Broadway East First School
Calculation Policy

2017

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Introduction

This document is a statement of the aims, principles and strategies for teaching and learning of calculation strategies in Mathematics at Broadway East First School.

Developmental Aims:

- To introduce children to the processes of calculation through practical, oral and mental activities.
- To support children in developing ways of recording to support their thinking and calculation methods
- Enable children to learn to interpret and use the signs and symbols.
- To facilitate children's use of models and images, such as empty number lines and Numicon to support their mental and informal written methods of calculation.
- To enable children to strengthen and refine their mental methods in order to develop informal written methods.
- To support children in becoming more efficient and succinct in their recordings which will ultimately lead to efficient written methods that can be used more generally.
- By the end of Year 4 children should be equipped with mental and written methods that they understand and can use correctly.
- By the end of Year 4, when faced with a calculation, children will be able to decide which method is most appropriate and have strategies to check its accuracy.
- At whatever stage in their learning, and whatever method is being used, children's methods of calculating will be underpinned by a secure and appropriate knowledge of number facts, along with the mental skills that are needed to carry out the process and judge if it was successful.

The overall aims when children leave first school are for them to:

- have a secure understanding of mental maths facts to apply to written mathematics;
- have a secure knowledge of number facts and a **good** understanding of the four operations
- have an efficient, reliable, compact written method of calculation for addition, subtraction and multiplication that children can apply with confidence when undertaking calculations that they cannot carry out mentally;
- be able to use this knowledge and understanding to solve problems;

Mental methods of calculation

Oral and mental mathematics is essential, particularly so in calculation. Early practical, oral and mental work lays the foundations by providing children with a good understanding of how the four operations build on efficient counting strategies and a secure knowledge of place value and number facts. Later learning and skill development must ensure that children recognise how the operations relate to one another and how the rules and laws of arithmetic are to be used and applied. Ongoing oral and mental mathematics learning provides practice and consolidation of these ideas. It must give children the opportunity to apply what they have learned to particular cases, exemplifying how the rules and laws work, and to general cases where children make decisions and choices for themselves.

The ability to calculate mentally forms the basis of all methods of calculation and has to be maintained and refined. A good knowledge of numbers or a 'feel' for numbers is the product of structured practice and repetition. It requires an understanding of number patterns and relationships developed through directed enquiry, use of models and images and the application of acquired number knowledge and skills. Secure mental calculation requires the ability to:

- recall key number facts instantly - for example, all addition and subtraction facts for each number to 20 together with mutiples of 10 that make 100 and doubles and halves (Year 2), multiples of 10 and 5 that make 100 (Year 3)
- recall all times tables up to 12 x 12 by then end of year 4. Learnt as follows:

Foundation – by end of year begin counting sequences

Year 1 – counting in multiples of 2, 10 and 5. By the end of year 1, children can start learning 2, 10 and 5 times tables.

Year 2 – Recall 2, 10, 5 times tables. Learn 3 times tables.

Year 3 – Recall 2, 10, 5, 3, times tables. Learn 4 and 8 times tables.

Year 4- Recall 2, 10, 5, 3, 4, 8 times tables. Learn 6, 7, 9, 11, 12 times tables.

- use taught strategies to work out the calculation - for example, recognise that addition can be done in any order and use this to add mentally a one-digit number or a 2 digit number to 20 (Year 1), partition two-digit numbers in different ways including into multiples of ten and one and add the tens and ones separately and then recombine (Year 2), add and subtract mentally 1, 10 and 100 to any 3 digit number.
- understand how the rules and laws of arithmetic are used and applied - for example, to add or subtract mentally combinations of one-digit and two-digit numbers (Year 3).

NB: See DofE Programme of study for Mathematics and Broadway East First Schools Excel assessment tables for full coverage.

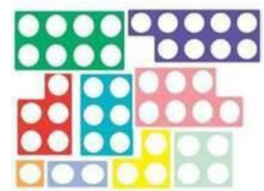
The aim is that by the end of Year 4, the great majority of children should be able to use an efficient written method for addition, subtraction and multiplication with confidence and understanding. Children will develop the ability to use what are commonly known as 'standard' written methods - methods that are efficient and work for any calculations, including those that involve whole numbers or decimals. They are compact and consequently help children to keep track of their recorded steps. Being able to use these written methods gives children an efficient set of tools they can use when they are unable to carry out the calculation in their heads or do not have access to a calculator. We want children to know that they have such a reliable, written method to which they can turn when the need arises.

In setting out these aims, the intention is that there will be a consistent approach to the learning of calculation strategies and that all teachers understand the progression of skills and key concepts. The great majority of children will benefit greatly from learning how to use the most efficient methods. The challenge for teachers will be in determining when their children should move on to a refinement in the method and become confident and more efficient at written calculation. Guidance is given below for the steps in reaching the most efficient methods for each of the four number operations.

Progression in Teaching Addition

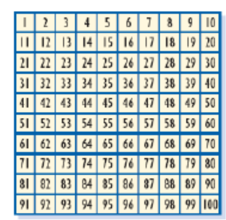
Mental Skills

Recognise the size and position of numbers
Count on in ones and tens
Know number bonds to 10 and 20
Add multiples of 10 to any number
Partition and recombine numbers
Bridge through 10



