All Saints Church School

Calculations Policy

This calculation policy has been developed and agreed after using the National Curriculum objectives and methods.
At All Saints Church School we recognise that mathematics can only be used effectively when the user understands the tool, and has ownership of it. With our calculation policy, we can be confident throughout school, that the hard work we all put into teaching the children each year to calculate, will be consolidated and extended the following year. By agreeing on the use of strategies and mathematical language the children will be taught in a consistent way in all classes, developing their understanding as they progress through school. This will hopefully cause less confusion for the children and ensure they have the necessary strategies and scaffolding to enable them to solve mathematical problems. Children will then be encouraged to use the calculation strategies they are secure with, whether done mentally or using pencil and paper methods.

Numicon

Numicon is a curriculum proof, multi-sensory approach, that's raises achievement across all mathematics ability levels.

With problem-solving, reasoning and conversation at its heart, Numicon perfectly embodies the aims of the Primary National Curriculum for mathematics:

- Develops fluency by using a visual, practical base to develop conceptual understanding and fluent recall.
- Helps children to reason mathematically through the use of concrete objects and spoken language to explain and justify.
- Develops children into confident problem-solvers.

Numicon will be used primarily by Foundation Stage, Year 1 and Year 2 in order to stimulate mathematical understanding in a practical way that impacts the learning. Key Stage 2 will use Numicon as a scaffold for learning more complex concepts.

All Saints Church School

Foundation Stage

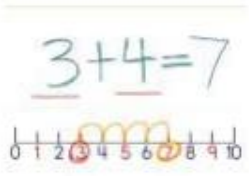
End of year expectations states that by the end of Foundation Stage children should be able to:

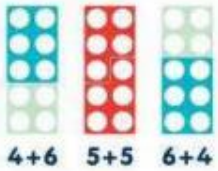
• count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and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

Children will start by applying skills to prepared number lines.

Addition

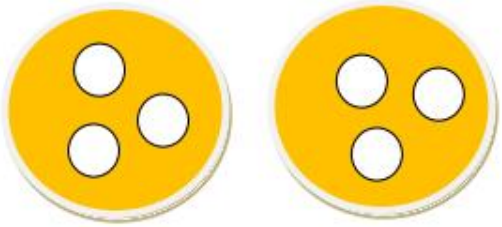
Children are encouraged to use Numicon and to record by drawing jumps on number lines to solve addition problems.





Sharing

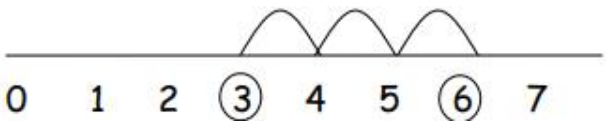
Children will use Numicon and concrete objects to share sets into equal groups.



Subtraction

Children are encouraged to use Numicon and to record by drawing jumps number lines.

6-3 would be recorded like this...



All Saints Church School

Year 1

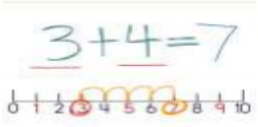
End of year expectations states that Year 1 children should be able to:

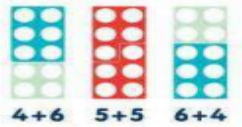
- add and subtract one-digit and two-digit numbers to 20, including zero.
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? – 9.
- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Before children use written methods they follow the process of a concrete (resources) then pictorial (pictures) and then abstract (written method). Children will use numbers on the number lines until they are confident to jump without them. Children will always count forwards on the number lines.

Addition

Children are encouraged to use Numicon or other materials (cubes/counters) and to record by drawing jumps on number lines to solve addition problems.





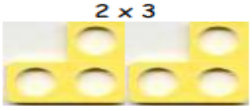
Children need to be able find missing numbers. Missing numbers need to be placed in all possible places.

3 + 4 = ☐
☐ + 4 = 7
3 + ☐ = 7

Multiplication

Children will use Numicon and concrete objects to solve multiplication.

2 x 3

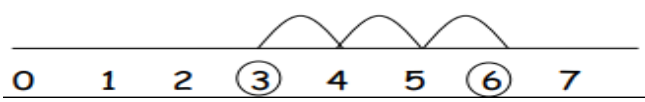


Children need to be able to count in groups of 2s, 5s and 10s.

Subtraction

Children are encouraged to use cubes/counters to record the taking away process and recording as a number sentence.

We also use a number line 6-3 would be recorded like this…



Division

Children will use Numicon and concrete objects to solve division by grouping and counting.

All Saints Church School

Year 2

End of year expectations states that Year 2 children should be able to:

- solve problems with addition and subtraction:
- using concrete objects and pictorial representations, including those involving numbers, quantities and measures • applying their increasing knowledge of mental and written methods
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including: o a two-digit number and ones o a two-digit number and tens o two two-digit numbers o adding three one-digit numbers
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Children will always count forwards on the number lines.

Addition

Children will start by using concrete objects and Numicon to solve addition problem before moving on to using empty number lines and counting on.

Children will use standard methods to calculate addition sums:

$$\begin{array}{r} 24 \\ +13 \\ \hline 37 \end{array} \qquad \begin{array}{r} 56 \\ +18 \\ \hline 74 \\ 1 \end{array}$$

Children need to be able find missing numbers. Missing numbers need to be placed in all possible places.

