

# All Saints CE Primary



How we teach calculations:

## **Calculation Policy for Mathematics**

# About our Calculation Policy

Autumn 2021

*A United Caring Community of Learners*

The following calculation policy has been devised to meet requirements of the National Curriculum 2014 for the teaching and learning of mathematics, and is also designed to give pupils a consistent and smooth progression of learning in calculations across the school.

Models and pictorial representations are vital for children to acquire and develop their conceptual understanding of number and calculation throughout the teaching of mathematic concepts. Teachers build fluency skills through problem solving and reasoning activities.

Fluency is the quick and efficient recall of facts whilst applying to different contexts and representations consisting of three elements: efficiency, accuracy and flexibility.

Age stage expectations of the final formal written method for each area of calculations are represented in this document.

The calculation policy is organised according to age stage expectations as set out in the National Curriculum 2014, **however it is vital that pupils are taught according to the stage that they are currently working at**, being moved onto the next level as soon as they are ready, or working at a lower stage until they are secure enough to move on.

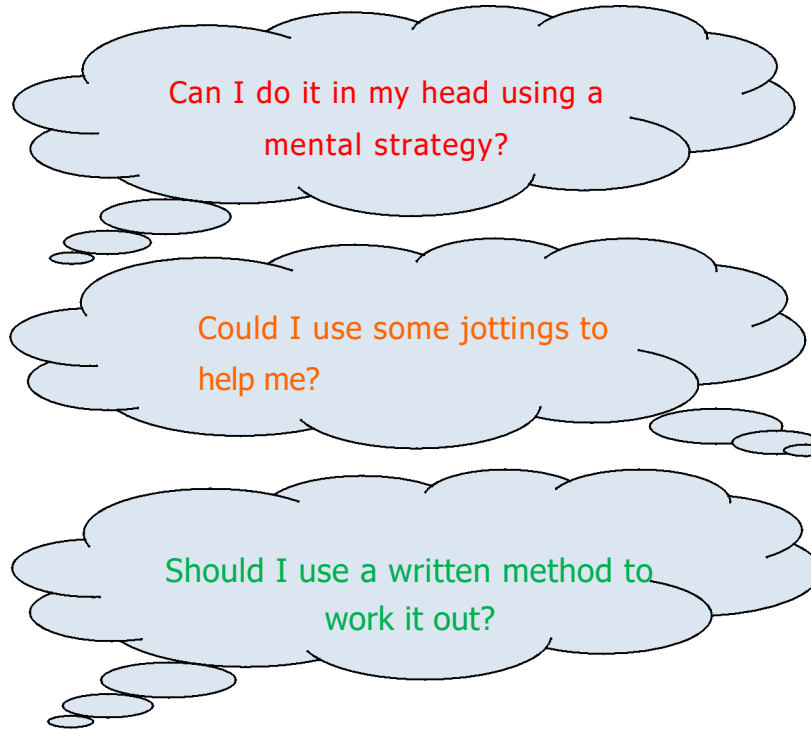
Providing a context for calculation:

It is important that **any type of calculation is given a real life context or problem solving approach** to help build children's understanding of the purpose of calculation, and to help them recognise when to use certain operations and methods when faced with problems. This must be a priority within calculation lessons.

Choosing a calculation method:

Children need to be taught to use the following processes in deciding what approach they will take to a calculation, to ensure they select the most appropriate method for the numbers involved:

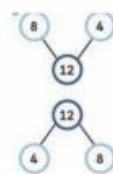
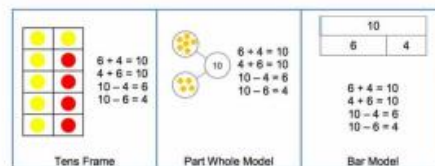
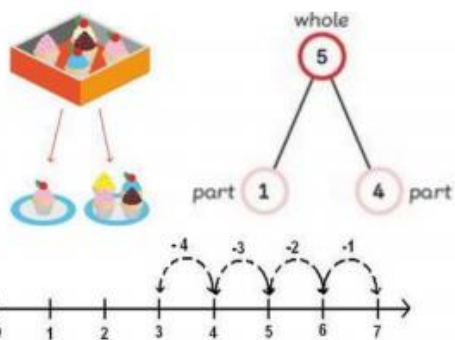
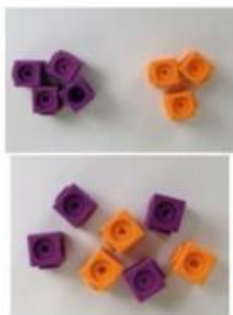
To work out a tricky calculation:
Approximate,
Calculate,
Check it mate!