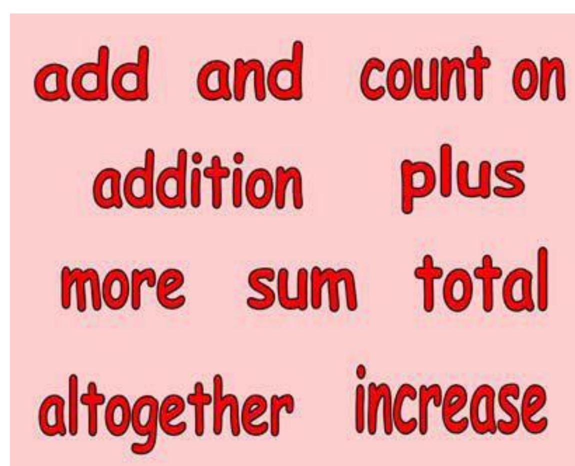
Models and Images

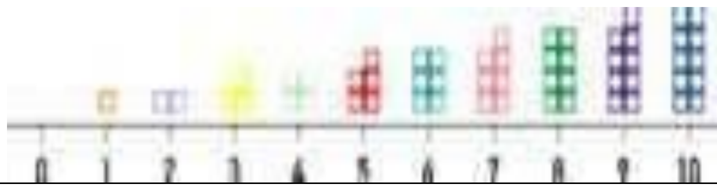
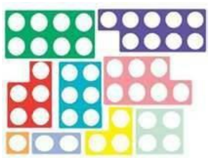
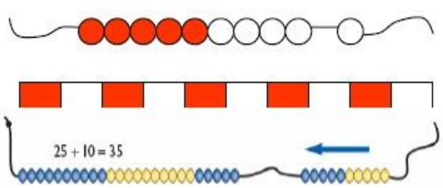
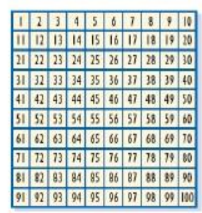
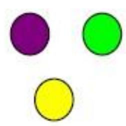
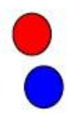
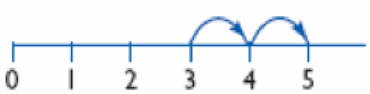
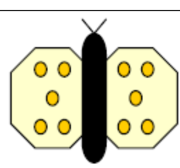
Counting apparatus
Place value apparatus
Place value cards
Number tracks
Numbered number lines
Marked but unnumbered number lines
Empty number lines
Hundred square
Counting stick
Bead string
Numicon

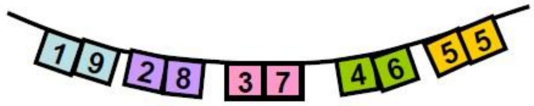
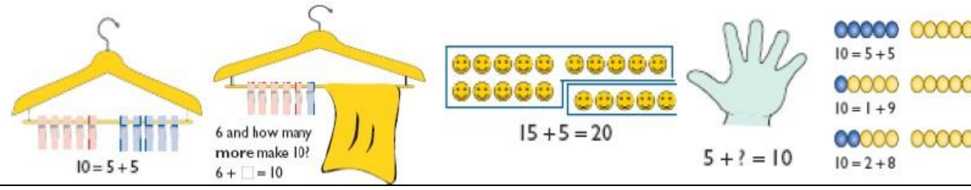
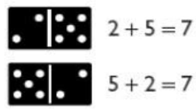
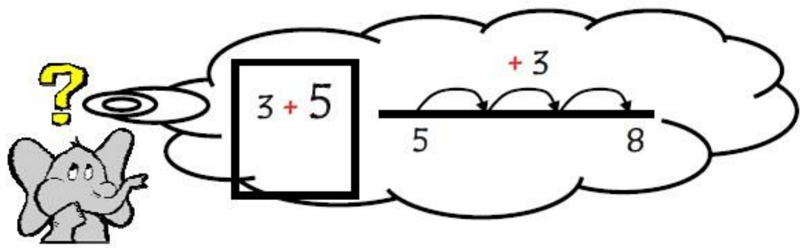
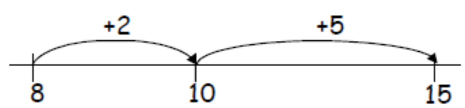
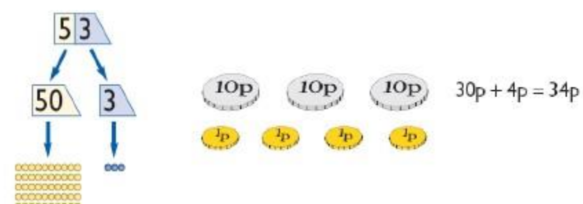


Key Vocabulary

add
addition
Plus
And
count on
more
sum
total
altogether
increase

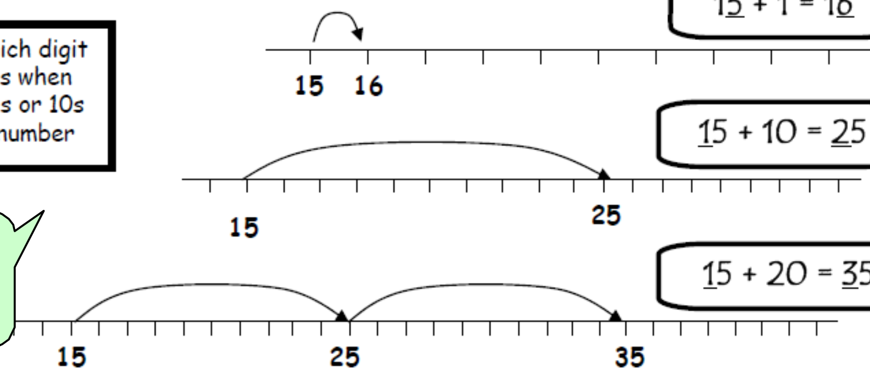


EYFS/ Stages in development	Progression of skills and methods (addition)
EYFS 'Numbers as labels for counting' 5	Recognise numbers 0 to 10 0 1 2 3 4 5 6 7 8 9 10 
EYFS 'Numbers as labels for counting' 6	 1, 2, 3, 4, 5, 6 … there are 6 teddies Count reliably up to 10 everyday objects
Stage 1 (also learn in EYFS)	 Count in ones and tens
EYFS Calculating 4	Begin to relate addition to combining two groups of objects  and  makes 5
Stage 1	3 + 2 = 5  Count along a number line to add numbers together
Stage 1	Begin to use the + and = signs to record mental calculations in a number sentence 6 + 4=10 
Stage 2	 5 + 5 = 10 Know doubles of numbers

Stage 2 (number bonds to 10) Stage 3 (number bonds to 20)	Know by heart all pairs of numbers with a total of 10 and 20  
Stage 2	  Know that addition can be done in any order
Stage 2	Put the biggest number first and count on 
Stage 3	8 + 7 = 15  Add two single-digit numbers that bridge 10
Stage 3 (mental maths skill)	Begin to partition numbers in order to add 

Stage 3 (mental maths skill)

Know which digit changes when adding 1s or 10s to any number



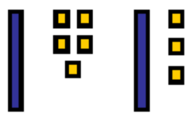
15 + 1 = 16

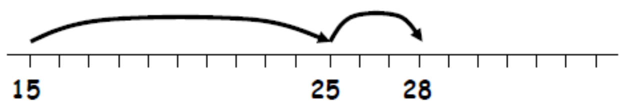
15 + 10 = 25

15 + 20 = 35

Can be demonstrated visually as in diagram but this **should not** be used as a written method.

