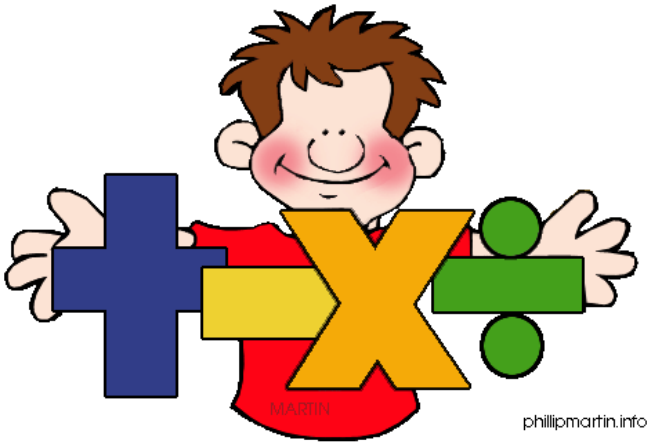
WEST BOROUGH
PRIMARY SCHOOL

Progression in the teaching of calculation

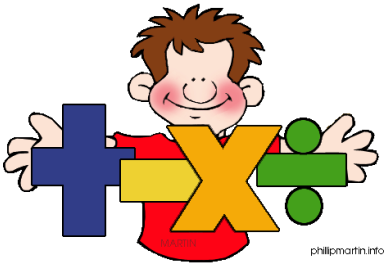
Parents Booklet

This booklet has been written to help you in supporting your child in mathematics.

The answers are still the same but the way we teach children to calculate may be different from the way you were taught.



Progression in Addition



EYFS

Maths for young children should be meaningful. Where possible, concepts should be taught in the concept of real life.

If available, Numicon shapes are introduced straight away and be used to:

- identify 1 more/less
- combine pieces to add
- find number bonds
- add without counting

Children can record this by printing or drawing around Numicon pieces.

Children can begin to combine groups of objects using concrete apparatus.

Construct number sentences verbally or using cards to go with practical activities.

Children are encouraged to read number sentences aloud in different ways 'Three add two equals 5' '5 is equal to three and two.'

Children make a record in pictures, words or symbols of addition activities already carried out.

Solve simple problems using fingers.

Number tracks can be introduced to count up and to find one more:

What is 1 more than 4? 1 more than 13?

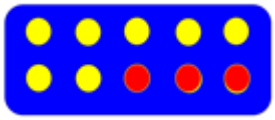
Number lines can then be used alongside number tracks and practical apparatus to solve addition calculations and word problems.

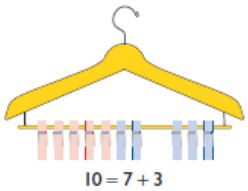
Children will need opportunities to look at and talk about different models and images as they move between representations.

Year 1

Mental Strategies (Addition and Subtraction)

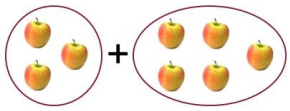
Children should experience regular counting on and back from different numbers in 1s and in multiples of 2, 5 and 10. Children should memorise and reason with number bonds for numbers to 20, experiencing the = sign in different positions.
They should see addition and subtraction as related operations e.g. 7+3=10 is related to 10-7=3, understanding of which could be supported by an image like this.

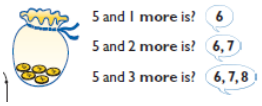




Use bundles of straws and Dienes to model partitioning teen numbers into tens and ones and develop understanding of place value. Children have opportunities to explore partitioning numbers in different ways e.g 7 = 6+1, 7= 5+2, 7=4+3

Children should begin to understand addition as combining groups and counting on.





Begin to count on from any number, combining two groups.

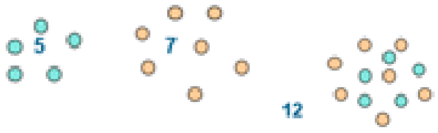
+ = signs and missing numbers

Children need to understand the concept of equality before using the '=' sign.
Calculations should be written either side of the equality sign is not just interpreted as 'the answer'.
2=1+1
2+3=4+1

Missing numbers need to be placed in all possible places.
3+4= _ _=3+4
3+_=7 7=_+4

Counting and Combining sets of Objects

Combining two sets of objects (aggregation) which will progress onto adding on to a set (augmentation)

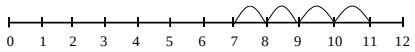


Understanding of counting on with a numbertrack.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Understanding of counting on with a numberline
(supported by models and images)

7+4

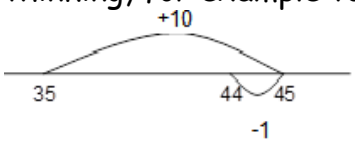


Year 2

Mental Strategies (Addition and Subtraction)

Children should regularly count regularly, on and back, in steps of 2,3,5 and 10. Counting forwards in in tens from any number should lead to adding multiples of 10.

Number lines should continue to be an important image to support mathematical thinking, for example to model how to add 9 by adding 10 and adjusting.



Children should practise addition to 20 to become increasingly fluent. They should use the facts they know to derive others, e.g using 7+3=10 to find 17+3=20, 70+30=100
They should use concrete objects such as bead strings and number lines to explore missing numbers 45+_=50

As well as number lines, 100 squares could be used to explore patterns in calculations such as 74+11, 77+9 encouraging children to think about 'What do you notice?' where partitioning or adjusting is used.

