



Mathematics at Parish

Parish Church of England Primary School

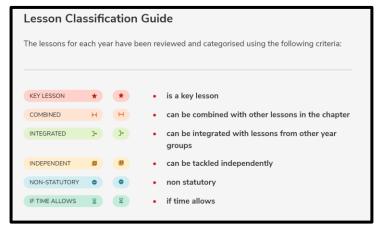
Intent:

At Parish Church of England Primary school, we provide a high-quality mathematics education utilising a mastery approach so that all children: become fluent in the fundamentals of mathematics; are able to reason mathematically with increasing articulacy; and can solve problems by applying their understanding to a variety of problems. Our inclusive mathematics curriculum provides challenge for all pupils with teachers choosing to progress to new learning only when the majority of learners have a secure understanding. Challenge occurs through depth of understanding with an offer of rich and sophisticated problems rather than new content. Our mathematics curriculum aims to develop the five core mathematical competencies in all of our learners – therefore providing a foundation for our children to understand the world around them knowing both the beauty and power of mathematics in its own right and how it can be applied to other subjects across the curriculum including Science and Computing.

Implementation:

Curriculum Plannings

- At Parish Church of England Primary School, our mathematics planning from EYFS through to Year 6 is informed (not dictated) by use of Maths-No Problem! a high-quality mastery scheme of work, setting high aspirations for all children, ensuring that all pupils can "keep up with new content", as opposed to having to "catch up." Five Mathematics lessons are taught per week to fully maximise curriculum coverage, including 'Fluency Focus' (incorporating discrete teaching of multiplication tables) to ensure pupil automaticity. Through implementation of a spiral curriculum, each lesson sequentially builds upon the prior learning. Topics consolidate understanding, while also increasing in complexity allowing new learning to be related to previous learning aiding retrieval.
- Maths No Problem! provides a series of carefully sequenced lessons enabling new knowledge and skills to be built upon what has been previously taught and pupils can work towards clearly defined end points. However, our highly skilled teachers are then able to reflect and adapt the teaching sequence appropriately (dependent on pupil's knowledge) to provide further opportunities for practise, consolidation and an increasing depth of conceptual understanding. The sequence and speed of lesson delivery is dictated by pupil understanding with whitespace lessons and prioritisation of 'key lessons' utilised where appropriate to embed the most fundamental concepts. This ensures that all statutory National Curriculum coverage is met, with additional coverage of deeper non-statutory content if time allows.



Lesson Coverage Across a Year			
Year	Number of	Number of	
Group	Lessons	Whitespace	
ΥI	85	IIO	
Y2	123	72	
Y3	178	17	
Y4	151	44	
Y5	140	55	
Y6	141	54	

Our mathematics long-term plan clearly stipulates the order of topics taught in each age group in each term, so that
new knowledge and skills can build on what has been taught before and towards our clearly defined end points - thus
ensuring our long-term is taught in its entirety year-on-year. This plan loosely follows Maths - No Problem's

- recommended long-term plan but has been amended to meet the needs of our school community by addressing identified gaps in pupils' knowledge and skills from question level analysis.
- At Parish, the Maths No Problem! Foundations scheme of work forms the basic outline for our curriculum offer in Reception as a full-year programme of teaching and learning activities, exercises and stories to deliver a firm foundation for developing maths mastery in Key Stage 1. Reading is at the beating heart of our curriculum offer within Reception.
- Non statutory guidance from the Department for Education and NCETM titled 'ready to progress criteria' are also utilised within planning to summarise the most important knowledge/concepts within each year group and make important connections between these mathematical topics. Again, this informs planning to ensure that pupils embed key concepts within their long-term memory and apply them fluently.
- Across the school we also focus on the fundamental teaching and learning of multiplication tables, which are
 progressively planned across our mathematics long-term plan to be learnt with increasing fluency. By the end of Year
 4, pupils should be able to recall all of their times tables accurately, supporting development in children's working
 memory.
- Across school, daily mathematics retrieval sessions take place across all classes. Beginning as 'Mathematics Meetings' across Phase I this quick-fire session, support retrieval and fluency within the four core number operations.

Reading

Reading is embedded throughout our mathematics curriculum as the "beating heart of all that we do." Each lesson begins with an anchor task which uses a story problem to launch the lesson and make learning meaningful. Children will then develop discussion in groups, with a greater emphasis on full sentences and using mathematical vocabulary to be articulate. Our delivery is also supported through a textbook which allows the children to independently discover methods to solve a problem. Reading is central to our EYFS curriculum offer with picture books used throughout our teaching.