Stage 3





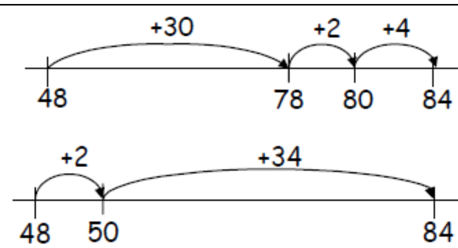
Adding two two-digit numbers (without bridging)

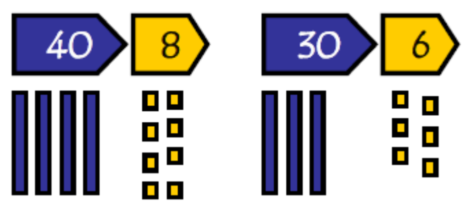
Counting in tens and ones

Partitioning and recombining

15 + 13 = 28

Stage 3





Adding two two-digit numbers (bridging through tens boundary)

Using a number line

OR

Using place value cards and place value apparatus to partition numbers and recombine

48 + 36 = 84

Partition is a mental method, but it is useful for children to record jottings as in the diagram.

40 + 30 + 8 + 6

40 + 30 = 70

8 + 6 = 14

70 + 14 = 84

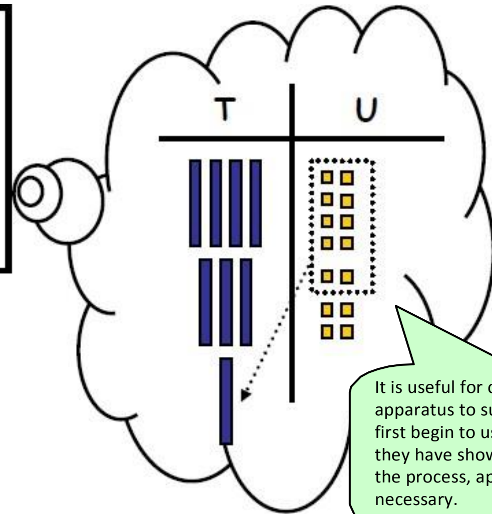
Stage 3 leading into Stage 4

Expanded method

It is important that the children have a good understanding of place value and partitioning using concrete resources and visual images to support calculations. The expanded method enables children to see what happens to numbers in the standard written method.

48 + 36

```
  48
+ 36
```



It is useful for children to use apparatus to support them when they first begin to use this method. When they have shown an understanding of the process, apparatus may not be necessary.

```
 T    U
40 +  8
30 +  6
80 +  4
10
```

Stage 4

```
  4 8
+ 3 6
  8 4
  1
```

Standard written method
The previous stages reinforce what happens to the numbers when they are added together using more formal written methods.

Children at Stage 4 should also be expected to:

- use this method for larger numbers (to at least 4 digits)
- use this method to add numbers with up to 2 decimal places.
- solve addition problems involving measures and money.

Stage 5

Using the standard written method:

- add decimals (including those which do not have the same amount of decimals digits).
- solve addition problems involving measures and money.
- use as an inverse operation to check subtraction calculations.

To add successfully, children need to be able to:

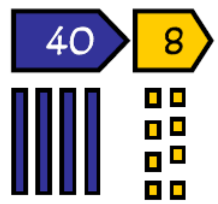
- recall all addition pairs to 9 + 9 and complements in 10;
- add mentally a series of one-digit numbers, such as 5 + 8 + 4;
- add multiples of 10 (such as 60 + 70) or of 100 (such as 600 + 700) using the related addition fact, 6 + 7, and their knowledge of place value;
- partition two-digit and three-digit numbers into multiples of 100, 10 and 1 in different ways.

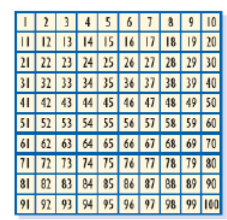
Note: It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for subtraction.

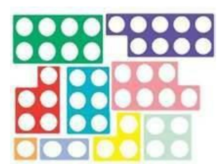
Progression in Teaching Subtraction

Mental Skills
Recognise the size and position of numbers Count back in ones and tens
Know number facts for all numbers to 20. Subtract multiples of 10 from any number
Partition and recombine numbers (only partition the number to be subtracted)
Bridge through 10

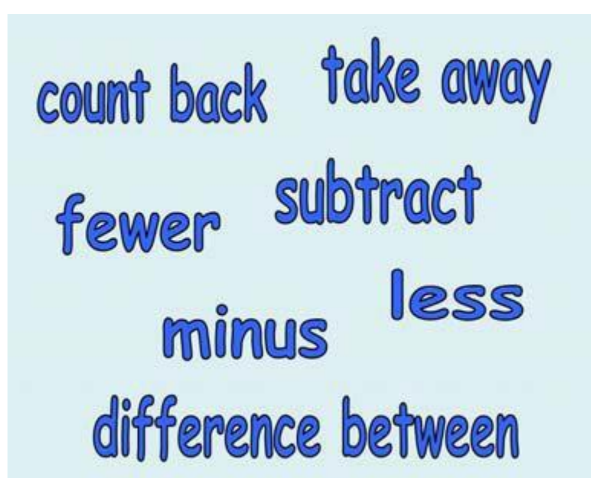
Counting apparatus
Place value apparatus
Place value cards
Number tracks
Numbered number lines
Marked but unnumbered lines
Hundred square
Empty number lines.
Counting stick
Bead strings
Numicon

