange and regroup, with dienes and then number counters. Always start with the ones. When an exchange is necessary, use knowledge of place value to see for example one ten = ten ones, so we are exchanging one ten, for ten ones, in this example, we now have fifteen ones.





Use a bar model to show the whole and each part, 3AS–3, this will support the relationship to addition and problem solving. For example, there are 45 pencils on the table. 17 fall off the table. How many pencils are left on the table?



Key Vocabulary

whole - part = part

exchange, regroup, inverse

T	O	
~~3~~ 4	15	
1	7	-
2	8	

Click here for video demonstration

Year 4, 5, 6 and 7 Addition & Subtraction

4NPV–1 Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100.

4NPV–2 Recognise the place value of each digit in four-digit numbers, and compose and decompose four-digit numbers using standard and nonstandard partitioning.

4NF–3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100).

6AS/MD–2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.

6AS/MD–4 Solve problems with 2 unknowns.

Also give pupils the opportunity to recall their addition and subtractions facts from Year 2 and beyond, 4NF–3.

Choose most efficient methods — mental, jottings or formal written method.

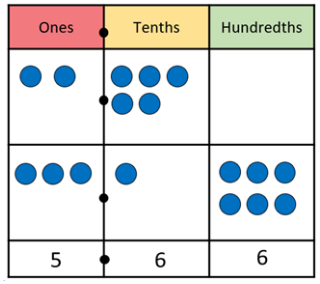
Year 4 — focus on column method up to four-digit number combinations.

Year 5 — five or six-digit numbers. Include numbers with up to two-decimal places, using a full square in their books for the decimal point to carefully align the place value. Till receipts are good to exemplify this structure.

Year 6 — add or subtract any combination of numbers up to eight-digits (ten million) to numbers with 3 decimal places.

Year 7 — add or subtract any combination of numbers up to ten-digits (one billion) to numbers with 3 decimal places.

2.5 + 3.16 = 5.66



		0.1	0.01
O	.	t	h
2	.	5	0
3	.	1	6
5	.	6	6

+

5.66	
3.16	2.5

When exchanging from a zero, look to the left, the next available value and using your knowledge of place value (4NPV–1) see this as one number, e.g. for 703 - 146, we say we are exchanging from 70 tens, 70 tens become 69 tens and we give one ten to the 3, making 13 ones.

H	T	O	
~~6~~7	~~9~~0	13	
1	4	6	-
5	5	7	

Allow pupils time to explore the *same difference rule*.

This shows that if we subtract the same amount from each part, the difference stays the same,

7,000 – 2,648 = 6,999 – 2,647 = 4,352

−1

7, 0 0 0 → 6, 9 9 9

2, 6 4 8 - → 2, 6 4 7 -

−1

4, 3 5 2

Key Vocabulary

part + part = whole, addend + addend = sum or total exchange, regroup.

whole - part = part, whole - part = difference exchange, regroup, difference

Early Years Multiplication and Division

Numerical Patterns
Early Learning Goals

Explore and represent patterns within numbers up to 10, including double facts and how quantities can be distributed equally.

Key Vocabulary

equal

the same

double

share

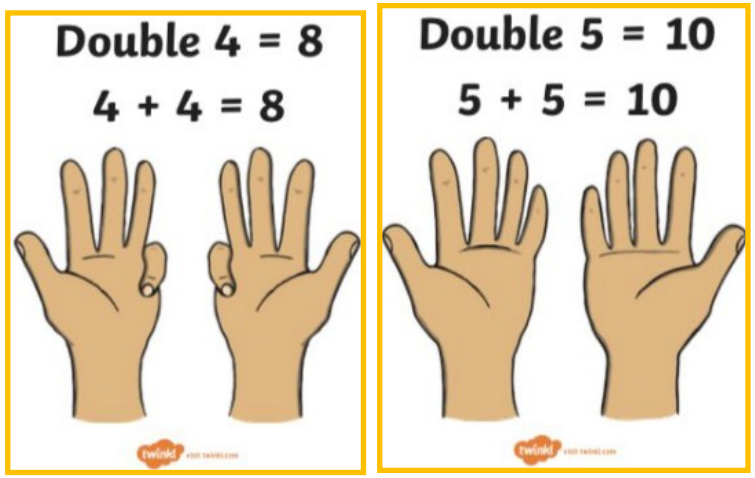
groups

Begin to recognise my double facts from addition can also be described as *two-lots of* ___, one two times, two two times, three two times….

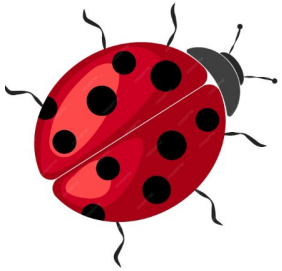
+	0	1	2	3	4	5
0						
1		1 + 1				
2			2 + 2			
3				3 + 3		
4					4 + 4	
5						5 + 5

Doubles

We can double on our hands:



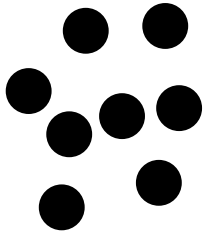
Find the double? What is the double?



Share the biscuits equally, onto the three plates.

How many biscuits will be on each plate?

Can we share the dots equally, onto both wings?



Year 1 and Multiplication & Division

1NF–2 Count forwards and backwards in multiples of 2, 5 and 10, up to 10 multiples, beginning with any multiple, and count forwards and backwards through the odd numbers.

Key vocabulary

factor x factor = product or multiple

product ÷ factor = factor

multiply, times, factor, product, multiple, grouping, sharing

The main focus in **Year 1 & 2** is beginning to know our multiplies of 10, 5 & 2. This will be by skip counting and recognising patterns . We will begin to write the multiplicative equations. Learn our multiplicative facts for 1 and 0.

