Progression in Written Calculations:

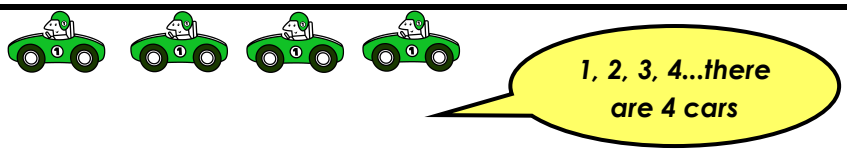
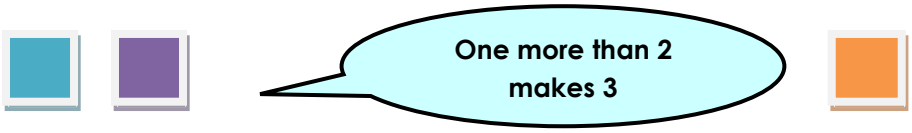
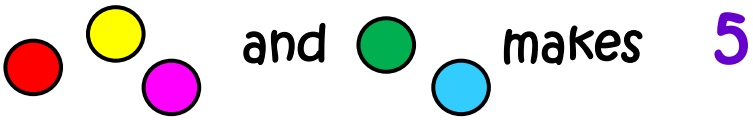
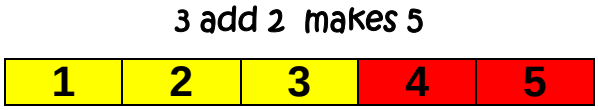
ADDITION

Key Vocabulary:

add	addition	and	plus	count on	more
increase	makes	sum	total	altogether	

EARLY STAGE :

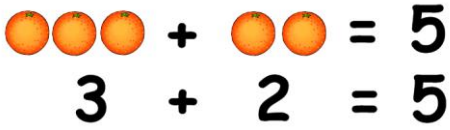
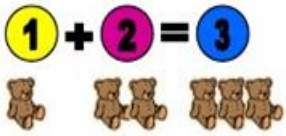
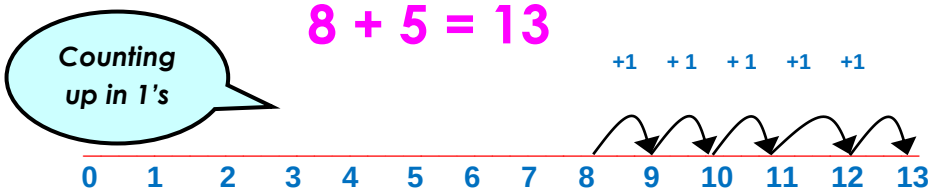
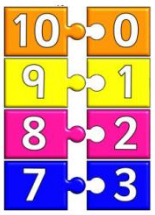
At this stage, children are not expected to use paper and pencil procedures for addition. Their experience of these operations will be a mixture of practical, oral and mental work.

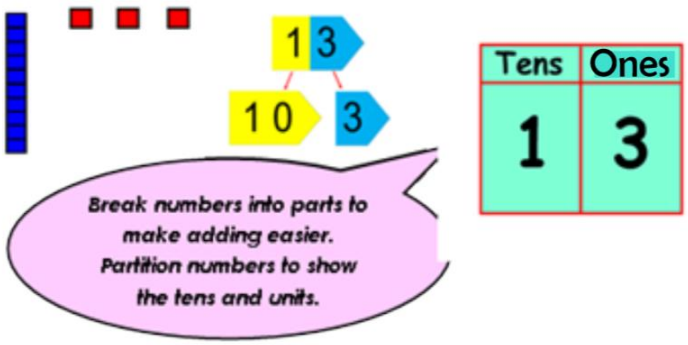
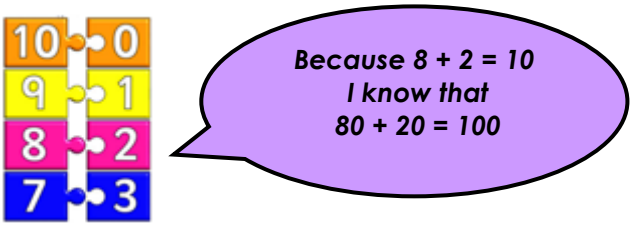
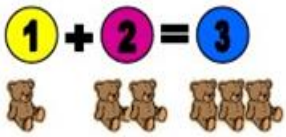
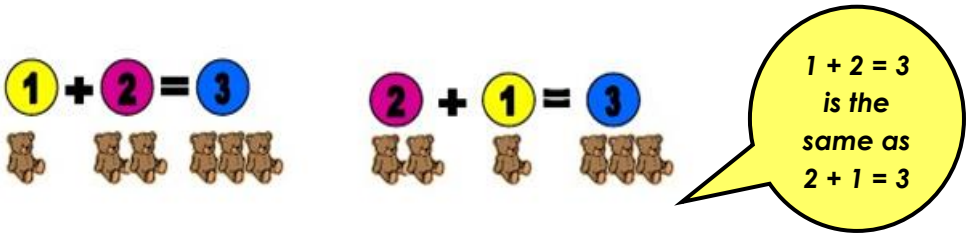
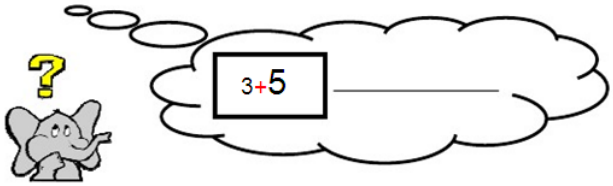
Recognise numbers 0 to 10	0 1 2 3 4 5 6 7 8 9 10
Count reliably up to 10 everyday objects	
Count one more than a number	
Begin to add two small groups of objects together	
Count in ones to add numbers together	

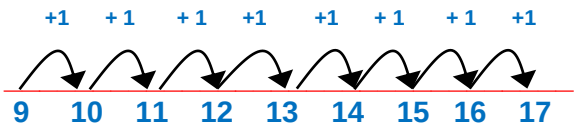
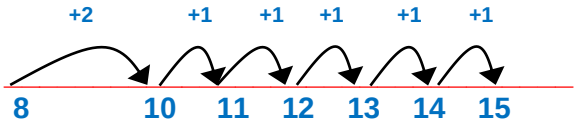
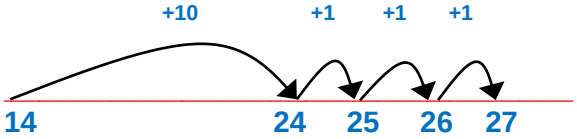
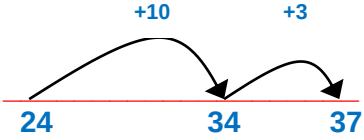
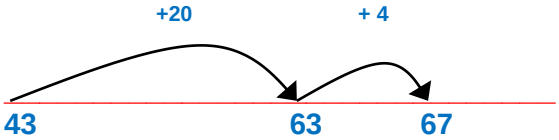
Before pupils can move to recording 3+2, they will need experience of practical addition, and an ability to respond to mathematical vocabulary practically. Children use signs and symbols to record practical work.

