Maths Long Term Plan

Archbishop Runcie CE First School

Updated Jan 2024

Vision

The school first existed as a force for social change and we remember this within our historic original mission as we continue to inspire and transform the minds and hearts of everyone we serve today and, thus, the wider world. Everyone associated with our school will experience life in all its fullness, as promised by Jesus. We do so with Love and Determination.

Our original Mission

"A school for the education of children only of the labouring mining and manufacturing and other poorer classes in the Parish of Gosforth and for no other purpose."

Mission Statement:

At ARFS, we promote educational excellence, for everyone. Our purpose in education is to enable the children, families, staff, Governors and the wider community we serve to flourish. The Christian values of Love and Determination are at the core of teaching and culture within the school. We believe this makes us distinctive in the learning experience on offer. This is firmly rooted in the following epistle:

Be on your guard; stand firm in the faith; be courageous; be strong.
Do everything in love.
1 Corinthians 16:13-14

Intent

At Archbishop Runcie CE First School, we recognise that Mathematics is more than just a core subject – it is a universal language that enables understanding of the world, providing important tools for fields like engineering, physics, architecture, medicine and business, developing children's abilities to think logically and methodically (Ofsted Research Review, 2021). Mathematics is celebrated as a way for children of all ages to think in new ways now and help change the world in the future, a key part of ensuring children can experience life in all its fullness. In Early Years, we believe that developing practitioners' own understanding of mathematics, their understanding of how children typically learn, and how this relates to effective pedagogy is essential for laying the foundations for learning.

For Key Stage 1 and 2, the study of Maths is a combination of declarative knowledge, procedural knowledge and conditional knowledge.

Knowledge:	How do children know it?		Examples:
Declarative 'I know that'	Facts and formulae	Relationship between facts (conceptual understanding)	I know that... 3x5=15 I know that... there are 100 pence in a pound
Procedural 'I know how'	Methods	Relationship between facts, procedures and missing facts (principles/mechanisms)	I know how, in $15 \div x = 3$, $x = 5$, because 3x5=15 I know how... £1.15 is 115p because 100p is £1 and you add the remaining 15p

Implementation

At Archbishop Runcie, we have a daily dedicated maths teaching input from Nursery to Year 4. Research tells us a sequential curriculum provides better results and allows teachers to focus on concepts and small steps being taught, rather than designing a sequences of learning. In school, we follow White Rose Maths small steps (alongside other schools within the Gosforth Schools' Trust including Gosforth Central Middle School that the vast majority of our children will continue onto), this is supplemented with supporting material from Master the Curriculum.

In Early Years, maths is also woven into the school day, to allow children to learn mathematical skills through their environment and routines, exposing them and extending their mathematical thinking.

Ten Town (rhymes, visuals and stories) is used to support number recognition and correct number formation; explicit teaching of correct number formation helps to effectively prepare children for Year 1.

In Key Stage 1 and 2, in addition to multiplication and division units of learning, times table knowledge is taught explicitly. This is further enhanced through intervention sessions and use of Times Table Rockstars; this ensures children are prepared for the statutory multiplication tables check (MTC) at the end of Year 4 and embeds their declarative knowledge.

This curriculum is focused on automaticity of declarative knowledge, then using this to formulate methods (procedural knowledge) with all children being exposed to problem solving (which requires conditional knowledge). In

Impact and Next Steps

The impact of the our maths curriculum will be that:

- Children will become fluent in all basic skills, including times tables, and are able to apply this fluency to more complex reasoning problems.
- Children are equipped for the next stage of their education
- Children retain important knowledge and attain fluency in multiplication tables
- Children can confidently use a variety of 'maths knowledge statements' and language as detailed in the Calculation Policy.
- Children are resilient learners with a positive growth mindset.

Conditional 'I know when'	Strategies	Relationship between information, strategies and missing information (reasoning)	I know when I have £15.25 and I divide it by 5 that I have 300p with a remainder of 25p

This means that reasoning and problem solving are not 'generic skills' but instead require deep bodies of declarative and procedural knowledge that can then be applied to problems when understood properly.