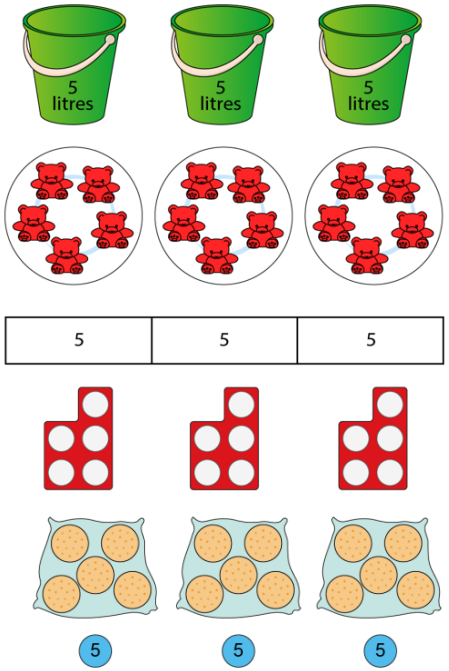
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 10

5 Multiples of 5

Multiples of 2

5 +5 + 5 = 3 x 5

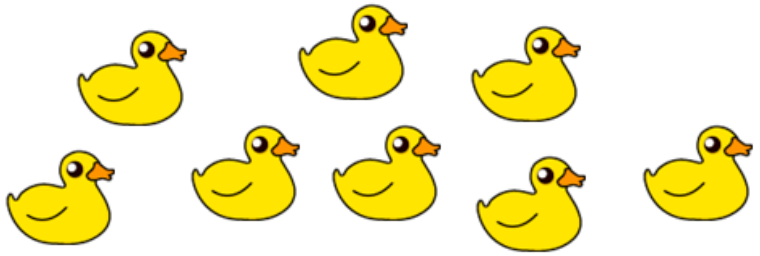


Year 1 division is taught through repeated addition and simple fractions.

How many pairs of socks can we group together?

Share the ducks equally into 2 groups.

Show one half of this group of ducks.



Year 2 Multiplication & Division

2NPV–2 Reason about the location of any two-digit number in the linear number system, including identifying the previous and next multiple of 10.

2MD–1 Recognise repeated addition contexts, representing them with multiplication equations and calculating the product, within the 2, 5 and 10 multiplication tables.

2MD–2 Relate grouping problems where the number of groups is unknown to multiplication equations with a missing factor, and to division equations (quotitive division).

Key vocabulary

factor x factor = product or multiple

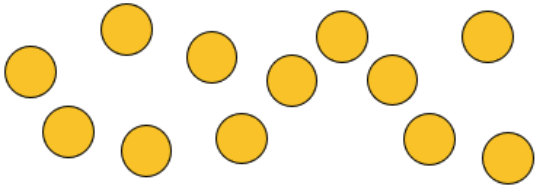
product ÷ factor = factor

multiply, times, factor, product, multiple, grouping, sharing

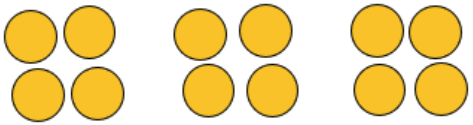
Begin to understand the difference between sharing and grouping, using counters and objects to move.

Grouping, is where the size of the group is known, we just don't know how many groups are needed.

Divide 12 counters in groups of 4.

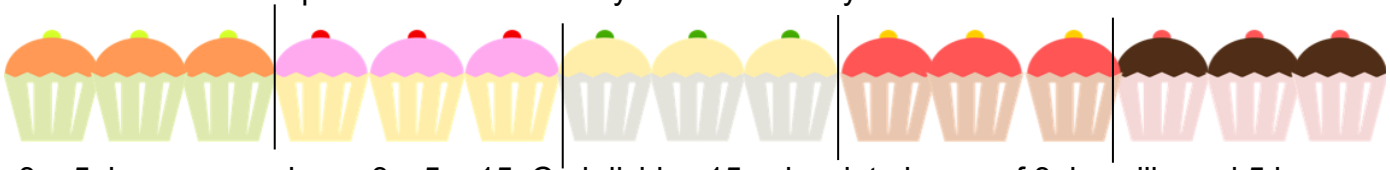


Pick up a group of 4 each time until there are no more counters to pick up.



2MD–2 12 ÷ 4 = 3 because we know 4 x 3 = 12. 12 is divided into 3 groups of 4.

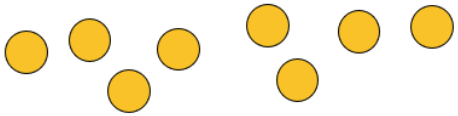
Cal bakes 15 cakes. Cal puts 3 cakes into every box. How many boxes will he need?



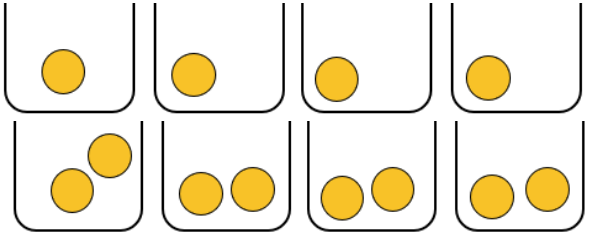
15 ÷ 3 = 5, because we know 3 x 5 = 15. Carl divides 15 cakes into boxes of 3, he will need 5 boxes with 3 cakes in each box.

Sharing is where the number of groups is known, we just don't know how many are in each group.

Divide 8 counters into 4 groups.



Start by putting one counter in each group, and keep going until all the counters have been shared out.



2MD–1 8 ÷ 4 = 2 because we know 4 x 2 = 8. 8 is divided into 4 groups of 2, there are 4 groups, with 2 in each group. 2 + 2 + 2 + 2 = 8.

Cal bakes 15 cakes. Cal puts them into 5 boxes. How many cakes will be in each box?

15 ÷ 5 = 3, because 5 x 3 = 15. Carl shares 15 cakes into 5 boxes, there are 3 cakes in each box.

Year 3 Multiplication 1

3NPV–1 Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three-digit multiples of 10.

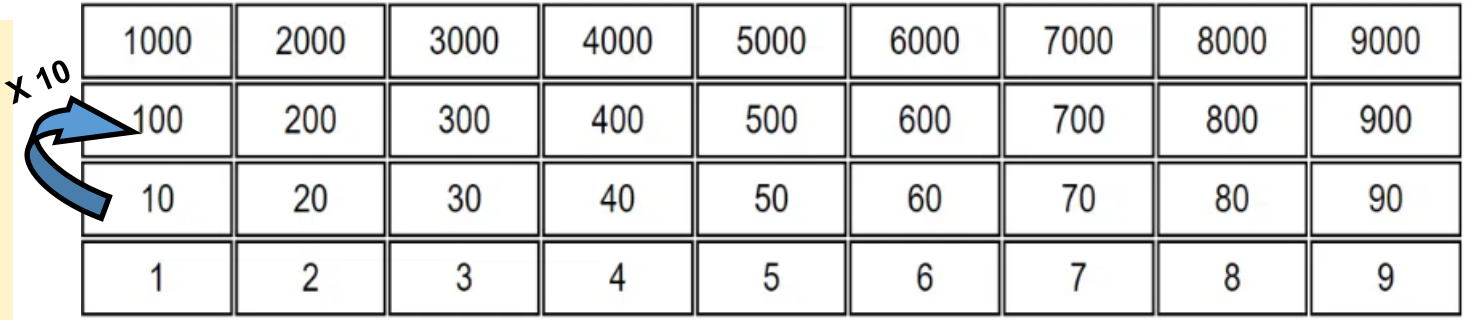
3NPV–3 Reason about the location of any three-digit number in the linear number system, including identifying the previous and next multiple of 100 and 10.