Vocabulary Teaching:

Vocabulary is progressively taught within our mathematics curriculum. This is mapped out upon our medium-term planning documentation adhering to both our calculation policy and the Department for Education's 'Ready to Progress' documentation. Consistent definitions are provided using our glossary of key terms across school

Pupil Premium Enhancements:

Following guidance from the EEF, our pupil premium children are targeted with the following enhancements to ensure that they "keep up with new content", as opposed to having to "catch up".

- Use assessment to build on pupils' existing knowledge and understanding.
- Use manipulatives and representations.
- Teach strategies for solving problems.
- Enable pupils to develop a rich network of mathematical knowledge.
- Develop pupils' independence and motivation.
- Use tasks and resources to challenge and support pupils' mathematics.

High Achieving Learners:

During mathematics lessons at Parish, high achieving learners are actively encouraged (through the development of their metacognitive thinking) to:

- Use the three Ps of pattern, word problem or prove it to deepen their understanding.
- Use physical models or draw something appropriate.
- Explain things to themselves as they work through examples.
- Try to construct relationships between new processes and what they already knew.
- Infer additional information that wasn't directly given.

Additional 'deeper thinking' tasks are also provided where appropriate.

- Use structured interventions to provide additional support (including First Class Number 1 and 2).
- Support pupils to make a successful transition between Primary and Secondary school.

SEND Offer:

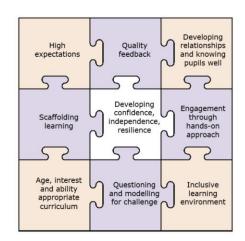
Teachers use appropriate assessment to set targets which are deliberately ambitious for pupils identified as having a SEND and ensure needs are met as identified through the pupil passport. Lessons our planned to address potential areas of difficulty and to attempt to remove barriers to pupil achievement. For the majority of children, such planning means that our pupils with SEND and disabilities are able to study the full National Curriculum. Teaching and targeted support is weighted towards the 'ready to progress' statements and fundamental knowledge stated' through adaptive teaching. Due to our high number of dyslexic learners, we also utilise the follow recommendations to overcome this specific barrier to learning. https://mathsnoproblem.com/blog/learner-focus/overcoming-obstacles-maths-learners-dyslexia/

Cognition and Learning (CL) Sensory and/or Physical Needs (SPN) Pupils encouraged to explain what they have Ensure that left and right-handed pupils are not sitting next to each other with writing to do to check understanding. Links to prior learning explicitly made. hands adjacent. Number lines stuck to desks. Seating should allow pupil to rest both feet Use of diagrams and pictures to add meaning flat on the floor - check chair heights. Have small whiteboards and pens available Desk should be at elbow height. for notes, to record ideas etc. Sloping desk provided if possible. Additional time to complete tasks if necessary. Encourage oral presentations as an alternative to some written work. Allow additional time to complete tasks. Allow more thinking and talking time. Model and teach careful listening along with signals when careful listening is required. Communication and Interaction (CI) Social, Emotional and Mental Health Difficulties (SEMH) 'Rules' of good listening displayed, taught, Take time to find pupil's strengths and praise modelled and regularly reinforced. these - ensure that the pupil has opportunities to Pupils aware of pre-arranged cues for active demonstrate their skills to maintain selflistening (e.g. symbol, prompt card). confidence. Delivery of information slowed down with time Provide lots of opportunities for kinaesthetic given to allow processing. learning e.g. practical activities, experiential Pupils are encouraged - and shown - how to seek learning, multi-sensory resources. Give breaks between tasks and give legitimate clarification. Adult support used effectively to explain and 'moving around' activities. support pupils to ask and answer questions. Have a range of simple, accessible activities that pupils enjoy to use as 'calming' exercises

- Use interactive strategies e.g. pupils have cards/whiteboards to hold up answers, come to the front to take a role etc.
- Teach pupils how to use post-it notes for questions and ideas rather than interruptions (when appropriate).

Maths Specific Strategies to Support SEND learners:

- Ensure key learning points are reviewed regularly throughout the lesson
- Present tasks in a meaningful context
- Ensure that multi-step tasks are supported by jottings and model this
- Give contexts for pupils to apply their learning
- Don't rush into abstract and formal written work before understanding is secure
- Be prepared to explore, repeat and rehearse steps again to ensure understanding of abstract concepts
- Give access to a wide range of practical resources
- Different coloured pens for hundreds, tens, ones etc.
- Provide talking partner for pupils to share/ explain their mathematical thinking
- Make close observations of pupil to fully understand the mathematical strategies being used to solve the problems- get them to talk through what they are doing.



