

# CALVERTON PRIMARY SCHOOL



## CALCULATION POLICY

<b>Person responsible for the policy</b>	<b>S Mintah Maths Lead</b>
<b>Date reviewed and shared with staff</b>	<b>May 2022</b>
<b>Date to be next reviewed by staff</b>	<b>May 2023</b>
<b>Date to be reviewed by the Local Governing Board</b>	

# **Calverton Primary School Calculation Policy**

## **Introduction**

The purpose of this calculation policy is to provide guidance for the teaching of calculation methods in order to ensure consistency of practice in our schools and across the School. This policy is in accordance with The Primary National Curriculum in England. The strategies are with examples supporting a CPA approach, (Concrete, Pictorial, and Abstract). It is important to note that the concrete and representation examples are not exhaustive, and teachers and pupils may well come up with alternatives. For pupils to have a true understanding of a mathematical concept, they need to master all three phases of the CPA (concrete-pictorial-abstract) approach. This approach is explained below:

- Concrete - the doing: A pupil is first introduced to an idea or a skill by acting it out with real objects. This is a 'hands on' component using real objects and it is the foundation for conceptual understanding. Concrete refers to objects such as base ten blocks, fraction tiles, markers, or other objects that can be physically manipulated.
- Pictorial - the seeing: When a pupil has sufficiently understood the hands-on experiences performed, they can now relate them to pictorial representations, such as a diagram or picture of the problem.
- Abstract - the symbolic: A pupil is now capable of representing problems by using mathematical notation, for example:  $12 \div 2 = 6$ . This is the most formal stage of mathematical understanding. Abstract representations can simply be an efficient way of recording the maths, without being the actual maths. They need to master all three phases.

Reinforcement is achieved by going back and forth between these representations. For example, if a child has moved on from the concrete to the pictorial, it does not mean that the concrete cannot be used alongside the pictorial. Or if a child is working in the abstract, 'proving' something or 'working out' could involve use of the concrete or pictorial. In short, these are not always 'exclusive' representations. Children should have a secure understanding before progressing onto the next step. Pupils who are successful should be challenged through rich problems rather than accelerating to the next stage unless it is deemed appropriate.

## **Mathematics Mastery**

At the centre of the mastery approach to the teaching of mathematics is the belief that all children have the potential to succeed. They should have access to the same curriculum content and, rather than being extended with new learning, they should deepen their conceptual understanding by tackling challenging and varied problems. Similarly, with calculation strategies, children must not simply rote learn procedures but demonstrate their understanding of these procedures through the use of concrete materials and pictorial representations. This policy outlines the different calculation strategies that should be taught and used in EYFS linking to the updated curriculum 2021 and Year 6 in line with the requirements of the 2014 Primary National Curriculum.

## **Mathematical Language**

High expectations of mathematical language development is essential, promoting mathematics as a language in itself that feeds into all elements of mathematics including reasoning. Teachers are expected to teach and understand all mathematical language related to the four operations and

# **Calverton Primary School Calculation Policy**

this is clearly set out in the Federation mathematics vocabulary list as well as on the Calculations Policy. The National Curriculum is explicit in articulating the importance of children using the correct mathematical language as a central part of their learning (reasoning). Indeed, in certain year groups, the non-statutory guidance highlights the requirement for children to extend their language around certain concepts. It is therefore essential that teaching using the strategies outlined in this policy is accompanied by the use of appropriate and precise mathematical vocabulary. New vocabulary should be introduced in a suitable context (for example, with relevant real objects, apparatus, pictures or diagrams) and explained carefully. The school agreed list of terminology can be found attached and the discussion for reasoning questions are located as Appendix A to this policy.

## **EYFS Maths**

The CPD federation approach to mathematics is based on the CPA method developed by American psychologist, Jerome Bruner.

### **Concrete**

Concrete is the “doing” stage, using concrete objects to model problems.

### **Pictorial**

Pictorial is the “seeing” stage, using representations of the objects to model problems.

### **Abstract**

Abstract is the “symbolic” stage, where children are able to use abstract symbols to model problems.

This approach develops children’s understanding at a deeper level and helps children learn new ideas and build on their existing knowledge by introducing abstract concepts in a more familiar and tangible way.

### **Key Skills in Numbers (Birth to 3, 3-4, Reception):**

- Recognise some numerals of personal significance.
- Recognises numerals 1 to 5.
- Counts up to three or four objects by saying one number name for each item.
- Counts actions or objects which cannot be moved.
- Counts objects to 10, and beginning to count beyond 10.
- Counts out up to six objects from a larger group.
- Selects the correct numeral to represent 1 to 5, then 1 to 10 objects.
- Counts an irregular arrangement of up to ten objects.
- Estimates how many objects they can see and checks by counting them.
- Uses the language of ‘more’ and ‘fewer’ to compare two sets of objects.
- Finds the total number of items in two groups by counting all of them.
- Says the number that is one more than a given number.
- Finds one more or one less from a group of up to five objects, then ten objects.
- In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting.
- Records, using marks that they can interpret and explain.
- Begins to identify own mathematical problems based on own interests and fascinations.

### **Early Learning Goal for Numbers:**

- Children can count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number.
- Using quantities and objects, they add and subtract 2 single-digit numbers and count on or back to find the answer.
- They solve problems, including doubling, halving and sharing.

## **Calverton Primary School Calculation Policy**

Children must be exposed to different representations of mathematical concepts in order to embed conceptual understanding. One of the aims under the Characteristics of Effective Learning is 'creating and thinking critically.' Children are encouraged to make links, find new ways to do things, solve problems, change strategies as needed, make predictions, develop ideas of grouping, sequencing, cause and effect.

### Addition EYFS

Children begin to combine groups of objects or pictures using concrete apparatus.

Solve simple problems using fingers.

Store the larger number mentally and use fingers to count on

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

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

Count on to find the answer.

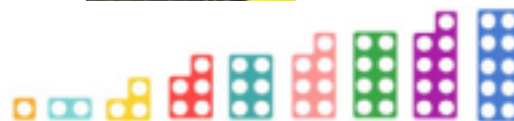
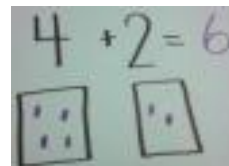
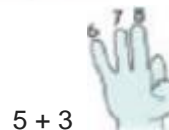
Have an understanding of what "more" means and be able to say what is one more than a given number.

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

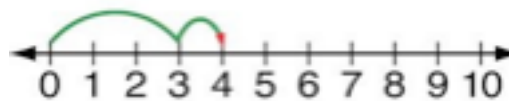
Children make a record in pictures, words or symbols of addition activities.

When appropriate, Numicon shapes are introduced to identify 1 more/less, combine pieces to add and find number bonds.

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



$$3 + 1 = 4$$



## **Calverton Primary School Calculation Policy**

### **Vocabulary:**

Games and songs can be useful way to begin using vocabulary involved in addition. Add, more, sum, and make, total, altogether.

### **MENTAL STRATEGIES: -**

- Develop a mental image of the number system. -
- Understand the value of a number
- Counting forwards and backwards
- Recall of number bonds to 10

## Addition Year 1

**CPA Approach**  
(Concrete, Pictorial, Abstract)

### Counting and Combining sets of Objects to 20

Combining two sets of objects e.g. Numicon, bundles of straws, Dienes apparatus, multi-link cubes, bead strings, ten frames, etc., which will progress onto adding on to a set.

### Understanding of counting using knowledge of number bonds

Ensure that children understand the combining and breaking up of a calculation (the part - part - whole relationship of numbers).  $2+3=5$  Represented using concrete linking to pictorial

From here move onto a bar model format so the children are used to grouping amounts together.

### Understanding of counting on

(Supported by models and images).  
 $7+4$

*If appropriate, progress from using number lines with every number shown to number lines with significant numbers shown. For example a number line that starts at 20 and finishes at 30*

Children should be able to separate 2 digit numbers to add the ones then add the tens.

### $+$ = 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 so that the sign is not just interpreted as 'the answer'.

$$2 = 1 + 1$$

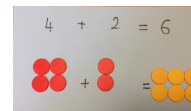
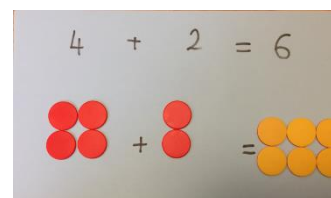
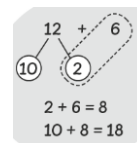
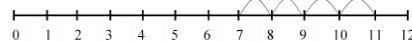
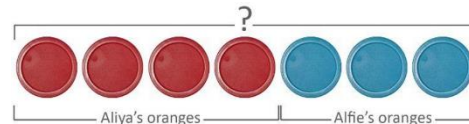
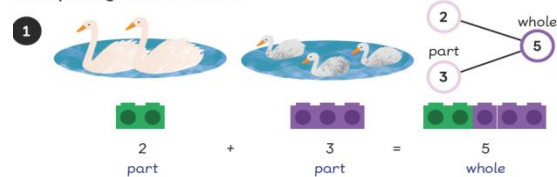
$$2 + 3 = 4 + 1$$

This would be modelled well using resources to show that both sides are balanced

Children will solve one-step addition problems using concrete objects and/or pictorial representations



Add by Using Number Bonds



I have 4 sweets and I am given 2 more. How many do I have altogether?