Children should learn to check their calculations, by using the inverse.
They should continue to see addition as both combining groups and counting on.
They should use Dienes to model partitioning into tens and ones and learn to partition numbers in different ways e.g 23= 20+3 =10+13

Missing number problems e.g. 14+5 =10 +_ 32+_+_=100 35=1+_=5

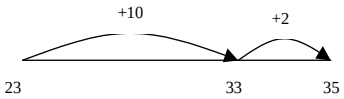
It is valuable to use a range of representations (also see Y1). Continue to use numberlines to develop understanding of:

Counting on in tens and ones

23+12=23+10+2

= 33+2

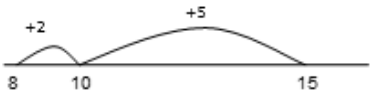
= 35



Partitioning and bridging through 10

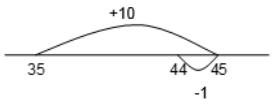
The steps in addition often bridge through a multiple of 10 e.g. Children should be able to partition the 7 to relate adding the 2 and then the 5.

8+7=15



Adding 9 or 11 by adding 10 and adjusting by 1

e.g. 35+9=44

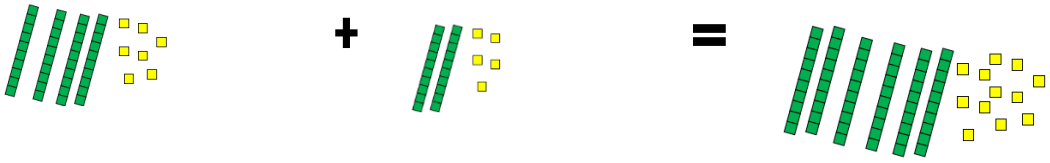


Towards a Written Method

Partitioning in different ways and recombine

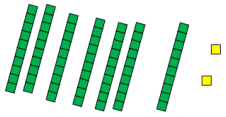
47+25

47 25 60+12



Leading to exchanging

72



Expanded written method

40+7+20+5=

40+20+7+5=

60+12=72

\+

40+7

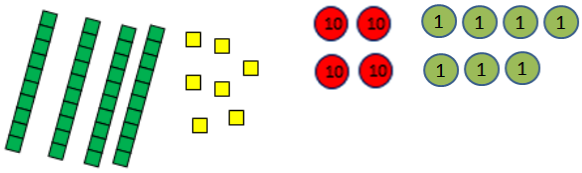
20+5

60+12=72

Year 3

Mental Strategies

Children should continue to count regularly, on and back, now including multiples of 4,8.50 and 100, and steps of 1/10. The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged. This will help to develop children's understanding of working mentally.
Children should continue to partition numbers in different ways.
They should be encouraged to choose the mental strategies which are most efficient for the numbers involved. E.g. Add the nearest multiple of 10, then adjust such as 63+29 is the same as 63+30-1;
counting on by partitioning the second number only such as 72+31=72+30+1=102+1=103
Manipulatives can be used to support mental imagery and conceptual understanding. Children need to be shown how these images are related eg.
What's the same? What's different?



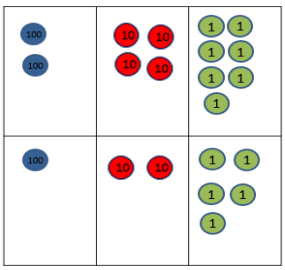
Missing number problems using a range of equations as in Year 1 and 2 but with appropriate, larger numbers.

Partition into tens and ones

Partition both numbers and recombine.
Count on by partitioning the second number only e.g.
247+125=247+100+20+5
= 347+20+5
= 367+5
=372
Children need to be secure adding multiples of 100 and 10 to any three digit number including those that are not multiples of 10.

Towards a Written Method

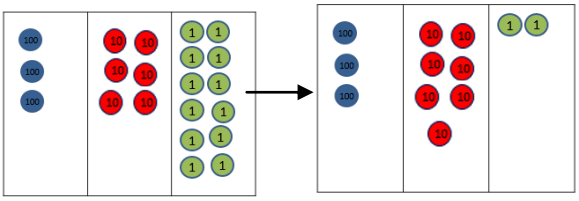
Introduce expanded column addition modelled with place value counters (Dienes could be used for those who need a less abstract representation)



200+40+7
100+20+5
300+60+12=372

247
+125
12
60
300
372

Leading to children understanding the exchange between tens and ones.



Some children may begin to use a formal columnar algorithm, initially introduced alongside the expanded method. The formal method should be seen as a more streamlined version of the expanded method, not a new method.

247
+125
372
10

Year 4

Mental Strategies

Children should continue to count regularly, on and back, now including multiples of 6,7,9,25 and 1000, and steps of 1/100.
The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged where appropriate.
Children should continue to partition numbers in different ways.

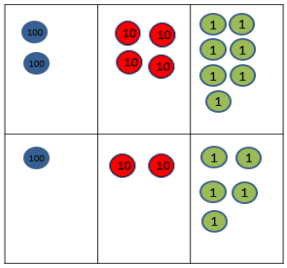
They should be encouraged to choose from a range of strategies:

- Counting forwards and backwards: 124-47, count back 40 from 124, then 4 to 80, then 3 to 77
- Reordering: 28+75, 75+28 (thinking of 28 as 25 +3)
- Partitioning: counting on or back: 5.6+3.7, 5.6+3+0.7 = 8.6+0.7
- Partitioning: bridging through multiples of 10: 6070-4987, 4987+13+1000+70
- Partitioning: compensating – 138+69, 138+70-1
- Partitioning: using 'near' doubles – 160+170 is double 150, then add 10, then add 20, or double 160 and add 10, or double 170 and subtract 10

- Partitioning: bridging through 60 to calculate a time interval – What was the time 33 minutes before 2.15pm?
- Using known facts and place value to find related facts

Written Methods (progressing to 4-digits)

Expanded column addition modelled with place value counters, progressing to calculations with 4-digit numbers.