# Addition formal methods

## Year 1

$3 + 4 = 7$



$$\begin{aligned} 8 + 4 &= 12 \\ 4 + 8 &= 12 \end{aligned}$$

This is a family of addition and subtraction facts.

$$\begin{aligned} 12 - 8 &= 4 \\ 12 - 4 &= 8 \end{aligned}$$



Using concrete resources, number lines, part-whole model and ten frames to solve addition problems within 20.

Year 2

$$\begin{array}{r} \text{a) } 36 + 47 = 83 \\ \begin{array}{r} \text{T O} \\ \text{||| } 36 \text{ :} \\ \text{|||} + 47 \text{ :} \\ \hline 83 \\ \text{xx} \end{array} \end{array}$$

Year 3

$$\begin{array}{r} 372 + 469 = 841 \\ \begin{array}{r} \text{H T O} \\ 372 \\ + 469 \\ \hline 841 \\ \text{xx} \end{array} \end{array}$$

Year 4

$$\begin{array}{r} \pounds 26.78 + \pounds 38.56 = \pounds 65.34 \\ \begin{array}{r} 26.78 \\ + 38.56 \\ \hline 65.34 \\ \text{xxx} \end{array} \end{array}$$

Year 5

$$\begin{array}{r} 30,594 + 15,423 = 46,017 \\ \begin{array}{r} 30594 \\ + 15423 \\ \hline 46017 \\ \text{xx} \end{array} \end{array}$$

Year 6

$$\begin{array}{r} 25.461 + 8.060 + 39.700 = 73.221 \\ \begin{array}{r} 25.461 \\ 8.060 \\ + 39.700 \\ \hline 73.221 \\ \text{xxx} \end{array} \end{array}$$

When adding with decimals, use a zero as a placeholder.

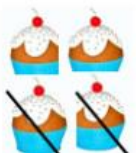
# Subtraction formal methods

## Year 1

Use physical objects, counters, cubes etc to show how objects can be taken away.



$$6 - 4 = 2$$

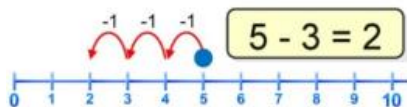


$$4 - 2 = 2$$

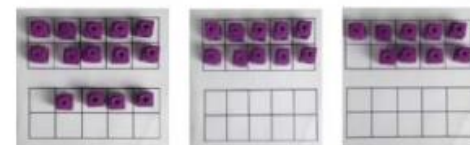
$$13 - 4$$



Use counters and move them away from the group as you take them away counting backwards as you go.



$$14 - 9 =$$



Make 14 on the ten frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.

## Year 2

	7	6	-	2	9	=	4	7
		T	O					
	X	6	X	6	:	:	:	:
	-	2		9				
		4		7				

## Year 3

	6	8	3	-	2	9	5	=	3	8	8
		H	T								
		5	X	8	:	:	:				
	-	2		9			5				
		3		8			8				

## Year 4

	7	5	2	8	-	2	6	3	4	=	4	8	9	4
	6	X	4	5	:	:	:	:						
	-	2		6			3		4					
		4		8			9		4					

## Year 5 & 6

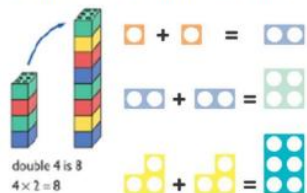
	2	7	5.	3	1	9	kg	-	3	8.	0	7	kg	=	2	3	7.	2	4	9	kg
	2	X	6	5	:	:	:														
	-	3		8.		0	7		0												
		2		3		7.	2		4												

When subtracting with decimals, use a zero as a placeholder.

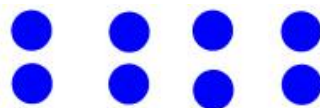
# Multiplication formal methods

## Year 1

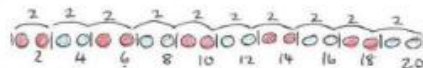
Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling



Double 4 is 8



Children make representations to show counting in multiples.



Count in multiples of a number aloud.

Write sequences with multiples of numbers.

2, 4, 6, 8, 10

5, 10, 15, 20, 25, 30

Count the groups as children are skip counting, children may use their fingers as they are skip counting.



## Year 2

$$5 \times 3 = 15$$

$$3 + 3 + 3 + 3 + 3 = 15$$

$$5 \times 6 = 30$$

## Year 3

$$24 \times 6 =$$

x	20	4
6	120	24

$$\begin{array}{r} 120 \\ + 24 \\ \hline 144 \end{array}$$

$$37 \times 4 = 148$$

$$\begin{array}{r} 37 \\ \times 4 \\ \hline 148 \end{array}$$

## Year 4

$$342 \times 6 = 2,052$$

$$463 \times 4 = 1,852$$

$$\begin{array}{r} 342 \\ \times 6 \\ \hline 12 \\ 240 \\ \hline 1800 \\ 2052 \\ \hline \end{array}$$

$$\begin{array}{r} 463 \\ \times 4 \\ \hline 1852 \\ \hline \end{array}$$

Ensure children understand the place value when multiplying by tens and hundreds, before moving onto short multiplication.