### Vocabulary

Add, Addition, Total, Equal, Group, Calculation, Plus, Together

## **Calverton Primary School Calculation Policy**

### **MENTAL STRATEGIES:**

- Know addition can be carried out in any order (commutative)
- Add 1 and 2 digit numbers to 20 including 0
- Number bonds to 20
- Doubles of numbers up to and including double 10
- Adding 10 to a single digit number
- Identify 1 more than a given number



## Addition Year 2

### CPA Approach

(Concrete, Pictorial, Abstract)

It is valuable to use a range of representations (also see Y1). Continue to use objects, number lines and ten frames to develop understanding of commutative law and of:

### Counting on in tens and ones

$$\begin{aligned} 23 + 12 &= 23 + 10 + 2 \\ &= 33 + 2 \\ &= 35 \end{aligned}$$

### 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.

$$8 + 7 = 15 \quad (8+2+5=15) \text{ Use Cube}$$

### Bar Modelling

Use of two parts making one whole through bar modelling. This can be shown using cubes as well as drawn.

This will support your pictorial element

### Towards a Written Method

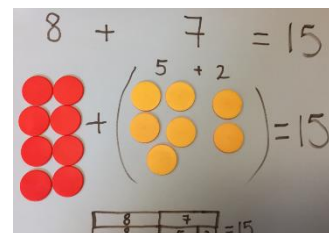
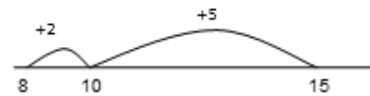
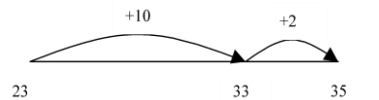
Partitioning in different ways and recombine to 100

Leading towards Exchanging

### Standard column method:

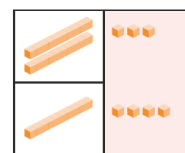
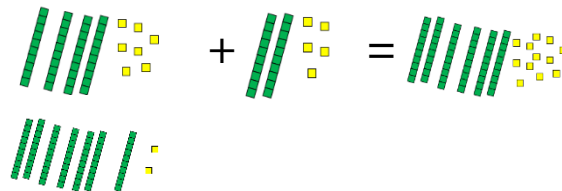
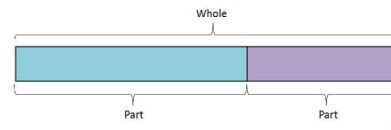
Concrete and pictorial to support the teaching of this method. Use of resources a necessity

Missing number problems



Whole and 2 Parts

Part + Part = Whole  
Whole - Part = Whole



	tens	ones
	2	3
+	1	4
		7

$$14 + 5 = 10 + \bullet \quad 32 + \bullet + \bullet = 100 \quad 35 = 1 + \bullet + 5$$

### Vocabulary

Add, Addition, Total, Equal, Group, Calculation, altogether

## **Calverton Primary School Calculation Policy**

### **MENTAL STRATEGIES:**

- Know that addition is the inverse of subtraction

- Add numbers mentally, including:

A 2-digit number and units

A multiple of 10 to a 2-digit number

Two 2-digit numbers

Three 1-digit numbers

- Use knowledge of inverse to check calculations and solve missing number problems

- Use knowledge of number bonds to 10 to calculate numbers bonds to 100

- Count on in tens from any given number (e.g.  $19 - 29 - 39 - 49$  etc)

## Addition Year 3

### CPA Approach (Concrete, Pictorial, Abstract)

#### Bar Modelling

Bar Model approaches which will be continually referred to throughout the year to support the visual pictorial stage.

Children need to be secure adding multiples of 100 and 10 to any three-digit number including those that are not multiples of 10.

#### Base 10

Use of Base ten to support concrete and pictorial

#### Partition into tens and ones

Partition both numbers and recombine.

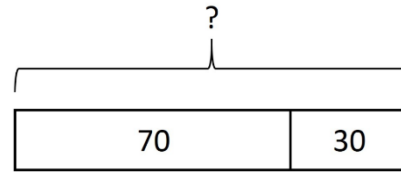
Count on by partitioning the second number only e.g.

#### Towards a Written Method to 1000

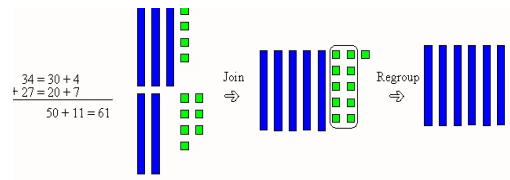
Standard column addition can be modelled with place value counters, objects and pictorial representations

Leading to children understanding the renaming between tens and ones (carrying/exchanging).

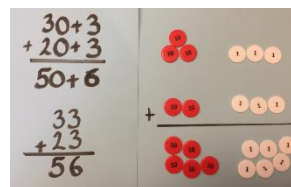
Include the Bar Method (See Above).  
Missing number problems using a range of equations as in Year 1 and 2 but with appropriate, larger numbers



$$70 + 30 = 100$$



$$\begin{aligned} 247 + 125 &= 247 + 100 + 20 + 5 \\ &= 347 + 20 + 5 \\ &= 367 + 5 \\ &= 372 \end{aligned}$$



	h	t	o
			8
+	2	3	6
		1	4
		3	0
+	2	0	0
	2	4	4

	h	t	o
		1	
	2	3	6
+	3	4	5
	5	8	1

# **Calverton Primary School Calculation Policy**

## **Vocabulary**

Addend, Total, Sum, Partition, increase, altogether

## **MENTAL STRATEGIES:**

- Add numbers mentally, including:  
a three-digit number and a single digit number  
a 3-digit number and multiples of 10  
a 3-digit number and multiples of 100
- Estimate the answer to a calculation and use inverse operations to check answers
- Know number pairs that total 1000 (multiples of 100) - Calculate 10 or 100 more than any given number

## Addition Year 4

CPA Approach  
(Concrete, Pictorial, Abstract)

### Mental methods (within 10,000)

This can be taught alongside methods such as Bar Modelling so that the children have a visual representation

### Written methods (progressing to 4-digits & 1dp)

Continue to model column addition with place value counters, objects, pictorial representations and the Bar Method

Ensure in the early stages you support as much as possible using resources to support calculations.

### Regrouping

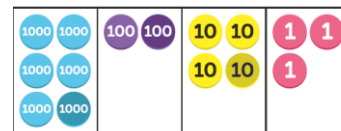
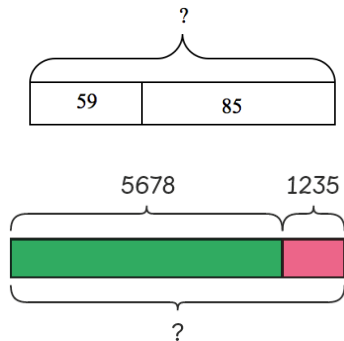
Extend to numbers with at least four digits, including renaming between various columns (Regrouping).

