Progression of Maths Calculations

DOCUMENT HISTORY	
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At Crooksbarn, we believe a clear progression in calculations will support the teaching and learning throughout the school, allow clarity and provide a secure foundation upon which to build and develop mathematical skills.

This booklet contains the key pencil and paper procedures that will be taught at Crooksbarn. Although the focus of this booklet focuses on pencil and paper procedures, it is important to recognise that the ability to calculate mentally lies at the heart of good math's practice. In every written method there is an element of mental processing. Sharing written methods with the teacher encourages children to think about the mental strategies that underpin and develop new ideas. Written methods, therefore, help children to both extend and clarify their thinking.

It is important that children do not abandon jottings and mental methods once other pencil and paper procedures are introduced. Children will always be encouraged to look at a calculation / problem and then decide on the best method.

Progression in calculation should include:

- A range of mental strategies to be used as a first resort (even after written methods have been introduced and embedded).
- An ability to understand the relationships between the four operations.
- An ability to explain, describe and record their methods.
- An ability to estimate and check whether the answer is correct.
- An ability to solve a wide range of problems.
- An ability to choose and use the most appropriate method of calculation (whether that is mental, jottings or written.)
- An ability to take the initiative to return to an earlier method that a child may be more confident with.

Teachers should use their own judgement to decide which methods would be most suitable for their pupils. For example; if a Y4 child has a strong grasp of place value, they could maybe be pushed to begin to use the long method of multiplication.

Layout should be followed as closely as possible, to provide consistency throughout the school.

Progression from mental to written methods for ADDITION

Nursery

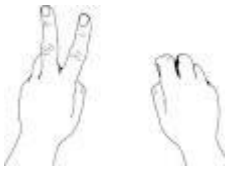
Children need to be able to count on from any number, combining two groups. They may develop ways of recording calculations using pictures or apparatus, such as Numicon.

3 2

3 and 2 more make 5

Children will recognise that addition can be done in any order, eg: 10 = 3 + 7
10 = 7 + 3

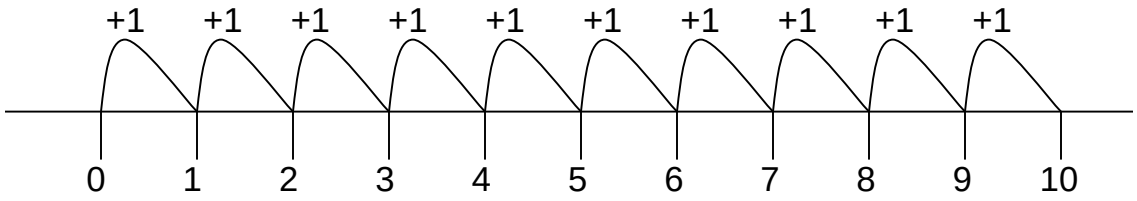
Children will begin to know addition facts to 10, they will begin to recognise how they can use their fingers to help them with number bond facts.



2 fingers up. How many are down?

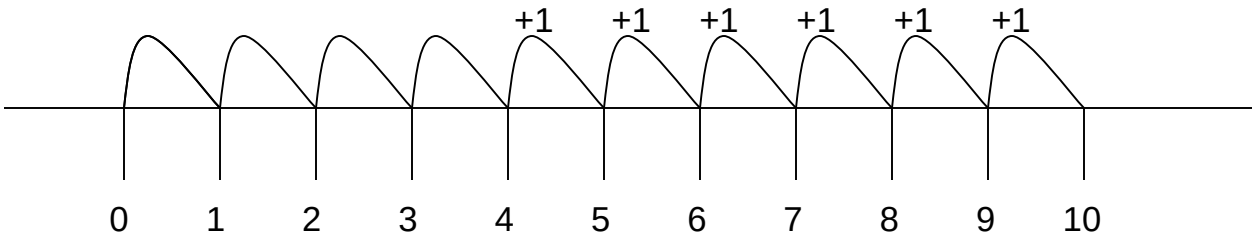
Reception

Children will be able to count on in ones on a numbered line.



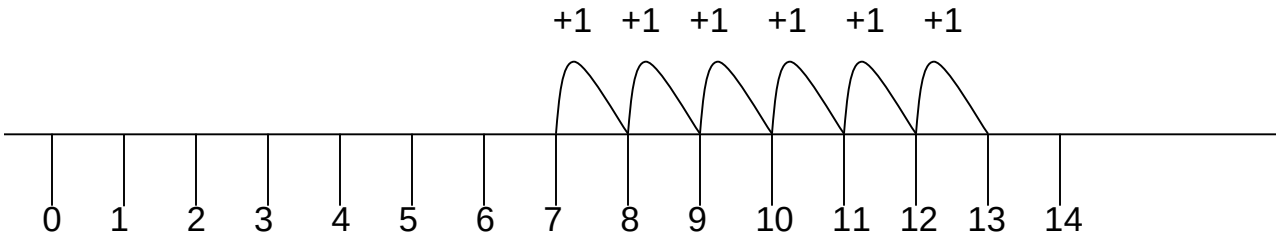
They will be able to count on from zero, and once they become confident with counting, they will be able to count on from the first number.

4 + 6 = 10



Children will be able to use more efficient jumps, starting with the larger number and counting on in ones. They will be able to record their calculation as a number sequence.

6 + 7 = 13

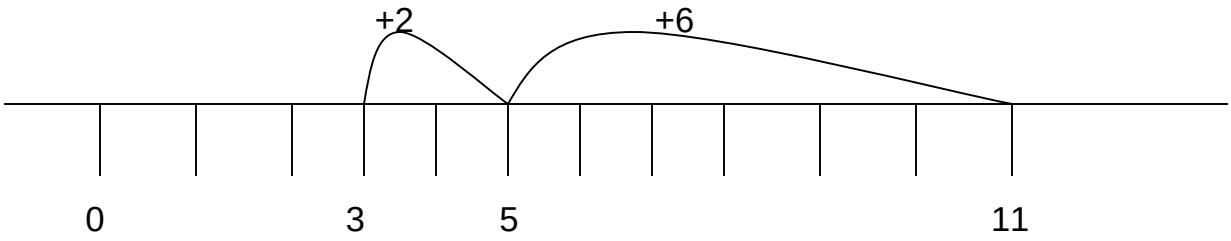


Year 1

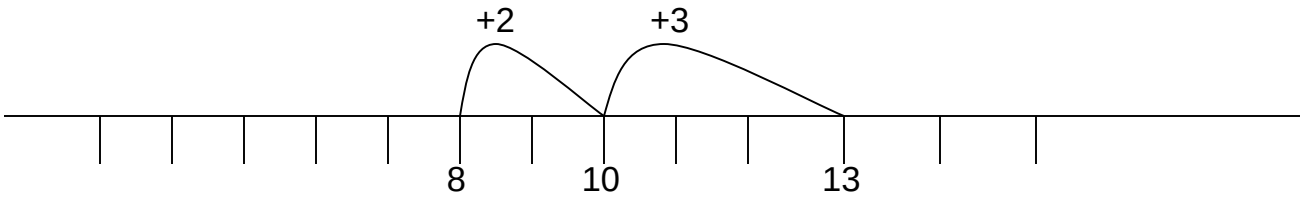
Children are able to count on using a marked unlabelled number line, then by drawing their own number line.

They begin to use jumps of various sizes, applying number bond knowledge to help them 'bridge' to the next 5 or 10.