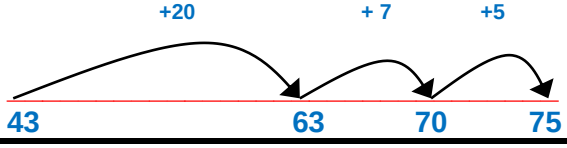
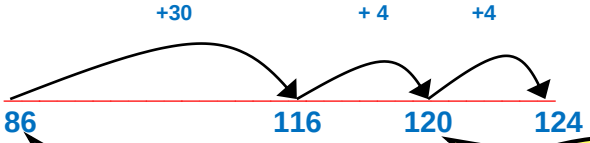
Key Stage 1

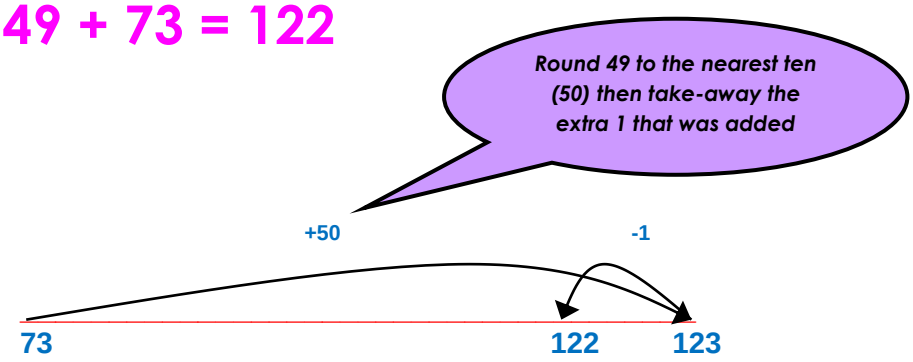
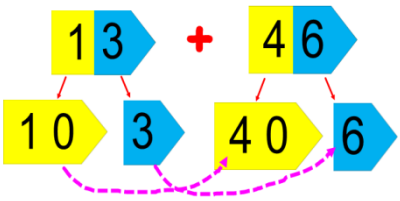
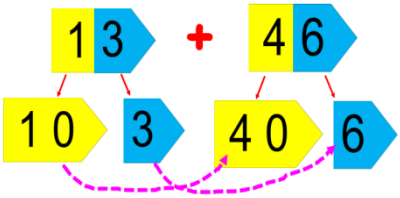
At this stage, pupils need experience of adding using concrete objects and pictorial representations in a wide variety of contexts. Pupils will use number lines extensively to develop mental calculations which will assist them when recording. Children begin to use blank number lines to support their own calculations.

Begin to read and use the + and = signs to record practical work and mental calculations in a number sentence	
Use concrete objects and pictorial representations to assist in adding one and two digit numbers	
Children begin to use **prepared** number lines to support their own calculations to add one and two digit numbers	
Know by heart all number bonds with a total of 10 or 20.	
Counting on in twos, fives and tens.	Counting in 2s 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

Partition 2-digit numbers in order to add at a later stage	
Recall all number bonds with a total of 10 and 20 fluently and use this to use related number bonds to 100.	
Continue to add and subtract numbers using concrete objects and pictorial representations to add: - a 2-digit number and ones - a 2-digit number and tens - two 2-digit numbers - adding three 1-digit numbers	
Know that addition can be done in any order.	
To put the biggest number first when counting on.	

Add two single-digit numbers, counting up in ones	**9 + 8 = 17**  *Continue Counting up in 1's*
Add two single-digit numbers that bridge 10	**8 + 7 = 15**  *Using knowledge of number bonds to 10 (8+2=10)*
Counting on in tens and ones	**14 + 13 = 27** 
Adding the tens and ones in one jump	**24 + 13 = 37** 
Adding the tens in one jump and the ones in one jump	**24 + 43 = 67**  *Remember to start from the biggest number*

Add two 2-digit numbers that bridge 10	**32 + 43 = 75**  *Using knowledge of number bonds to 10 (3+7=10)*
Children will continue to use empty number lines with increasingly large numbers, and counting on from the largest number irrespective of the order of the calculation	**38 + 86 = 124**  *Start from the biggest number* *Using knowledge of number bonds to 10 (6+4=10)*

Children will continue to use empty number lines with increasingly large numbers, including **compensation** where appropriate	**49 + 73 = 122** 
Horizontal partitioning Begin to record mental calculations using partitioning, splitting the tens and ones, and recombining	**13 + 46 = (10 + 40) + (3 + 6)** **= 50 + 9** **= 59** 
Column partitioning Partitioning both numbers into tens and ones where ones are placed under ones and tens under tens to prepare children for formal columnar methods.	**13 + 46 = 10 + 3** **40 + 6** **50 + 9 = 59** 

Key Stage 2

During Key Stage 2, children should become increasingly confident using the formal columnar method of addition. In Year Three they should be using 3 digit numbers, in Year 4 they should be using 4 digit numbers and in Year Five they should be able to add numbers with more than 4 digits. By Year Six this method should be completely embedded. Children should also be able to add decimals in the context of measure (money, length etc).

Expanded column method adding the ones first, then tens, then the hundreds	67 +43 10 (7+3) 100 (60+40) 110 *Record mental calculation* 126 +54 10 (6+4) 70 (20+50) 100 (100+0) 180
Use expanded column method when adding money, beginning with decimals that require no carrying and then move onto carrying the tenths or hundredths only	£ 2. 50 +£ 1. 75 5 (5p + 70p) £ 1. 20 (50p + 70p) £ 3. 00 (£2.00 + £1.00) £ 4. 25 
Compact column method without carrying Children add from least significant number without carrying	H T U 3 4 2 + 5 7 3 9 9 *Add the ones first, then the tens and lastly, the hundreds*
Compact column method, carrying below the line (ONES only)	H T U 6 2 5 + 4 8 6 7 3 1 **Children will begin with carrying only the ones below the line. 5+8 = 13. Record the 3 in the ones column, carrying the 1 ten.**

Compact column method, carrying below the line (TENS only)	H T U 6 2 5 + 9 4 7 1 9 1 Children carry only the tens below the line. 2 tens+9 tens = 11 tens. Record 1 ten in the tens column, carrying the 10 tens.
Compact column method, carrying ones, tens and hundreds	587 + 475 1062 1 1 3587 + 675 4262 1 1 1
Carrying decimals, begin with decimals to 1 decimal place and then moving to 2 decimal places	Carrying tenths only 32.5 km + 54.6 km 87.1 km 1
Carrying of both tenths and hundredths	£6.72 £8.56 + £2.33 £17.61 1 1