3NF–2 Recall multiplication facts, and corresponding division facts, in the 10, 5, 2, 4 and 8 multiplication tables, and recognise products in these multiplication tables as multiples of the corresponding number

3NF–3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10).

3MD–1 Apply known multiplication and division facts to solve contextual problems with different structures, including quotitive and partitive division.

Gattegno Chart 3NPV–1 & 3NPV–3



Know the multiplicative facts for 10, 5, 2 , 4 and 8 in this order, 3NF–2, using my knowledge of doubling to derive facts. It is best to learn one fact at a time, and focus on one table per half term.

Understanding commutativity means we can say these facts in any order, so, as we are learning one fact, we know others.

1 x 5 = 5 5 x 1 = 5

2 x 5 = 10 5 x 2 = 10

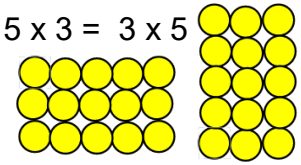
3 x 5 = 15 5 x 3 = 15

4 x 5 = 20 5 x 4 = 20

5 x 5 = 25 ...

Commutativity

5 x 3 = 3 x 5



Fact Families, 3NF–2**,** using commutativity (factors in any order)

3 x 5 = 15 15 = 3 x 5

5 x 3 = 15 15 = 5 x 3

15 ÷ 3 = 5 5 = 15 ÷ 3

15 ÷ 5 = 3 3 = 15 ÷ 5

Related Facts, 3NF–3

If I know 3 x 5 = 15, then 30 x 50 = 150; 3 ones multiplied by 5 ones are 15 ones, so 3 tens multiplied by 5 tens are 15 tens

Key Vocabulary

factor x factor = product or multiple

multiply, times, factor, product, multiple, fact family, array

quotitive is grouping, partitive is sharing

1 x 10 = 10	1 x 5 = 5	1 x 2 = 2	1 x 4 = 4	1 x 8 = 8
2 x 10 = 20	2 x 5 = 10	2 × 2 = 4	2 x 4 = 8	2 x 8 = 16
3 x 10 = 30	3 x 5 = 15	2 × 3 = 6	3 x 4 = 12	3 x 8 = 25
4 x 10 = 40	4 x 5 = 20	2 × 4 = 8	4 × 4 = 16	4 x 8 = 32
5 x 10 = 50	5 × 5 = 25	2 × 5 = 10	4 × 5 = 20	5 x 8 = 40
6 x 10 = 60	5 × 6 = 30	2 × 6 = 12	4 × 6 = 24	6 x 8 = 48
7 x 10 = 70	5 × 7 = 35	2 × 7 = 14	4 × 7 = 28	7 x 8 = 56
8 x 10 = 80	5 × 8 = 40	2 × 8 = 16	4 × 8 = 32	8 × 8 = 64
9 x 10 = 90	5 × 9 = 45	2 × 9 = 18	4 × 9 = 36	8 × 9 = 72
10 x 10 =100	5 x 20 = 50	2 x 10 = 20	4 x 10 = 40	8 x 10 = 80

Year 3 Multiplication 2

3NPV–1 Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three-digit multiples of 10.

3NPV–3 Reason about the location of any three-digit number in the linear number system, including identifying the previous and next multiple of 100 and 10.

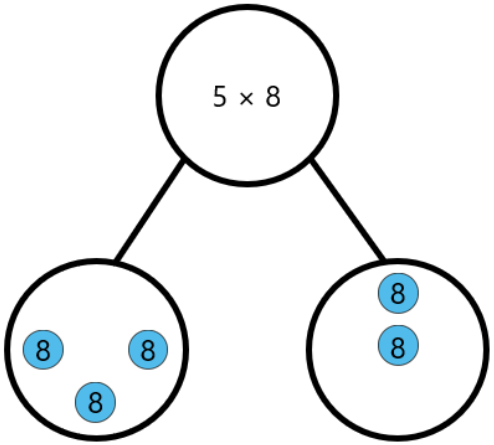
3NF–2 Recall multiplication facts, and corresponding division facts, in the 10, 5, 2, 4 and 8 multiplication tables, and recognise products in these multiplication tables as multiples of the corresponding number

3NF–3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10).

3MD–1 Apply known multiplication and division facts to solve contextual problems with different structures, including quotitive and partitive division.

Written Methods

Written methods involve using part-part-whole and partitioning. Moving onto informal jottings. No column method.