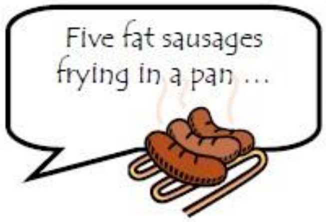
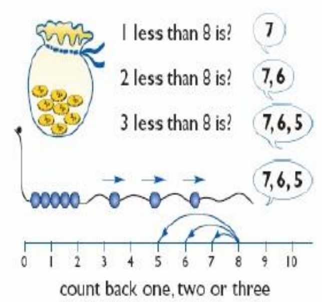
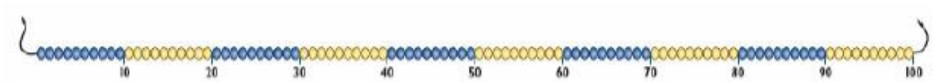
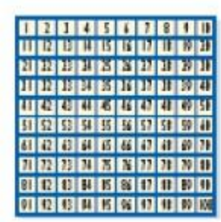
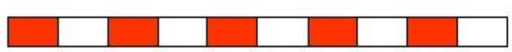




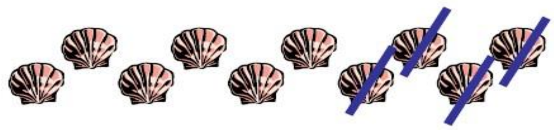


Vocabulary
subtract
take away
minus
count back
less
fewer
difference between



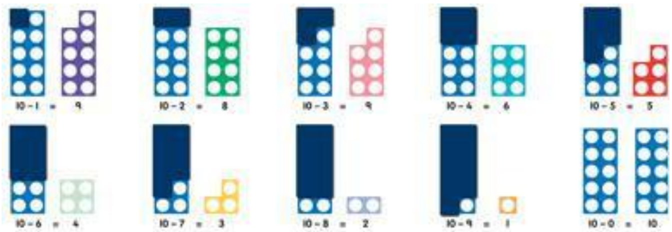
EYFS / NC Stage	**Progression of skills and methods** **(subtraction)**
EYFS Numbers as labels for counting 1	Begin to count backwards in familiar contexts such as number rhymes or stories  
EYFS Calculating 7	10, 9, 8, 7 . . . Continue the count back in ones from any given number
EYFS Calculating 5	Begin to relate subtraction to ' taking away '  Three teddies take away two teddies leaves one teddy
EYFS Calculating 3 (up to 5) 7 (up to 10)	 Find one less than a number
Stage 1	  Count back in tens 

Stage 1



If I take away four shells there are six left

Count backwards along a number line to ' take away



Stage 1

Begin to use the - and = signs to record mental calculations in a number sentence

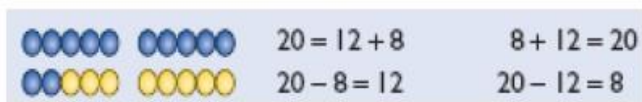
Maria had six sweets and she ate four. How many did she have left?

6 - 4 = 2

Stage 2
(numbers to 10)

Stage 3
(numbers to 20)

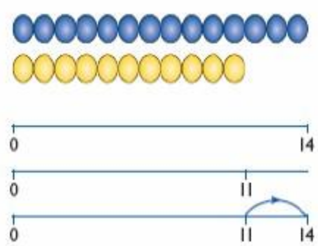
6 + ? = 10   ? + 6 = 10
10 – 6 = ?   10 – 4 = 6



Know by heart subtraction facts for numbers up to 10 and 20

Stage 2

The difference is?

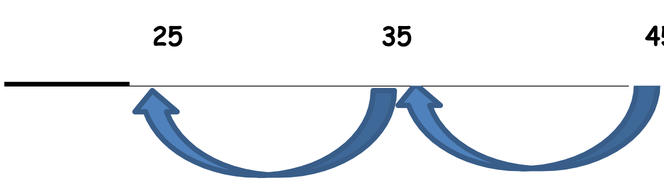


The difference between 11 and 14 is 3.
14 – 11 = 3
11 + ☐ = 14

Begin to find the difference by counting up from the smallest number

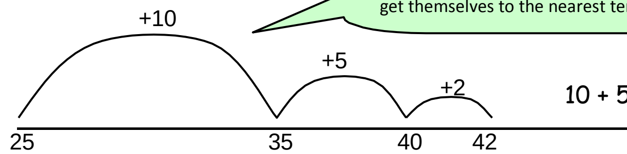
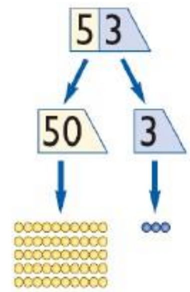
Stage 2
(mental maths skill)

Children should be able to do this mentally. This visual aid (in the form of a number line) may be used support those who need it.



Subtract 1 or multiples of 10 from any two-digit

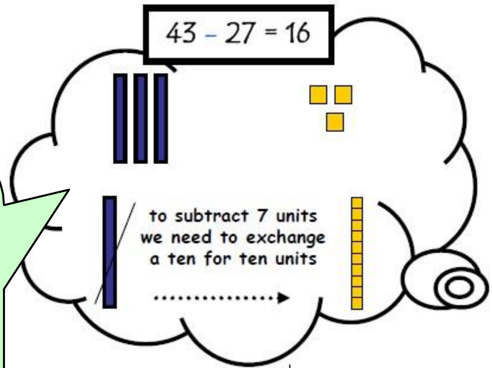
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

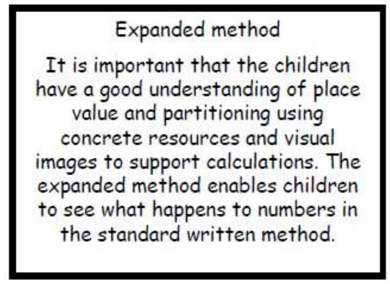
Stage 3	**Continue to use a number line to find the difference by adding on from the smaller to the larger number. (including bridging through tens boundary).** 42 – 25 = Children may choose to add on different quantities first. They may prefer to add on 5 to begin with to get themselves to the nearest tens number.  10 + 5 + 2 = 17
Stage 3 (mental maths skill)	Begin to partition numbers in order to take away 
Stage 3 (mental maths skill*) Find difference on number line?	*This method is a mental method, but it is useful for children to record jottings as in the diagram. Partitioning number to be subtracted - with exchanging (links to counting back on number line) 43 – 27 = 16  43 – 20 7 43 – 20 = 23 23 – 7 = 16