Compact column method, carrying ones, tens, hundreds and thousands Adding more than two numbers	7648 + 1486 9134 1 1 1 6584 + 5848 12432 1 1 1 42 6432 786 3 + 4681 11944 1 2 1
Add decimals with different numbers of places and different numbers of digits	124.9 86.3 211.2 1 1 1 124.9 117.25 242.15 1 1

Progression in Written Calculations:

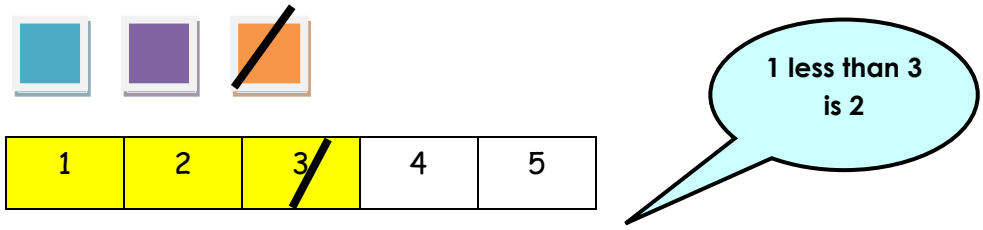
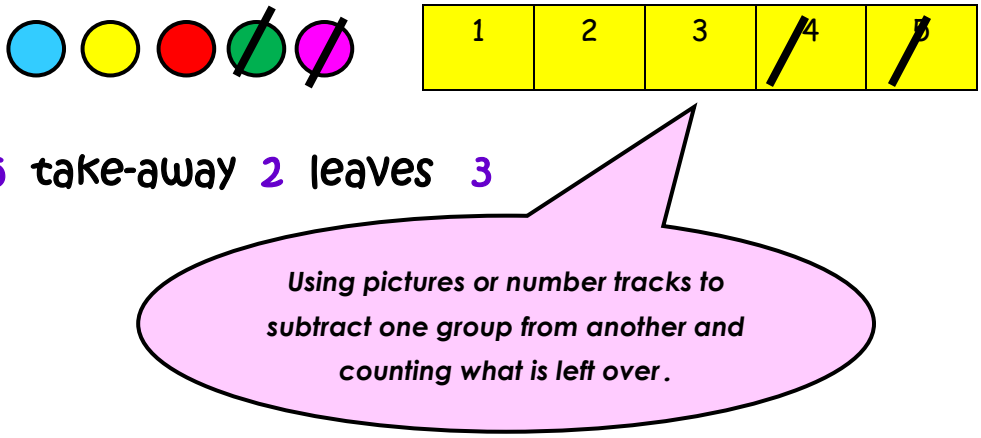
SUBTRACTION

Key Vocabulary:

take-away	count back	subtract	less
fewer	minus	difference	difference between

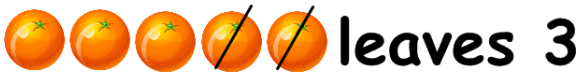
EARLY STAGE 1:

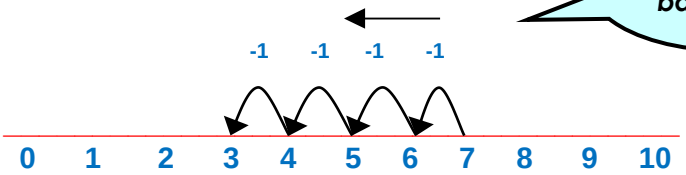
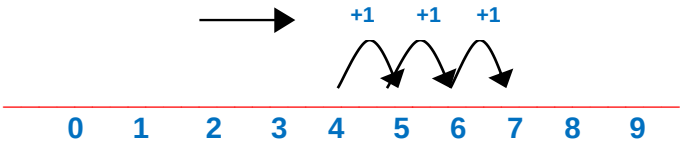
At this stage, children are not expected to use paper and pencil procedures for subtraction. Their experience of these operations will be a mixture of practical, oral and mental work.

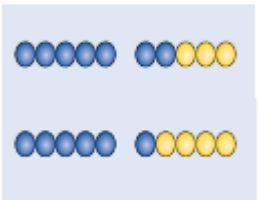
Recognise numbers 0 to 10	0 1 2 3 4 5 6 7 8 9 10
Count back from 10	10 9 8 7 6 5 4 3 2 1 0
Count one less than a number	
Begin to subtract one small group from another	

KEY STAGE 1

Before pupils can move to recording 5-2, they will need experience of practical subtraction, and an ability to respond to mathematical vocabulary practically. Children use signs and symbols to record practical work only when they are ready. At this stage, pupils use number lines extensively to develop mental calculations which will assist them when recording. Children begin to use blank number lines to support their own calculations.

Begin to use the - and = signs to record practical work and mental calculations in a number sentence	 leaves 3 5 - 2 = 3
Children begin to understand that subtraction is not commutative	6 - 2 = 4 2 – 6 = 4 ✕ *Biggest number always comes first.*
Subtract 1 and 2 digit numbers to 20 – including 0.	12 – 4 = 8 15 – 5 = 10
Relationship to addition: Use models and images to show the inverse relationship between addition and subtraction. Use this to solve missing number problems.	 5 - 2 = 3  3 + 2 = 5
Recall subtraction facts to 20	 10 – 2 = 8 20 – 2 = 18

Continue to add and subtract numbers using concrete objects and pictorial representations to add: - a 2-digit number and ones - a 2-digit number and tens - two 2-digit numbers	 3 - 2 = 1
Children begin to use **prepared** number lines to support their own calculations , beginning with counting back in ones	7 – 4 = 3 Counting back in 1's 
Using a **prepared** number line to find the difference by counting up	 7 – 4 = 3 The numberline is used to show that 7 - 4 means the 'difference between 7 and 4' or 'the difference between 4 and 7' and how many jumps they are apart.

Take – away numbers 0 - 20 from 20. Use these to use related facts up to 100.	 10 – 3 = 7 100 – 30 = 70 Because I know: 10 – 3 = 7 I know: 100- 30 = 70

Count forwards and backwards in 1's, 2's, 5's and 10's

Count forward → Counting in 1s ← Count backward

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

Counting in 2s

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

Counting in 5s

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

Count forward ↓ Count backward ↑

Counting in 10s

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

Count forward ↓ Count backward ↑

Empty number lines to count back, first counting back in tens and ones

29 - 14 = 15

-1 -1 -1 -1 -10

15 16 17 18 19 29

Start from left and count back

Empty number lines to count back, counting back in tens and the ones in one jump

29 - 14 = 15

-4 -10

15 19 29

Using the known fact 9 – 4 = 5 to count back in one jump

Empty number lines to count back, counting back in tens and the ones in one jump

47 - 23 = 24

-3 -20

24 27 47

Subtract two 2-digit numbers that bridge 10

42 - 27 = 15

-5 -2 -20

15 20 22 42

Using knowledge of number bonds to 10 (7+3=10) (10-3 = 7)