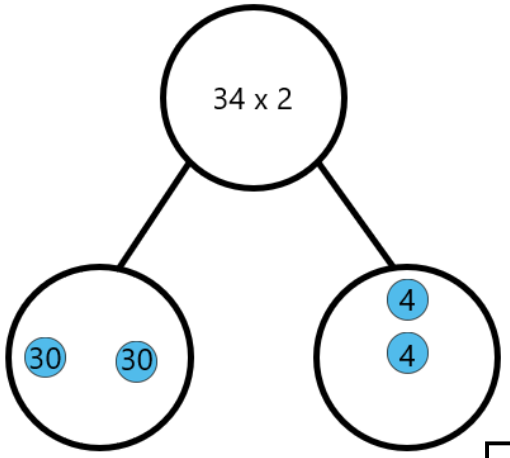


5 = **3** + **2**

5 × 8 = **3** × 8 + **2** × 8

= 24 + 16

= 40



34 × 2 = **30** × 2 + **4** × 2

= 60 + 8

= 68

Informal Jottings without the part-part whole

34 x 2 = 30 x 2 + 4 x 2

= 60 + 8

= 68

68	
34	34

Key Vocabulary

factor x factor = product or multiple

multiply, times, factor, product, multiple, fact family, array

quotitive is grouping, partitive is sharing

1 x 10 = 10	1 x 5 = 5	1 x 2 = 2	1 x 4 = 4	1 x 8 = 8
2 x 10 = 20	2 x 5 = 10	2 × 2 = 4	2 x 4 = 8	2 x 8 = 16
3 x 10 = 30	3 x 5 = 15	2 × 3 = 6	3 x 4 = 12	3 x 8 = 25
4 x 10 = 40	4 x 5 = 20	2 × 4 = 8	4 × 4 = 16	4 x 8 = 32
5 x 10 = 50	5 × 5 = 25	2 × 5 = 10	4 × 5 = 20	5 x 8 = 40
6 x 10 = 60	5 × 6 = 30	2 × 6 = 12	4 × 6 = 24	6 x 8 = 48
7 x 10 = 70	5 × 7 = 35	2 × 7 = 14	4 × 7 = 28	7 x 8 = 56
8 x 10 = 80	5 × 8 = 40	2 × 8 = 16	4 × 8 = 32	8 × 8 = 64
9 x 10 = 90	5 × 9 = 45	2 × 9 = 18	4 × 9 = 36	8 × 9 = 72
10 x 10 =100	5 x 20 = 50	2 x 10 = 20	4 x 10 = 40	8 x 10 = 80

Year 3 Division

3NPV–4 Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/ number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts.

3NF–2 Recall multiplication facts, and corresponding division facts, in the 10, 5, 2, 4 and 8 multiplication tables, and recognise products in these multiplication tables as multiples of the corresponding number

3MD–1 Apply known multiplication and division facts to solve contextual problems with different structures, including quotative (grouping) and partitive (sharing) division.

Key Vocabulary

product ÷ factor = factor

grouping, sharing, division

In Year 3 we solve division problem with no remainders. Our division is linked to the multiplication facts we know. Use bar models and number lines to show what is happening, e.g. Jun has 24 cookies to **share** equally between 4 bags. How many cookies will there be in each bag? 3MD–1

We will share out one group of 4 at a time, so we can use our multiplication facts. We can also write a multiplication equation. We need to find out how many groups of 4 are in 24.

$24 \div 4 = \square$ $24 = 4 \times \square$

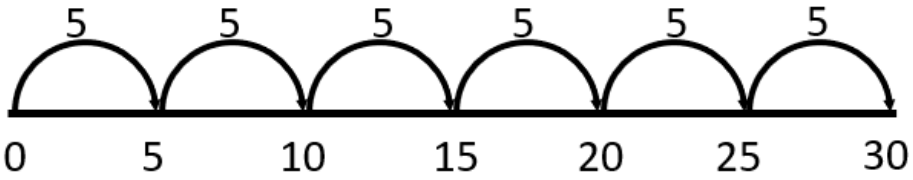
24			
6	6	6	6

$24 \div 4 = 6$

$24 = 4 \times 6$

There are 4 bags, so every time we put one cookie in each bag, we are taking a group of 4 to share out.

Jun is selling cakes. He has 30 cakes and he is **dividing** them between 5 boxes. We can visualise each group of cakes Jun takes to share on a number line.



30				
6	6	6	6	6

30 ÷ 5 = 6 because 5 x 6 = 30. 30 cakes divided between 5 boxes, there will be 6 cakes in each box. 30 is the number of cakes, 5 is the number of boxes and 6 is how many cakes are in each box.

Year 4 Multiplication 1

4NPV–1 Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100.

4NPV–3 Reason about the location of any four-digit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each.

4NF–1 Recall multiplication and division facts up to 12 x 12, and recognise products in multiplication tables as multiples of the corresponding number.

4NF–3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100)

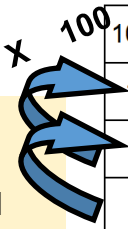
4MD–1 Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size.

4MD–2 Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication.

4MD–3 Understand and apply the distributive property of multiplication.

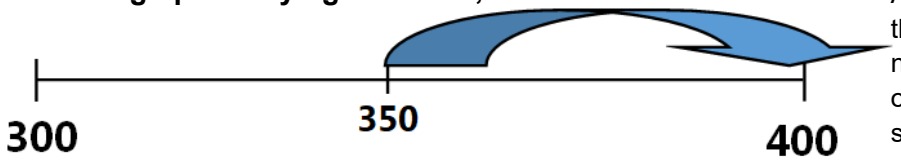
Key Vocabulary

factor x factor = product or multiple
multiply, times, double, equivalent, rounding



10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

Rounding up or staying the same, 4NPV–3



Always look to the place value column to the right of where you are rounding, if the number is 5 or above round up, if it is 4 or below round to stay the same. Avoid saying round down, as this may lead to round to the ten below.

Learn these 36 multiplicative facts, 4NF–1.

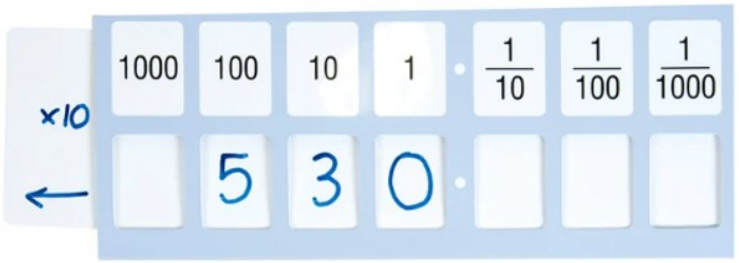
From Year 3 know 10, 5, 2, 4 and 8 multiplicative facts.
For Year 4 also know 3, 6, 9 and 7 multiplicative facts in this order, building on your knowledge of doubling or generate facts.

Learn the 11 and 12 by deriving from known facts, e.g. 12 x 4 = 10 x 4 + 2 x 4

2 × 2 = 4								
2 × 3 = 6	3 × 3 = 9							
2 × 4 = 8	3 × 4 = 12	4 × 4 = 16						
2 × 5 = 10	3 × 5 = 15	4 × 5 = 20	5 × 5 = 25					
2 × 6 = 12	3 × 6 = 18	4 × 6 = 24	5 × 6 = 30	6 × 6 = 36				
2 × 7 = 14	3 × 7 = 21	4 × 7 = 28	5 × 7 = 35	6 × 7 = 42	7 × 7 = 49			
2 × 8 = 16	3 × 8 = 24	4 × 8 = 32	5 × 8 = 40	6 × 8 = 48	7 × 8 = 56	8 × 8 = 64		
2 × 9 = 18	3 × 9 = 27	4 × 9 = 36	5 × 9 = 45	6 × 9 = 54	7 × 9 = 63	8 × 9 = 72	9 × 9 = 81	

Related Facts, 4NF–3

If I know 3 x 5 = 15,
then 30 x 5 = 150,
3 ones multiplied by 5 ones are 15 ones, so 3 tens multiplied by 5 tens are 15 tens



When multiplying by 10, 100, or 1000 move all the digits one, two or three places to the left, then use zero place holders. Do not say add a zero as this causes confusion when multiplying decimals.