Select and use different methods to solve word problems, involving two step problems in context

### Vocabulary

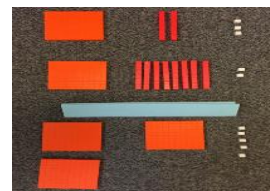
Addend, Total, Sum, Partition, increase, altogether

### MENTAL STRATEGIES:



$$\begin{array}{r}
 4 \quad 2 \quad 5 \quad 6 \\
 + 1 \quad 9 \quad 8 \quad 7 \\
 \hline
 1 \quad 3 \\
 1 \quad 3 \quad 0 \\
 1 \quad 1 \quad 0 \quad 0 \\
 + 5 \quad 0 \quad 0 \quad 0 \\
 \hline
 6 \quad 2 \quad 4 \quad 3
 \end{array}$$

add ones  
add tens  
add hundreds  
add thousands



$$\begin{array}{r}
 1 \quad 1 \quad 1 \quad 6 \\
 4 \quad 2 \quad 5 \quad 6 \\
 + 1 \quad 9 \quad 8 \quad 7 \\
 \hline
 6 \quad 2 \quad 4 \quad 3
 \end{array}$$

## **Calverton Primary School Calculation Policy**

<ul style="list-style-type: none"><li>- Add numbers mentally, including: a four digit number and multiples of one thousand</li><li>- Use knowledge of doubles to derive related facts (e.g <math>15 + 16 = 31</math> because <math>15 + 15 = 30</math> and <math>30 + 1 = 31</math>)</li><li>- Know number pairs that total 1000 (multiples of 10)</li><li>- Estimate the answer to a calculation and use inverse operations to check answers</li></ul>	
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# Calverton Primary School Calculation Policy

## Addition Year 5

CPA Approach  
(Concrete, Pictorial, Abstract)

### Mental methods (within 1,000,000)

Develop, supported by a range of models and images, including place value counters. Children should practise with increasingly large numbers to aid fluency

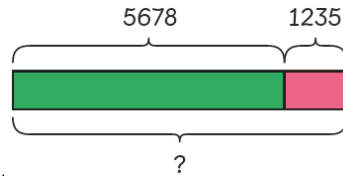
### Written methods (progressing to more than 4-digits & 2dp)

As in Year 4, continue to explore column addition modelled with place value counters, objects, pictorial representations and the Bar Method

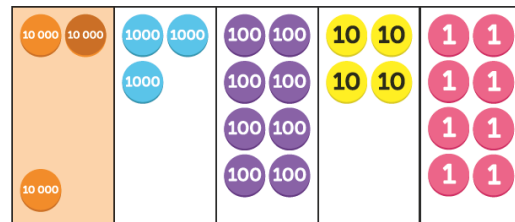
### Column Additions

Children will move on to the formal columnar method for whole numbers and decimal numbers as an efficient written method.

Select and use different methods to solve word problems, involving two step problems in context. Use of Bar Model alongside calculations for word problems.



$$12464 + 2500 = 14964$$



$$\begin{array}{r} \phantom{+} 1 \\ 16603 \\ + 17245 \\ \hline 33848 \end{array}$$

### Vocabulary

Addend, Total, Sum, Partition, increase, altogether, exchange

## Addition Year 6

**CPA Approach**  
(Concrete, Pictorial, Abstract)

### Mental methods

Should continue to develop, supported by a range of models and images, including the number line.  
Including negative numbers and decimals

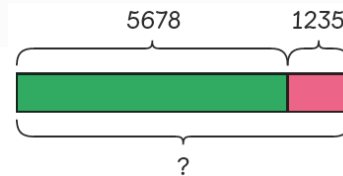
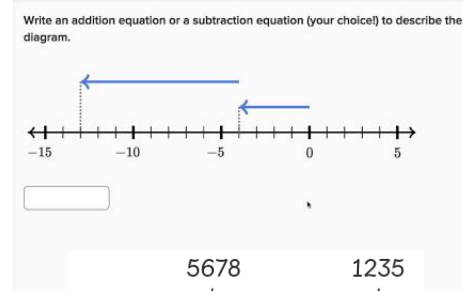
### Written methods

As in Year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with columnar method to be secured. Continue to model with place value counters, objects, pictorial representations and the Bar Method (See Appendix 1) Continue calculating with decimals, including those with different numbers of decimal places, and develop procedural fluency with renaming (carrying) to be secured.

### 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

Refer to Year 5 for support with development groups.



789 + 642 becomes

$$\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \end{array}$$

Answer: 1431

A handwritten decimal addition problem. The numbers are 6.59 and 0.72, with a plus sign to the left. The sum 7.31 is written below a horizontal line. The digits are color-coded: 6 is in a dark grey box, 5 is in a light blue box, 9 is in a light pink box, 0 is in a dark blue box, 7 is in a light blue box, 2 is in a light pink box, and 7 is in a dark grey box, 3 is in a light blue box, 1 is in a light pink box.

### Vocabulary

Addend, Total, Sum, Partition, increase, altogether

## Subtraction EYFS



# Calverton Primary School Calculation Policy

Concrete apparatus is used to relate subtraction to taking away and counting how many objects are left.

Solve simple problems using fingers.

Children will use their fingers to help with subtraction, e.g.  $5 - 3 = 2$ . A child will start with the biggest number in their head '5' and hold 5 fingers up. They will count back saying '5' (touching their head) '4, 3' (curling one finger down at a time), then count how many fingers are left.

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

Children are encouraged to read sentences aloud in different ways "five subtract one leaves four" "four is equal to five subtract one."

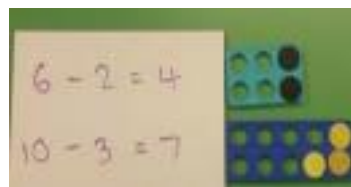
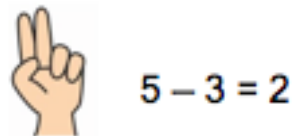
Count back to find the answer.

Have an understanding of what "less" means and be able to say what is one less than a given number. What is 1 less than 9? 1 less than 20?

Number tracks can be introduced to count back and to find one less.

Children make a record in pictures, words or symbols of subtraction activities.

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



## **Calverton Primary School Calculation Policy**

### **Vocabulary:**

Games and songs can be a useful way to begin using the vocabulary involved in subtraction. Take (away), leave, left/left over, less, fewer, difference.

### **MENTAL STRATEGIES:**

- Develop a mental image of the number system
- Children count backwards using familiar number rhymes (e.g '10 Green Bottles', '5 Fat Sausages')
- Count backwards from different starting points

# Subtraction Year 1

**CPA Approach**  
(Concrete, pictorial, Abstract)

**Understand subtraction as crossing out (take-away) (within 20):**

**Using knowledge of number bonds to subtract (within 20):**

**Understand subtraction as counting back (within 20):**

Use concrete objects and pictorial representations. Progress from using number lines with every number shown to number lines with significant numbers shown.

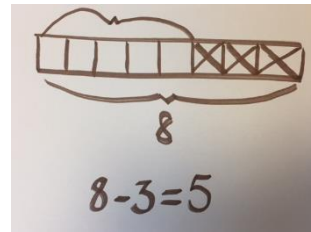
**Partitioning to subtract**

Children should be able to separate 2 digit numbers to subtract from the tens then add the leftover ones.

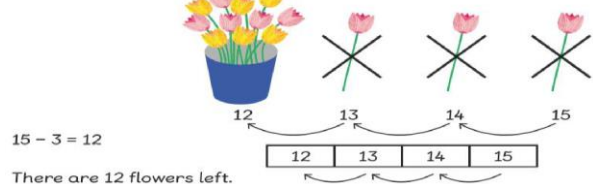
Ensure doing this time you are counting backwards in steps as well as counting forwards



$$7 - 2 = 5$$

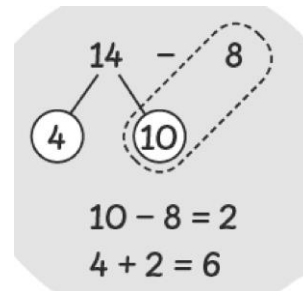


Subtract 3 from 15.



$$15 - 3 = 12$$

There are 12 flowers left.



Missing number problems e.g.

$$7 = \square - 9$$

$$20 - \square = 9$$

$$15 - 9 = \square$$

$$\square - \square = 11$$

## **Vocabulary**

Subtraction, Subtract, Take Away, Minus, Less, Backwards,

**MENTAL STRATEGIES:**

## **Calverton Primary School Calculation Policy**

- Subtract 1 and 2 digit numbers to 20 including 0 - To know that subtraction is not commutative and that the larger number must always come first
- Use knowledge of number bonds to 10 and 20 to reason ( $9 + 1 = 10$  so  $10 - 9 = 1$  and  $10 - 1 = 9$ )

# Subtraction Year 2

**CPA Approach**  
(Concrete, Pictorial, Abstract)

## Recall and use subtraction facts to 20 fluently

It is valuable to use a range of representations (also see Y1). Continue to use Base Ten, number lines, ten frames and objects to model take-away and difference.

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.

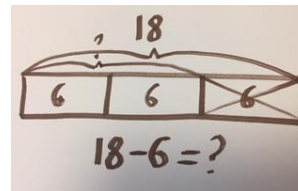
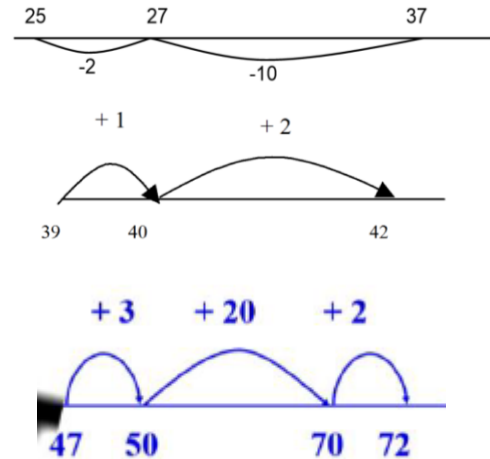
Using number lines that do not need to go to 0

## Bar Modelling by crossing out from the total

## Towards written methods within 100

Record addition and subtraction in columns, the numbers may be represented with objects and pictorial representations. E.g.  $23 - 5$ . Progress to renaming (borrowing).