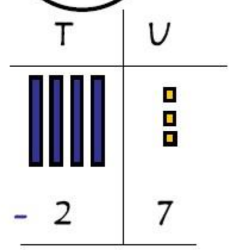
Stage 3 leading into Stage 4

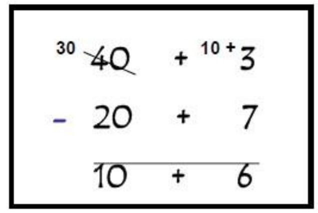
This is an important method that should not be skipped as it help children understand the process of exchanging (particularly the 'exchanging' element).

Apparatus can be used to demonstrate the process of 'exchanging'.

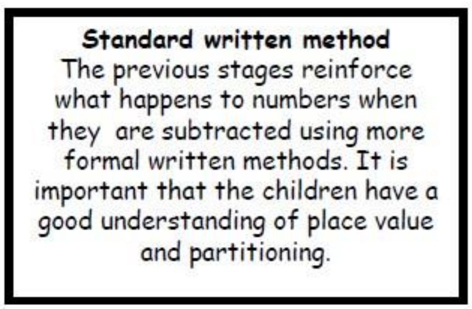


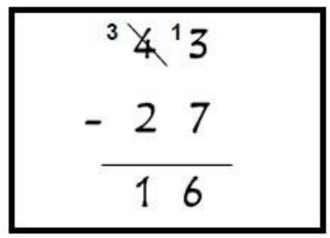






Stage 4





Children at Stage 4 should also be expected to:

- use this method for larger numbers (to at least 4 digits)
- use this method to subtract numbers with up to 2 decimal places.
- solve subtraction problems involving measures and money.

Stage 5

Using the standard written method:

- subtract decimals (including those which do not have the same amount of decimals digits).
- solve subtraction problems involving measures and money.
- use as an inverse operation to check addition calculations.

To subtract successfully, children need to be able to:

- recall all addition and subtraction facts to 20
- subtract multiples of 10 (such as 160 - 70) using the related subtraction fact, 16 - 7, and their knowledge of place value
- partition two-digit and three-digit numbers into multiples of one hundred, ten and one in different ways (e.g. partition 74 into 70 + 4 or 60 + 14).
- **Note:** It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for subtraction.

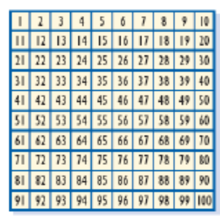
Progression in Teaching Multiplication

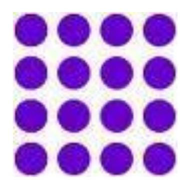
Mental Skills

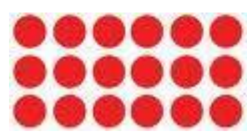
Recognise the size and position of numbers
Count on in different steps 2s, 5s, 10s
Double numbers up to 10
Recognise multiplication as repeated addition
Quick recall of multiplication facts
Use known facts to derive associated division facts
Use known facts to generate other facts (e3.g. double the 2 x table to find 4 x table)
Multiplying by 10, 100, 1000 and understanding the effect

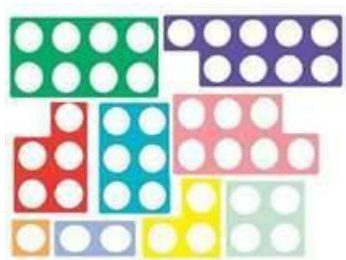
Counting apparatus

Place value apparatus
Arrays
100 squares
Number tracks
Numbered number lines
Marked but unnumbered lines
Empty number lines
Multiplication squares
Counting stick
Bead strings



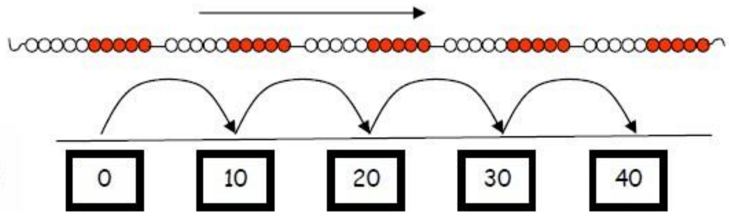
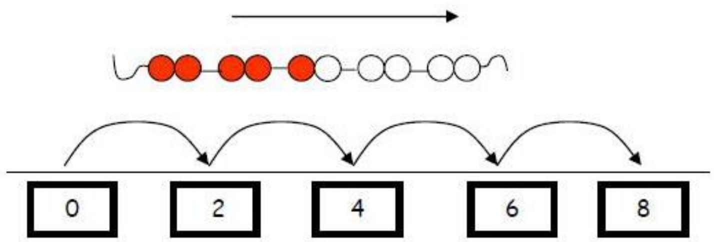
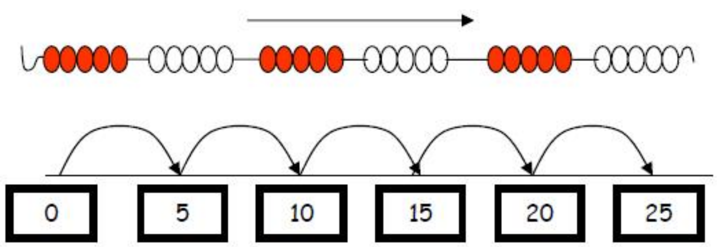
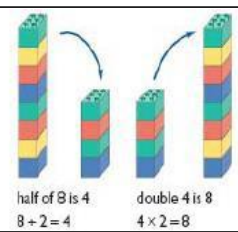
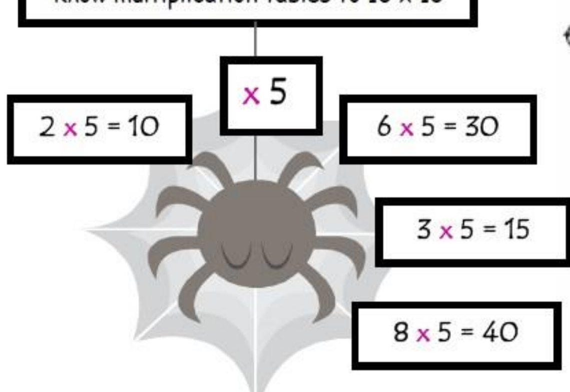
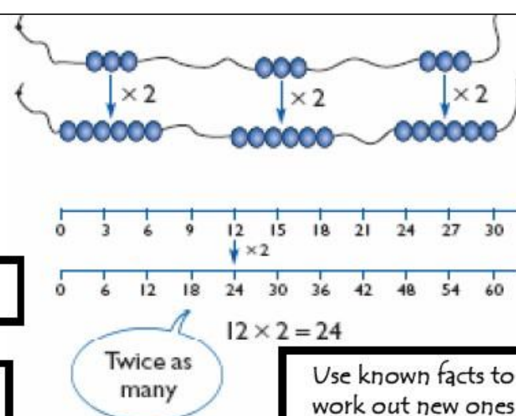