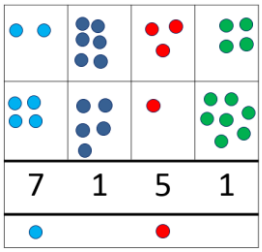


200 + 40 + 7
100 + 20 + 5
300 + 60 +12 = 372

247
+125
12
60
300
372

Compact written method

Extend to numbers with at least four digits



2634
+4517
7151
1 1

Children should be able to make the choice of reverting to expanded methods if experiencing any difficulty.

Extend to up to two places of decimals (same number of decimal places) and adding several numbers (with different numbers of digits).

72.8
+ 54.6
127.4
1 1

Year 5

Mental Strategies

Children should continue to count regularly, on and back, now including steps of powers of 10. The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged where appropriate. Children should continue to partition numbers in different ways.

They should be encouraged to choose from a range of strategies:

- Counting forwards and backwards in tenths and hundredths: 1.7+0.55
- Reordering: 4.7+5.6-0.7, 4.7-0.7+5.6=4+5.6
- Partitioning: counting on or back – 540+280, 540+200+80
- Partitioning: bridging through multiples of 10
- Partitioning: compensating: 5.7+3.9, 5.7+4.0-0.1
- Partitioning: using 'near' double: 2.5+2.6 is double 2.5 add 0.1 or double 2.6 and subtract 0.1
- Partitioning: bridging through 60 to calculate a time interval: It is 11.45. How many hours and minutes is it to 15.20?
- Using known facts and place value to find related facts.

Written Methods (progressing to more than 4-digits)

As year 4, progressing when understanding of the expanded method is secure, children will move on to the formal columnar method for whole numbers and decimal numbers as an efficient written algorithm.

```
 172.83
+54.68
--------
 227.51
--------
   1  1  1
```

Year 6

Mental Strategies

Children should experiment with order of operations, investigating the effect of positioning the brackets in different places, e.g 20-5x3=5; (20-5)x3=45

Written Methods

As year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with columnar method to be secured. Continue calculating with decimals, including those with different numbers of decimal places.

Problem Solving

Teachers should ensure that pupils have the opportunity to apply their knowledge in a variety of contexts and problems (exploring cross curricular links) to deepen their understanding.

Progression in subtraction

EYFS

Children begin with mostly pictorial representations

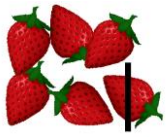
XXX | XX

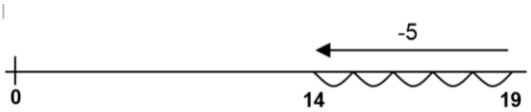
Concrete apparatus is used to relate subtraction to taking away and counting how many objects are left.
Concrete apparatus models the subtraction of 2 objects from a set of 5

Construct number sentences verbally or using cards to go with practical activities.
Children are encouraged to read number sentences aloud in different ways 'five subtract one leaves four' 'four is equal to five subtract one'.
Children make a record in pictures, words or symbols of subtraction activities already carried out.
Solve problems using fingers.
Number tracks can be introduced to count back and to find one less.
What is 1 less than 9? 1 less than 20?
Number lines can then be used alongside number tracks and practical apparatus to solve subtraction calculations and word problems. Children count back under the number line.
Children will need opportunities to look at and talk about different models and images as they move between representations.

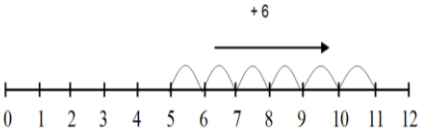
Year 1

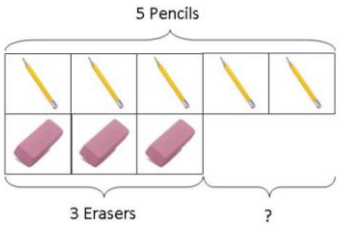
Missing number problems e.g. 7 = □ - 9; 20 - □ = 9; 15 – 9 = □; □ - □ = 11; 16 – 0 = □
Use concrete objects and pictorial representations. If appropriate, progress from using number lines with every number shown to number lines with significant numbers shown.
Understand subtraction as take-away:





Understand subtraction as finding the difference:

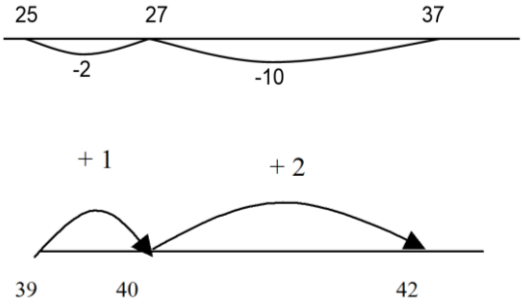




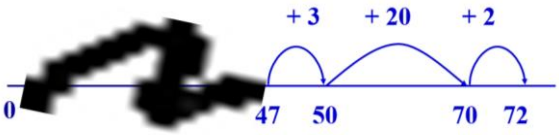
The above model would be introduced with concrete objects which children can move (including cards with pictures) before progressing to pictorial representation.
The use of other images is also valuable for modelling subtraction e.g. Numicon, bundles of straws, Dienes apparatus, multi-link cubes, bead strings

Year 2

Missing number problems e.g. 52 – 8 = □; □ – 20 = 25; 22 = □ – 21; 6 + □ + 3 = 11
It is valuable to use a range of representations (also see Y1). Continue to use number lines to model take-away and difference. E.g.