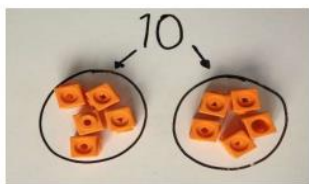
## Year 5 & 6

$$4,036 \times 24 = 96,864$$

$$\begin{array}{r} 4036 \\ \times 24 \\ \hline 16144 \\ 80720 \\ \hline 96864 \end{array}$$

# Division formal methods

## Year 1



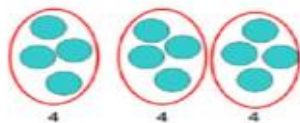
I have 10 cubes, can you share them equally in 2 groups?

Children use pictures or shapes to share quantities.

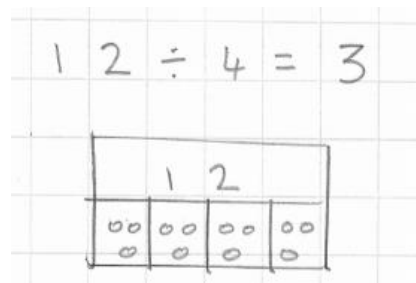


8 shared between 2 is 4

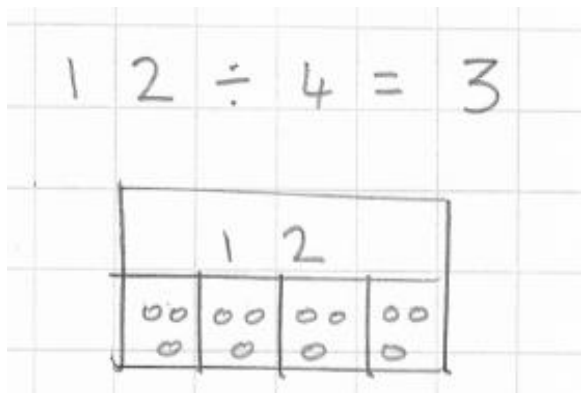
Sharing:



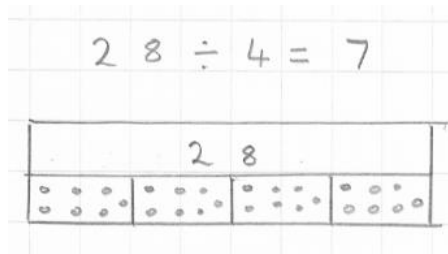
12 shared between 3 is 4



## Year 2



## Year 3



Year 4

$$367 \div 2 = 183 \text{ r } 1$$

$$\begin{array}{r} 183 \text{ r } 1 \\ 2 \overline{) 367} \end{array}$$

Year 5

$$5309 \div 8 = 663 \text{ r } 5$$

$$\begin{array}{r} 663 \text{ r } 5 \\ 8 \overline{) 5309} \end{array}$$

Year 6

$$432 \div 5 = 86 \text{ r } 2$$

$$\begin{array}{r} 086 \text{ r } 2 \\ 5 \overline{) 432} \end{array}$$

$$\begin{array}{r} 086 \text{ r } \frac{2}{5} \\ 5 \overline{) 432} \end{array}$$

$$\begin{array}{r} 086.4 \\ 5 \overline{) 432.00} \end{array}$$

Division shown as a whole number, fraction and decimal (2dp)

$$432 \div 15$$

$$\begin{array}{r} 028 \text{ r } 12 \\ 15 \overline{) 432} \end{array}$$

$$\begin{array}{r} 1 \mid 15 \\ 2 \mid 30 \\ 3 \mid 45 \\ 4 \mid 60 \\ 5 \mid 75 \\ 6 \mid 90 \\ 7 \mid 105 \\ 8 \mid 120 \\ 9 \mid 135 \end{array}$$

$$\begin{array}{r} 28 \text{ r } 12 \\ 15 \overline{) 432} \\ \underline{-300} \quad (\times 20) \\ \phantom{0} 132 \\ \underline{-90} \quad (\times 6) \\ \phantom{00} 42 \\ \underline{-30} \quad (\times 2) \\ \phantom{000} 12 \text{ r} \end{array} \quad \begin{array}{r} 15 \\ 30 \times 2 \\ 45 \\ 60 \\ 75 \\ 90 \times 6 \end{array}$$

Children to be shown each method, individual preference on which they use for calculations.