Vocabulary

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

EYFS / NC Stage	Progression of skills and methods **(multiplication)**
Stage 1	Introduce in Reception if children are ready. Count in tens from zero  
Stage 1	 Introduce in Reception if children are ready. Count in twos from zero 
Stage 1	Introduce in Reception if children are ready. Count in fives from zero  
Stage 2	 Know doubles and corresponding halves
Stage 3	Know multiplication tables to 10 x 10   Use known facts to work out new ones

Stage 3

Understand that …

24 x 20 = 24 x 2 x 10

24 x 50 = 24 x 5 x 10

Use factors to multiply

Stage 3

2 + 2 + 2 + 2

Understand multiplication as repeated addition

2 + 2 + 2 + 2 = 8

4 x 2 = 10

2 multiplied by 4

4 lots of 2

Stage 3

2 x 4

2 × 4 = 8

4 × 2 = 8

4 x 2

4 × 2 = 8

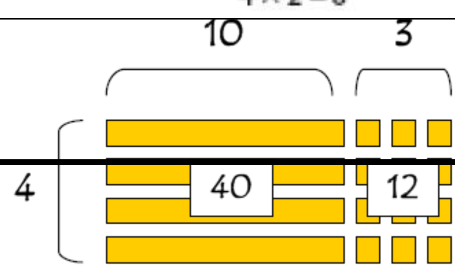
2 × 4 = 8

Understand multiplication as an array

Stage 3

When first introducing the grid method, use resources to show the visual process, as well as recording the workings within a grid.

Visual



Use place value apparatus to support the multiplication of U x TU alongside the grid method

Written recording

	10	3
4	40	12

4 x 13

40 + 12 = 52

Stage 4	**Expanded standard written method**	38 x 7 = 30 + 8 x 7 56 (7 x 8 = 56) 210 (7 x 30 = 210) 266 To demonstrate the process, it may help to record, in brackets, each step. Move away from this as children are ready.

To multiply successfully, children need to be able to:

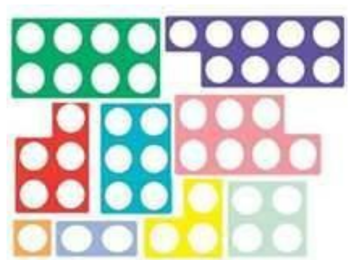
- recall all multiplication facts to 10 × 10
- partition number into multiples of one hundred, ten and one
- work out products such as 70 × 5, 70 × 50, 700 × 5 or700 × 50 using the related fact 7 × 5 and their knowledge of place value
- add two or more single-digit numbers mentally
- add multiples of 10 (such as 60 + 70) or of 100 (such as 600 + 700) using the related addition fact, 6 + 7, and their knowledge of place value
- add combinations of whole numbers using the column method (see above).

Note: It is important that children's mental methods of calculation are practiced and secured alongside their learning and use of an efficient written method for multiplication.

Progression in Teaching Division

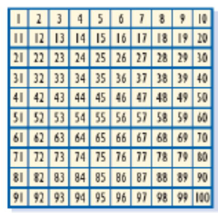
Mental Skills

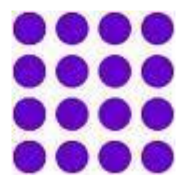
Recognise the size and position of numbers
Count back in different steps 2s, 5s, 10s
Halve numbers to 20
Recognise division as repeated subtraction
Quick recall of division facts
Use known facts to derive associated facts
Divide by 10, 100, 1000 and understanding the effect
Divide by multiples of 10