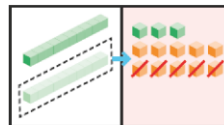
## Missing number problems, including use of inverse relationships



Regroup 1 ten into 10 ones.

Subtract the ones.

$13 \text{ ones} - 5 \text{ ones} = 8 \text{ ones}$



tens	ones
1	13
-	<del>3</del>
	5
	8

$$52 - 8 = \square$$

$$\square - 20 = 25$$

$$22 = \square - 21$$

$$6 + \square + 3 = 11$$

## Vocabulary

## **Calverton Primary School Calculation Policy**

Subtraction, Subtract, Take Away, Minus, Less, Backwards, inverse

### **MENTAL METHODS:**

To know that subtraction is the inverse of addition

- Use knowledge of inverse to check calculations and solve missing number problems

- Subtract numbers mentally, including:

subtracting units from a 2-digit number

subtracting a multiple of 10 from a 2-digit number

subtracting a 2-digit number from another 2-digit number

- Recall and use subtraction facts to 20 fluently

- Use knowledge of number bonds to 100 (multiples of 10) to reason ( $40 + 60 = 100$  so  $100 - 60 = 40$  and  $100 - 40 = 60$ )

## Subtraction Year 3

CPA Approach  
(Concrete, pictorial, Abstract)

### Mental methods

Should continue to develop, supported by a range of models and images, including the number line  
Children should make choices about which strategy to use, depending on the numbers involved.

This will **lead** to renaming (borrowing), modelled using place value counters or Base Ten

### Bar Model

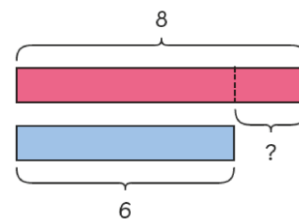
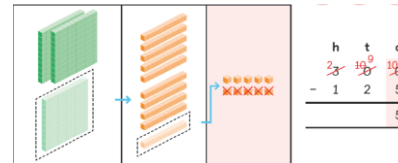
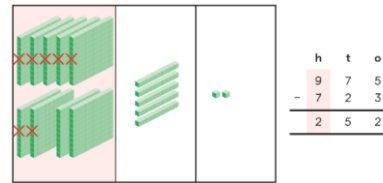
To show visualisation of subtraction problem

### Written methods (progressing to 3-digits)

Continue to model column subtraction with no renaming (Regrouping/decomposition), modelled with objects such as place value counters, Numicon and Base ten.

3 digit - 3 digit with tens value in subtrahend being greater – exchange from hundreds ( no zero place values )

### Missing number problems, including use of inverse relationships e.g.



$$8 - 6 = 2$$



$$\begin{array}{r} 334 \\ - 153 \\ \hline \end{array}$$

$$\square = 43 - 27$$

$$145 - \square = 138$$

$$274 - 30 = \square$$

$$245 - \square = 195$$

$$532 - 200 = \square$$

$$364 - 153 =$$

## **Calverton Primary School Calculation Policy**

### **Vocabulary**

Subtraction, Subtract, Take Away, Minus, Less, Backwards, inverse

Subtrahend (amount being taken away) Minuend (the quantity from which another will be subtracted)

Difference.



## Subtraction Year 4

CPA Approach  
(Concrete, pictorial, Abstract)

### Mental methods (within 10,000)

Children should continue to develop, supported by a range of models and images, including partitioning.

Bar Model

To support the visualisation of subtraction. The missing element as a question mark

### Written methods (progressing to 4-digits & 1 dp)

Continue to use column subtraction modelled with place value counters, objects, pictorial representations and the Bar Method (See Appendix 1)

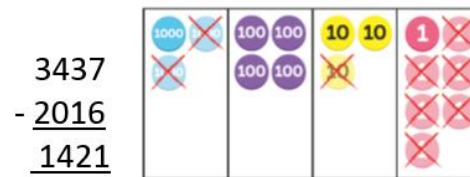
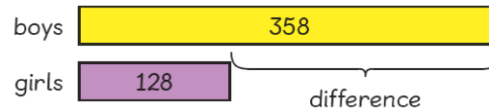
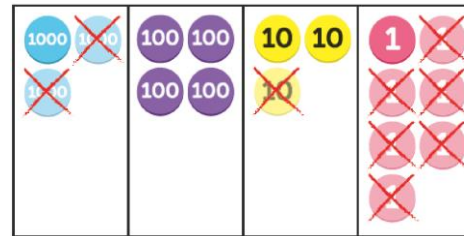
Extend to numbers with at least four digits, including renaming between various columns (borrowing).

### Use place value counters to explore compensation method

### Select and use different methods to solve word problems,

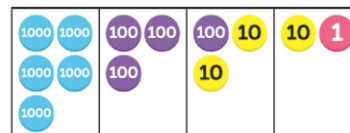
Involve two step problems in context.

Missing number/digit problems, including use of inverse relationships:



$$\begin{array}{r} 3437 \\ - 2016 \\ \hline 1421 \end{array}$$

$$\begin{array}{r} 5 \quad 2 \quad \overset{7}{\cancel{8}} \quad \overset{10}{\cancel{9}} \\ - 3 \quad 1 \quad 6 \quad 9 \\ \hline 2 \quad 1 \quad 1 \quad 1 \end{array}$$



$$\begin{array}{r} 5 \quad 3 \quad \overset{12}{\cancel{2}} \quad \overset{11}{\cancel{8}} \\ - 1 \quad \overset{2}{\cancel{2}} \quad \overset{3}{\cancel{3}} \quad 8 \\ \hline \end{array}$$

$$200 - 90 - 80 = \square$$

$$225 - \square = 150$$

$$\square - 25 = 67$$

$$\square - 2000 = 900$$

## **Calverton Primary School Calculation Policy**

### **Vocabulary**

Subtraction, Subtract, Take Away, Minus, Less, Backwards, inverse

Subtrahend (amount being taken away) Minuend (the quantity from which another will be subtracted)

Difference.

### **MENTAL STRATEGIES:**

Subtract numbers mentally, including:

- Subtracting multiples of one thousand from a 4-digit number
- Use of number pairs that total 1000 (multiples of 10) to calculate subtraction (e.g  $1000 - 300 = 700$ )
- Estimate the answer to a calculation and use inverse operations to check answers

## Subtraction Year 5

CPA Approach  
(Concrete, pictorial, Abstract)

**Mental methods (within 1 000 000)** should continue to develop, supported by a range of models and images, including partitioning.

**Written methods (progressing to more than 4-digits)**

As in Year 4, continue to use place value counters to support understanding of decomposition (renaming/exchanging) in formal written method.  
E.g.  $96\ 420 - 87\ 531 =$

Continue to select and use different methods to solve word problems, involving two step problems in context.

### Bar Model to support problem solving

Use of bar model for missing number problems; questions with more than one answer; Numbers involving negatives.

### Missing number/digit problems:

$6.45 = 6 + 0.4 + \square$ ;  
 $119 - \square = 86$ ;  $1\ 000\ 000 - \square = 999\ 000$ ;  
 $600\ 000 + \square + 1000 = 671\ 000$ ;  $12\ 462 - 2\ 300 =$

$$600\ 000 - 345\ 000 = \square$$

Method 1

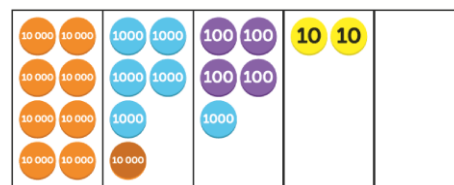
$$\begin{array}{r} 600 \\ 400 \quad 200 \\ - 345 \\ \hline 55 \end{array}$$

$$600 - 345 = 200 + 55$$

Method 2

$$\begin{array}{r} 600 \\ 500 \quad 90 \quad 10 \\ - 300 \quad - 40 \quad - 5 \\ \hline 200 \quad 50 \quad 5 \end{array}$$

$$600 - 345 = 200 + 50 + 5$$



$$\begin{array}{r} 15 \\ 8 \cancel{16} \quad 14 \\ \cancel{9} \cancel{6} \quad \cancel{4} 2 0 \\ - 87\ 531 \\ \hline \end{array}$$

$$\boxed{a} - \boxed{b} =$$

$$\begin{array}{c} \text{Difference} \\ \boxed{b} \\ \boxed{a} \end{array}$$

$$\begin{array}{l} -7 - x = -21 \\ \text{Whole} \rightarrow \boxed{21} \\ \text{Part} \rightarrow \boxed{-7} \quad \boxed{x} \\ x = ? \end{array}$$