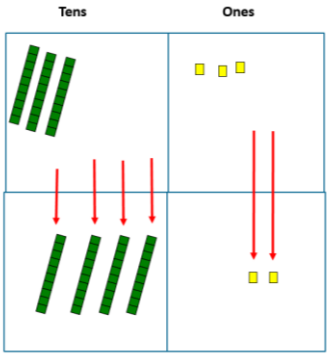
The link between the two may be supported by an image like this, with 47 being taken away from 72, leaving the difference, which is 25.



The bar model should continue to be used, as well as images in the context of **measures**.

Towards written methods

Recording addition and subtraction in expanded columns can support understanding of the quantity aspect of place value and prepare for efficient written methods with larger numbers. The numbers may be represented with Dienes apparatus. E.g. 75 – 42



$$\begin{array}{r} 70\ \ 5 \\ -\,40\ \ 2 \\ \hline 30\ \ 3 \end{array}$$

Year 3

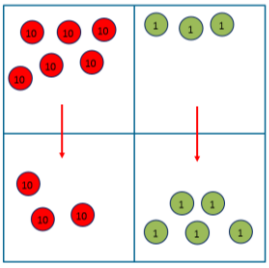
Missing number problems e.g. □ = 43 – 27; 145 – □ = 138; 274 – 30 = □; 245 – □ = 195; 532 – 200 = □; 364 – 153 = □

Mental methods should continue to develop, supported by a range of models and images, including the number line. The bar model should continue to be used to help with problem solving (see Y1 and Y2).

Children should make choices about whether to use complementary addition or counting back, depending on the numbers involved.

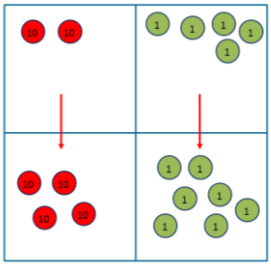
Written methods (progressing to 3-digits)

Introduce expanded column subtraction with no decomposition, modelled with place value counters (Dienes could be used for those who need a less abstract representation)



$$\begin{array}{r} 90\ \ 8 \\ -\,30\ \ 5 \\ \hline 60\ \ 3 \end{array}$$

For some children this will lead to exchanging, modelled using place value counters (or Dienes).



$$\begin{array}{r} {\scriptstyle 60}\ \ {\scriptstyle 1} \\ \cancel{70}\ \ 2 \\ -\,40\ \ 7 \\ \hline 20\ \ 5 \end{array}$$

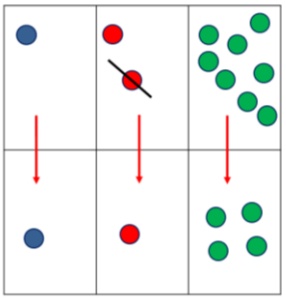
Year 4

Missing number/digit problems: 456 + □ = 710;
1□7 + 6□ = 200; 60 + 99 + □ = 340; 200 – 90 – 80 = □; 225 - □ = 150; □ – 25 = 67; 3450 – 1000 = □; □ - 2000 = 900

Mental methods should continue to develop, supported by a range of models and images, including the number line. The bar model should continue to be used to help with problem solving.

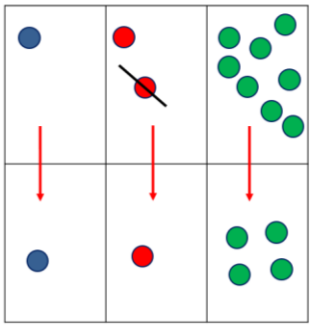
Written methods (progressing to 4-digits)

Expanded column subtraction with decomposition, modelled with place value counters, progressing to calculations with 4-digit numbers.



$$\begin{array}{r} 200\ \ \overset{20}{\cancel{30}}\ \ {}^{1}2 \\ -\ 100\ \ 10\ \ 4 \\ \hline 100\ \ 10\ \ 8 \end{array}$$

If understanding of the expanded method is secure, children will move on to the formal method of decomposition, which again can be initially modelled with place value counters.



$$\begin{array}{r} {}^{2}\cancel{3}\ {}^{1}2 \\ -\ 114 \\ \hline 118 \end{array}$$

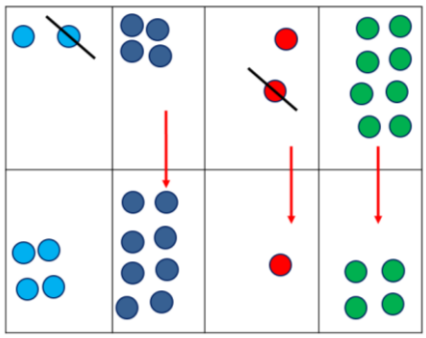
Year 5

Missing number/digit problems: 6.45 = 6 + 0.4 + □; 119 - □ = 86; 1 000 000 - □ = 999 000; 600 000 + □ + 1000 = 671 000; 12 462 – 2 300 = □

Mental methods should continue to develop, supported by a range of models and images, including the number line. The bar model should continue to be used to help with problem solving.

Written methods (progressing to more than 4-digits)

When understanding of the expanded method is secure, children will move on to the formal method of decomposition, which can be initially modelled with place value counters.



$$\begin{array}{r} {\scriptstyle 5\ 1\ 2\ 1} \\ 6\cancel{2}\cancel{3}2 \\ -\ 4814 \\ \hline 1418 \end{array}$$

Progress to calculating with decimals, including those with different numbers of decimal places.