To divide by 10, 100 or 1000, do the same, but move all the digits to the right.

Year 4 Multiplication 2

4NPV–1 Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100.

4NPV–3 Reason about the location of any fourdigit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each.

4NF–1 Recall multiplication and division facts up to 12 x 12, and recognise products in multiplication tables as multiples of the corresponding number.

4NF–3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100)

4MD–1 Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size.

4MD–2 Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication.

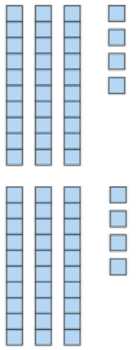
4MD–3 Understand and apply the distributive property of multiplication.

Key Vocabulary
factor x factor = product or multiple
multiply, times, double, equivalent, rounding
quotient is the answer to a division question

Formal Written Methods

Written by expanding, then the condensed method, using dienes and place value counters. Up to HTO x O,

e.g. 2 rows, each with 34

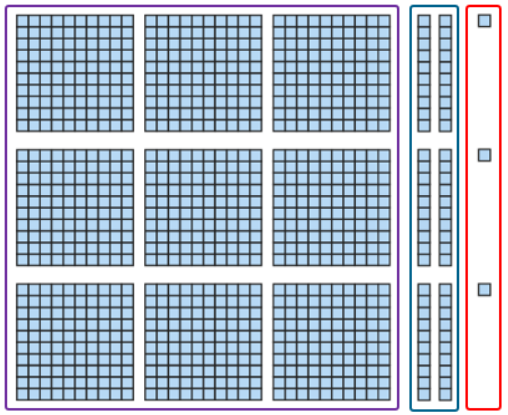


10s	1s	
3	4	
×	2	
	8	2 × 4 ones = 8 ones
6	0	2 × 3 tens = 6 tens
6	8	

68	
34	34

Informal written method	Expanded multiplication algorithm	Short multiplication
34×2 = 30×2 + 4×2 = 60 + 8 = 68	10s 1s 3 4 × 2 8 — 2 × 4 ones = 8 ones 6 0 — 2 × 3 tens = 6 tens 6 8	10s 1s 3 4 × 2 6 8

321 × 3 = 963



100s	10s	1s	
3	2	1	
×		3	
		3	3 × 1 ones = 3 ones
	6	0	3 × 2 tens = 6 tens
9	0	0	3 × 3 hundreds = 9 hundreds
9	6	3	

3	2	1
×		3
9	6	3

Year 4 Division 1

4NPV–4 Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/ number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts.

4NF–1 Recall multiplication and division facts up to 12 x 12, and recognise products in multiplication tables as multiples of the corresponding number.

4NF–2 Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders, and interpret remainders appropriately according to the context.

4MD–1 Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size.

4MD–2 Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication.

Key Vocabulary

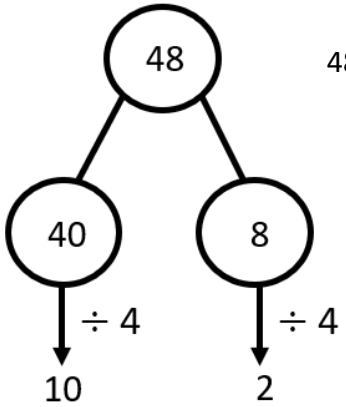
product ÷ factor = factor

We use these terms to make explicit links to multiplication. The Ready to Progress criteria also use

dividend ÷ divisor = quotient

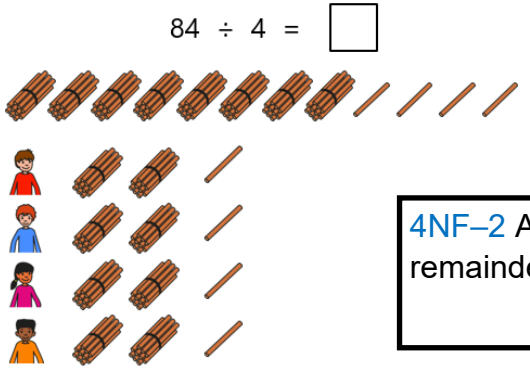
In Year 4 we begin to use flexible partitioning to solve division problems,

e.g. Use partitioning to help calculate 48 ÷ 4



48 ÷ 4 = 12

Continue to use manipulatives and objects to help show what is happening, e.g 84 sticks shared equally between 4 children. How many sticks each?



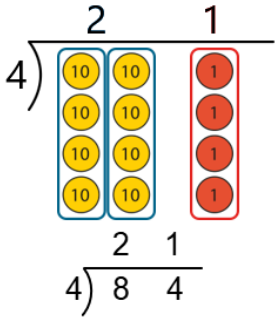
8 tens ÷ 4 = 2 tens

4 ones ÷ 4 = 1 one

4NF–2 Allow pupils to experience remainders, when some are left out.

Written methods are now introduced, this is called short division or the bus stop method, initially without remainders. e.g 84 sticks shared equally between 4 children. How many sticks each?

84 ÷ 4 = 21



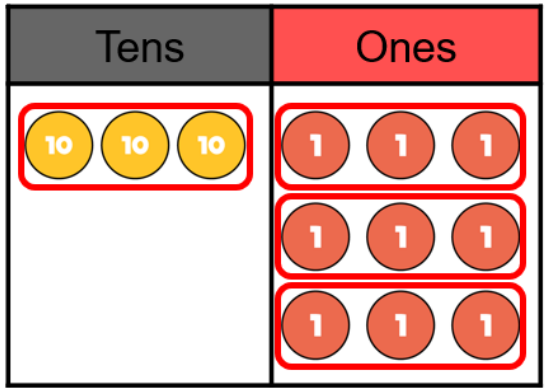
8 tens ÷ 4 = 2 tens

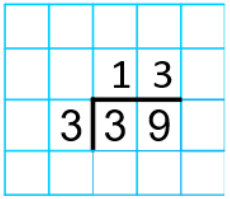
4 ones ÷ 4 = 1 one

Each child gets 21 sticks.