### Vocabulary

Subtraction, Subtract, Take Away, Minus, Less, Backwards, inverse  
Subtrahend (amount being taken away) Minuend (the quantity from which another will be subtracted)  
Difference

### MENTAL STRATEGIES:

## **Calverton Primary School Calculation Policy**

Subtract increasingly large numbers mentally (e.g  $12,654 - 1,341 = 11,213$ )

- Mentally subtract tenths (e.g  $0.7 - 0.5 = 0.2$ ) and 1-digit whole numbers and tenths ( $8 - 0.3 = 7.7$ )

- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy

## Subtraction Year 6

CPA Approach  
(Concrete, pictorial, Abstract)

### Mental methods

should continue to develop, supported by a range of models and images,

### Written methods Alongside visual methods such as Bar Modelling

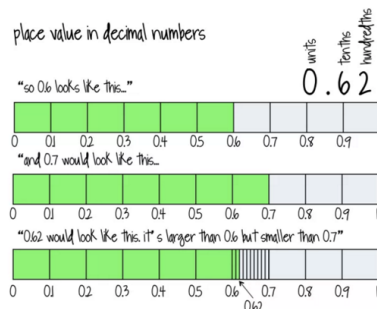
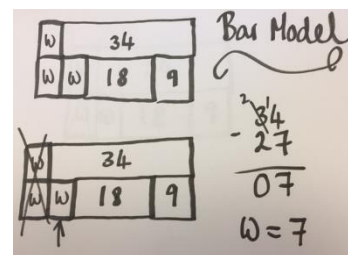
As in Year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with columnar method to be secured. Continue to model with place value counters, objects, pictorial representations and the Bar Method.

Continue calculating with decimals, including those with different numbers of decimal places, and develop procedural fluency with decomposition (Regrouping) to be secured.

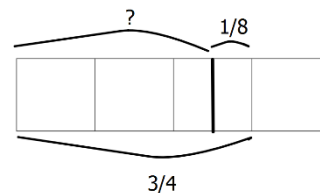
### Problem Solving

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

$$\begin{array}{r} \text{£ } 1 \overset{14}{\cancel{5}} . \overset{9}{\cancel{0}} \overset{10}{\cancel{0}} \\ - \text{£ } 1 \quad 3 . 4 \quad 5 \\ \hline \text{£ } \quad \square . \square \square \end{array}$$



$$3/4 \text{ of } 64 - 1/8 \text{ of } 64 =$$



## **Calverton Primary School Calculation Policy**

### **Vocabulary**

Subtraction, Subtract, Take Away, Minus, Less, Backwards, inverse

Subtrahend (amount being taken away) Minuend (the quantity from which another will be subtracted)

Difference, Zero digit

The year group markings relate to Mental Arithmetic sessions.

### **MENTAL STRATEGIES:**

Subtract increasingly large numbers mentally (e.g  $12,654 - 1,341 = 11,213$ )

- Mentally subtract tenths (e.g  $0.7 - 0.5 = 0.2$ ) and 1-digit whole numbers and tenths ( $8 - 0.3 = 7.7$ )
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy

# Multiplication EYFS

The link between addition and multiplication can be introduced through doubling and reinforced through repeated addition of the same number.

Numicon is used to visualise the repeated adding of the same number.

Children begin with mostly pictorial representations e.g. How many groups of 2 are there?  $2 + 2 + 2 + 2 + 2$ , so 5 groups of 2.

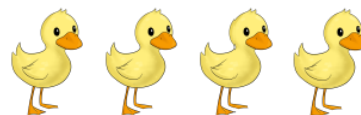
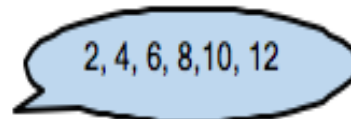
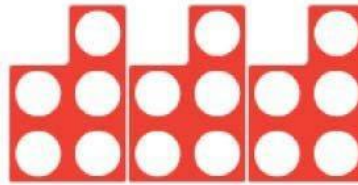
Real life contexts and use of practical equipment is used to count in repeated groups of the same size e.g. How many wheels are there altogether?

Children are encouraged to read number sentences aloud in different ways “five times two makes ten” “ten is equal to five multiplied by two” “ten is the same as five lots of two.”

Count in twos, fives and tens both aloud and with objects.

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

$$5 + 5 + 5$$



### **Vocabulary:**

Lots of, groups of, times, repeated addition, double, combine.

### **MENTAL STRATEGIES:**

Develop a mental image of the number system.

- Understand the value of a number
- Counting in 2s, 5s and 10s.
- Number patterns on a number line and on a hundred squares
- 2's, 5's and 10's.

## Multiplication Year 1

**CPA Approach**  
(Concrete, pictorial, Abstract)

### Doubling and repeated addition

Understand multiplication is related to doubling and combining groups of the same size (repeated addition) for 2, 5, 10.

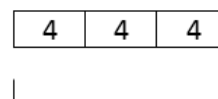
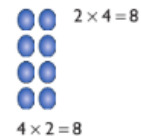
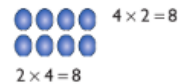
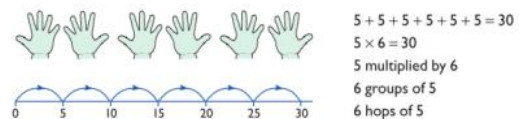
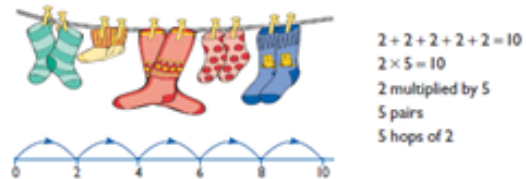
Washing line, and other practical resources for counting. Concrete objects: Base Ten, Numicon, bundles of straws, bead strings

### Bar Modelling

Use of bar model as a visual to support early multiplication. This can be taught through cubes or counters

### Problem solving

Problem solving with concrete objects (including money and measures) Use arrays to begin to understand multiplication can be done in any order (commutative)



$$3 \times 4 = 12$$





# **Calverton Primary School Calculation Policy**

## **Vocabulary**

Groups of, times, multiply, addition, arrays, lots of

## **MENTAL STRATEGIES:**

Count forwards and backwards in multiples of 2s, 5s and 10s.

- Recall doubles of numbers up to and including 10.

# Multiplication Year 2

**CPA Approach**  
(Concrete, Pictorial, Abstract)

## Times table Facts

Recall and use multiplication facts for the 2, 5 and 10 multiplication tables as a minimum requirement. Develop understanding of solving multiplication problems using arrays, objects, pictorial representations and number lines (see Year 1).

## Number Sentences

Expressing multiplication as a number sentence using  $\times$  and explore commutative law of multiplication

## Scaling

Begin to develop understanding of multiplication as scaling (3 times bigger/taller)

## Number lines

Using number lines with a link to repeated addition.

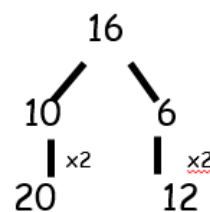
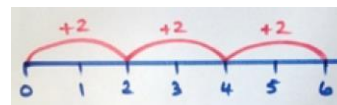
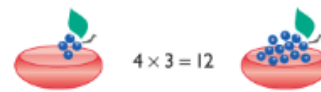
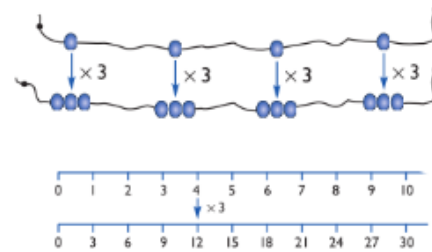
## Doubling numbers up to 10 + 10

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

## Towards written methods

Use arrays and jottings to develop an understanding of doubling two digit numbers

## Solve missing number problems.



$$\begin{array}{l} 7 \times 2 = \bullet \\ 7 \times \bullet = 14 \\ \bullet \times 2 = 14 \end{array} \qquad \begin{array}{l} \bullet = 2 \times 7 \\ 14 = \bullet \times 7 \\ 14 = 2 \times \bullet \end{array}$$

## Vocabulary

Groups of, times, multiply, addition, arrays, lots of, multiplication

## MENTAL STRATEGIES:

## **Calverton Primary School Calculation Policy**

Count forwards and backwards in multiples of 3.