3 + 8 = 11
Bridging to 5



8 + 5 = 13
Bridging to 10

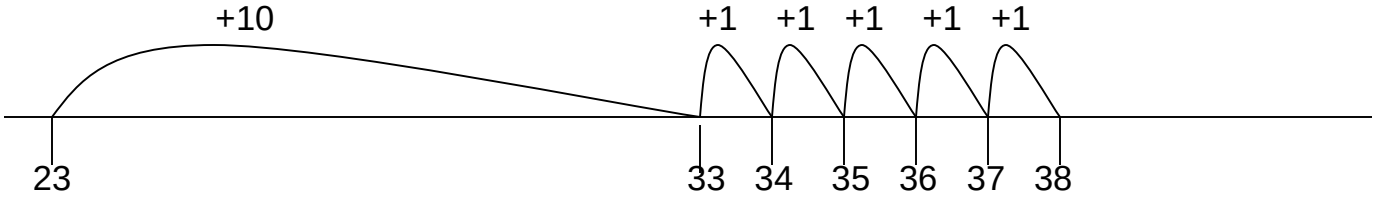


They use their knowledge of number patterns to count on in different sized steps.

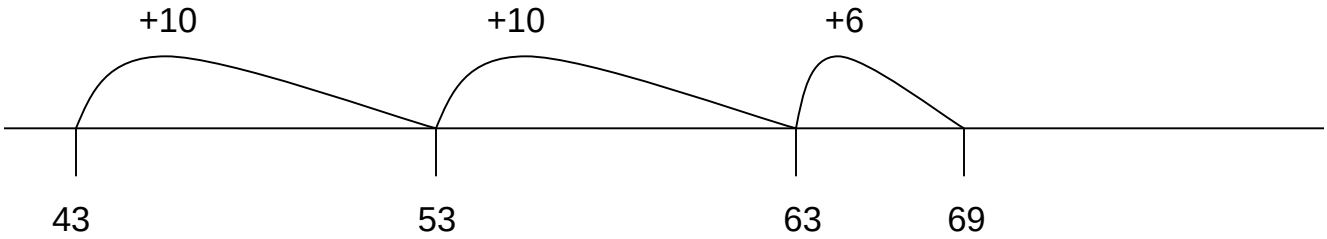
Year 2

The children will be able to partition two digit numbers; they will be able to count on in tens and multiples of ten. Children will be encouraged to count on from the largest integer.

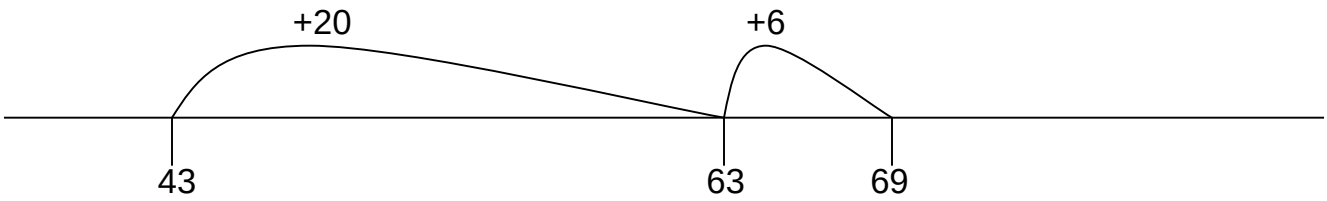
23 +14 = 37
23 +10 + 4 = 37 (partition 14 into 10 and 4)



The children count on in tens and then in ones.
26 + 43 = 69
43 + 10 + 10 + 6 = 69 (partition 26 into 10, 10 and 6)

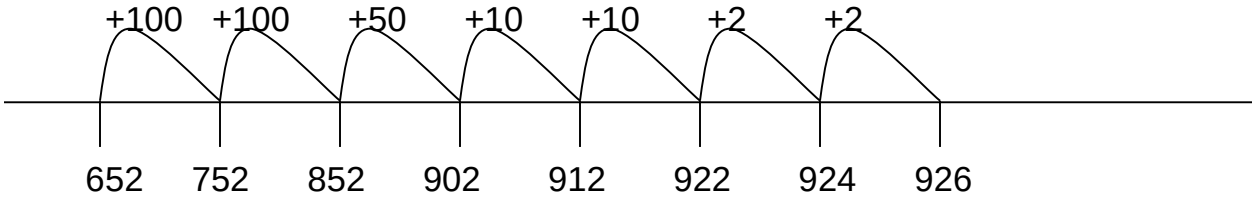


OR



They will progress onto using number lines to add larger numbers more efficiently.

652 + 274 = 926

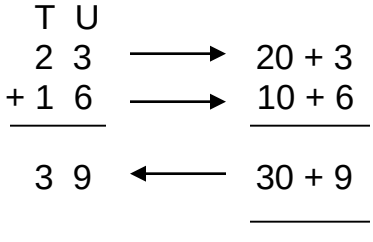


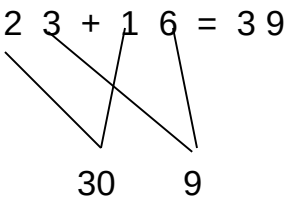
As pupils enter Key Stage 2 they will be able to use number lines proficiently to add numbers of any size using the most efficient method.

Year 3

The children will be able to solve addition using the Expanded Column Method and will understand the importance of lining up the place value digits. This can closely be linked to horizontal methods of mental recording as shown below.

They can partition the number and add each place value separately, always starting with the least significant digits (eg: the units)





They can ‘carry’ into the tens when the units are more than 9.

```
  T  U
  4  7   ——→   40 + 7
  3  4   ——→   30 + 4
+ 1                ———
  8  1   ←——   70 + 11
                   ———
```

They can ‘carry’ into the hundreds when the tens are more than 90.

```
  H  T  U
  2  4  7  ——→   200 + 40 + 7
     8  2  ——→         80 + 2
+ 1
  ———                ———————
  3  2  9  ←——   200 + 120 + 9
                   ———————
```

Year 4

The children will be able to solve additions using the Compact Method and will understand the importance of lining up the place value digits.

They understand the place value of each digit, adding fro the least significant digit first.

```
   T  U
   4  2
 + 3  4
 ———————
   8  6
 ———————
```

They can ‘carry’ by using the ‘carry-on’ line when the digits go over their value.

```
   T  U
   4  7
   3  4
+  1
 ———————
   8  1
 ———————
```

	Th	H	T	U
	1	0	4	7
		9	8	4
+		1	1	
	2	0	3	1

By the time children reach Year 5, they will be confident in using the most efficient method for addition. They now need to apply these methods to decimal numbers. By Year 6 the children will be consolidating and refining the method and applying it in their 2-step problem solving.

Year 5&6

The children will be using the Compact Addition method to solve addition of decimal numbers, with the use of the 'carry-on' line. Pupils should be encouraged to place the decimal point in the answer box, before completing each calculation.

They apply the same rules with 'carrying' to decimal numbers.

			$\frac{1}{10}$
	T	U	
	2	4 .	6
+	3	4 .	7
		1	
	5	9 .	3

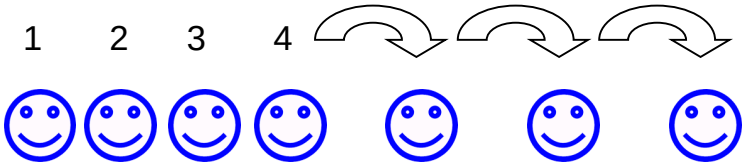
			$\frac{1}{10}$	$\frac{1}{100}$
	T	U		
	2	4 .	6	4
+	3	4 .	7	9
		1 .	1	
	5	9 .	4	3

Progression from mental to written methods for SUBTRACTION

Before children can move onto the methods for subtraction they need to be able to count reliably including one to one correspondence.