In order to facilitate this, the school follows a mastery approach – this means children across all classes acquiring a deep, long-term, secure and adaptable understanding of the subject. There are a number of key principles that underpin this:

- That all children who work hard at Maths can succeed
- It rejects the idea that groups of children 'just can't do Maths'
- That whole-class teaching, with all children working together on the same concept at the same time, is required before the class can move on
- If a pupil fails to grasp a concept or procedure, this is identified quickly and early intervention ensures the pupil is ready to move forward with the whole class
- A typical lesson teaches the small step, with retrieval opportunities to consolidate prior learning and previous small steps that have been developed in a sequence of learning. Generally, pupils sit facing the teacher and the teacher leads back and forth interaction, including questioning, short tasks, explanation, demonstration, and discussion
- Key facts such as multiplication tables and addition facts within 10 are learnt to automaticity to avoid cognitive

addition, leaders and staff know that children's capabilities to solve word problems are not just reliant on these three areas of knowledge but also proficiency in reading.

In Early Years, picture books are used to discuss mathematical ideas and extend thinking. We have mapped out quality picture books to use each week to support dedicated daily teaching time as well as rhymes and songs (EEF Improving Mathematics in Early Years and Key Stage 1).

Maths vocabulary, symbols and methods are carefully sequenced and also standardised through the calculation policy.

As per the school's historic and current mission, vision, values and ethos, there is a clear focus in equity – as such, differentiation is not a tool that staff use often. Instead, there is a focus on 'keep up' rather than 'catch up', with all children exposed to the same learning. This is made possible by there being additional time built into the curriculum plans (consolidation weeks).

We use concrete, practical resources to ensure that children are introduced to difficult mathematical ideas in a more 'hands on' approach to embed their learning. Using concrete resources is key to conceptual understanding. Initially supported, children can use these practical resources if and when they need them throughout the small steps of learning. Pictorial representations allow children to make links between the practical resources and mathematical concepts. This is a key stepping stone before using more abstract mathematical notations. Manipulatives and representations are used to effectively develop and deepen understanding. In Years 1-4, key

- During their time at Archbishop Runcie, children continue to move through a progressive curriculum which enables them to build on the skills and knowledge effectively preparing them for their next step in their learning. Children are provided opportunities to revisit and consolidate small steps of learning.
- Beyond Archbishop Runcie, children leave the school ready for the next phase of learning and will have the skills to apply their learning to a wide range of problems in real life.
- Beyond their school life, Children have developed skills in logical and methodical thinking they can take with

overload in the working memory and enable pupils to focus on new concepts	vocabulary, CPA representations and support for children are displayed on the Maths working wall which is situated at the front of the classroom.	them into future careers.

Long Term Plan

Each long term plan is dependent on the number of weeks in each term. Teachers will ensure that there is enough coverage throughout the unit to ensure that units are complete before each half term. How the small steps are covered within the units are at the teachers' discretion dependent on the needs of the class but must be planned effectively to ensure that coverage and pace is appropriate.

Key:

Unit of learning:	**Colour code:**
Number	
Measurement	
Geometry	
Statistics	
Consolidation	
Discrete declarative knowledge	
Additional Maths opportunities	

Nursery

Autumn	**Autumn 1**						**Autumn 2**				
	Colours: Red Blue Yellow	Colours: Green Purple Mix of colours	Match: Buttons and colours	Match: Match number shapes Match shapes Patterns	Sort: Colour Size Shape	Sort: What do you notice?	Number 1	Number 2	Pattern - AB	Pattern - ABC	Consolidation activities
Spring	**Spring 1**						**Spring 2**				
	Number 3		Number 4		Number 5		Consolidate numbers 1 - 5	Number 6	Length and height	Mass	Capacity	Consolidation activities
Summer	**Summer 1**						**Summer 2**				
	Sequencing	Positional language	More than/fewer than	2D shape Revisit pattern from Autumn term	3D shape Revisit pattern from Autumn term	Consolidation: more than/fewer than One more/one less	Numbers 1 – 5 composition	What comes after?	What comes before?	Numbers to 5	Consolidation activities Ready for Reception .	