- Know the 2, 5 and 10 times tables (in and out of order)
- Recognise odd and even numbers

## Multiplication Year 3

CPA Approach  
(Concrete, pictorial, Abstract)

### Mental methods

Doubling 2 digit numbers using partitioning

Demonstrating multiplication on a number line –  
jumping in larger groups of amounts

$13 \times 4 = 10$  groups of 4 then 3 groups of 4

Recall and use multiplication facts for the 3, 4 and 8 multiplication tables

### Bar modelling

Developing this method further to go alongside calculations

### Written methods (progressing to 3digit x 1digit)

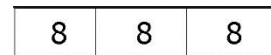
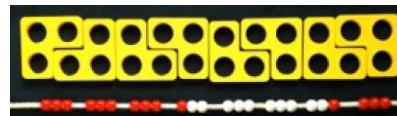
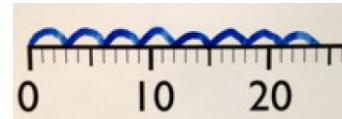
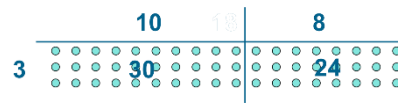
Developing written methods using understanding of visual images to group and create equal groups of objects and pictures

### Grid method

2 and 3 digit by 1 digit only looking at partitioning of multiplicand

### Short Multiplication

2 by 1 digit numbers using known facts to support



?

$$3 \times 8 = ?$$

<b>x</b>	<b>30</b>	<b>5</b>
<b>7</b>		

	H	T	U
x		3	4
			3
		1	2
		9	0
	1	0	2

$24 \times 6$  becomes

$$\begin{array}{r} 24 \\ \times 6 \\ \hline 144 \\ 2 \end{array}$$

Answer: 144

### Vocabulary

Multiplicand (Number to be multiplied) Multiplier (Amount that multiplicand is being multiplied by)  
Product, lots of, groups of, times, as much, factors

### MENTAL STRATEGIES:

Count forwards and backwards in multiples of 4, 8, 50 & 100 - Know the 3, 4 and 8 times tables (in and out of order)

- Connect the 2, 4 and 8 times tables through doubling

- Use knowledge of place value to calculate multiplication (e.g.  $2 \times 2 = 4$ ,  $2 \times 20 = 40$ ,  $2 \times 200 = 400$ )

## **Calverton Primary School Calculation Policy**

## Multiplication Year 4

CPA Approach  
(Concrete, pictorial, Abstract)

### Mental methods

Counting in multiples of 6, 7, 9, 25 and 1000, and steps of 1/100.

Recall and use multiplication facts for the 6, 7, 9, 11 and 12 multiplication tables

Use known facts to multiply by multiples of 10

### Written methods (progressing to 3digit x 2digit, including 1dp)

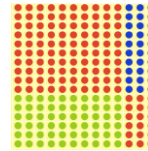
Children to embed and deepen their understanding to multiply up to 2d x 2d progressing to 3d x 2d and decimals to 1dp. Ensure this is still linked back to their understanding of arrays and supported using place value counters

### Leading to short written method including regrouping (carrying):

Children to use their knowledge of multiplication tables and inverse, supported by pictorial representations and the Bar Method

### Bar Model to support calculations and word problems

$$\begin{array}{r} 43 \times 6 \\ 40 \times 6 + 3 \times 6 \end{array}$$



43 x 6 by partitioning

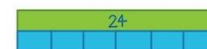
x	40	3
6	240	18

$$\begin{array}{r} \phantom{0}2\phantom{0}3 \\ \times \phantom{0}6 \\ \hline \phantom{0}120 \\ + \phantom{0}18 \\ \hline \phantom{0}138 \end{array}$$

$$\begin{array}{r} \phantom{0}2\phantom{0}3 \\ \times \phantom{0}6 \\ \hline \phantom{0}138 \end{array}$$

Courtney baked 24 cookies to share with her friends. If she shares her cookies with 6 friends, how many cookies would each friend get?

C = amount of cookies for each friend



### Vocabulary

Multiplicand (Number to be multiplied) Multiplier (Amount that multiplicand is being multiplied by)  
Product, lots of, groups of, times, as much, factors

### MENTAL STRATEGIES:

Know all times tables up to and including 12 x 12 (by the end of Year 4)

## **Calverton Primary School Calculation Policy**

- Recognise and use factor pairs (e.g factor pairs for numbers up to and including 10)
- Know that  $TU \times 5$  is  $TU \times 10$  then divide by 2 (e.g  $18 \times 5 = (18 \times 10) \div 2 = 90$ )
- Know that  $TU \times 9$  is  $TU \times 10$  then subtract  $TU$  (e.g  $18 \times 9 = (18 \times 10) - 18 = 162$ )

## Multiplication Year 5

CPA Approach  
(Concrete, pictorial, Abstract)

### Mental methods

X whole numbers and decimals by 10, 100, 1000  
using knowledge of place value to move digits

Use practical resources and jottings to explore  
equivalent statements (e.g.  $4 \times 35 = 2 \times 2 \times 35$ )

Recall of prime numbers up to 19 and identify  
prime numbers up to 100 (with reasoning)

Identify multiples and factor pairs for numbers

### Written methods (progressing to 4d x 2d)

Children to continue to explore long and short  
methods:

As in Year 4, children to use their knowledge of  
multiplication tables and inverse, supported by  
pictorial representations and the Bar Method

Grid method to multiply 2 digit numbers by 2  
digit numbers e.g.  $39 \times 51 =$

### Bar model to support Problem solving. Link with other operations

$$\begin{array}{r} 118 \\ \times \quad 3 \\ \hline 24 \rightarrow \text{multiply by ones} \\ 30 \rightarrow \text{multiply by tens} \\ + 300 \rightarrow \text{multiply by hundreds} \\ \hline 354 \end{array}$$

$$\begin{array}{r} 133 \\ 1144 \\ \times \quad \quad 8 \\ \hline 9152 \end{array}$$

	50	1
30	?	?
9	?	?

Jason rode with his uncle for 6 hours at the average rate  
of 49 miles per hour. How far did he travel?

Jason's miles

1	2	3	4	5	6	
49	49	49	49	49	49	?

?

$$\begin{aligned} 49 \times 6 &= \\ (40 \times 6) + (9 \times 6) &= \\ 240 + 54 &= \\ 294 & \end{aligned}$$

Jason travelled 294 miles.

### Vocabulary

Multiplicand (Number to be multiplied) Multiplier (Amount that multiplicand is being multiplied by)  
Product, lots of, groups of, times, as much, Factors

### MENTAL STRATEGIES:

Recognise and calculate factor pairs for any number  
- Use times table knowledge to derive multiples of any number



## **Calverton Primary School Calculation Policy**

- Establish whether a number is a prime number (up to 100) or a composite number (not prime) and recall prime numbers up to 19
- To know what a square number is and recall all square numbers (up to and including 144)
- To know what a cube number is and recall the first 5 cube numbers

## Multiplication Year 6

CPA Approach  
(Concrete, pictorial, Abstract)

### Mental methods

Identifying common factors and multiples of given numbers and prime numbers

X 2d and 3d numbers by 1d mentally or using jottings

Perform mental calculations including mixed operations and large numbers

### Written methods

Continue to refine and deepen understanding of written methods including grid method, expanded column and fluency for using column multiplication supported by jottings and the Bar Method

### Bar model to support word problems and percentages

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

$$23 \times 113 =$$

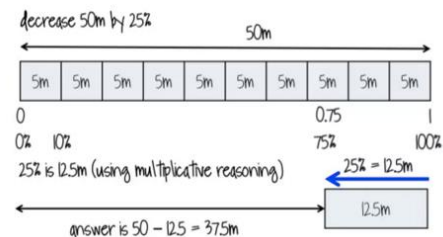
$$20 \times 113 = 2260$$

$$3 \times 113 = 339$$

$$23 \times 113 = 2599$$

$$\begin{array}{r} 5172 \\ \times 38 \\ \hline 41376 \\ 151160 \\ \hline 196536 \\ 1 \end{array}$$

increase/decrease by a percentage



by putting on both the perc and decimal number line you can link to multipliers, in this case it shows why the multiplier for a 25% decrease is 0.75

## **Calverton Primary School Calculation Policy**

### **Vocabulary**

Multiplicand (Number to be multiplied) Multiplier (Amount that multiplicand is being multiplied by)  
Product, lots of, groups of, times, as much, Factors

### **MENTAL STRATEGIES:**

Use scaling to solve decimal number problems as whole number problems using the rule: 'the number of decimal digits in the question is the same as the number of decimal digits in the answer'

- Identify common factors, common multiples and prime numbers
- Use common factors to simplify fractions mentally
- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy

## Calverton Primary School Calculation Policy: Multiplication

### Division EYFS

Division can be introduced through halving or sharing an equal amount into 2 groups.