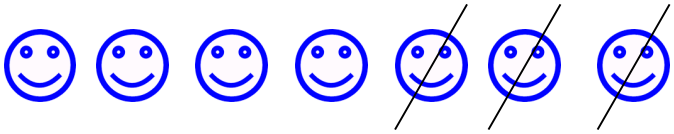
Nursery

Children will be able to count up or back from any number.



How many more will I need to make 7?

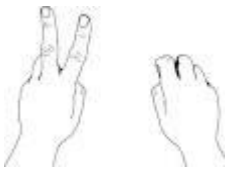
Children will understand subtraction as taking away.



Remove some objects and count.

Children will begin to know the INVERSE relationship of number facts up to 10.

7 + 3 = 10 3 + 7 = 10
10 – 3 = 7 10 – 7 = 3



2 fingers up. How many are down?

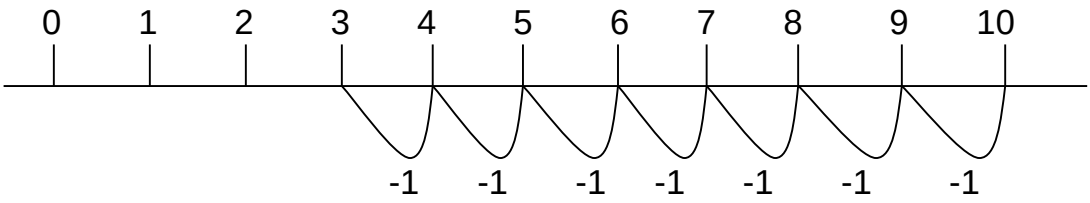
8 fingers down. How many are up?

The children will be supported with these concepts through singing nursery rhymes and develop ways of recording calculations using pictures or using apparatus, such as Numicon.

Reception

The children will be able to count back in ones on a numbered line.

10 – 7 = 3

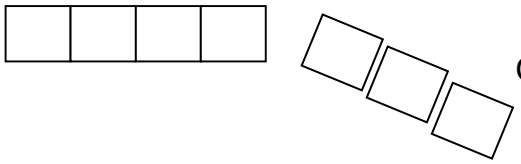


They will be able to record their calculation as a number sequence.

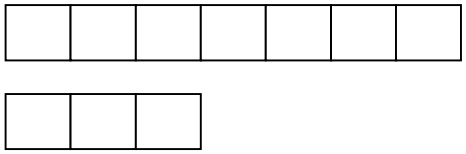
Children will be able to understand the concept of subtraction as:

~ Taking away
~ Finding the difference
~ Counting up
~ Counting back

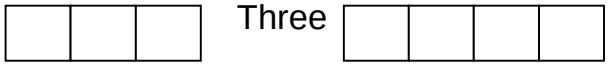
7 – 3 = 4



One quantity with 3 removed



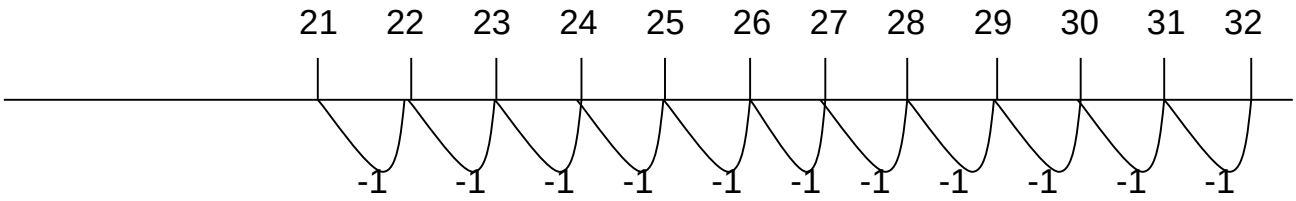
Two quantities. 4 more make them the same.
(I have 3, how many more do I need to make 7?)



Three four more to make 7.

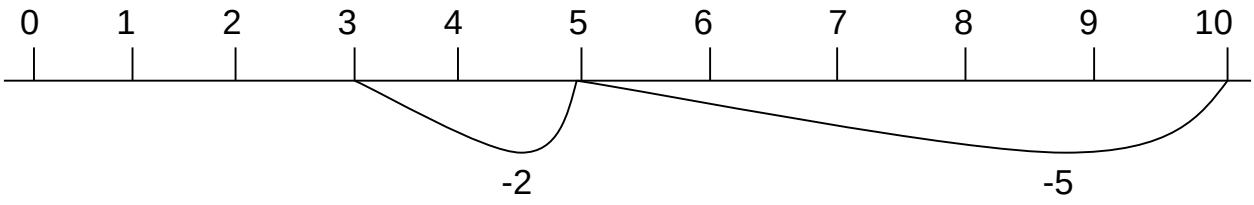
Children are able to count back using marked unlabeled number lines, then by drawing their own number line.

$$\begin{array}{r} 32 \\ -\ \underline{11} \\ 21 \end{array}$$



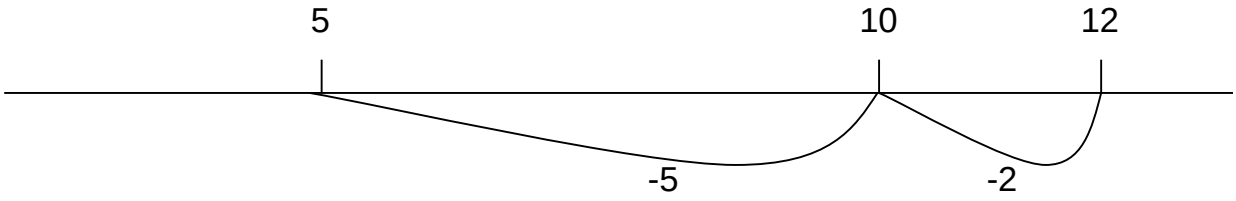
They begin to use jumps of various sizes, applying number bond knowledge to help them 'bridge' to 5 or 10.

$$\begin{array}{r} 10 \\ -\ \underline{\ 7} \\ 3 \end{array}$$



(more efficient jumps on labeled number line)

12 – 7 = 5



(more efficient jumps on empty number line)

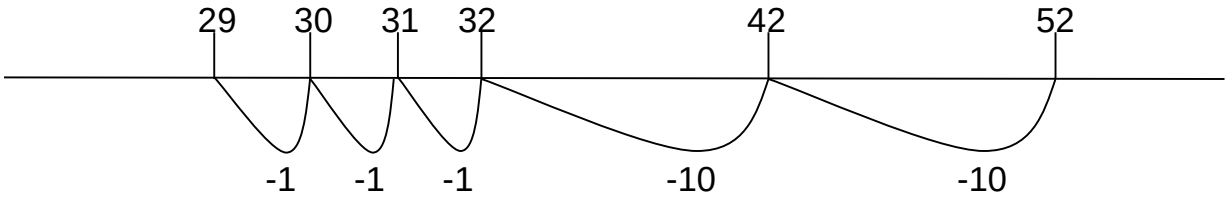
They use their knowledge of number patterns to count back in different sized jumps.

Year 2

The children will be able to partition two digit numbers. They will be able to count back in tens and multiples of tens. Children should be encouraged to record questions and answers in columns.