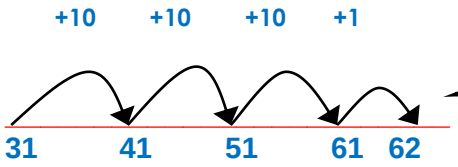
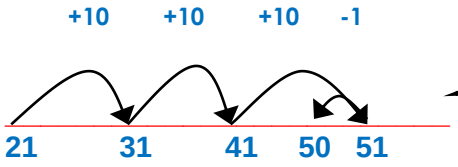
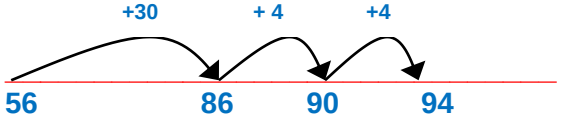
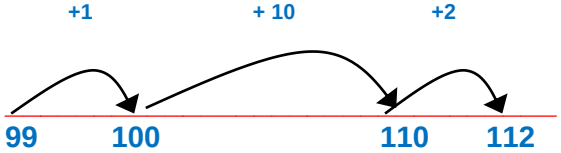
<u>Empty number lines to count up</u>

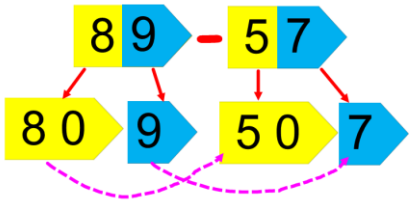
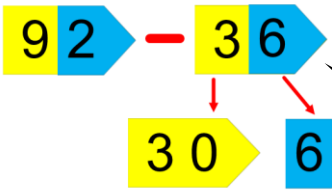
It can be more efficient to count on if the numbers involved

42 - 39 = 3

+1 +2

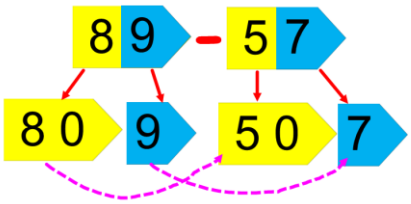
Calculations close together

in the calculation are close together or if the numbers involved in the calculation are near to multiples of 10, 100 etc	39 40 42 **62 - 31 = 31**  *Near to multiples of 10,100 etc* **50 - 21 = 29**  *Subtracting 9 or 11, 19 or 21 etc* ***Making decisions about counting up or back*** ***With practice, children will need to decide whether to count back or forward and which method is more efficient to use.***
Empty number lines with large numbers to count on Children will continue to use empty number lines with increasingly large numbers to count on from the smaller number to the larger number	**94 - 56 = 30 + 4 + 4 = 38**  *Counting up to find the difference*
Where the numbers involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used	**112 – 99 = 13** 

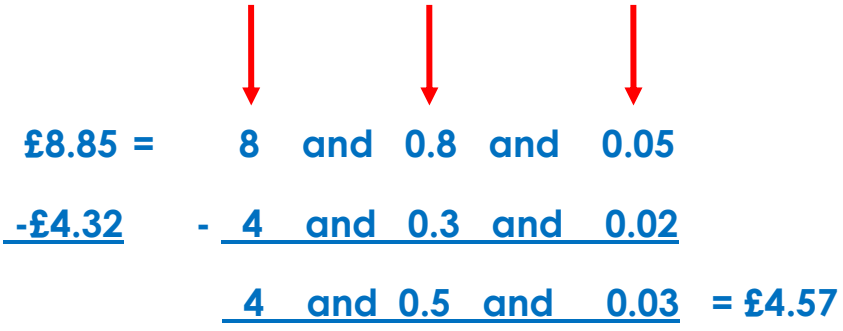
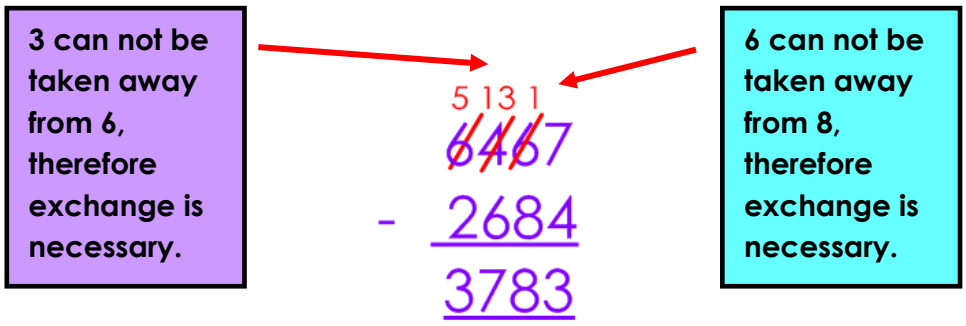
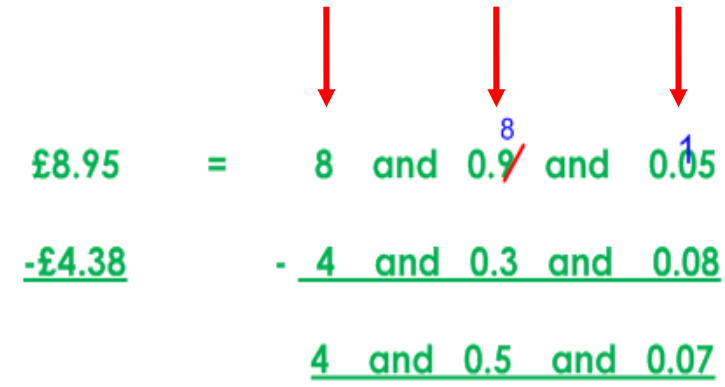
Partitioning without exchanging Partition both tens and ones	89 - 57 = (80 - 50) + (9 - 7) = 30 + 2 = 32 
Partitioning the second number only Partition only second number when the ones in the largest number is smaller than the ones in the smaller number	 92 - 36 = (92 - 30) - 6 = 62 - 6 = 56 *6 (ones in the second number) is larger than the ones in the first number*

Key Stage 2

At this stage, children need to continue to develop mental methods for subtraction and begin to use formal methods for columnar subtraction. During year 3 they should be using numbers up to 3 digits, year 4 up to 4 digits and during year 5 4 digits and above.

