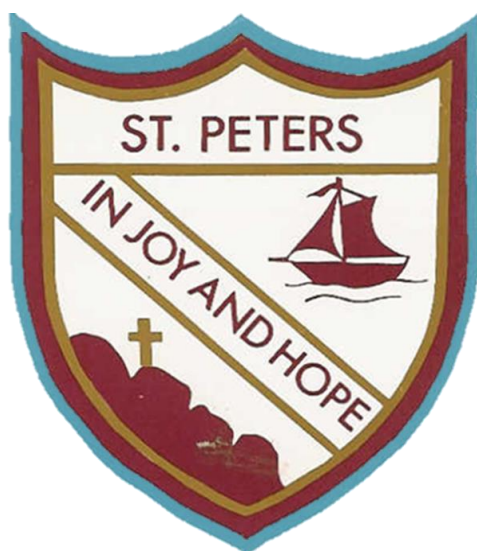


St Peter's Catholic Primary School



Calculation Policy

Agreed by Governors: June 2021

Chair of Governors Signature_____

Rationale

This policy has been designed to show progression in written mathematical methods throughout the school. Our written calculation policy is set out to show:

- The objectives stipulated for all four operations by the National Curriculum
- The calculation methods for each year group
- Relevant vocabulary needed at each stage
- Examples of reasoning activities

Concrete, Pictorial and Abstract

Each method has examples as to what it looks like in the concrete, pictorial and abstract forms. All learners are introduced to a calculation method for the first time using concrete manipulatives. Concrete resources from EYFS to Year 6 include: bead strings, Base 10, Cuisenaire Rods, Place Value counters, Numicon and Snap cubes. Children will then progress through to a pictorial stage before moving to the abstract. The amount of time needed to progress through each stage is unique to each learner.

Mastering Calculation

The new curriculum has a strong focus on mastery and therefore, if a child is fluent in a method for their year group, they should not be moved onto a different method of calculation or a larger set of numbers (see the quick glance guides in this policy). Instead, children will be encouraged by their teacher to 'go deeper' within this method. This may involve: using it in different contexts; using and applying it to other learning; using it with missing digits or values; explaining or experimenting with different aspects of it; proving answers with pictures or manipulatives; or explaining what has gone wrong in a calculation. Children must also check their calculations through the use of estimation and inverse operations.

Mathematical Vocabulary

The National Curriculum places great emphasis upon the use of correct mathematical vocabulary and children developing this. Throughout school, children are strongly recommended to use and apply mathematical vocabulary when learning a new method or concept. They will be constantly exposed to this, have it expertly modelled by their teacher and be expected to use it themselves when justifying methods.

Mental Methods

Children should always be encouraged to see if they can work out a calculation mentally before trying a written method. Children will be shown number patterns and relationships between numbers throughout the school. Times tables are introduced and taught in specific year groups: Reception: $\times 2$; Year 1: $\times 5$, $\times 10$; Year 2: $\times 4$; Year 3: $\times 3$, $\times 6$, $\times 8$; Year 4: $\times 7$, $\times 9$, $\times 11$, $\times 12$. Please also see the separate Mental Calculation Strategies policy.

EYFS

During F1 and F2, children are embarking on their learning journey throughout Maths. The EYFS classes follow the statutory framework for the Early Years Foundation Stage and work towards the two Early Learning Goals for Mathematics:

- ELG 11 (more explicitly shown below).
- ELG 12 Children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns. They use mathematical language to describe everyday objects.

During foundation stage children are provided with lots of opportunities to develop their understanding of number and shape through a combination of formal teaching, play and structured exploration.