Reception

Autumn	**Autumn 1**				**Autumn 2**					
	Settling into Reception	Pattern – match and sort	Numbers 1-5	Comparing groups Numbers 6 - 10	One more	One less	Addition	Assessment and consolidation	Subtraction	Pattern - height, length and distance
Spring	**Spring 1**				**Spring 2**					
	2D shapes	Addition	Subtraction	Number bonds to 10	Numbers 0-20		Assessment and consolidation	3D shapes	Weight	Capacity
Summer	**Summer 1**				**Summer 2**					
	Doubling, halving, sharing	Measuring	Problem solving	Height, length and distance	Consolidation Look at Year 1 objectives for those who are ready Transition					

Year 1

<table>
<tr><td rowspan="3">Autumn</td><td colspan="3">Autumn 1</td><td colspan="3">Autumn 2</td></tr>
<tr><td colspan="3">Place value</td><td colspan="2">Addition and subtraction</td><td>Shape</td><td>Consolida</td></tr>
<tr><td>Discrete declarative knowledge: Number Bonds to 5 (addition & subtraction)

Subitising</td><td>Days of the week</td><td>Left and right - https://www.youtube.com/watch?v=4VZLVcYsaQk</td><td colspan="2">Discrete declarative knowledge: Number Bonds to 10 (addition & subtraction)</td><td colspan="2">Months of the year</td></tr>
<tr><td rowspan="3">Spring</td><td colspan="3">Spring 1</td><td colspan="3">Spring 2</td></tr>
<tr><td colspan="2">Place value (within 20)</td><td>Addition and subtraction (within 20)
STEM WEEK</td><td>Place value (within 50)</td><td>Length and height</td><td>Mass and volume</td></tr>
<tr><td colspan="2">Discrete declarative knowledge: Number Bonds to 20 (addition & subtraction)</td><td>Counting in 2s Doubles and halves</td><td>Rote count to 100</td><td>Counting in 10s</td><td>Counting in 5s</td></tr>
<tr><td rowspan="3">Summer</td><td colspan="3">Summer 1</td><td colspan="3">Summer 2</td></tr>
<tr><td>Multiplication and division</td><td>Fractions</td><td>Position and directio</td><td>Place value (within 100)</td><td>Money</td><td>Time</td><td>Consolidation</td></tr>
<tr><td>Discrete declarative knowledge: 2 x table</td><td>Discrete declarative knowledge: 10 x table</td><td></td><td colspan="2">Discrete declarative knowledge: Number Bonds to 100 (addition & subtraction)</td><td colspan="2">Discrete declarative knowledge: 5 x table</td></tr>
</table>

Year 2 (to be changed in 2024-25)

Year 2's curriculum is different to the other year groups due to SATS in Summer 1. This means that the most important content is front-loaded to ensure children are confident in accessing the questions within the SATS papers

	Autumn 1		Autumn 2		
Autumn	Place value	Addition and subtraction	Money	**Multiplication** and division	Consolidation & **NFER**
Discrete declarative knowledge	Count in steps of 2 Double and halve Number bonds to 100 (addition **& subtraction**)		Count in steps of 3 Count in steps of 5 and 10		

	Spring 1			Spring 2		
Spring	Multiplication and **division**	Statistics	Shape STEM WEEK	Fractions	Time	Consolidation & **NFER**
Discrete declarative knowledge	Multiplication and division facts for 5 & 10 times tables	Number bonds to 10, 20, 100 (addition **& subtraction**)		Multiplication and division facts for 2, 5 & 10 times tables		

	Summer 1			Summer 2	
Summer	Length and Height/reading scales	Position and direction	Consolidation	Mass, capacity and temperature **SATS**	Consolidation