Expanded decomposition without exchanging Partitioning both numbers into tens and ones where ones are placed under ones and tens under tens	89 - 57 = 80 + 9 50 + 7 30 + 2 = 32 
Expanded decomposition with exchanging	71 - 46 = *Step 1* 70 and 1 - 40 and 6 *Step 2* 60 ~~70~~ and 11 - 40 and 6 20 and 5 = 2 **1 can not be taken away from 6, therefore exchange is necessary.** **Exchange one ten and regroup it as 10 ones, therefore 11 – 6 can be done.**

Children will use expanded decomposition with increasingly large numbers	**754 - 86 =** ***Step 1*** **700 and 50 and 4** **- 80 and 6** **4 can not be taken away from 6, therefore exchange is necessary.** ***Step :*** **This would be recorded by the children as:** *adjust from hundreds to tens* *adjust from tens to ones* 600 140 ~~700~~ and ~~50~~ and $^{1}4$ - 80 and 6 600 and 60 and 8 = 668
Compact decomposition without exchanging	H T U 5 6 4 -3 2 1 2 4 3 **They will move onto compact decomposition when ready**
Compact decomposition with exchanging	HTU 6 $^{1}4$ 1 ~~7~~ ~~5~~ 4 - 86 668 **4 can not be taken away from 6, therefore a ten needs to be carried over.** **4 can not be taken away from 8, therefore one hundred needs to be carried over.** ✓ Children will use compact decomposition with increasingly large numbers

Expanded decomposition of decimals without exchanging	
Compact Decomposition be able to subtract numbers with different numbers of digits	
Expanded decomposition of decimals WITH exchanging be able to subtract two or more decimal fractions with up to three digits and either one or two decimal places	
Compact decomposition of decimals WITH exchanging	

Progression in Written Calculations:

MULTIPLICATION

Key Vocabulary:

lots of groups of times multiply multiplication multiple product double repeated addition once,twice,three times array row column

Using multiplication facts:

It is essential that pupils have a quick recall of the times tables facts. Below is a guide to show what facts they should learn and when.

Year 1
Count in multiples of 2s, 5s and 10s

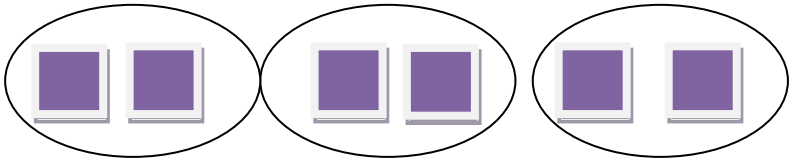
Year 2
Recall multiplication and division facts for the 2, 5 and 10 multiplication tables

Year 3
Recall multiplication and division facts for the 3, 4 and 8 multiplication tables

Year 4
Derive and recall quickly all multiplication and division facts up to 12 x 12.

EARLY STAGE 1:

- ✓ The focus in the early stage is on addition and addition strategies so the links to multiplication are limited.
- ✓ Much of it comes in the form of repeated addition of small groups of numbers.
- ✓ At this stage the children will still be doing a lot of concrete work.
- ✓ Some children may extend on their experiences and represent in pictorial form.

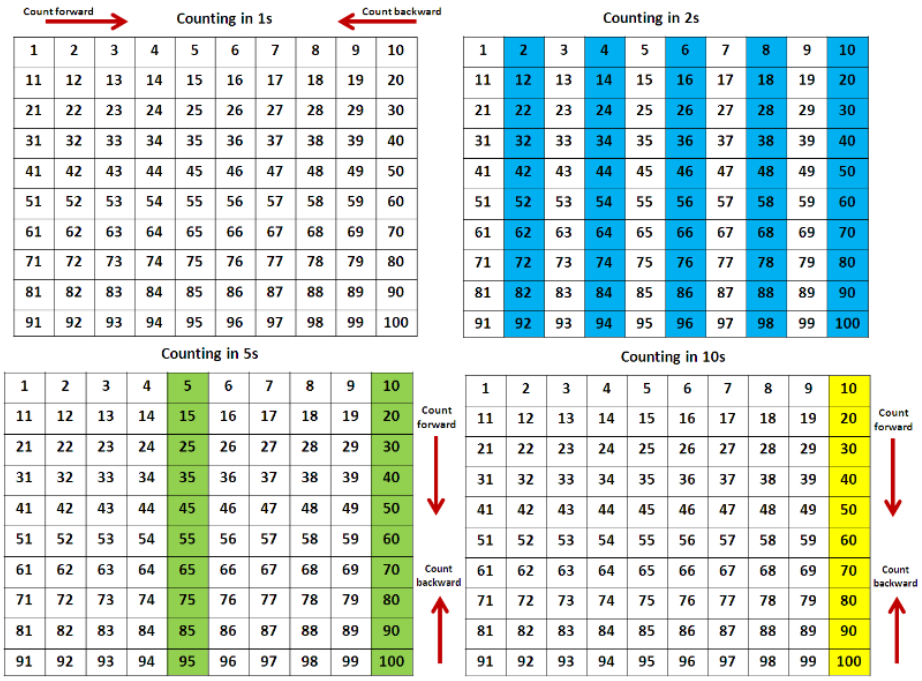
Practical activities Pictorial representations	 2 plus 2 plus 2 makes 6

Key Stage 1

At this stage children should have lots of experience of counting in 2s, 3s, 5s and 10s. They should use repeated addition, concrete materials, mental methods and multiplication and division facts to enable them to solve problems. They should be introduced to the x and = symbols.

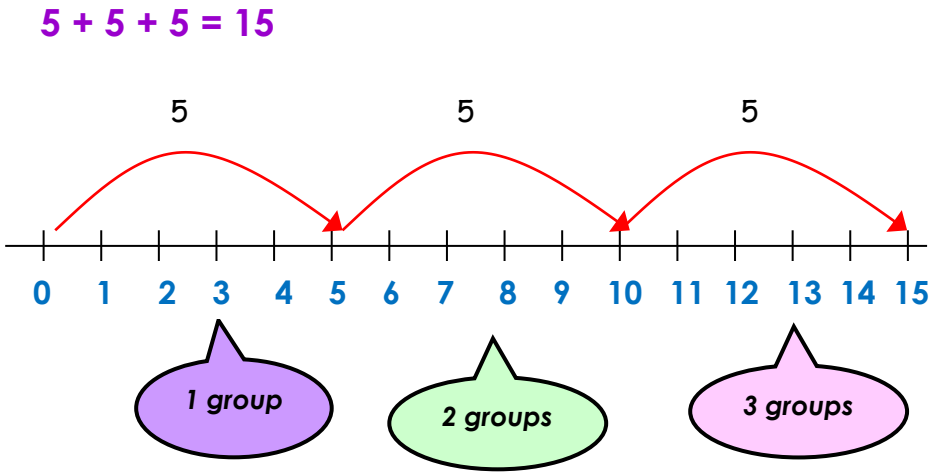
Groups/lots of 2's and 10's, later in 5's using pictorial representations	 *Children given 10 candles and asked to make 2 equal groups* 2 groups of 5 makes 10 or 2 lots of 5 makes 20
Repeated addition	 2 + 2 + 2 + 2 Know that 2 x 4 is the same as: 2 + 2 + 2 + 2 or 4 groups of 2 or 4 lots of 2 *Children are introduced to the X sign and can start using it to record practical activities*