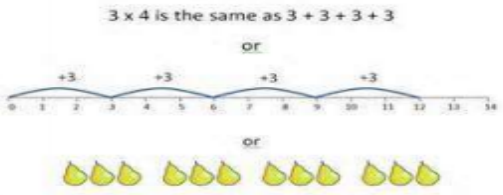
13 + 4 = ☐
☐ + 4 = 17
13 + ☐ = 17

Multiplication

Children will began to use repeated addition to solve multiplication problems.

4 x 3

This can also be shown on a number line.



Subtraction

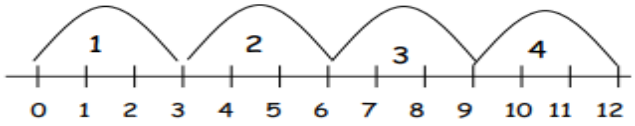
Children will start by using concrete objects and Numicon to solve subtraction problems before moving on to using empty number lines and counting on.

$$\begin{array}{r} 24 \\ -13 \\ \hline 11 \end{array} \qquad \begin{array}{r} 4\,\overset{1}{5}\,\overset{1}{6} \\ -\,1\;8 \\ \hline 3\;8 \end{array}$$

Division

Children will use Numicon and concrete objects to solve division by grouping and counting before moving on to number lines.

12 ÷ 3 = 4



All Saints Church School

Year 3

End of year expectations states that Year 3 children should be able to:

- add and subtract numbers with up to three digits, using formal written methods of column addition and subtraction
- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.

Children will ALWAYS start with the 'ones' when adding, subtracting and multiplying.

Addition

Children should begin to use formal written methods with numbers up to 3 digits.

	4	3	2	
+	3	4	5	
	7	7	7	

Children should then move on to the understanding of carrying over.

	4	3	6	
+	3	4	7	
	7	8	3	
		1		

Multiplication

Children need to know multiplication facts mentally for 3, 4 and 8.

Children will begin to multiply 2 digit numbers by 1 digit numbers using the facts they know. They will begin to use formal written methods.

		3	2	
x			5	
	1	6	0	
		1		

Subtraction

Children should begin to use formal written methods with numbers up to 3 digits.

	8	5	4	
-	3	4	2	
	5	1	2	

Children should then move on to the understanding of carrying over.

		4	1	
	8	5	4	
-	3	3	6	
	5	1	8	

Division

Children will use metal strategies to solve division problems using the facts they know.

All Saints Church School

Year 4

End of year expectations states that Year 4 children should be able to:

- add and subtract numbers with up to 4 digits using the formal written methods of column addition and subtraction where appropriate
- recall multiplication and division facts for multiplication tables up to 12 × 12
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout

Children will ALWAYS start with the 'ones' when adding, subtracting and multiplying

Addition

Children should begin to use formal written methods with numbers up to 4 digits.

	4	3	2	4	
+	3	4	5	5	
	7	7	7	9	

Children should then move on to the understanding of carrying over.

	4	3	6	4	
+	3	4	7	6	
	7	8	4	0	
		1	1		

Multiplication

Children need to know multiplication facts mentally up to 12 x

Children will begin to multiply 2 and 3 digit numbers by 1 digit numbers using the facts they know. They will begin to use formal written methods.

		3	2	
x			5	
	1	6	0	
		1		

		2	3	2	
x				6	
	1	3	9	2	
		1	1		

Subtraction

Children should begin to use formal written methods with numbers up to 4 digits.

	8	5	4	6	
-	3	4	2	1	
	5	1	2	5	

Children should then move on to the understanding of carrying over.

		4	1		
	8	5	4	5	
-	3	3	6	3	
	5	1	8	2	

Division

Children will use metal strategies to solve division problems using the facts they know.

All Saints Church School

Year 5

End of year expectations states that Year 5 children should be able to:

- add and subtract whole numbers with more than 4 digits, including using formal written methods (column addition and subtraction)
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division Children will ALWAYS start with the 'ones' when adding, subtracting and multiplying.

Addition

Children will be able to use formal written methods for addition confidently.

	6	4	2	3	
+	2	6	9	7	
	9	1	2	0	
	1	1	1		

Multiplication

Children will be able to complete multiplication of 4 digits by one digit using short multiplication.

		4	2	3	2	
x					6	
	2	5	3	9	2	
		1	1	1		

Children will then move onto multiplication by two digit using long multiplication.

		2		
		2	4	
x		1	6	
	1	4	4	
	2	4	0	
	3	8	4	

Subtraction

Children will be able to use formal written methods for subtraction confidently.

	6	11	13	1	
	~~7~~	~~8~~	~~4~~	5	
-	3	3	6	9	
	3	8	7	6	

Division

Children will use short division to solve problems.

$$\begin{array}{r} 0\ 3\ 5 \\ 5\overline{)\,1^{1}\,7^{2}\,5} \end{array}$$

All Saints Church School

Year 6

End of year expectations states that Year 6 children should be able to:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.

Children will ALWAYS start with the 'ones' when adding, subtracting and multiplying.

Addition

Children will be able to use formal written methods for addition confidently.

	6	4	2	3	
+	2	6	9	7	
	9	1	2	0	
	1	1	1		

Multiplication

Children will use long multiplication to solve problems. They will be able to multiply a 4 digit number by a 2 digit number.

		4	3	2	3	
x				1	3	
	1	2	9	6	9	
	4	3	2	3	0	
	5	6	1	9	9	
		1				

Subtraction

Children will be able to use formal written methods for subtraction confidently.

	6	11	13	1	
	~~7~~	~~2~~	~~4~~	5	
-	3	3	6	9	
	3	8	7	6	

Division

Children will begin to use long division to solve problems involving 4 digit and 2 digit numbers.