84	÷	4	=	21	2 1 / 4) 8 4
dividend	÷	divisor	=	quotient	quotient / divisor) dividend
product	÷	factor	=	factor	factor / factor) product

Use counters and place value charts to emphasise what is happening, e.g. £39 is shared equally between 3 friends. How much do they each get?





There is 1 group of three tens.

There are 3 groups of three ones.

39 ÷ 3 = 13

Year 4 Division 2

4NPV–4 Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/ number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts.

4NF–1 Recall multiplication and division facts up to 12 x 12, and recognise products in multiplication tables as multiples of the corresponding number.

4NF–2 Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders, and interpret remainders appropriately according to the context.

4MD–1 Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size.

4MD–2 Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication.

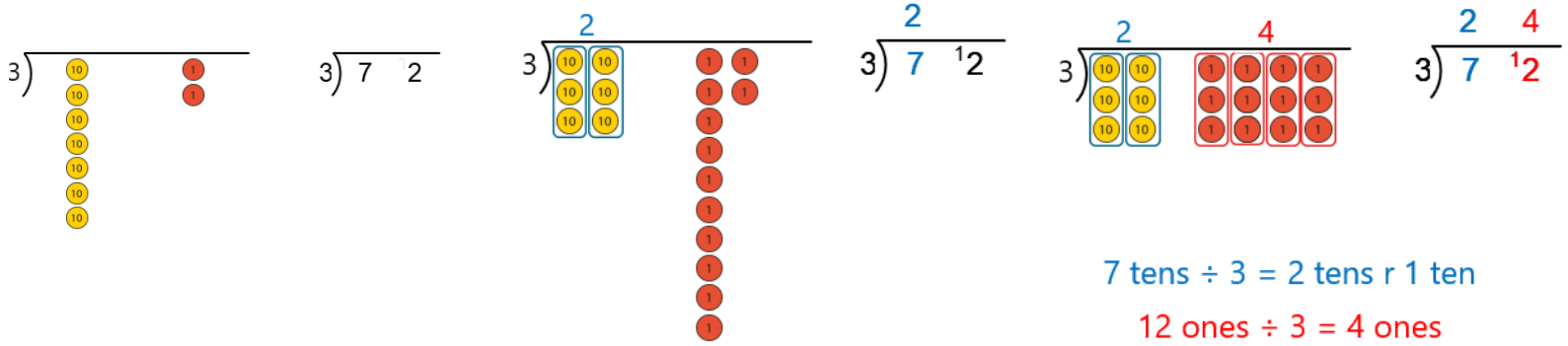
Key Vocabulary

product ÷ factor = factor

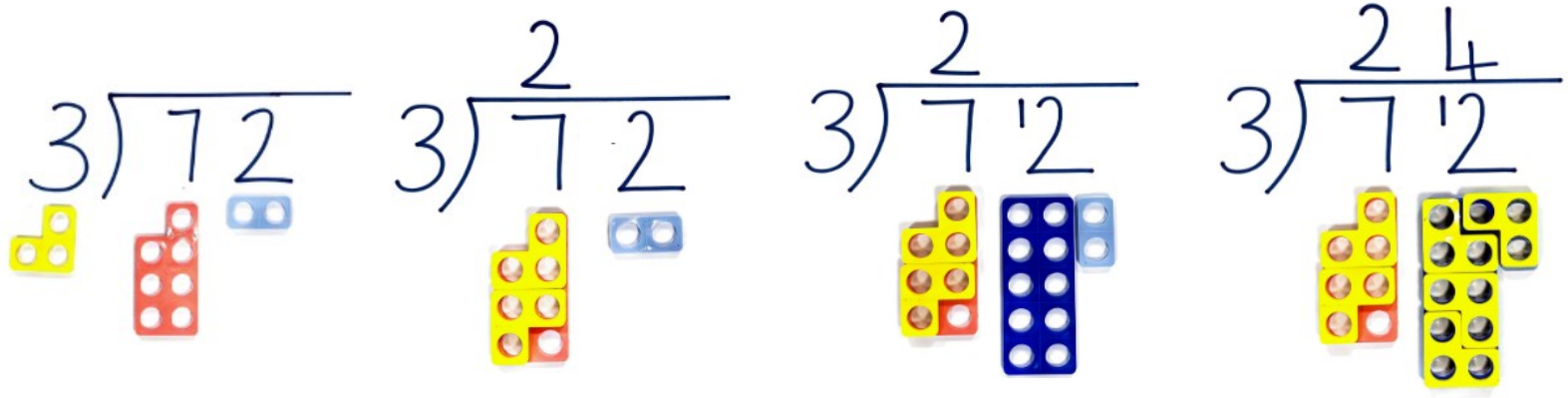
We use these terms to make explicit links to multiplication. The Ready to Progress criteria also use

dividend ÷ divisor = quotient

Exchange and regroup will also be necessary, e.g. 72 sticks shared equally between 3 children. How many sticks each?



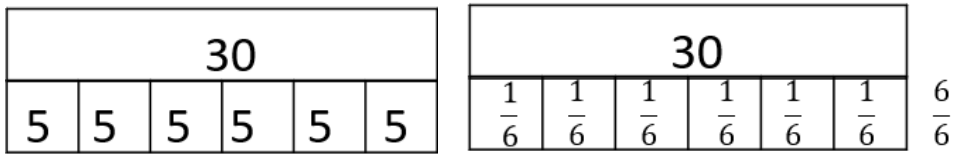
Numicon can be very helpful to support those still struggling to see the link between multiplication and division. Use the Numicon pieces to see how many goes into each time:



Remainders can be shown as a whole number, e.g. 74 ÷ 3 = 24 r2

84	÷	4	=	21	$4\overline{)84}$ (2 1)			
dividend	÷	divisor	=	quotient	divisor) dividend (quotient)			
product	÷	factor	=	factor	factor) product (factor)			

Make links explicit with division and multiplying by a fraction.



$30 \div 6 = 30 \times \frac{1}{6}$

Year 5 & 6 Multiplication

5MD–1 Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size.

5MD–2 Find factors and multiples of positive whole numbers, including common factors and common multiples, and express a given number as a product of 2 or 3 factors.

5MD–3 Multiply any whole number with up to 4 digits by any one-digit number using a formal written method.

6AS/MD–1 Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number).

6AS/MD–2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.

6AS/MD–3 Solve problems involving ratio relationships.

6AS/MD–4 Solve problems with 2 unknowns.