Count forwards and backwards in 2s, 5s and 10s. (Yr2 – count in 3s)



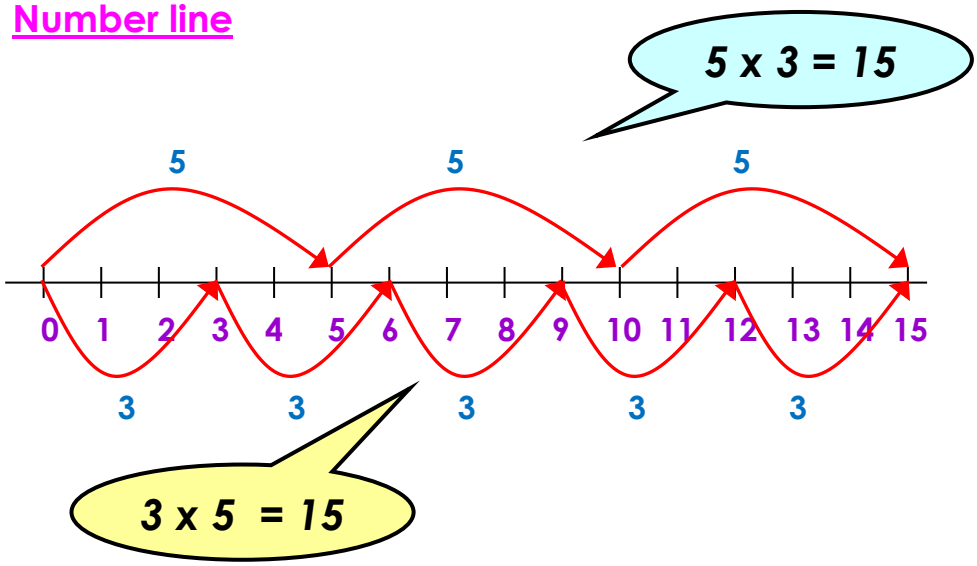
Continue using repeated addition, however with larger numbers

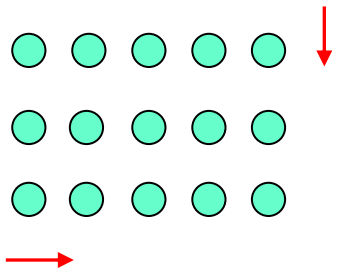
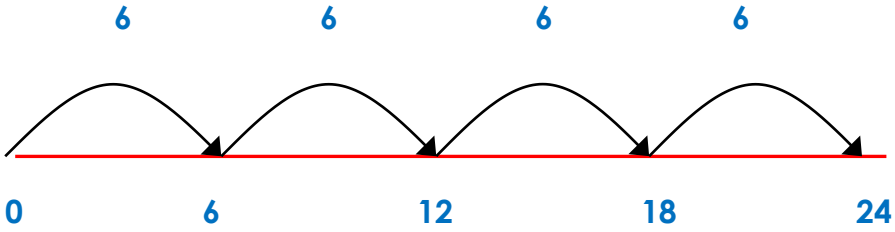
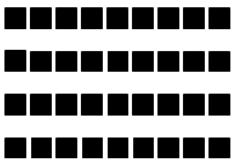
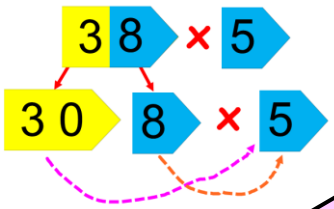
Begin using a number line to show repeated addition



Commutativity

Children should know that 3 x 5 has the same answer as 5 x 3. This can also be shown on a prepared number line or arrays



Children should be able to model a multiplication calculation using an array. Using the language of rows and columns.	**Arrays**  5 x 3 = 15  3 x 5 = 15
Repeated addition Children use blank number lines to support their understanding	 **Children know that:** 4 x 6 is 6 + 6 + 6 + 6 or 4 lots of 6 or 6 x 4
Continue using arrays with larger numbers	 9 x 4 = 36 4 x 9 = 36
Partitioning horizontally, multiplying the tens first	 *Use known fact:* *3 x 5* 38 x 5 = (30 x 5) + (8 x 5) = 150 + 40 = 190

Key Stage 2

At this stage children move on to using formal methods of multiplication moving from the grid method to columnar methods including long multiplication. Year 3 should be using x facts that they are familiar with, year 4 should be multiplying 2 and 3 digit numbers by a 1 digit number, year 5 should be multiplying up to 4 digit numbers by 2 and 1 digit numbers (including long multiplication for 2 digit numbers 23 x 25) and year 6 should be able to multiply numbers up to 4 digits by a 2 digit number using the formal method of long multiplication.

<table>
<tr>
<td>Grid method for short multiplication (multiplication by a single digit)</td>
<td>
23 x 8
<table>
<tr><td>x</td><td>20</td><td>3</td></tr>
<tr><td>8</td><td>160</td><td>24</td></tr>
</table>
= 160
+ 24
184

Multiplying a 2-digit number by a single digit number

153 x 4
<table>
<tr><td>X</td><td>100</td><td>50</td><td>3</td></tr>
<tr><td>4</td><td>400</td><td>200</td><td>12</td></tr>
</table>
= 400
200
+ 12
612

Extending to a 3-digit number multiplied by a single digit number
</td>
</tr>
<tr>
<td>Formal written multiplication for short multiplication- expanded form</td>
<td>
23
X 7
21 (3x7)
140 (20x7)
161

Children partition vertically to lead to a more formal recording.
Only when they are ready.
</td>
</tr>
</table>

STAGE 5:

<table>
<tr>
<td>Grid method for short multiplication (multiplication by a single digit)</td>
<td>
346 x 9
<table>
<tr><td>x</td><td>300</td><td>40</td><td>6</td></tr>
<tr><td>9</td><td>2700</td><td>360</td><td>54</td></tr>
</table>
2700
+ 360
+ 54
3114
1 1
</td>
</tr>
</table>

Grid method for long multiplication *(multiplication by a 2-digit)*

72 x 38

x	70	2
30	2100	60
8	560	16

2100
+ 560
+ 60
+ 16
2736
1

Multiplying decimals using the grid method

4.9 x 3

x	4	0.9
3	12	2.7

12
+ 2.7
14.7

Formal written multiplication – expanded form

3 digit number by a single digit number

423
X 7
21 (3x7)
140 (20x7)
2800 (400x7)
2961

Grid method for short multiplication ThHTU x U

4346 x 8

x	4000	300	40	6
8	32000	2400	320	48

32000
+ 2400
+ 320
+ 48
34768

Grid method for long multiplication HTU x TU

372 x 24

x	300	70	2
20	6000	1400	40
4	1200	280	8

6000
+ 1400
+ 1200
+ 280
+ 40
+ 8
8928

1

Multiplying decimals using the grid method	**4.92 x 3** | x | 4 | 0.9 | 0.02 | | --- | --- | --- | --- | | 3 | 12 | 2.7 | 0.06 | 12 + 0.7 + 0.06 12.76 **Moving onto numbers with 2 decimal places when ready**
Expanded form of short multiplication, moving onto the compact method once secure	**Short Multiplication:** 4346 X 8 48 320 2400 32000 34768 leading to 4346 x 8 34768 2 3 4
Expanded form of long multiplication, moving onto the compact method once secure	**Long Multiplication:** 352 X 27 14 350 2100 40 1000 6000 9504 1 leading to 352 x 27 2464 7040 9504 1