Four guiding principles should shape practice in the early years' settings. These are:

- Every child is a **unique child**, who is constantly learning and can be resilient, capable, confident and self-assured;
- Children learn to be strong and independent through **positive relationships**;
- Children learn and develop well in **enabling environments**, in which their experiences respond to their individual needs and there is a strong partnership between practitioners and parents and/or carers;
- **Children develop and learn in different ways and at different rates.**

The Early Years Outcomes are a non-statutory guide to support practitioners. It can be used by childminders, nurseries and others, such as Ofsted, throughout the early years as a guide to making best-fit judgements about whether a child is showing typical development for their age, may be at risk of delay or is ahead for their age.

The table below sets out what you should be observing a child doing at each stage, if they are developing typically for their age.

Mathematics - Number

22 – 36 months	<ul style="list-style-type: none"> • Selects a small number of objects from a group when asked, for example, 'please give me one', 'please give me two'. • Recites some number names in sequence. • Creates and experiments with symbols and marks representing ideas of number. • Begins to make comparisons between quantities. • Uses some language of quantities, such as 'more' and 'a lot'. • Knows that a group of things changes in quantity when something is added or taken away.
30 – 50 months	<ul style="list-style-type: none"> • Uses some number names and number language spontaneously. • Uses some number names accurately in play. • Recites numbers in order to 10. • Knows that numbers identify how many objects are in a set. • Beginning to represent numbers using fingers, marks on paper or pictures. • Sometimes matches numeral and quantity correctly. • Shows curiosity about numbers by offering comments or asking questions. • Compares two groups of objects, saying when they have the same number. • Shows an interest in number problems. • Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same. • Shows an interest in numerals in the environment. • Shows an interest in representing numbers. • Realises not only objects, but anything can be counted, including steps, claps or jumps.
40 – 60 months	<ul style="list-style-type: none"> • Recognises 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.
<p>Early Learning Goal 11</p> <p>This summarises the knowledge, skills and understanding that all young children should have gained by the end of the Reception year.</p>	<p>Children 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.</p>
Exceeding statement	<p>Children estimate a number of objects and check quantities by counting up to 20. They solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups.</p>

Key Stage 1 - Year 1

	+	-	x	÷
National Curriculum Objective	<ul style="list-style-type: none"> Read, write and interpret statements involving addition, subtraction and equals sign. Add and subtract 1 and 2 digit numbers to 20, including zero. Represent and make number bonds and related subtraction facts within 20. Regroup to 10 to make 10. 		<ul style="list-style-type: none"> Double and halve numbers to 10 through grouping and sharing. Make links to counting in multiples of 2, 5 and 10 – drawing arrays. Reason about odd and even numbers and relate to doubling and halving. Solve one-step problems involving multiplication and division. Share objects into equal sized groups. 	
Suggested calculation	<ul style="list-style-type: none"> Counting on using number lines and number tracks Informal partitioning 	Counting back	Repeated addition and arrays	Sharing and grouping
Mathematical vocabulary	count on, count back, number bonds, number facts, subtraction facts, fact family, add, subtract, more, less, plus, minus, total, sum, difference between, equal		grouping, sharing, multiply, divide, double, half, array, lots of	

Year 2

	+	-	x	÷
National Curriculum Objective	<ul style="list-style-type: none"> Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 Understand the = sign and how $20 + 2$ and $24 - 2$ both have the same value of 22. Add and subtract numbers: <ul style="list-style-type: none"> a 2-digit number and ones (no regrouping & regrouping in the ones) a 2-digit number and tens (no regrouping & regrouping in the ones) 		<ul style="list-style-type: none"> Introduction of arrays in a grid method. Write mathematical statements using the multiplication (\times), division (\div) and equals (=) signs. Link multiplication and division through missing number questions. Make links to counting in multiples of 4 and 8. Share and group objects. Group using repeated subtraction. 	
Suggested calculation	<ul style="list-style-type: none"> Informal partitioning Partitioning column 		<ul style="list-style-type: none"> Arrays in a grid 	<ul style="list-style-type: none"> Sharing and grouping in arrays
Mathematical vocabulary	Add, subtract, count on, count back, more, less, plus, minus, total, sum, difference, partition, bridge, round, inverse, number line, number facts, multiple of 10, regroup		Inverse, operation, multiplication table, times table, multiply, multiplication, times, product, repeated addition, lots of, array, divide, division, shared by, halve, double	