Children begin with mostly pictorial representations linked to real life contexts.

Children need to see and hear representations of division as both grouping and sharing.

#### Grouping model:

Mum has 6 socks. She grouped them into pairs. How many pairs did she make?

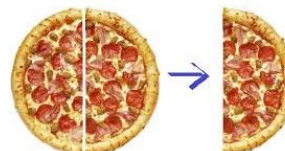
#### Sharing model:

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

The sharing model is a useful way to introduce young children to fractions e.g. Can you cut the pizza in half?

Children make a record in pictures, words or symbols of division activities.

Children are encouraged to have a go at recording the calculation that has been carried out e.g. by arranging concrete objects into groups.



#### **Vocabulary:**

Half, halve, share, equal, groups of, left/left over.

#### **MENTAL STRATEGIES:**

Count forwards and backwards in multiples of 2s, 5s and 10s.

## Division Year 1

**CPA Approach**  
(Concrete, pictorial, Abstract)

### Number Patterns

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 to 10- understanding the difference between the two concepts.**

### Sharing

Importance of one-to-one correspondence.

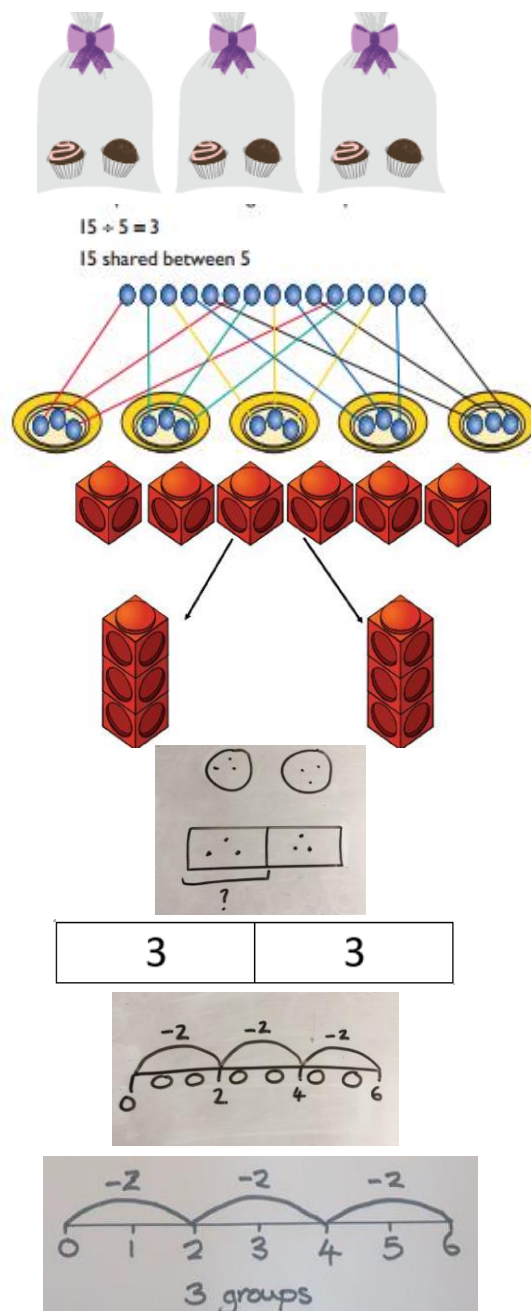
Children should be taught to share using concrete apparatus.

### Grouping and Use of Bar Model

Children should apply their counting skills to develop some understanding of grouping.  
How many groups of 2 in 6?

Arrays as a pictorial representation can be used for division.  $15 \div 3 = 5$  There are 5 groups of 3.  
 $15 \div 5 = 3$  There are 3 groups of 5.

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



### Vocabulary

halve, share, share equally, groups, equal groups of, divide, divided by, left, left over

### MENTAL STRATEGIES:

Count forwards and backwards in multiples of 2s, 5s and 10s

## Division Year 2

**CPA Approach**  
(Concrete, Pictorial, Abstract)

### Sharing and Grouping

Know and understand sharing and grouping-  
introducing children to the  $\div$  sign.

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

Children should continue to use grouping and  
sharing for division (dividends below 20) using  
practical apparatus, arrays and pictorial  
representations.

### Progress to Grouping using a number line

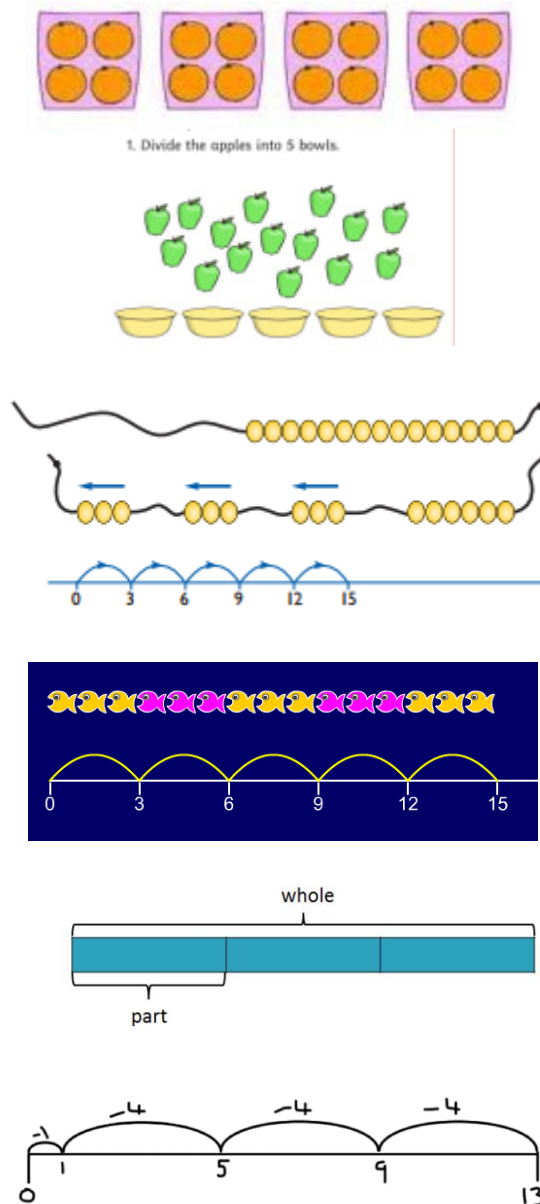
Group from zero in jumps of the divisor to find  
out 'how many groups of 3 are there in 15?'.  
 $15 \div 3 = 5$

### Bar Model

Using bar model to represent a number divided  
into  $\frac{1}{2}$   $\frac{1}{4}$  etc. With not remainders at the start  
point.

### Remainders using resources

Continue work on arrays. Support children to  
understand how multiplication and division are  
inverse. Look at an array – what do you see?  
Remainders can be introduced by use of number  
lines; sorting activities; cube and counter use and  
bar model.



### Vocabulary

groups of, equal groups of, halve, share, share equally, divide, divided by, divided into, repeated subtraction, inverse.

### MENTAL STRATEGIES:

To know that division is the inverse of multiplication  
- Recall division facts for the 2, 5 and 10 times tables

## **Calverton Primary School Draft Calculation Policy:**

- Recall halves for even numbers up to and including 20

## Division Year 3

CPA Approach  
(Concrete, pictorial, Abstract)

### Recall of Known facts

Recall and use division facts for the 3, 4 and 8 multiplication tables using times grids.

Children should continue to use grouping and sharing for division using practical apparatus, arrays and pictorial representations.

Place value counters, arrays and number lines can be used to support children apply their knowledge of grouping.

### Partitioning

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

$$48 \div 4 = 12$$

### Bar Model and Short Division

Use of bar model as a representation to link alongside basic 2 digit short division.