Progression in Written Calculations:

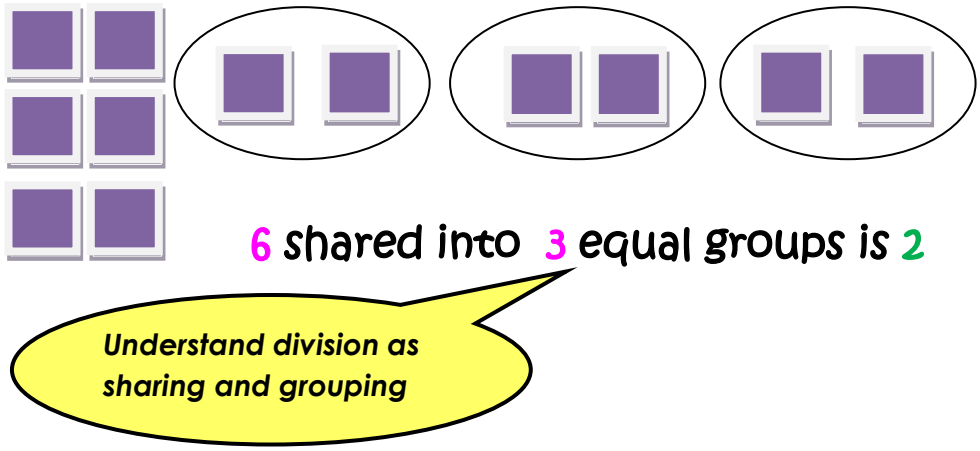
DIVISION

Key Vocabulary:

lots of	groups of	group	share
shared between		divide	divide into
division	divided by		remainder
factor	quotient	divisible	

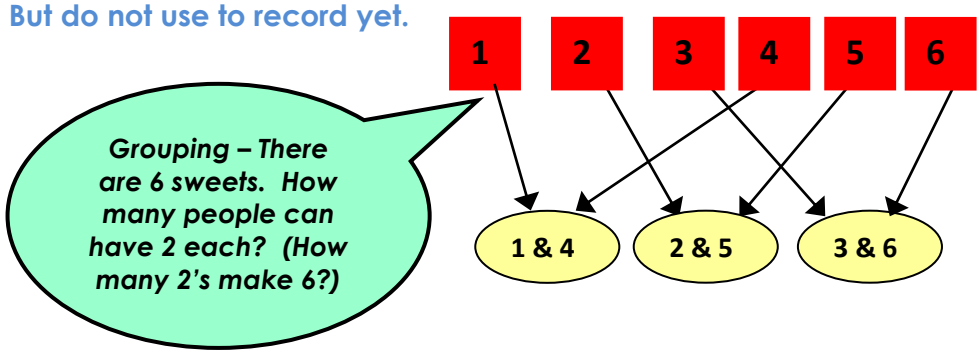
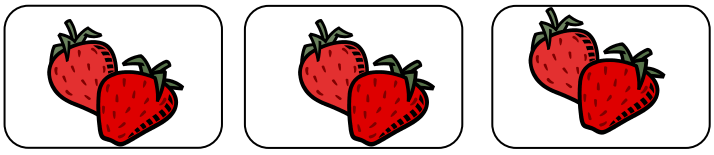
EARLY STAGE 1:

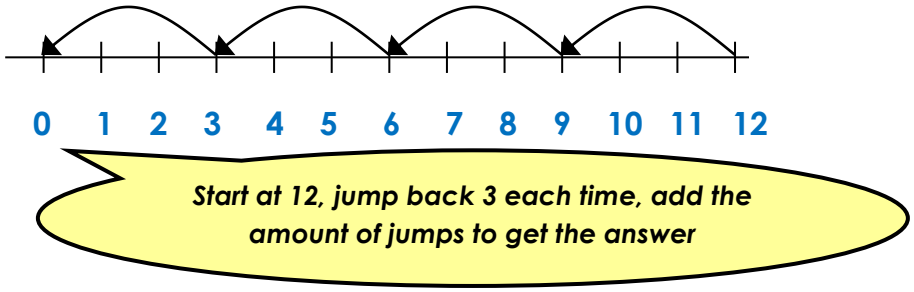
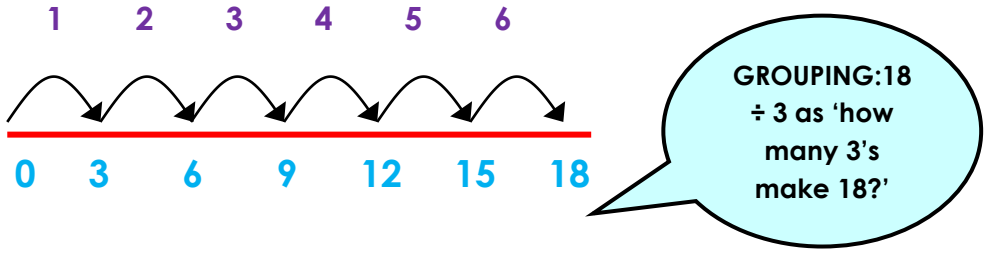
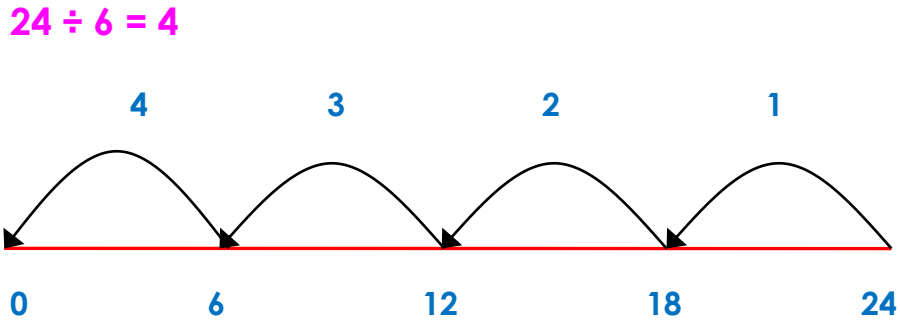
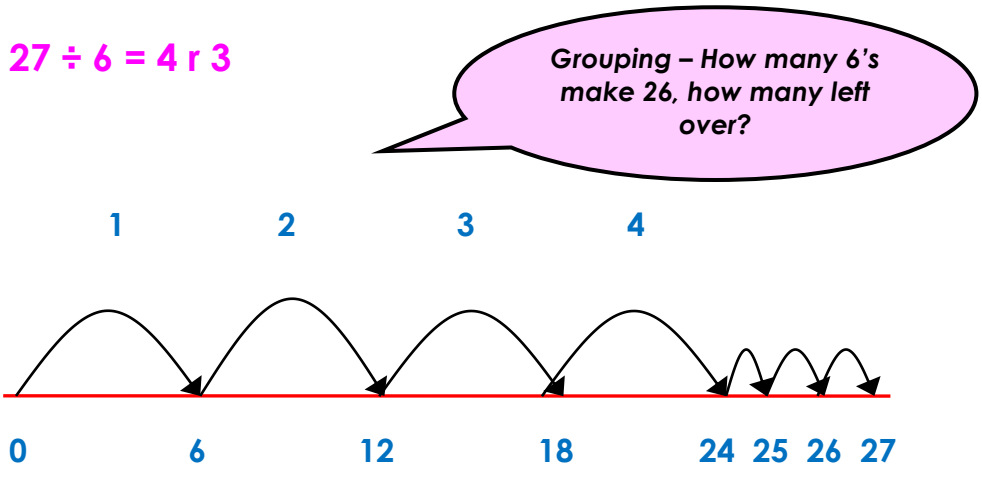
At the early stage, the focus is primarily on practical experiences involving sharing items into equal groups with the use of concrete apparatus for the children to physically count and see.