Year 6

Missing number/digit problems: □ and # each stand for a different number. # = 34. # + # = □ + □ + #. What is the value of □? What if # = 28? What if # = 21

10 000 000 = 9 000 100 + □

7 – 2 x 3 = □; (7 – 2) x 3 = □; (□ - 2) x 3 = 15

Mental methods should continue to develop, supported by a range of models and images, including the number line. The bar model should continue to be used to help with problem solving.

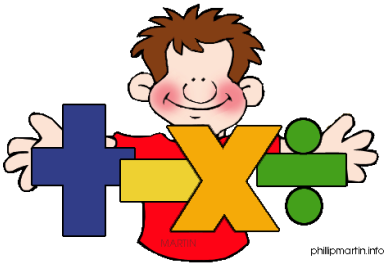
Written methods

As year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with decomposition to be secured.

Teachers may also choose to introduce children to other efficient written layouts which help develop conceptual understanding. For example:

$$\begin{array}{r} 326 \\ -148 \\ \hline -2 \\ -20 \\ \hline 200 \\ \hline 178 \end{array}$$

Continue calculating with decimals, including those with different numbers of decimal places.



Progression in multiplication

EYFS

The link between addition and multiplication can be introduced through doubling.
If available, Numicon is used to visualise the repeated addition of the same number.
These can then be drawn around or printed as a way of recording.

Children begin with mostly pictorial representations:

How many groups of 2 are there?

Real life contexts and use of practical equipment to count in repeated groups of the same size.

Count in twos;fives;tens both aloud and with objects

Children are given multiplication problems in a real life context. Children are encouraged to visualise the problem.
How many fingers on two hands? How many sides on three triangles? How many legs on four ducks?

Children are encouraged to read number sentences aloud in different ways 'five times two makes ten' 'ten is equal to five multiplied by two'

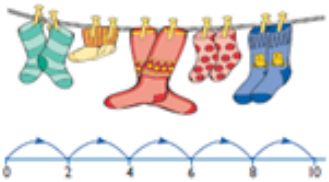
Year 1

Mental Strategies

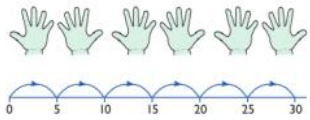
Children should experience regular counting on and back from different numbers in 1s and in multiples of 2, 5 and 10.
Children should memorise and reason with numbers in 2, 5 and 10 times tables
They should see ways to represent odd and even numbers. This will help them to understand the pattern in numbers.

Children should begin to understand multiplication as scaling in terms of double and half. (e.g. that tower of cubes is double the height of the other tower)
Understand multiplication is related to doubling and combing groups of the same size (repeated addition)

Washing line, and other practical resources for counting. Concrete objects. Numicon; bundles of straws, bead strings

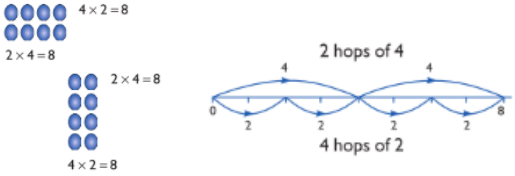


2 + 2 + 2 + 2 + 2 = 10
2 × 5 = 10
2 multiplied by 5
5 pairs
5 hops of 2



5 + 5 + 5 + 5 + 5 + 5 = 30
5 × 6 = 30
5 multiplied by 6
6 groups of 5
6 hops of 5

Problem solving with concrete objects (including money and measures
Use cuissenaire and bar method to develop the vocabulary relating to 'times' –
Pick up five, 4 times
Use arrays to understand multiplication can be done in any order (commutative)



Year 2

Mental Strategies

Children should count regularly, on and back, in steps of 2, 3, 5 and 10.
Number lines should continue to be an important image to support thinking, for example

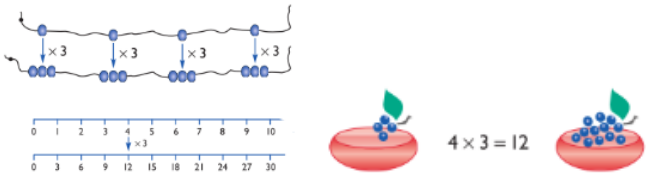
Children should practise times table facts
2 x 1 =
2 x 2 =
2 x 3 =

Use a clock face to support understanding of counting in 5s.
Use money to support counting in 2s, 5s, 10s, 20s, 50s

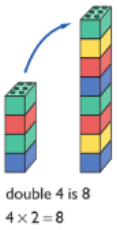
Expressing multiplication as a number sentence using x
Using understanding of the inverse and practical resources to solve missing number problems.

7 x 2 = □	□ = 2 x 7
7 x □ = 14	14 = □ x 7
□ x 2 = 14	14 = 2 x □
□⊗ = 14	14 = □⊗

Develop understanding of multiplication using array and number lines (see Year 1).
Include multiplications not in the 2, 5 or 10 times tables.
Begin to develop understanding of multiplication as scaling (3 times bigger/taller)

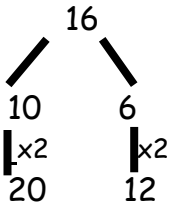


Doubling numbers up to 10 + 10
Link with understanding scaling
Using known doubles to work out
double 2d numbers
(double 15 = double 10 + double 5)



Towards written methods

Use jottings to develop an understanding of doubling two digit numbers



Year 3

Mental Strategies

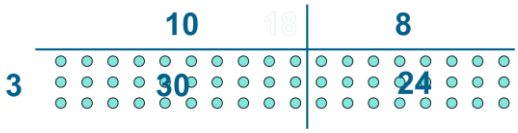
Children should continue to count regularly, on and back, now including multiples of 4, 8, 50, and 100, and steps of 1/10.
The number line should continue to be used as an important image to support thinking, and the use of informal jottings and drawings to solve problems should be encouraged.