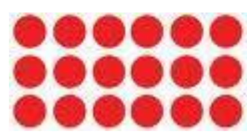
Counting apparatus

Arrays
100 squares
Number tracks



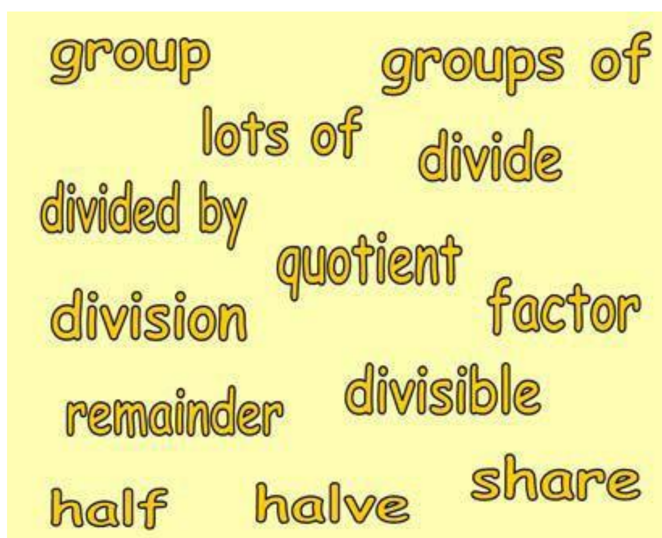


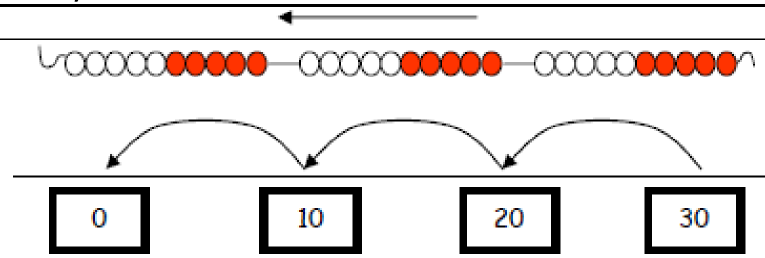
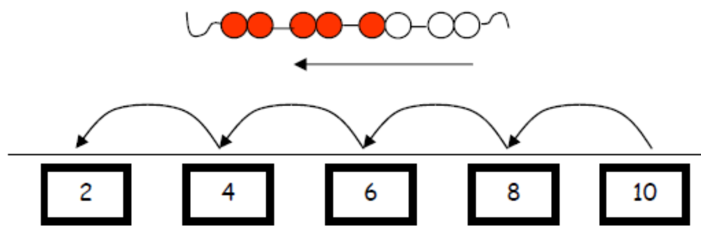
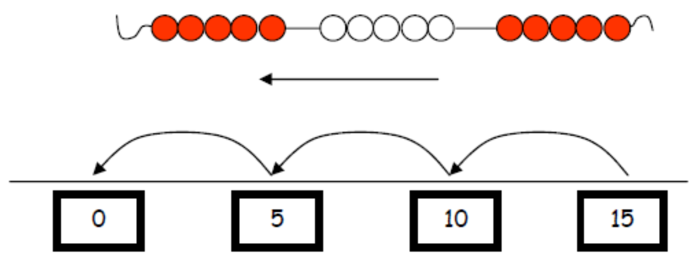
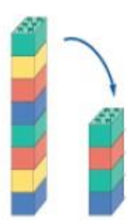
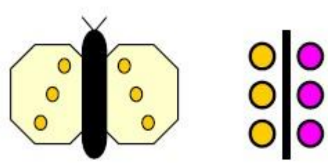
Numbered number lines
Marked but unnumbered lines
Empty number lines
Multiplication squares

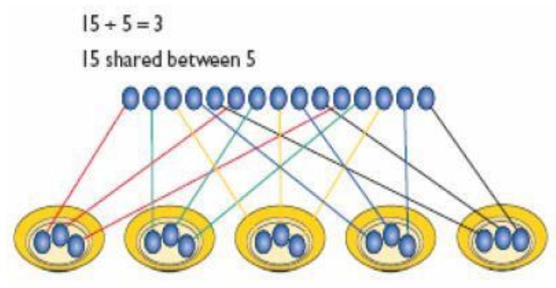
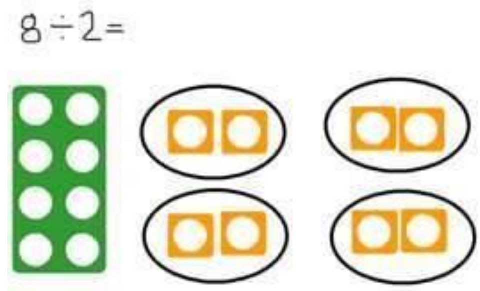
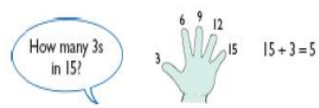
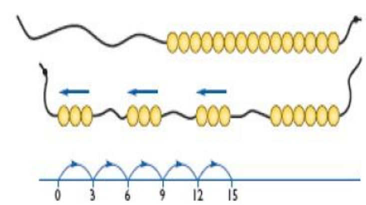
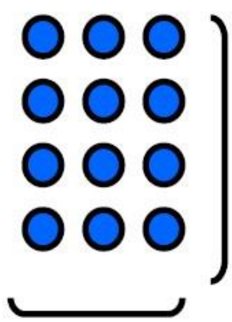


Vocabulary

lots of
groups of
share
group
halve
half
divide
division
divided by
remainder
factor
quotient
divisible



EYFS / NC Stage	Progression of skills and methods (division)
Stage 1	Count back in tens  Introduce in Reception if children are ready.
Stage 1	 Count back in twos Introduce in Reception if children are ready.
Stage 1	Introduce in Reception if children are ready. Count back in fives 
Stage 2	 half of 8 is 4 8 ÷ 2 = 4  Half of 6 is 3 ½ of 6 = 3 Know halves
Stage 3	Use known multiplication facts to work out corresponding division facts If 2 x 10 = 20 then 20 ÷ 10 = 2 20 ÷ 2 = 10

Stage 3	 Understand division as sharing
Stage 3	 Understand division as grouping  
Stage 3	 12 divided into groups of 3 gives 4 groups 12 ÷ 3 = 4 12 divided into groups of 4 gives 3 groups 12 ÷ 4 = 3 Reinforce division as grouping through the use of arrays

Stage 4 Non Statutory in Y4	**Standard written method (short division)** $$\begin{array}{r} 2\ \ 7 \\ \hline 3\ \big)\ 8\ {}^{2}1 \end{array}$$ Children at Stage 4 should also be expected to: • use this method for larger numbers HTU ÷ U, ThHTU ÷ U • solve division problems involving measures and money. • use as the inverse operation to check multiplication calculations.

To carry out written methods of division successfully, children need to be able to:

- understand division as repeated subtraction
- estimate how many times one number divides into another - for example, how many sixes there are in 47, or how many 23s there are in 92
- multiply a two-digit number by a single-digit number mentally
- subtract numbers using the column method.

Note: It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for division.

Concluding Statements

- Calculation strategies, both mental and written, underpin much of children's achievement in other areas of mathematics, especially in problem solving and investigative learning.
- Encourage children to reflect upon which method or strategy they find most reliable and suits their style of learning.
- By the end of Key Stage 2 it is important that children **record** their working out, and often marks may be awarded in SATs for clear calculations.
- Children should therefore be encouraged to jot down their thought processes from an early age.