Key Vocabulary

factor x factor = product or multiple

multiply, times, double, equivalent, rounding, carry, regroup

In **Year 5 & 6**, continue to practise our multiplication and division facts. Link to related facts, 5MD –1, including with decimals, e.g. if 6 x 4 = 24, then 0.6 x 4 = 2.4

When finding factors of any number, 5MD–2, recognise that factors always come in pairs, every number has 1 and itself as a factor. Start with this factor pair and systematically find all remaining factors.

Find all the factors of 12, the factors of 12 are 1, 2, 3, 4, 6 ,and 12.

1 x 12

2 x 6

3 x 4

Written Methods

Year 5 focus ThHTO x O, 5MD–3, once mastered progress to TO x TO, using the column method, using a zero place holder when multiplying by the tens.

Year 6 HTO x TO

100s	10s	1s	
	4	7	
	1	8	x
3	7^{5}	6	7 x 8 + 40 x 8
4	7	0	7 x 10 + 40 x 10
8	4	6	
1			

Th	H	T	O	
	4	1	7	
		2	3	x
1	2	5^{2}	1	417 x 3
8	3^{1}	4	0	417 x 20
9	5	9	1	

Year 6 & 7 Multiplication

6AS/MD–1 Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number).

6AS/MD–2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.

6AS/MD–3 Solve problems involving ratio relationships.

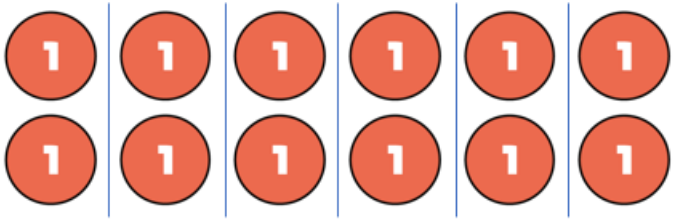
6AS/MD–4 Solve problems with 2 unknowns.

Key Vocabulary

factor x factor = product or multiple

multiply, times, double, equivalent, rounding, carry, regroup

Initially understand related facts, e.g. 6 x 2 = 12 and if we divide one factor by 10, the product also must divide by 10, so 6 x 0.2 = 1.2 6AS/MD–2



$6 \times 2 = 12$

$6 \times 0.2 = 1.2$

If both factors are divided by 10, e.g 0.6 x 0.2 then the product must be divided by 10 twice, or divided by 100, so 0.6 x 0.2 = 0.12

Written Methods with decimals

In Year 6, you will need to multiply a decimal number by a whole number. The column method can be used when multiplying a decimal by a whole number, be careful to align the decimal points and always estimate first to ensure we know what answer to expect, e.g. 21.3 x 4, estimate 20 x 4 = 80; or 3.25 x 5, estimate 3 x 5 = 15

	2	1	.	3
x				4
	8	5	.	2

1

		3	.	2	5
x					5
	1	6	.	2	5

1 2

85.2			
21.3	21.3	21.3	21.3

16.25				
3.25	3.25	3.25	3.25	3.25

However, encourage pupils to multiply the decimal by either 10 or 100 to make it a whole number, then use column multiplication and remember to divide the product by either 10 or 100 to show the product in its correct place value. Use estimation to check your final place value

e.g.. (213 x 4) ÷ 10 = 21.3 x 4

or (325 x 5) ÷ 100 = 3.25 x 5

In Year 7, you will need to multiply a decimal by a decimal. DO NOT use the column method when multiplying by a decimal as this will lead to problems with place value. Always multiply the decimals by 10, 100 or 1000 to make them whole numbers first, then divide the product by the same amount you initially multiplied both factors by, e.g. 4.2 x 3.4 = (42 x 34) ÷ 100,
4.21 x 3.4 = (421 x 34) ÷ 1000

Year 5, 6 & 7 Division

Year 5 continue to practise the short division method, this time introducing HTO ÷ O, 5MD–4

5MD–1 Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size.

5MD–4 Divide a number with up to 4 digits by a one-digit number using a formal written method, and interpret remainders appropriately for the context.

6AS/MD–3 Solve problems involving ratio relationships.

6AS/MD–4 Solve problems with 2 unknowns.

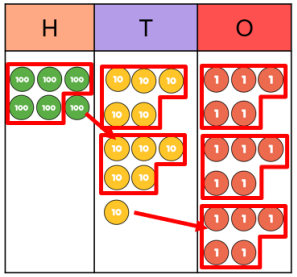
Key Vocabulary

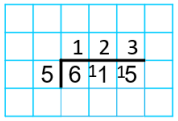
product ÷ factor = factor

We use these terms to make explicit links to multiplication. The Ready to Progress criteria also use

dividend ÷ divisor = quotient

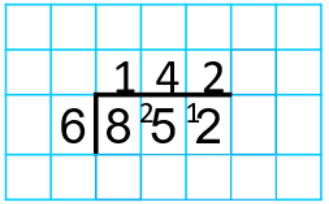
615 ÷ 5 =

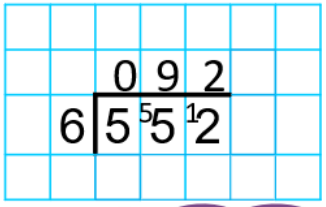


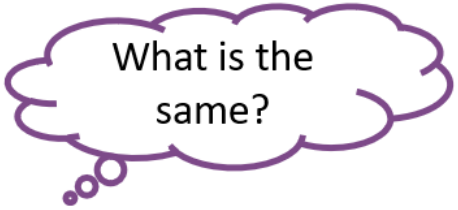


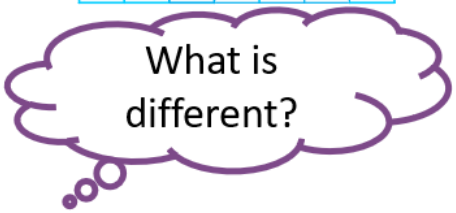
6 hundreds divided by 5 is equal to 1 hundred with a remainder of 1

I can exchange 1 hundred for 10 tens.







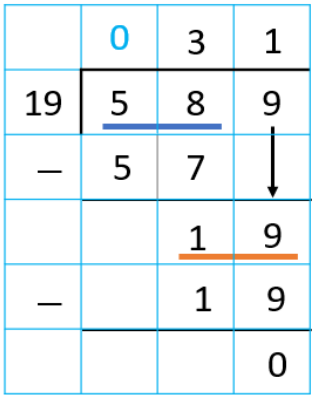


Year 6 continue to practise short division, once confident, introduce long division by a two-digit number, using HTO ÷ TO

Calculate 589 ÷ 19 = 31

	x 19
1	19
2	38
3	57
4	76
5	95
6	
7	
8	152
9	
10	190

Generate the 19 x table by using doubling, halving and addition. We know 1 x 19 = 19, then 10 x 19 = 190. Half this to find 5 x 19 = 95. Then double 19 to find 2 x 19 = 38, double this to find 4 x 19 = 76 and double this to find 8 x 19 = 152. Then add 1 x 19 and 2 x 19 to find 3 x 19 = 57. You may not need to find all the other components.