Discrete declarative knowledge	Multiplication and division facts for up to 6 x 3 (first half of 3 x table)	Recap 2 x, 5 x, 10 x facts	Multiplication and division facts for up to 12 x 3 (second half of 3 x times table)	Recap 2 x, 3 x, 5 x, 10 x facts

Potential SATs window: weeks 4, 5 and 6 of Summer 1

Year 3

Autumn	**Autumn 1**			**Autumn 2**			
	Place value		Addition and subtraction	Multiplication and division A			Consolidation NFER
Discrete declarative knowledge	Recap 2 x, 3 x, 5 x, 10 x facts		Multiplication and division facts for up to 6 x 4 (first half of 4 x table)	Multiplication and division facts for up to 12 x 4 (second half of 4 x times table)		Recap 2 x, 3 x , 4 x, 5 x, 10 x facts	
Spring	**Spring 1**			**Spring 2**			
	Multiplication and division B		Length and perimeter STEM WEEK	Fractions A		Mass and capacity & **NFER**	
Discrete declarative knowledge	Multiplication and division facts for up to 6 x 8 (first half of 8 x table)		Recap 2 x, 3 x, 4 x, 5 x, 10 x facts	Multiplication and division facts for up to 12 x 8 (second half of 8 x times table)		Recap 2 x, 3 x, 4 x, 5 x, 8 x, 10 x facts	
Summer	**Summer 1**			**Summer 2**			
	Fractions B	Money	Time	Time	Shape	Statistics	**NFER** & Consolidation
Discrete declarative knowledge	Multiplication and division facts for 2, 5, 10 and 3, 4, 8 x tables		Multiplication and division facts for up to 6 x 6 (first half of 6 x table)	Multiplication and division facts for up to 12 x 6 (second half of 6 x times table)		Multiplication and division facts for 2, 5, 10 and 3, 4, 6, 8 x tables	

Year 4

The Year 4 statutory multiplication check occurs in week 1-2 of Summer 2, so time is given for multiplication consolidation in this week.

Autumn	**Autumn 1**			**Autumn 2**					
	Place value		Addition and subtraction	Measurement	Multiplication and division			Consolidation & **NFER**	
Discrete declarative knowledge	Multiplication and division facts for 2, 5, 10 and 3, 4, 6, 8 x tables		Multiplication and division facts for up to 6 x 9 (first half of 9 x table) Emphasise that product adds up to 9 Finger trick	Multiplication and division facts for up to 12 x 9 (second half of 9 x times table)	Multiplication and division facts for 2, 5, 10 and 3, 4, 6, 8, 9 x tables		Multiplication and division facts for up to 6 x 12 (first half of 12 x table)		
Spring	**Spring 1**			**Spring 2**					
	Multiplication and division B		Length and perimeter STEM WEEK	Fractions			Decimals A & **NFER**		
Discrete declarative knowledge	Multiplication and division facts for up to 12 x 12 (second half of 12 x times table)		Multiplication and division facts for 11 x table	Multiplication and division facts for up to 6 x 7 (first half of 7 x table)			Multiplication and division facts for up to 7 x 12 (second half of 7 x times table)		
Summer	**Summer 1**			**Summer 2**					
	Decimals B	Make £5 grow enterprise project Money	Time	Multiplication consolidation	Shape	Statistics	Position and direction	Consolidation & **NFER**	
	Multiplication and division facts for x 6	Multiplication and division facts for x 7,	Multiplication and division facts for x 8	Multiplication & division facts for up to 12 x 12					