Children should practise times table facts
3 x 1 =
3 x 2 =
3 x 3 =

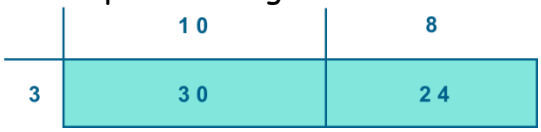
Missing number problems
Continue with a range of equations as in Year 2 but with appropriate numbers.

Written methods (progressing to 2d x 1d)

Developing written methods using understanding of visual images



Develop onto the grid method



Give children opportunities for children to explore this and deepen understanding using Dienes apparatus and place value counters

Year 4

Mental Strategies

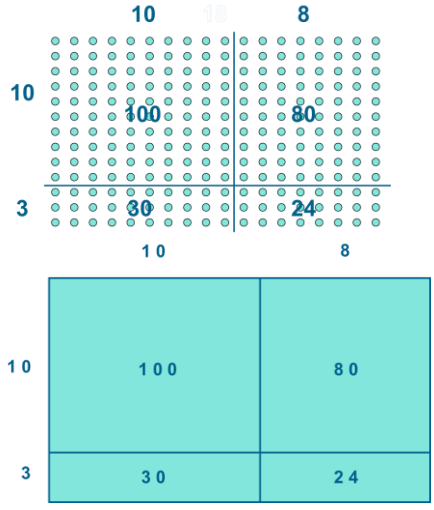
Children should continue to count regularly, on and back, now including multiples of 6, 7, 9, 25 and 1000, and steps of 1/100.
Become fluent and confident to recall all tables to x 12
Use the context of a week and a calendar to support the 7 times table (e.g. how many days in 5 weeks?)
Use of finger strategy for 9 times table.

Multiply 3 numbers together
The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged.
They should be encouraged to choose from a range of strategies:

- Partitioning using x10, x20 etc
- Doubling to solve x2, x4, x8
- Recall of times tables
- Use of commutativity of multiplication

Written methods (progressing to 3d x 2d)

Children to embed and deepen their understanding of the grid method to multiply up 2d x 2d. Ensure this is still linked back to their understanding of arrays and place value counters.



Year 5

Mental Strategies

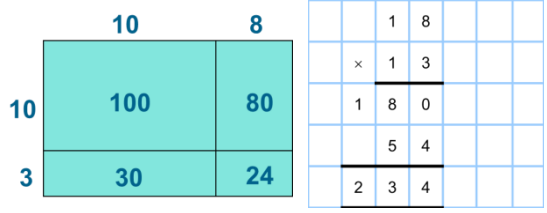
Children should continue to count regularly, on and back, now including steps of powers of 10.
Multiply by 10, 100, 1000, including decimals (Moving Digits ITP)
The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged.
They should be encouraged to choose from a range of strategies to solve problems mentally:

- Partitioning using x10, x20 etc
- Doubling to solve x2, x4, x8
- Recall of times tables
- Use of commutativity of multiplication

If children know the times table facts to 12 x 12. Can they use this to recite other times tables (e.g. the 13 times tables or the 24 times table)

Written methods (progressing to 4d x 2d)

Long multiplication using place value counters
Children to explore how the grid method supports an understanding of long multiplication (for 2d x 2d)



		1	8			
	×	1	3			
1	8	0				
		5	4			
	2	3	4			

Year 6

Mental Strategies

Consolidate previous years.

Children should experiment with order of operations, investigating the effect of positioning the brackets in different places, e.g. 20 – 5 x 3 = 5; (20 – 5) x 3 = 45

They should be encouraged to choose from a range of strategies to solve problems mentally:

- Partitioning using x10, x20 etc
- Doubling to solve x2, x4, x8
- Recall of times tables
- Use of commutativity of multiplication

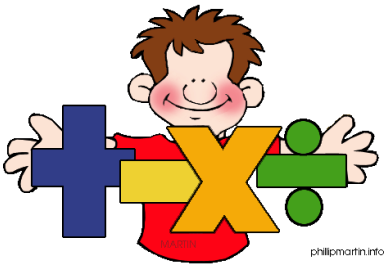
If children know the times table facts to 12 x 12. Can they use this to recite other times tables (e.g. the 13 times tables or the 24 times table)

Written methods

Continue to refine and deepen understanding of written methods including fluency for using long multiplication

X	**1000**	**300**	**40**	**2**
10	10000	3000	400	20
8	8000	2400	320	16

$$\begin{array}{r} {\scriptstyle 2\ \ 3\ \ 1} \\ 1342 \\ \times\ \ 18 \\ \hline 13420 \\ 10736 \\ \hline 24156 \\ {\scriptstyle 1} \end{array}$$



Progression in Division

EYFS

The ELG states that children solve problems, including doubling, halving and sharing.
Children need to see and hear representations of division as both grouping and sharing.
Division can be introduced through halving.
Children begin with mostly pictorial representations linked to real life contexts:

Grouping model
Mum has 6 socks. She grouped them into pairs – how many pairs did she make?

Sharing model
I have 10 sweets. I want to share them with my friend. How many will we have each?

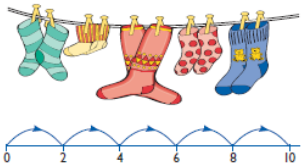
Children have a go at recording the calculation that has been carried out.

Year 1

Mental Strategies

Children should experience regular counting on and back from different numbers in 1s and in multiples of 2, 5 and 10.