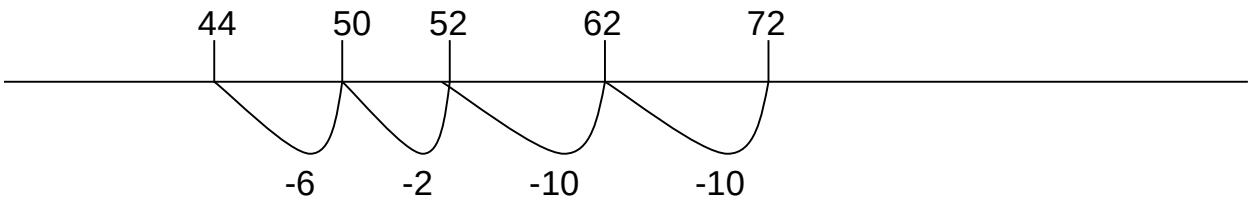
52
- 23
29

They count back in tens first then in ones.



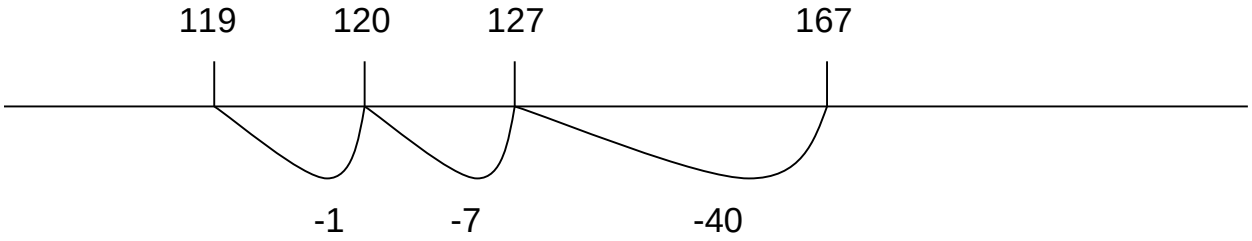
72
- 28
44

They count back in tens, then in more efficient jumps.



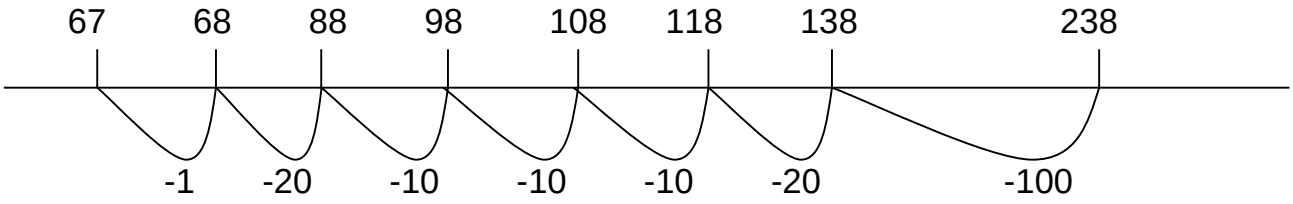
167
- 48
119

They count back in more efficient jumps of multiples of 10.



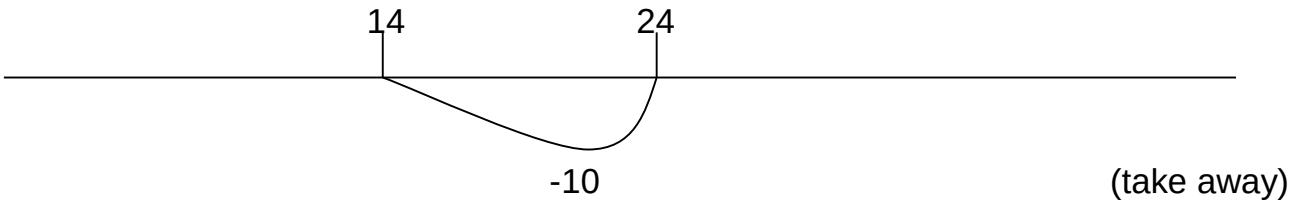
They can use number lines to subtract larger numbers more effectively.

238
- 171
67

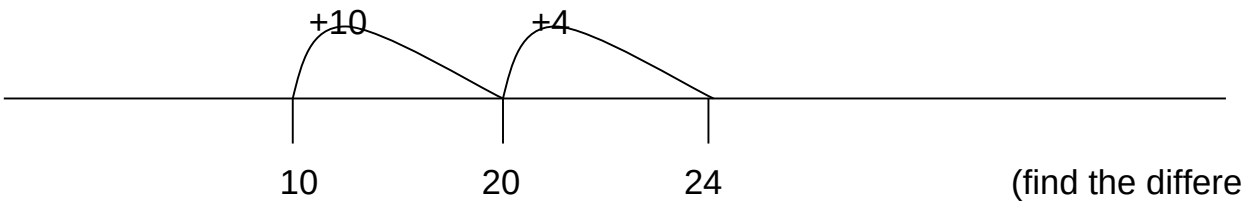


The children will understand the link between subtraction as finding the difference and taking away.

24
- 10
14

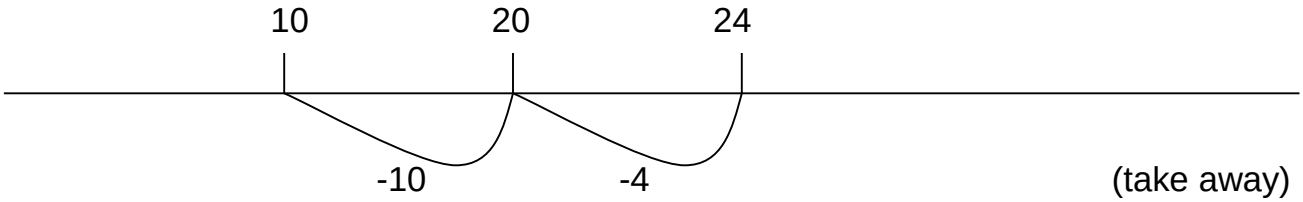


10 + ? = 24



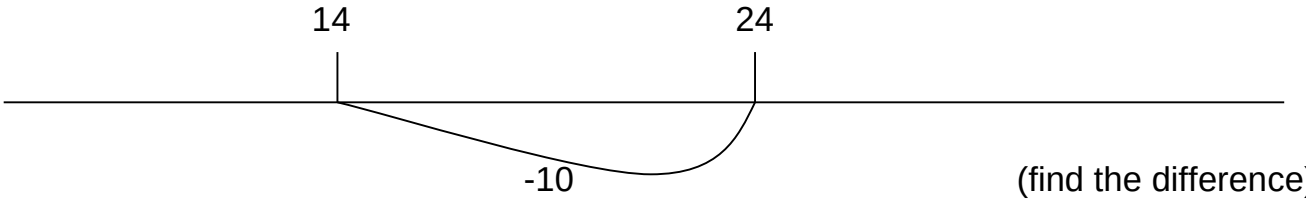
(find the difference)

24 – 14 = 10



(take away)

24 - ? = 14



(find the difference)

As pupils enter Key Stage 2, they will be able to use number lines proficiently to subtract numbers of any size using the most efficient method.

By the end of Key Stage 1, children should begin to record addition and subtraction down in columns. This will help with their understanding of place value, as they move to work with written methods in upper school.

Year 3

Children will be expected to begin the columnar methods for addition and subtraction in Year 3. The importance of place value and layout **must** be stressed.

Initially, no exchanging over. Eg: the units or tens of the number being subtracted is smaller than the starting number.

68 – 32 = 36

	T	U
	6	8
-	3	2
	3	6

Next, they will learn how to exchange from the tens to the units. They need to recognise when the starting number's units have less than the number being subtracted. When this is the case, they need to 'exchange' 10 from the tens into the units, in order to be able to subtract the numbers. It is vital the children understand the tens have to come over to the units as a whole ten. Cuisenaire apparatus (in Key Stage 2 Numicon kits) may help the children to visualise what happens and how the exchange takes place.