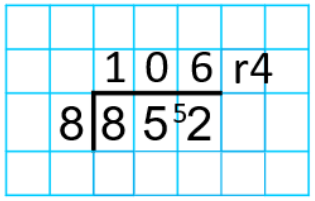
58 tens divided by 19 is equal to 3 tens with a remainder of 1 ten.

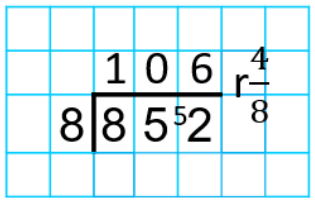
The remainder is exchanged into 10 ones.

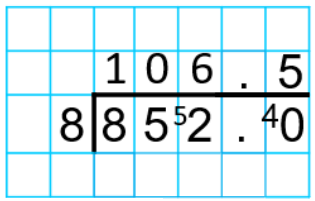
19 ones divided by 19 is equal to 1 one.

Remainders as fractions and decimals

Remainders initially are shown as a whole number. Then, as a fraction of the initial divisor; progressing to a decimal by continuing the division.







84 ÷ 4 = 21	2 1 / 4) 8 4
dividend ÷ divisor = quotient	quotient / divisor) dividend
product ÷ factor = factor	factor / factor) product

Printable Resources

+	0	1	2	3	4	5	6	7	8	9	10
0	0 + 0	0 + 1	0 + 2	0 + 3	0 + 4	0 + 5	0 + 6	0 + 7	0 + 8	0 + 9	0 + 10
1	1 + 0	1 + 1	1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 7	1 + 8	1 + 9	
2	2 + 0	2 + 1	2 + 2	2 + 3	2 + 4	2 + 5	2 + 6	2 + 7	2 + 8		
3	3 + 0	3 + 1	3 + 2	3 + 3	3 + 4	3 + 5	3 + 6	3 + 7			
4	4 + 0	4 + 1	4 + 2	4 + 3	4 + 4	4 + 5	4 + 6				
5	5 + 0	5 + 1	5 + 2	5 + 3	5 + 4	5 + 5					
6	6 + 0	6 + 1	6 + 2	6 + 3	6 + 4						
7	7 + 0	7 + 1	7 + 2	7 + 3							
8	8 + 0	8 + 1	8 + 2								
9	9 + 0	9 + 1									
10	10 + 0										

Adding 1

Adding 2

Bonds to 10

Adding 0

Doubles

Near Doubles

Year 2 Content
left blank

Composition to 10

+	0	1	2	3	4	5
0						
1						
2						
3						
4						
5						

Composition to 10

+	0	1	2	3	4	5
3						
1						
5						
0						
4						
2						

+	0	1	2	3	4	5	6	7	8	9	10
0	0 + 0	0 + 1	0 + 2	0 + 3	0 + 4	0 + 5	0 + 6	0 + 7	0 + 8	0 + 9	0 + 10
1	1 + 0	1 + 1	1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 7	1 + 8	1 + 9	1 + 10
2	2 + 0	2 + 1	2 + 2	2 + 3	2 + 4	2 + 5	2 + 6	2 + 7	2 + 8	2 + 9	2 + 10
3	3 + 0	3 + 1	3 + 2	3 + 3	3 + 4	3 + 5	3 + 6	3 + 7	3 + 8	3 + 9	3 + 10
4	4 + 0	4 + 1	4 + 2	4 + 3	4 + 4	4 + 5	4 + 6	4 + 7	4 + 8	4 + 9	4 + 10
5	5 + 0	5 + 1	5 + 2	5 + 3	5 + 4	5 + 5	5 + 6	5 + 7	5 + 8	5 + 9	5 + 10
6	6 + 0	6 + 1	6 + 2	6 + 3	6 + 4	6 + 5	6 + 6	6 + 7	6 + 8	6 + 9	6 + 10
7	7 + 0	7 + 1	7 + 2	7 + 3	7 + 4	7 + 5	7 + 6	7 + 7	7 + 8	7 + 9	7 + 10
8	8 + 0	8 + 1	8 + 2	8 + 3	8 + 4	8 + 5	8 + 6	8 + 7	8 + 8	8 + 9	8 + 10
9	9 + 0	9 + 1	9 + 2	9 + 3	9 + 4	9 + 5	9 + 6	9 + 7	9 + 8	9 + 9	9 + 10
10	10 + 0	10 + 1	10 + 2	10 + 3	10 + 4	10 + 5	10 + 6	10 + 7	10 + 8	10 + 9	10 + 10

Adding 1

Adding 2

Bonds to 10

Adding 0

Doubles

Near Doubles

Make 10

+	0	1	2	3	4	5	6	7	8	9	10
0											10
1											
3											
8			10								
4							10				
5											
2									10		
7											
6											
9											
10											

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

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

Multiples of 10

5 Multiples of 5

Multiples of 2

Core multiplication facts

2 × 2 = 4							
2 × 3 = 6	3 × 3 = 9						
2 × 4 = 8	3 × 4 = 12	4 × 4 = 16					
2 × 5 = 10	3 × 5 = 15	4 × 5 = 20	5 × 5 = 25				
2 × 6 = 12	3 × 6 = 18	4 × 6 = 24	5 × 6 = 30	6 × 6 = 36			
2 × 7 = 14	3 × 7 = 21	4 × 7 = 28	5 × 7 = 35	6 × 7 = 42	7 × 7 = 49		
2 × 8 = 16	3 × 8 = 24	4 × 8 = 32	5 × 8 = 40	6 × 8 = 48	7 × 8 = 56	8 × 8 = 64	
2 × 9 = 18	3 × 9 = 27	4 × 9 = 36	5 × 9 = 45	6 × 9 = 54	7 × 9 = 63	8 × 9 = 72	9 × 9 = 81

Thousands			Ones			.	Decimals		
H	T	O	H	T	O	.	t	h	th

Thousands			Ones			.	Decimals		
100,000	10,000	1,000	100	10	1	.	0.1	0.01	0.001