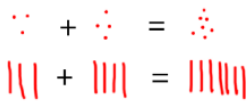
Maths Calculation Policy

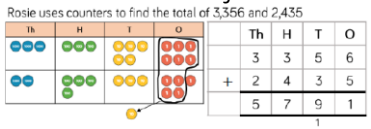
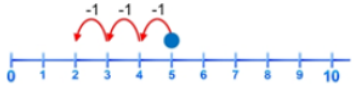
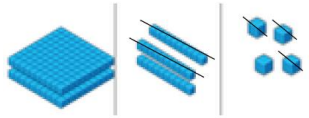
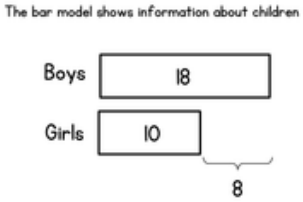
Archbishop Runcie CE First School

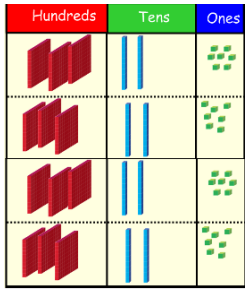
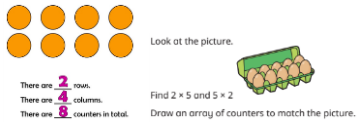
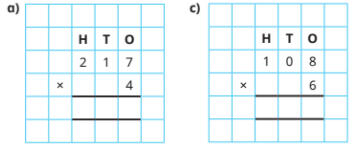
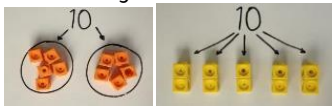
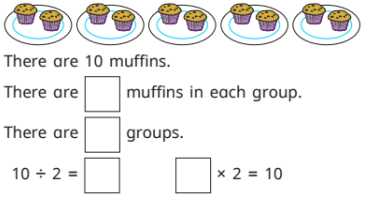
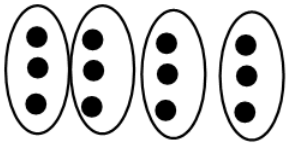
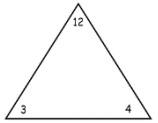
What does Maths look like at Archbishop Runcie First School?

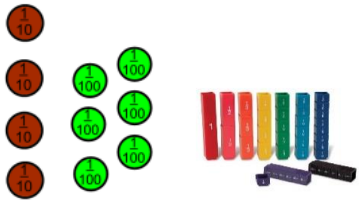
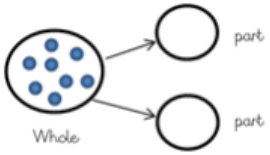
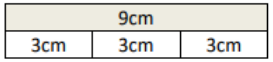
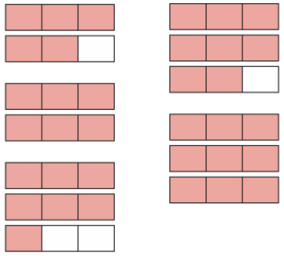
At Archbishop Runcie CE First School, we see Maths as a journey and therefore ensure consistency across the school. Each classroom has a selection of age and unit appropriate concrete resources to scaffold learning; these resources are progressive and mapped out throughout each year group.

Methods of calculation used across the school

	Concrete	Pictorial	Abstract	Key vocabulary
Place value	• Use of Base 10 to represent place value of numbers • Place value grids with Base 10 representations • Place value grids with place value counters • Numicon	• Place value grids with drawn Base 10/place value counters/plain counters • Ten Town for number formation	• Numbers written in books, one digit per square • Some chn may feel comfortable writing Th, H, T, O above each digit	thousands, hundreds, tens, ones, partition, portioning, part, whole, subatise
Addition	• Cubes and double sided counters and Numicon to show parts and wholes e.g. four is a part, 3 is a part. The whole is 7.   • Use of Tensframe and counters to visualise making next 10 • Base 10	• Use numbered number lines to add, by counting on in ones. Encourage children to start with the larger number and count on • Part whole models to help to build calculations • Squares, lines and dots to represent hundreds, tens and ones 	• Abstract equations e.g. 4 + 3 = 7 • Use of partitioning thousands, hundreds and tens in an equation to make working out simpler Eg. 45 + 22 = 40 5 20 2 40 + 20 = 60 5 + 2 = 7 60 + 7 = 67 Therefore 45 + 22 = 67 • Use of column method for children who are confident	addition, add, plus, total, altogether, combine, sum, increase, fact family