334 – 217 = 117

	H	T	U
		2	1
	3	~~3~~	4
-	2	1	7
	1	1	7

Exchanging from hundred to tens should be introduced next. The children need to understand that 100s are exchanged as a whole 100. Be careful as some children try to just take 10 from the 100.

Next, the children need to exchange from tens to units, and hundreds to tens.

e.g. in the sum 521 – 376 = 145

Year 4

Children will be able to subtract using the Compact Decomposition Method and understand the importance of lining each digit up.

Carrying tens to units. They understand the place value of each digit, subtracting from the least significant digit first.

334 – 217 = 117

	H	T	U
		2	1
	3	~~3~~	4
-	2	1	7
	1	1	7

Carrying hundreds to tens. They know to look carefully at the numbers and identify which parts (HTU) need exchanging, before beginning. They still need to start with the least significant figure first.

537 – 274 = 263

	H	T	U
	4	1	
	~~5~~	3	7
-	2	7	4
	2	6	3

Carrying tens to units and hundreds to tens.

534 – 378 = 156

	H	T	U
	4	12	1
	~~5~~	~~3~~	4
-	3	7	8
	1	5	6

Carrying when there are no tens. Often a common misconception is that 10 can be carried from 100 into the units, or 100 can be carried into the units. It is really important the children understand they have to carry 100 into the tens, and then carry the ten into the units ~ it takes two steps to get the units ready for subtraction to take place.

504 – 247 = 257

```
  H  T  U
  4  9  1  1
  5  0  4
- 2  4  7
---------
  2  5  7
```

By the time children reach Year 5, they will be confident in using the most efficient methods for subtraction. They now need to apply these methods to decimal numbers. By Year 6, the children will be consolidating and refining the method and applying it to their 2 step problem solving.

Year 5&6

The children will be using the Compact Decomposition Subtraction method to solve subtraction of decimal numbers. They use the same rules for exchanging to decimal numbers.

```
     T  U   1
            10
     7     1
  3  8 . 2
- 2  4 . 7
---------
  1  3 . 5
---------
```

```
     T  U   1    1
            10   100
     3     11    1
  6  4 . 2   1
- 2  1 . 7   2
---------------
  4  2 . 4   9
```

Progression from mental to written methods for MULTIPLICATION

Children need to have a clear understanding of addition (need to be able to combine groups of objects and have grasped basic addition skills) before they are able to attempt multiplication.

Reception

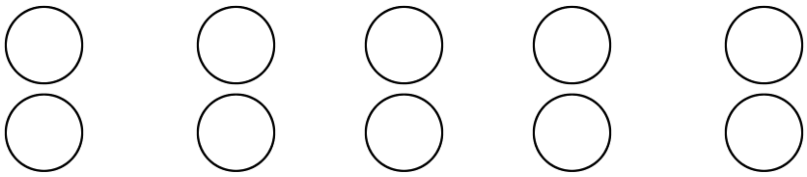
Children will experience equal groups of objects and will be able to count in 2s, 5s and 10s. Practical problem solving activities, involving equal sets or groups, and use of apparatus like Numicon, will help children to visualise the grouping of numbers and support counting on as repeated addition.

2 4 6

5 10 15

10 20 30

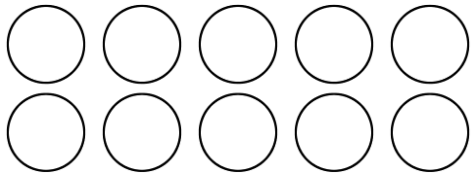
Children will begin seeing these groups as ‘lots of’ ‘groups of’, eg:



5 lots of 2 = 10

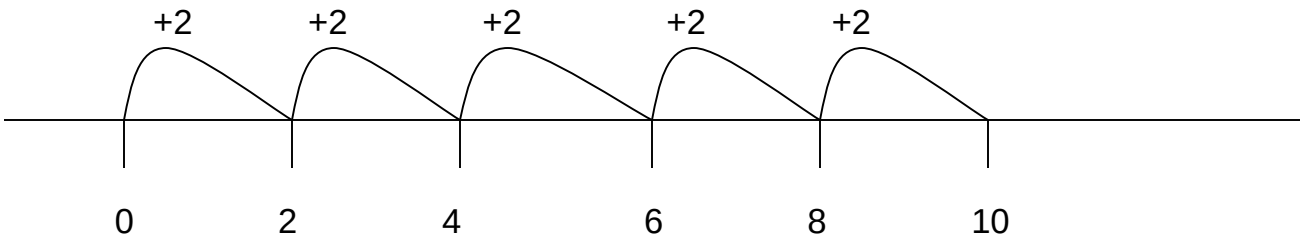
Year 1

The children will understand that two equal groups of objects or numbers is ‘double’. The vocabulary ‘double’ or ‘doubling’ should be used alongside ‘multiplied by 2,’ ‘times 2,’ ‘2 lots of,’ and ‘two groups of.’

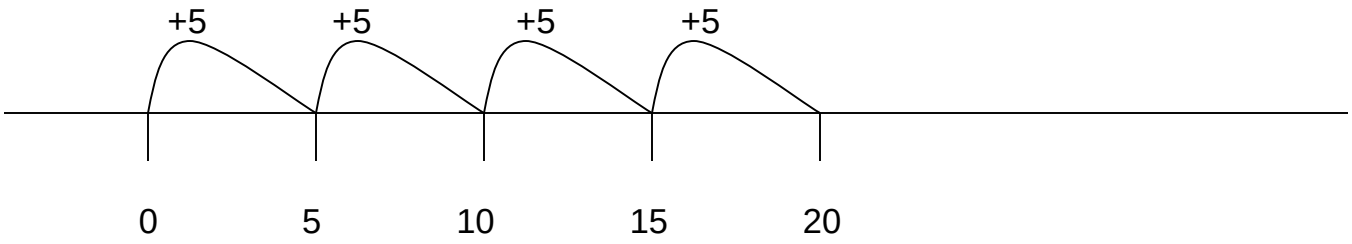


5 + 5 = 10
5 X 2 = 10

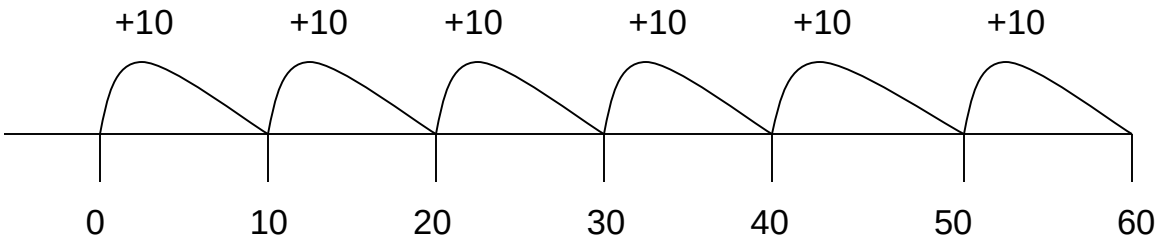
Children will be able to represent jumps of 2, 5 and 10 on a numbered number line and relate it to the concept of repeated addition.



The children will begin to see the relationship between addition and multiplication, so 2 + 2 + 2 + 2 + 2 = 10 is the same as 5 X 2 = 10 (X being lots of, groups of).



5 + 5 + 5 + 5 = 20 is the same as 4 x 5 = 20



10 + 10 + 10 + 10 + 10 + 10 = 60 is the same as 6 X 10 = 60

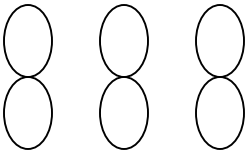
If required, pupils should be encouraged to use pictoral or visual aids in multiplication.