They should begin to recognise the number of groups counted to support understanding of relationship between multiplication and division.



$2+2+2+2+2=10$
$2\times5=10$
2 multiplied by 5
5 pairs
5 hops of 2

Children should begin to understand division as both sharing and grouping.

Sharing – 6 sweets are shared between 2 people. How many do they have each?

Grouping-
How many 2's are in 6?

They should use objects to group and share amounts to develop understanding of division in a practical sense.

E.g. using Numicon to find out how many 5's are in 30? How many pairs of gloves if you have 12 gloves?

Children should begin to explore finding simple fractions of objects, numbers and quantities.

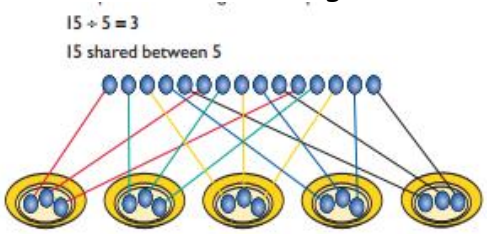
E.g.*16 children went to the park at the weekend. Half that number went swimming. How many children went swimming?*

Children must have secure counting skills- being able to confidently count in 2s, 5s and 10s.
Children should be given opportunities to reason about what they notice in number patterns.

Group AND share small quantities- understanding the difference between the two concepts.

Sharing

Develops importance of one-to-one correspondence.
Children should be taught to share using concrete apparatus.

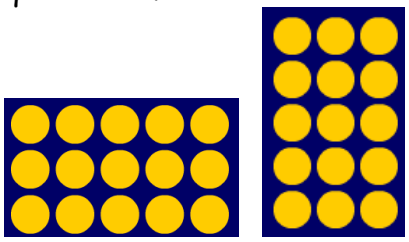


Grouping

Children should apply their counting skills to develop some understanding of grouping.

Use of arrays as a pictorial representation for division. 15 ÷ 3 = 5 There are 5 groups of 3.
15 ÷ 5 = 3 There are 3 groups of 5.

Children should be able to find $\frac{1}{2}$ and $\frac{1}{4}$ and simple fractions of objects, numbers and quantities.



Year 2

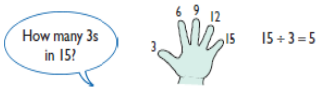
Mental Strategies

Children should count regularly, on and back, in steps of 2, 3, 5 and 10.
Children who are able to count in twos, threes, fives and tens can use this knowledge to work out other facts such as 2 × 6, 5 × 4, 10 × 9. Show the children how to hold out their fingers and count, touching each finger in turn. So for 2 × 6 (six twos), hold up 6 fingers:

Touching the fingers in turn is a means of keeping track of how far the children have gone in creating a sequence of numbers. The physical action can later be visualised without any actual movement.

This can then be used to support finding out 'How many 3's are in 18?' and children count along fingers in 3's therefore making link between multiplication and division.

Children should continue to develop understanding of division as sharing **and** grouping.



15 pencils shared between 3 pots, how many in each pot?

Children should be given opportunities to find a half, a quarter and a third of shapes, objects, numbers and quantities. Finding a fraction of a number of objects to be related to sharing.

They will explore visually and understand how some fractions are equivalent – e.g. two quarters is the same as one half.

Use children's intuition to support understanding of fractions as an answer to a sharing problem.

3 apples shared between 4 people = $\frac{3}{4}$

÷ = signs and missing numbers

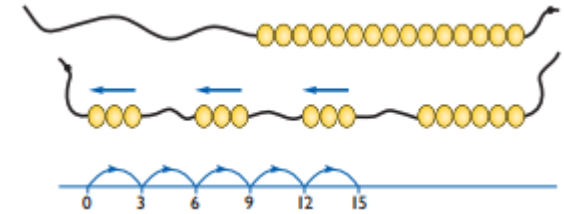
6 ÷ 2 = □	□ = 6 ÷ 2
6 ÷ □ = 3	3 = 6 ÷ □
□ ÷ 2 = 3	3 = □ ÷ 2
□ ÷ ∇ = 3	3 = □ ÷ ∇

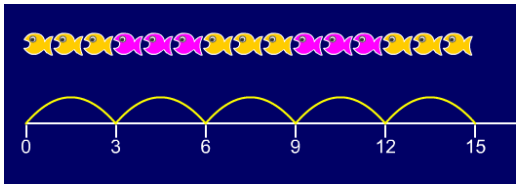
Know and understand sharing and grouping- introducing children to the ÷ sign.
Children should continue to use grouping and sharing for division using practical apparatus, arrays and pictorial representations.

Grouping using a numberline

Group from zero in jumps of the divisor to find our 'how many groups of 3 are there in 15?'.

15 ÷ 3 = 5





Continue work on arrays. Support children to understand how multiplication and division are inverse. Look at an array – what do you see?

Year 3

Mental Strategies

Children should count regularly, on and back, in steps of 3, 4 and 8. Children are encouraged to use what they know about known times table facts to work out other times tables.
This then helps them to make new connections (e.g. through doubling they make connections between the 2, 4 and 8 times tables).

Children will make use multiplication and division facts they know to make links with other facts.
3 x 2 = 6, 6 ÷ 3 = 2, 2 = 6 ÷ 3
30 x 2 = 60, 60 ÷ 3 = 20, 2 = 60 ÷ 30

They should be given opportunities to solve grouping and sharing problems practically (including where there is a remainder but the answer needs to given as a whole number) e.g. Pencils are sold in packs of 10. How many packs will I need to buy for 24 children?