		• Pictorial representations begin to model column methods in preparation for more formal written methods in future  	425 + 321 746	
Subtraction	• Use of cubes, double sided counters and Numicon to encourage inverse and parts/wholes to ensure children understand number sentence fully • Children physically remove amount being subtracted using concrete resources • Use of Base 10 to exchange 1 ten stick for 10 ones, 1 hundred for 10 tens, etc when exchanging	• A numbered number line to demonstrate 'counting back'  • Pictorial images of Base 10 used and drawn to show 'crossing out' of subtracted numbers  • Bar models used to show difference and help with missing number problems  	• Abstract equations e.g. 7 – 3 = 4 • Abstract equations consisting of missing numbers to encourage use of inverse method • Use of column method for children who are confident 11 621 - 318 303	subtract, minus, difference, take away, decrease, inverse, fact family
Multiplication	• Use of Numicon, cubes and counters to physically make equal groups and count equal groups made 	• Equal groups are written/drawn pictorially e.g. use of triangles for X lots of 3. • Children exposed to real life examples of equal groups to consolidate understanding	• Children recall times tables by rote and then apply this to solve multiplication problems e.g. 2 x 3 = ____ • Use multiplication facts to complete sequences and missing number problems	double, multiplication, multiply, multiplied by, equal groups, arrays, fact family, inverse

	• Create arrays using cubes  • Use Base 10 to represent multiplication as repeated addition e.g. 327 x 4  	 • Arrays are drawn and shown pictorially to represent number sentences  	e.g. 2, ___, 6, 8, ____, 12 • Children can partition numbers to tens and ones when completing more complex multiplication sentences e.g, 4 x 15 = 4 x 10 = 4 x 5 = • Use column method of multiplication where necessary for 2 digit and 3 digit numbers.  	
Division	• See division as grouping and sharing  10 has been shared into 2 groups of 5. 10 has been shared into 5 groups of 2. • Use of arrays to link to 'fact families' of multiplication and division. • Use stem sentences e.g. "If I know 3 x 5 = 15 then I know 5 x 3 = 15 and I also know 15 ÷ 3 = 5 and 15 ÷ 5 = 3." 	• Use pictures and shapes to represent division calculations.  • Children can use dots (two dots per square) to represent objects in a problem, using circles to split them into groups.  E.g. Rose has 12 apples. She shares them with 4 friends. How	• Once chn are secure with division in a concrete and pictorial sense, they can move onto abstract calculations. 12 ÷ 4 = 3. • Chn can then make 'fact families' to see connection between multiplication and division facts. 3 x 4 = 12 4 x 3 = 12 12 ÷ 4 = 3 12 ÷ 3 = 4  Use of triangles to represent numbers could be used. • Once fluent in this, chn could move onto missing number problems which	equal groups, divide, divided by, divided into, half, share, share equally, equal groups, fact family, inverse

		many apples does each person get?	encourages use of inverse. 12 ÷ ___ = 3 ___ ÷ 4 = 3. ___ = 12 ÷ 3	
Fractions	• Using concrete resources to supporting finding half/quarters etc – link to division and 'sharing'  • Use folded strips of paper to represent fractions • Create 'fraction wall' to investigate equivalent fractions using strips of paper • Use of fraction cubes/counters to support recognising and counting in fractions 	• Use of pictorial shapes to 'shade' in. • Could use part whole models to 'share' counters into part/part /whole  • Use of bar models to show fractions of amounts  • Seeing fractions in bar models to add and compare fractions • Use of a fraction wall will be useful in finding equivalent fractions  	• Once children are secure in using pictorial representations, they will write fractions numerically within a square in their books • They will be able to represent the whole number and the fraction (mixed numbers) and improper fractions • Children will recognise fractions on a number line 	part, whole, numerator, denominator, equivalent fractions, mixed number, improper fractions, whole number, integer