Pupils will begin to see that is doesn't matter which way round a multiplication sum is done, that it always has the same answer. This is shown in dot arrays. This is called the 'commutative' method of multiplication.

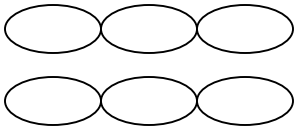
2 + 2 + 2 + 2 = 2 x 4 = 8

4 + 4 = 4 x 2 = 8

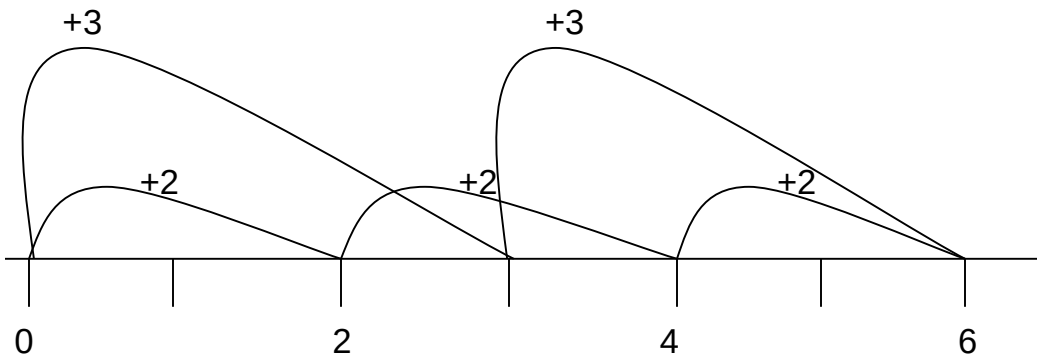
The use of apparatus such as Numicon or number lines will help to visualise this concept, they will see how repeated additions will still come to the same total.



3 x 2 = 6



2 x 3 = 6

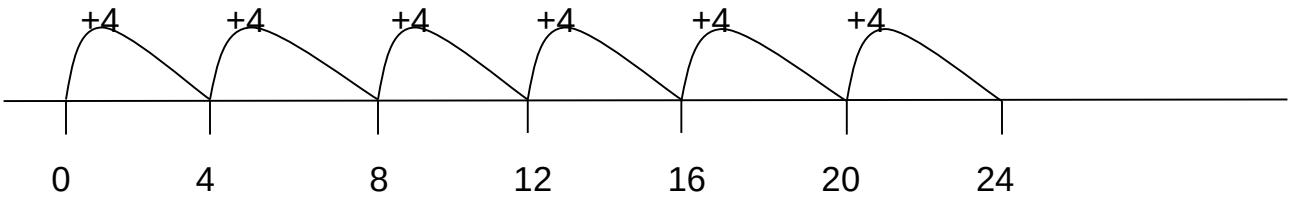


Year 2

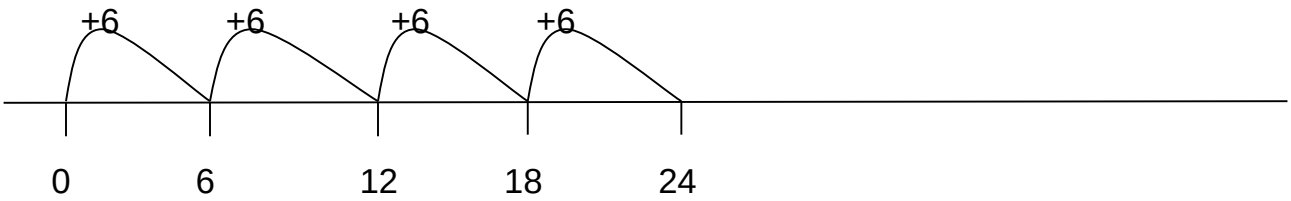
By the time children progress into Year 2, children will know their 2, 5, 10 times tables and should be gaining more confidence in repeated addition to calculate other times tables (3, 4, 6, 7, 8 and 9).

Children will be able to draw blank number lines, know that for multiplication they are to start from zero, and they will understand the commutative nature of multiplication and will select the number they feel more confident in grouping by for repeated addition.

Eg: 6 x 4 = 24

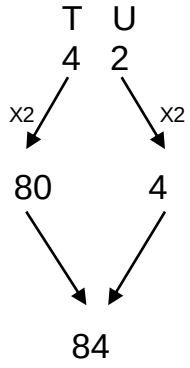


or

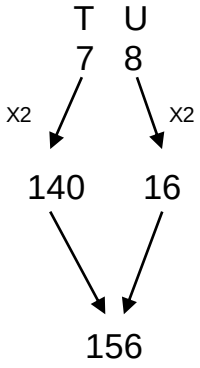


Children will be able to use their knowledge of the 2x table to double two digit numbers. Pupils will use partitioning and jottings (like a diamond) to double each part of the number, then adding to get the final answer.

Double 42



Double 78

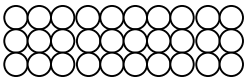


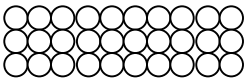
Pupils will be able to use times tables knowledge to multiply larger numbers, by partitioning 2 digit numbers into tens and units. Dot arrays will help children to visualise this.

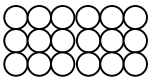
26 x 3 = (10 + 10 + 6) x 3

10 x 3 = 30
10 x 3 = 30
6 x 3 = 18
78

and

10
3 

10
3 

6
3 

As pupils enter Key Stage 2, they will be able to partition any 2 digit and 3 digit numbers and multiply by a multiple of 10.
They will know 2x, 5x and 10x table and be able to calculate 3x, 4x, 6x, 7x, 8x and 9x.

Year 3

Pupils will be able to multiply by a multiple of 10, using their knowledge of place value (they will know that when a number is multiplied by 10, the number gets 10x larger and the digits move one place value to the left).

H	T	U
		1
	1	0
1	0	0

(x10 from U to T; x10 from T to H)

50 x 6 = (5 x 6) x 10
= 30 x 10
= 300

The children will then be introduced to the grid method to calculate TU x U. They will learn to partition the two digit number into tens and units and then multiply each part separately. They will finally add the numbers together to get the final answer.

14 x 8

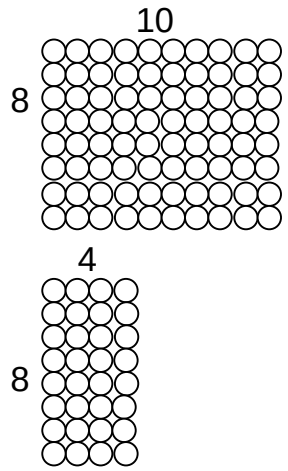
X	10	4
8	80	32

H	T	U
	8	0
	3	2
1	1	2

or

X	8
10	80
4	32
	112

Using dot arrays showing an array of 14x8 into 10x8 and 4x8, children will understand that this will give them the same answer.



Once confident with using grid method, pupils will progress onto multiplying larger two digit numbers and then three digit numbers. They need to continue applying their mental times tables knowledge to simplify numbers (ie: 40x 6 = (4x6)x10), and multiply numbers by ten.

27 x 6

X	20	7
6	120	42

or

X	6
20	120
7	42

H	T	U
1	2	0
	4	2
1	6	2

162

134 x 4

X	100	30	4
4	400	120	16

or

X	4
100	400
30	120
4	16

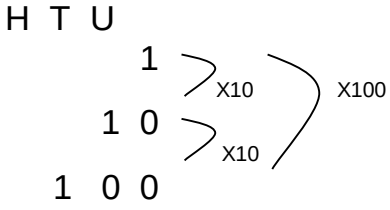
H	T	U
4	0	0
1	2	0
	1	6
5	3	6

536

Year 4

Children should now be consolidating their knowledge of multiplying TU x U and HTU x U in a range of problems with increasingly harder numbers.