Lower Key Stage 2 - Year 3

	+	-	x	÷
National Curriculum Objective	<ul style="list-style-type: none"> Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100. Add and subtract numbers: <ul style="list-style-type: none"> up to three digits two 2 digit numbers adding 3 one digit numbers 		<ul style="list-style-type: none"> Multiply 2 digit numbers by a 1 digit. Introduction of the grid method. Make links to counting in multiples of 3,6,9. Share using place value headings TO \div O. Introduce remainders. 	
Suggested calculation	Expanded column method		<ul style="list-style-type: none"> Grid method 	<ul style="list-style-type: none"> Sharing and grouping within place value columns
Mathematical vocabulary	Add, subtract, count on, count back, more, less, plus, minus, total, sum, difference, partition, bridge, round, inverse, number facts, multiple of 10, regroup		Inverse, operation, multiplication table, times table, multiply, multiplication, times, product, repeated addition, lots of, array, divide, division, shared by, halve, double	

Year 4

	+	-	x	÷
National Curriculum Objective	Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction.		<ul style="list-style-type: none"> • Multiply 2/3 digits by a 1-digit number. • Recall multiplication & division facts up to 12 x 12. 	Divide numbers up to 3 digits by a 1 digit number using the formal written method of short division and interpret remainders appropriately in context
Suggested calculation	Compact column		<ul style="list-style-type: none"> • Expanded short multiplication • Compact short multiplication 	<ul style="list-style-type: none"> • Expanded short division
Mathematical vocabulary	addition, subtraction, sum, total, difference, minus, less, plus, altogether, column addition, column subtraction, regroup, operation, estimate, equal, method, inverse		place value, multiply, multiplication, times, product, divide, division, factor, factor pairs, multiplication & division facts, operation, estimate, multiple, shared equally, array	

Upper Key Stage 2 - Year 5

	+	-	x	÷
National Curriculum Objective	Add and subtract whole numbers with more than 4 digits and decimals, using formal written methods of columnar addition and subtraction.		<ul style="list-style-type: none"> • Multiply numbers up to 4 digits by a 1 or 2-digit number. • Introduction of expanded long multiplication. • Introduction of compact long multiplication. 	Divide numbers up to 3 digits by a 1 digit number using the formal written method of short division and interpret remainders appropriately in context
Suggested calculation	Compact column		<ul style="list-style-type: none"> • Expanded long multiplication • Compact long multiplication 	<ul style="list-style-type: none"> • Compact short division
Mathematical vocabulary	addition, subtraction, sum, total, difference, minus, less, column addition, column subtraction, operation, regroup, inverse, estimate, digit, place holder, rounding, approximate, accuracy		multiply, multiplication, times, product, commutative, short multiplication, long multiplication, multiplication facts, estimate, multiple, remainder	

Year 6

	+	-	x	÷
National Curriculum Objective	Add and subtract whole numbers with more than 4 digits, and decimals with different place values, using formal written methods of columnar addition and subtraction.		<ul style="list-style-type: none"> • Multiply multi-digit numbers up to 4 digits by a 2 digit whole number using formal written method of long multiplication. 	Divide numbers up to 4 digits by a 2 digit number whole number using the formal written method of long division, and interpret remainders as whole number, fractions or decimals
Suggested calculation	Compact column		<ul style="list-style-type: none"> • Expanded long multiplication • Compact long multiplication 	<ul style="list-style-type: none"> • Long Division

Mathematical vocabulary	addition, subtraction, sum, total, difference, minus, less, column, operation, inverse, estimate, approximate, multiply, multiplication, times, product, commutative, short multiplication, long multiplication, estimate, remainder, fraction, decimal, divisible
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