Practical activities Pictorial representations	

Key Stage 1

Emphasis in this stage is in counting in steps and the recall and use of multiplication facts. Children should be introduced to the division ÷ symbol and solve division problems using concrete objects, arrays, repeated subtraction and division facts.

Sharing equally Children will understand equal groups and share items out in play and problem solving. They will count in 2s and 10s and later in 5s and 3s. Count forwards and backwards in 2s/ 5s/ 10s (3s in year 2 from any number).	Introduced to the ÷ sign But do not use to record yet. ***6 ÷ 2 can be modelled as:***  Count forward Counting in 1s Count backward 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 Counting in 2s 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 Counting in 5s 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 Count forward Count backward Counting in 10s 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 Count forward Count backward
Understand division as sharing and grouping Sharing equally – 2's, 10's and 5's Grouping using pictures Begin using the division sign	**There are 6 strawberries, how many people can have 2 strawberries each?** ***3 people*** **OR** **There are 6 strawberries, how many strawberries does each person get if there are 3 people.** ***2 strawberries each*** 
Repeated subtraction using a prepared number	**12 ÷ 3 = 4** **4th Group** **3rd group** **2nd group** **1st group**

line as 10 ÷ 5 as 'how many 5s make 10?'	
Emphasis on grouping rather than sharing using a blank number line	
Repeated subtraction using a number line Children use blank number lines to support their understanding	
Introducing remainders Using a number line to support understanding	

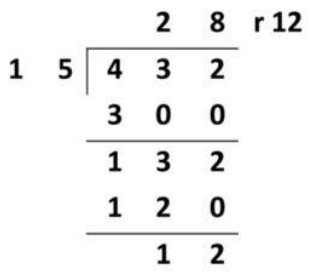
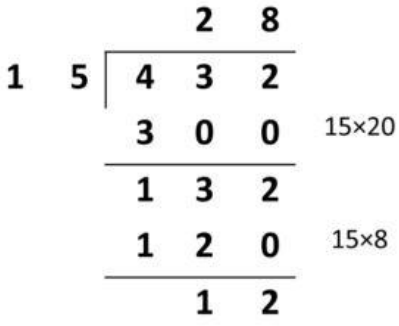
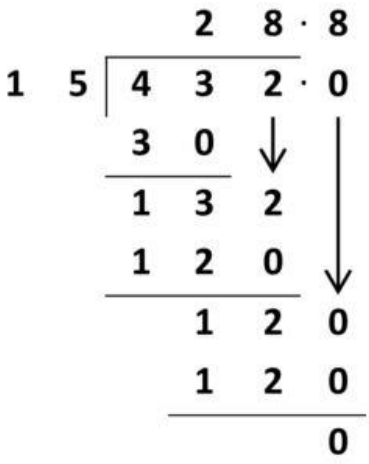
Key Stage 2

At this stage children should start to use formal written methods for division, moving from the chunking method, to short division and long division. By year 5 children should dividing numbers up to 4 digits by a 1 digit using the short division method. In year 6 they should be dividing numbers upto 4 digit by 2 digit whole numbers using short or long division. At this stage remainders need to interpreted as either whole number remainders, fractions or rounding – according to context.

Chunking method: 2 digit number divided by a single digit number Children begin with familiar multiples 2, 5, 10 and 3	72 ÷ 3 3) 72 - 30 (10 x 3 = 30) 42 - 30 (10 x 3 = 30) 12 - 6 (2 x 3 = 6) 6 - 6 (2 x 3 = 6) 0 Follows the repeated subtraction method. Children take-away small chunks at a time until they get to zero. Answer : 10 + 10 + 2 + 2 =24
Leading to subtraction of other multiples	96 ÷ 6 1 6 6) 96 - 60 (10x 6) 36 - 36 (6x 6) 0 Answer : 10 + 6 = 16

Continue vertical written method (chunking) with and without remainders Subtracting larger multiples	196 ÷ 6 32 r 4 6) 196 - 180 (30x6) 16 - 12 (2x6) 4 Answer : 30+2 = 32 with 4 left over 32 r 4 Children become more efficient and will now look for opportunities to reduce workings by subtracting larger multiples. e.g. Instead of subtracting 10x6 three times, children will subtract 30x6 and use known facts to assist, ie: 3x6

Continue subtracting larger multiples Continue chunking method to solve 3 digit numbers divided by a single digit number, extending to 3 digit numbers divided by 2-digit numbers	**972 ÷ 36** 27 36) 972 - 720 (20 x 36) 252 - 252 (7 x 36) 0 **Answer: 20 + 7 = 27** Using known facts: 2 x 26 or double 36 = 72, adding the zero to make 720
Short division	Step 1: 6 into 19 = 3 times with 1 remaining. The 1 is carried over to make 16. Step 2: 6 into 16 = 2 times with 4 remaining 3 2 r4 6) 1 9 1 6 step 1 step 2
Remainders as fractions	Step 1: 6 into 19 = 3 times with 1 remaining. The 1 is carried over to make 16. Step 2: 6 into 16 = 2 times with 4 remaining. As a fraction 4/6

Long division – with remainders	432 ÷ 15 becomes  Answer: 28 remainder 12
Long division – with fraction as remainder.	 $\frac{\cancel{12}}{\cancel{15}} = \frac{4}{5}$ Answer: $28\frac{4}{5}$
Long division with decimal remainders	 Answer: 28·8