Children will know how to move the digits one place to left when multiplying by 10, and two places when multiplying by 100.



500 x 6 = (5 x 6) x 100
= 30 x 100
= 3000

Pupils will be confident when multiplying numbers like 60x40. They will simplify to 6x4, then understand that they made the both numbers 10x smaller, therefore there answer will need to be made 10x larger twice (100x larger).

60x40 = (6x4) x100
= 24 x 100
= 2400

HA - They will then progress onto using the grid method to multiply TU x TU.

34 x 27

X	20	7
30	600	210
4	80	28

H	T	U
6	0	0
2	1	0
	8	0
	2	8
1		
9	1	8

As pupils leave Year 4 and move into Year 5, they will need to apply the methods taught to larger numbers and decimals.

Year 5

Pupils will be able to use the grid method to multiply HTU x TU.

234 x 27

X	20	7
200	4000	1400
30	600	210
4	80	28

Th	H	T	U
4	0	0	0
1	4	0	0
	6	0	0
	2	1	0
		8	0
		2	8
	1	1	
	6	3	1	8

The children will be able to multiply any decimal number by 10, 100 and 1000. They will understand the place value of decimals and know how to move the digits 1 place to left when x10, 2 places to left when x 100 and 3 places to left when x1000.

H	T	U	.	$\frac{1}{10}$	$\frac{1}{100}$	
		0	.	0	1	
		0	.	1	0	X10
		1	.	0	0	X10
	1	0	.	0	0	X10
1	0	0	.	0	0	X10

x100

x1000

They will simplify numbers and adjust when multiplying by decimals, eg:

6 x 0.16 = (6x16) ÷ 100
= 96 ÷ 100
= 0.96

Children will the move on to using grid method to multiply decimal numbers by U.

6.7 x 8

X	6	0.7
8	48	5.6

or

x	8
6	48.0
0.7	5.6

T U . $\frac{1}{10}$
4 8 . 0
5 . 6
\+ 1
5 3 . 6

Year 5 (more able) and Year 6

Pupils should move on to consolidating and refining multiplication methods and applying them to 2-step problems.

The aim should be for all children to be using the formal long method for multiplication by the end of Year 6. This can be taught alongside the grid method to further understanding of place value when using this method.

2 4
X 5 6
2
1 4 4 ~ begin with 4x6=24, put 4 in U, carry 2 into tens. Then 20x6 (add on 2) = 14
2
1 2 0 0 ~ as multiplying by 50, begin by putting place holder in U. Then 4x5=20, put 0 in tens carry 2 into hundreds. Then 2x5=10 (add on 2) = 12
1 3 4 4

Progression from mental to written methods for DIVISION

Children must have an understanding of the concept of 'sharing' and 'grouping' before they can move onto any methods for division.

Nursery

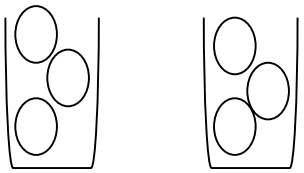
In Nursery, children will experience the language of sharing early on and will experience the idea of groups, eg: sharing toys or sorting toys and objects into groups of the same colour etc..

Reception and into Year 1

Children will experience counting in 2s, 5s and 10s and will be given many opportunities to group objects in these amounts. The focus will be on 'groups' and 'grouping' and at this age, these words become key for the children to recognise this means division / to divide.

Children will use counters, objects, Numicon or other objects to divide into equal groups of two or two equal groups. The children will begin to recognise how times table facts can help them to see the inverse relationship between division and multiplication.

 6 in 3 groups of 2's (grouping)

 6 into 2 equal groups of 3 (sharing)

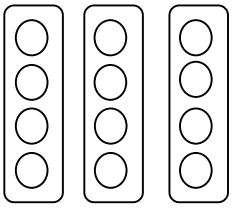
6 ÷ 2 = 3
(6 divided into groups of 2 = 2 groups)

and

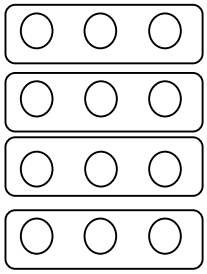
3 x 2 = 6
(3 groups of, lots of 2 = 6)

Children will move on to using dot arrays to solve division problems using the vocabulary ‘sharing’ and ‘grouping’. This will be initially taught practically, but once children become more confident, they will be able to draw jottings and dot arrays to support.

Grouping

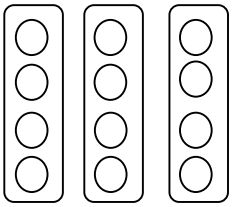


3 groups of 4 = 12
3 x 4 = 12
12 in groups of 4 = 3 groups

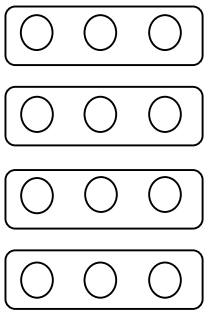


4 groups of 3 = 12
4 x 3 =12
12 in groups of 3 = 4 groups

Sharing



12 shared into groups of 4 = 3 groups
12 ÷ 4 = 3



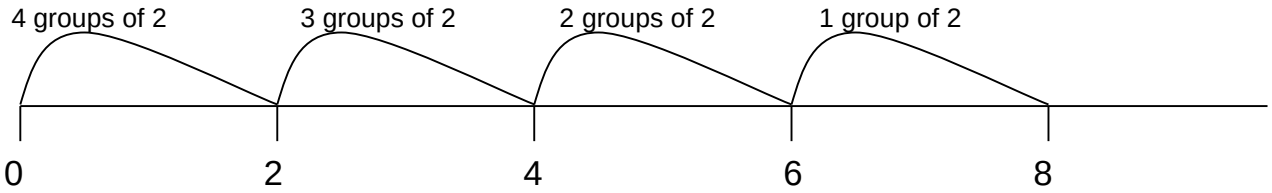
12 shared into groups of 3 = 4 groups
12 ÷ 3 = 4

Year 2

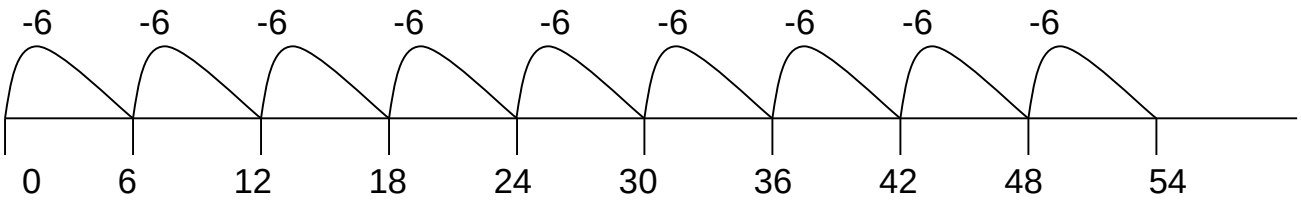
Children will be able to use number lines to calculate how many jumps of 2, 5 and 10 are needed to reach a particular number, and then transfer this skill for 3, 4, 6, 7, 8 and 9. Children will always begin at the finishing number and it is important that they understand the answer is how many groups they have, and should count the groups. Numicon number tracks can be used to help pupils with the concept of grouping along a number line.