Many children enjoy the challenge of completing calculations at speed: mental maths challenges involving all four operations should be encouraged, especially in Key Stage 2.

APPENDIX 1 – GUIDELINES PRODUCED IN 2013 IN CONJUCTION WITH THE NEW NATIONAL CURRICULUM

Mathematics Appendix 1: Examples of formal written methods for addition, subtraction, multiplication and division

This appendix sets out some examples of formal written methods for all four operations to illustrate the range of methods that could be taught. It is not intended to be an exhaustive list, nor is it intended to show progression in formal written methods. For example, the exact position of intermediate calculations (superscript and subscript digits) will vary depending on the method and format used.

For multiplication, some pupils may include an addition symbol when adding partial products. For division, some pupils may include a subtraction symbol when subtracting multiples of the divisor.

Addition and subtraction

789 + 642 becomes

$$\begin{array}{cccc} & 7 & 8 & 9 \\ + & 6 & 4 & 2 \\ \hline 1 & 4 & 3 & 1 \\ \hline & {}_{1} & {}_{1} & \end{array}$$

Answer: 1431

874 – 523 becomes

$$\begin{array}{cccc} & 8 & 7 & 4 \\ - & 5 & 2 & 3 \\ \hline & 3 & 5 & 1 \\ \hline \end{array}$$

Answer: 351

932 – 457 becomes

$$\begin{array}{cccc} & {}^{8}\cancel{9} & {}^{12}\cancel{3} & {}^{1}2 \\ - & 4 & 5 & 7 \\ \hline & 4 & 7 & 5 \\ \hline \end{array}$$

Answer: 475

932 – 457 becomes

$$\begin{array}{cccc} & 9 & {}^{1}3 & {}^{1}2 \\ - & \cancel{4}_{5} & \cancel{5}_{6} & 7 \\ \hline & 4 & 7 & 5 \\ \hline \end{array}$$

Answer: 475

Short multiplication

24 × 6 becomes

$$\begin{array}{ccc} & 2 & 4 \\ \times & & 6 \\ \hline 1 & 4 & 4 \\ \hline & {}_{2} & \end{array}$$

Answer: 144

342 × 7 becomes

$$\begin{array}{cccc} & 3 & 4 & 2 \\ \times & & & 7 \\ \hline 2 & 3 & 9 & 4 \\ \hline & {}_{2} & {}_{1} & \end{array}$$

Answer: 2394

2741 × 6 becomes

$$\begin{array}{ccccc} & 2 & 7 & 4 & 1 \\ \times & & & & 6 \\ \hline 1 & 6 & 4 & 4 & 6 \\ \hline & {}_{4} & {}_{2} & & \end{array}$$

Answer: 16 446

Long multiplication

24 × 16 becomes

$$\begin{array}{rrr} & {}^{2} & \\ & 2 & 4 \\ \times & 1 & 6 \\ \hline 2 & 4 & 0 \\ 1 & 4 & 4 \\ \hline 3 & 8 & 4 \\ \hline \end{array}$$

Answer: 384

124 × 26 becomes

$$\begin{array}{rrrr} & {}^{1} & {}^{2} & \\ & 1 & 2 & 4 \\ \times & & 2 & 6 \\ \hline 2 & 4 & 8 & 0 \\ & 7 & 4 & 4 \\ \hline 3 & 2 & 2 & 4 \\ \hline {}_{1} & {}_{1} & & \end{array}$$

Answer: 3224

124 × 26 becomes

$$\begin{array}{rrrr} & {}^{1} & {}^{2} & \\ & 1 & 2 & 4 \\ \times & & 2 & 6 \\ \hline & 7 & 4 & 4 \\ 2 & 4 & 8 & 0 \\ \hline 3 & 2 & 2 & 4 \\ \hline {}_{1} & {}_{1} & & \end{array}$$

Answer: 3224

Short division

98 ÷ 7 becomes

$$\begin{array}{r|rr} & 1 & 4 \\ \cline{2-3} 7 & 9 & {}^{2}8 \end{array}$$

Answer: 14

432 ÷ 5 becomes

$$\begin{array}{r|rrrl} & & 8 & 6 & \text{r } 2 \\ \cline{2-4} 5 & 4 & 3 & {}^{3}2 & \end{array}$$

Answer: 86 remainder 2

496 ÷ 11 becomes

$$\begin{array}{rr|rrrl} & & & 4 & 5 & \text{r } 1 \\ \cline{3-5} 1 & 1 & 4 & 9 & {}^{5}6 & \end{array}$$

Answer: $45\frac{1}{11}$

Long division

432 ÷ 15 becomes

$$\begin{array}{rr|rrrl} & & & 2 & 8 & \text{r } 12 \\ \cline{3-5} 1 & 5 & 4 & 3 & 2 & \\ & & 3 & 0 & 0 & \\ \cline{3-5} & & 1 & 3 & 2 & \\ & & 1 & 2 & 0 & \\ \cline{3-5} & & & 1 & 2 & \end{array}$$

Answer: 28 remainder 12

432 ÷ 15 becomes

$$\begin{array}{rr|rrrl} & & & 2 & 8 & \\ \cline{3-5} 1 & 5 & 4 & 3 & 2 & \\ & & 3 & 0 & 0 & 15\times 20 \\ \cline{3-5} & & 1 & 3 & 2 & \\ & & 1 & 2 & 0 & 15\times 8 \\ \cline{3-5} & & & 1 & 2 & \end{array}$$

$$\frac{\cancel{12}}{\cancel{15}} = \frac{4}{5}$$

Answer: $28\frac{4}{5}$

432 ÷ 15 becomes

$$\begin{array}{rr|rrrr} & & & 2 & 8\cdot & 8 \\ \cline{3-6} 1 & 5 & 4 & 3 & 2\cdot & 0 \\ & & 3 & 0 & \downarrow & \\ \cline{3-4} & & 1 & 3 & 2 & \downarrow \\ & & 1 & 2 & 0 & \\ \cline{3-5} & & & 1 & 2 & 0 \\ & & & 1 & 2 & 0 \\ \cline{4-6} & & & & & 0 \end{array}$$

Answer: 28·8