Children should be given the opportunity to further develop understanding of division (sharing) to be used to find a fraction of a quantity or measure.

Use children's intuition to support understanding of fractions as an answer to a sharing problem.

3 apples shared between 4 people = $\frac{3}{4}$

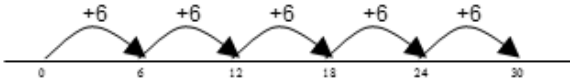
÷ = signs and missing numbe

Continue using a range of equations as in year 2 but with appropriate numbers.

Grouping

How many 6's are in 30?

30 ÷ 6 can be modelled as:



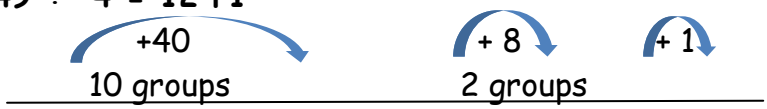
Becoming more efficient using a numberline

Children need to be able to partition the dividend in different ways.

48 ÷ **4** = **12**

Remainders

49 ÷ 4 = 12 r1



Sharing – 49 shared between 4. How many left over?

Grouping – How many 4s make 49. How many are left over?

Place value counters can be used to support children apply their knowledge of grouping.

For example:

60 ÷ 10 = How many groups of 10 in 60?

600 ÷ 100 = How many groups of 100 in 600?

Year 4

Mental Strategies

Children should experience regular counting on and back from different numbers in multiples of 6, 7, 9, 25 and 1000.

Children should learn the multiplication facts to 12 x 12.

÷ = signs and missing numbers

Continue using a range of equations as in year 3 but with appropriate numbers.

Sharing, Grouping and using a number line

Children will continue to explore division as sharing and grouping, and to represent calculations on a number line until they have a secure understanding. Children should progress in their use of written division calculations:

- Using tables facts with which they are fluent
- Experiencing a logical progression in the numbers they use, for example:

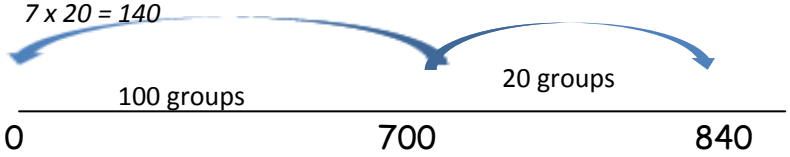
1. Dividend just over 10x the divisor, e.g. 84 ÷ 7
2. Dividend just over 10x the divisor when the divisor is a teen number, e.g. 173 ÷ 15 (learning sensible strategies for calculations such as 102 ÷ 17)
3. Dividend over 100x the divisor, e.g. 840 ÷ 7
4. Dividend over 20x the divisor, e.g. 168 ÷ 7

All of the above stages should include calculations with remainders as well as without.
Remainders should be interpreted according to the context. (i.e. rounded up or down to relate to the answer to the problem)

e.g. 840 ÷ 7 = 120

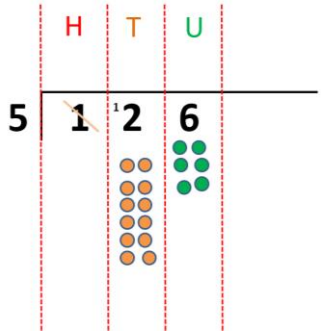
Jottings

7 x 100 = 700
7 x 10 = 70
7 x 20 = 140



Formal Written Methods

Formal short division should only be introduced once children have a good understanding of division, its links with multiplication and the idea of 'chunking up' to find a target number (see use of number lines above)
Short division to be modelled for understanding using place value counters as shown below. Calculations with 2 and 3-digit dividends. E.g. fig 1



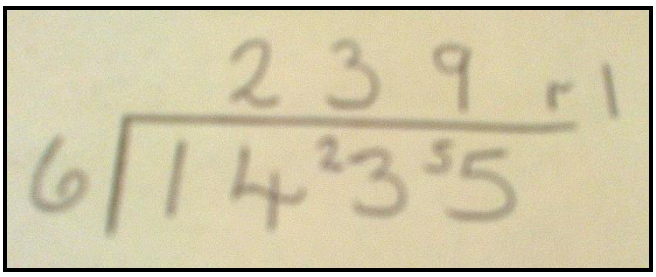
Year 5

Mental Strategies

See year 4

Formal Written Methods

Continued as shown in Year 4, leading to the efficient use of a formal method. The language of grouping to be used (see link from fig. 1 in Year 4)
E.g. 1435 ÷ 6



Children begin to practically develop their understanding of how express the remainder as a decimal or a fraction. Ensure practical understanding allows children to work through this (e.g. what could I do with this remaining 1? How could I share this between 6 as well?)

Year 6

Mental Strategies

Children should count regularly, building on previous work in previous years.
Children should practice and apply the multiplication facts to 12 x 12.

÷ = signs and missing numbers

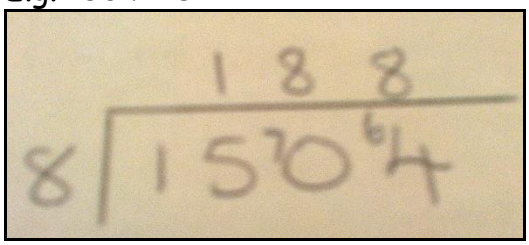
Continue using a range of equations but with appropriate numbers

Sharing and Grouping and using a number line

Children will continue to explore division as sharing and grouping, and to represent calculations on a number line as appropriate.
Quotients should be expressed as decimals and fractions

Formal Written Methods – long and short division

E.g. 1504 ÷ 8



E.g. 2364 ÷ 15