The number line method is linked to repeated subtraction ~ it is vital that children explore and understand this, so they recognise that multiplication and division are inverse operations.

8 ÷ 2 = 4

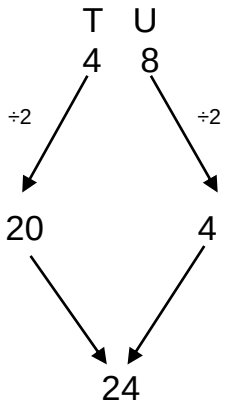


54 ÷ 6 = 9



Pupils will be able to use their knowledge of 2x table and apply this to the inverse, by halving two digit numbers. The diamond method of jotting will mean pupils will partition into tens and units, then half each part, before adding together to get final answer, eg:

Half 48



Children will then be shown how to partition an odd unit by recognising the need for halves. Pupils need to know that half of 1 is ½ to be able to do this successfully.

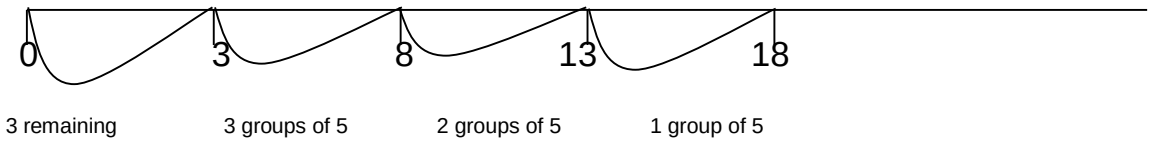
Before children move into KS2, they will know 2x, 5x and 10x table and be able to calculate 3x, 4x, 6x, 7x, 8x and 9x quickly. They will understand that division is the inverse of multiplication and be capable using number lines to solve division problems.

Year 3

The children will understand how to deal with remainders. They will get the opportunity to experience a range of problems and be able to put the answer back into the context of the problem. Number lines can be used to support as repeated subtraction, but they need to recognise that when another group cannot be added, it is the remainder.

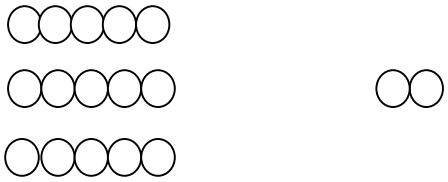
Grouping problems

A car holds 5 people. How many cars are needed to transport 18 people?
18 ÷ 5 = 3 r 3
The answer will need to be rounded up; therefore, *4 cars will be needed*.



Sharing problems

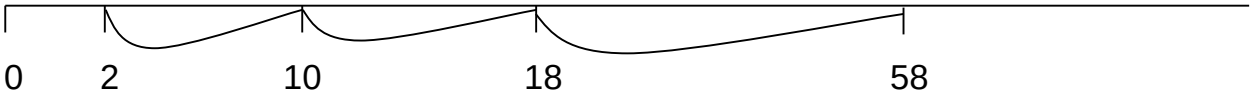
I share 17 sweets equally between 5 party bags. How many sweets will there be in each bag?
17 ÷ 5 = 3 r 2
The answer will need to be rounded down; therefore, *there will be 3 sweets in each party bag and 2 left over.*



Children will use repeated subtraction but they will use their times tables knowledge to count in 'chunks', making the number line shorter and working out quicker. Pupils need to get into the habit of circling their chunks and adding them up mentally.

58 ÷ 4 = 14 r 2

(2) x 4 = 8 (2) x 4 = 8 (10) x 4 = 40



Chunks of 10 + 2 + 2 = 14 r2

Year 4

Once children are confident using 'chunking' on a number line, they can transfer this into a more formal written method of 'chunking'.

Children will be taught repeated subtraction and chunking to solve larger division sums, applying their times tables knowledge, beginning with zero and subtracting 'chunks' until they reach the required number or have a remainder. Children will be encouraged to write down key facts for the divisor prior to beginning the 'chunking' process so they have all the information they need to hand. They need to understand it is the 'chunks' that give them the answer.

Begin with sums that do not leave a remainder.
132 ÷ 6

<u>Key facts</u>
1 x 6 = 6
2 x 6 = 12
5 x 6 = 30
10 x 6 = 60
20 x 6 = 120

	H	T	U	
	1	3	2	
-		6	0	(10 x 6)
		7	2	
-		6	0	(10 x 6)
		1	2	
-		1	2	(2 x 6)
			0	

Circle the 'chunks' and mentally add = 22
<u>132 ÷ 6 = 22</u>

Move onto sums that do leave a remainder.
156 ÷ 7

Key facts
1 x 7 = 7
2 x 7 = 14
5 x 7 = 35
10 x 7 = 70
20 x 7 = 140

	H	T	U	
	1	5	6	
-		7	0	(10 x 7)
		8	6	
-		7	0	(10 x 7)
		1	6	
-		1	4	(2 x 7)
			2	(remainder)

or

	H	T	U	
	1	5	6	
-	1	4	0	(20 x 7)
		1	6	
-		1	6	(2 x 7)
			2	(remainder)

Circle the chunks and add mentally = 22 remainder 2
156 ÷ 7 = 22 remainder 2

By the end of Year 4, they will be confident using these methods and be able to solve more challenging HTU ÷ U problems.

Pupils will also be able to use the method of 'chunking' to solve HTU ÷ TU sums, with and without remainders.

The children will begin to grasp that the bigger the 'chunks' they add each time, the quicker the process.

Year 5 and 6

The children will now be confident with 'chunking' and now need to work on applying this method to find decimal answers.

Children should now be expected to use the either the formal long method of division or the 'bus stop' method.

Bus stop method: It is important that children have a solid understanding of place value and times table facts when using this method.

- Children should be encouraged to cross out the first digit, if the calculation cannot be carried out.
- HA children should be encouraged to continue with decimals, rather than leaving a remainder.
- Numbers that are 'carried over' need to be clear and placed to the left of the following number.

e.g.

1. The divisor (smaller number) needs to be placed to the left of the number that is being divided.
2. We start by doing 'how many 4s go into 1'.
3. Seeing as the answer is not an integer, we carry the 1 onto the next column, which then becomes 14 instead of 4.
4. We then calculate 14 divided by 4, which is 3 remainder 2.
5. The three goes on top of the 'bus stop', with the remainder being carried to the next column. Continue in this way.
6. If the answer extends beyond the decimal point, a zero can be used as a place holder to continue the calculation.
7. Continue in this way, up to two decimal places.
8. Children must then be reminded to move the decimal point directly above into their answer.

146 ÷ 4

$$
\begin{array}{r}
36.5 \\
4\,\overline{)\,146.0} \\
122
\end{array}
$$

666 ÷ 9

$$
\begin{array}{r}
74 \\
9\,\overline{)\,666} \\
63
\end{array}
$$

967 ÷ 8

$$
\begin{array}{r}
120.875 \\
8\,\overline{)\,967.000} \\
17\,6\,4
\end{array}
$$

Alternatively, some children may prefer to use the formal long method of multiplication. This is similar to the 'bus stop' method, yet the carrying of numbers is done underneath, with a more visible representation of the numbers that are being taken away (as division is basically repeated subtraction).

666 ÷ 9 =

```
      7 4
   ┌──────
 9 │ 6 6 6
   - 6 3 ↓
     3 6
```

Again this is possible with decimal numbers.

146 ÷ 4

```
      3 6 . 5
   ┌──────────
 4 │ 1 4 6 . 0
   1 2 ↓     |
     2 6     |
     2 4     ↓
       2 0
```

Children should be given the opportunity to learn both of these methods, then decide which they prefer. When teaching division, teachers should cater for both methods.