Starting with 2 digit dividends with no remainders moving onto remainders and showing remainder as a fraction

### Repeated Subtraction

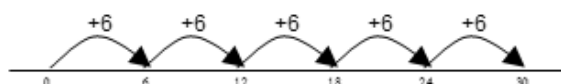
#### $\div$ = signs and missing numbers

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

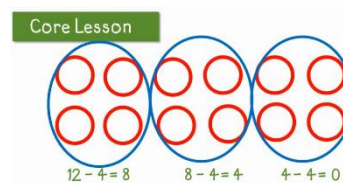
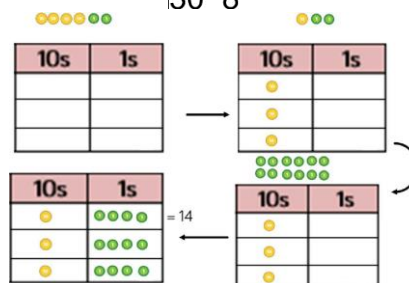
	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144



$$12 \div 4 = 3$$



$$\begin{array}{r} 38 \\ 30 \quad 8 \end{array}$$



$$3 \overline{) 6393}$$

### Vocabulary

Divisor, dividend, quotient, sharing, groups of, lots of, vinculum

#### MENTAL STRATEGIES:

Know the division facts from the 3, 4 and 8 times tables

- Use knowledge of place value to calculate division (e.g.  $14 \div 2 = 7$ ,  $140 \div 2 = 70$ ,  $1400 \div 2 = 700$ )



## Division Year 4

CPA Approach  
(Concrete, pictorial, Abstract)

Recall division facts for the multiplication tables up to  $12 \times 12$

### Sharing, Grouping, Repeated Subtraction and Inverse

Children will continue to explore division as sharing, grouping, repeated subtraction and inverse until they have a secure understanding. Continue to use pictorial representations and Bar Method to solve word problems in context.

### Chunking method

Calculations with remainders as well as without should be used

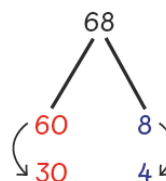
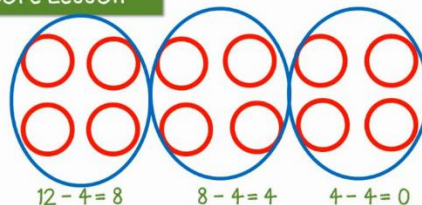
Remainders should be interpreted according to the context.

### Place value and Short Division

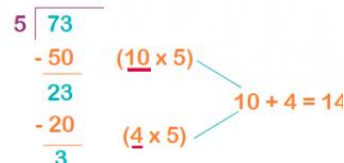
Use of partitioning and place value to show the process of regrouping across to the next column. Remainders to be represented as a remainder so:

$$946 \div 7 = 137 \text{ r}5$$

#### Core Lesson

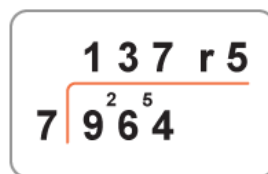
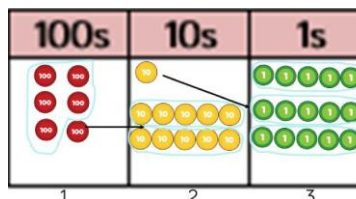


$$73 \div 5$$



How many 5s have been subtracted?  
14 sets of 5, with 3 left over.

Answer:  $73 \div 5 = 14 \text{ r}3$



### Vocabulary

Divisor, dividend, quotient, sharing, groups of, lots of, vinculum

### MENTAL STRATEGIES:

Know all related division facts for all times tables up to 12 times table (by the end of Year 4)

## Division Year 5

CPA Approach  
(Concrete, pictorial, Abstract)

### Sharing, Grouping, Repeated Subtraction and Inverse

Children should progress in their use of written division calculations:

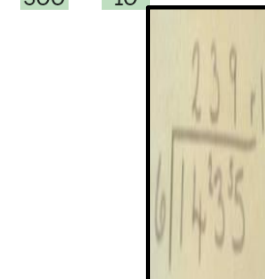
- Using tables facts with which they are fluent
- Experiencing a logical progression in the numbers they use, for example:
  1. Dividend just over 10x the divisor, e.g.  $84 \div 7$
  2. Dividend just over 10x the divisor when the divisor is a teen number, e.g.  $173 \div 15$  (learning sensible strategies for calculations such as  $102 \div 17$ )
  3. Dividend over 100x the divisor, e.g.  $840 \div 7$
  4. Dividend over 20x the divisor, e.g.  $168 \div 7$

All of the above stages should include calculations with remainders as well as without.

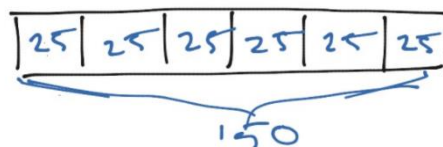
Children begin to practically develop their understanding of how to express the remainder as a decimal or a fraction. Ensure practical understanding allows children to work through this (e.g. What could I do with this remaining 1? How could I share this between 6 as well?)

$$\begin{array}{r}
 930 \\
 \swarrow \searrow \\
 900 \quad 30 \\
 \downarrow \quad \downarrow \\
 300 \quad 10 \\
 \hline
 310
 \end{array}$$

$$\begin{array}{r}
 3 \overline{) 930} \\
 \underline{9 \phantom{0} 0} \phantom{0} \\
 3 \phantom{0} 0 \\
 \underline{3 \phantom{0} 0} \\
 0
 \end{array}$$



$$150 \div 6 = 25$$



$432 \div 15$  becomes

$$\begin{array}{r}
 28 \text{ r } 12 \\
 15 \overline{) 432} \\
 \underline{30 \phantom{0}} \\
 13 \phantom{0} \\
 \underline{12 \phantom{0}} \\
 12
 \end{array}$$

### Vocabulary

Divisor, dividend, quotient, sharing, groups of, lots of, vinculum

### MENTAL STRATEGIES:

Multiply and divide numbers mentally drawing upon known facts  
- Associate fractions with division

## Division Year 6

CPA Approach  
(Concrete, pictorial, Abstract)

### Sharing, Grouping, Repeated Subtraction and Inverse

Children will continue to explore division as sharing, grouping, repeated subtraction and inverse and to represent problems using the Bar Method (See Appendix 1) if appropriate. Quotients (results of division) should be interpreted appropriately for the context as a whole number, remainders, decimal or fraction.

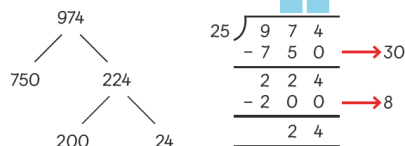
### Formal Written Methods – long and short division

Continue to use partitioning, number bonds and place value counters to support the efficient use of long and short division methods including expressing remainder as a fraction or decimal  
Dividing fractions by fractions

### 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

$$974 \div 25 = \square$$



$$974 \div 25 = 38 \frac{24}{25} = 38 \frac{96}{100} = 38.96$$

432  $\div$  15 becomes

$$\begin{array}{r} 28 \\ 15 \overline{) 432} \\ \underline{30} \phantom{0} \\ 132 \\ \underline{120} \\ 12 \end{array} \quad \begin{array}{l} 15 \times 20 \\ 15 \times 8 \end{array}$$

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

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

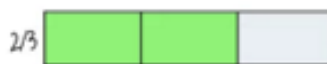
432  $\div$  15 becomes

$$\begin{array}{r} 28.8 \\ 15 \overline{) 432.0} \\ \underline{30} \phantom{00} \\ 132 \phantom{0} \\ \underline{120} \phantom{0} \\ 120 \\ \underline{120} \\ 0 \end{array}$$

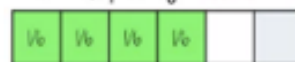
Answer: 28.8

dividing fractions by fractions

$$\frac{2}{3} \div \frac{1}{6}$$



"how many  $\frac{1}{6}$ 's go into  $\frac{2}{3}$ ?"



$$= 4$$

### Vocabulary

Divisor, dividend, quotient, sharing, groups of, lots of, vinculum

### MENTAL STRATEGIES:

Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy  
- Calculate a fraction of an amount

# **Calverton Primary School Draft Calculation Policy:**

## **Appendix A**

### **Mathematical Language:**

High expectations of the mathematical vocabulary and language used are essential, with staff only accepting what is correct.

Consistency across the school is key:

<b>Correct Terminology</b>	<b>Incorrect Terminology</b>
Ones	Units
Is equal to (is the same as)	Equals
Zero	Oh (the letter 'o')
Exchange Exchanging Regrouping	Stealing Borrowing
Calculation Equation	Generic term of 'sum' or 'number sentence'
Whole (bar model) Part	

Encourage discussion and reasoning:

- > What do you notice?
- > True or false? Odd one out?
- > Do, then explain
- > Spot the mistake
- > Give an example of
- > Continue the pattern
- > Convince me...prove it!
- > What is the same.....what is different?
- > Is this always, sometimes or never true? If sometimes, when?
- > If this is my answer, what could the question be?
- > Explain why
- > I wonder why
- > How do you know
- > Does anyone know
- > What will happen if

## **Calverton Primary School Draft Calculation Policy:**

- How will you know
- How can we find out
- Can you describe ...?
- Is there another way
- What makes you think that ...?