Scaffold and Support:

- Focus Group (If a group are all getting the workbook wrong, gather a group of them around you, and you convert or differentiate the independent work into a guided practice).
- Struggling Learners (Early interventions help pupils to catch-up and perform better across the curriculum. Any children who need additional support within the less are supported using the 3C's—coherence, context or concrete. As soon as possible, use the following strategies to support struggling learners. Providing clear models for solving a problem type using an array of examples, giving pupils extensive practice in new strategies and skill, providing chances to think aloud and talk about their steps and decisions, providing students with extensive feedback).

<u>Cultural Capital:</u>

Cultural capital visits, visitors and events - whether it be the Money Mentors in KS2, our celebration of World Mathematics Day or our Geography field trip to a river in Y4 - allow us to illustrate how Mathematics is threaded through all aspects of life throughout differing occupations. Within our lessons, we also believe we offer the right mix of challenge and support for our children to be confident in taking risks with their mathematical thinking and how mistakes are part of the learning process that they can take into future study and beyond.

Teaching and Learning Approaches:

- Within our mathematics lessons at Parish, all learners move through topics at broadly the same pace through an inclusive approach, beginning with mixed ability groupings within all our classrooms. Each topic is studied focussed upon depth of understanding and the teacher does not move onto the next stage until all children demonstrate that they have a secure understanding of the most fundamental mathematical concepts. Our inclusive approach places emphasis on promoting multiple methods of solving a problem, creating self-confidence and resilience in pupils. Those pupils who grasp concepts quickly are challenged with rich and sophisticated problems within the topic, incorporating the 3 Ps (Can you find a pattern? Can you create a word problem? Can you prove it?) Those children who are not sufficiently fluent to progress are provided additional support to consolidate their understanding prior to moving on with the 3 Cs (Can I use concrete resources? Is the problem in context? Am I using effective communication?).
- Our teaching and learning approach also supports the OFSTED 'Mathematics Research Review' with staff fully aware of how they need to teach different types of knowledge in order to become fluent.

 Declarative browledge can be introduced with "I brow that" and refers to facts and formulae, and the relationship

Declarative knowledge: can be introduced with "I know that" and refers to facts and formulae, and the relationship between facts

Procedural knowledge: can be introduced with "I know how" and refers to methods, and the principles underpinning them. An example of this is a missing number problem.

Conditional knowledge: can be introduced with "I know when" and refers to knowledge and understanding of strategies which can be used to reason and solve problems. This extends to combinations of declarative and procedural knowledge which then become strategies for particular types of problems.

- Every mathematics lesson taught across school follows an identical three-part lesson approach (incorporating the anchor task, guided practice and independent practice) to create consistency across school. Each lesson also underpins the five core competencies of the mastery approach, which are attributes that can be seen within our learners and are competencies that children develop throughout their mathematical journey.

Lesson Part:	Lesson Feature:	Five Core Competencies
		Demonstrated by Learners Throughout A
		Lesson:
Anchor Task	Lesson opens with a potential real-life	
(30 minutes)	problem called an anchor task, which	Visualisation: ask learners to show 'how they
	develops children's reading skills. Pupils	know' at every stage of solving the problem.
	tackle the problem, utilising concrete,	Generalisation: challenge learners to dig
	pictorial, abstract approach. Record ideas in	deeper by finding proof.
	journaling after extensive opportunities for	Communication: encourage learners to
	exploration and discussion	answer in full sentences. Try asking learners
Guided Practise	With the methodology discussed, the children	to talk about the work they're doing or use
(10 minutes)	then used this learning in the Guided	structured tasks centred around a class
	Practice section. Working through the	discussion.
	problems together, children continue to talk to	Number sense: a learner's ability to
	each other and share ideas.	workfluidly and flexibly with numbers,
Independent	For the final part of the lesson, children	Metacognition: teach learners to think about
Practise	complete the independent practice section of	how they are thinking. This helps learners
(15 minutes)	the workbook individually. Initially, the	solve multi-step tasks and promotes the
	workbook questions are scaffolded. However,	ability to keep complex information in mind.
	as pupils work through them, the scaffolding	
	is reduced, and the questions gradually	

	become more challenging. Use of purple pen
1	to discuss solutions if appropriate.

Fundamental to our teaching and learning approach, the five core competencies supplement NCTEMs "Five Big Ideas": representation and structure, mathematical thinking, fluency, variation and coherence. These five big ideas have been used to develop the 5 core competencies that are fundamental to lesson delivery).

https://mathsnoproblem.com/blog/teaching-practice/relational-understanding-with-core-competencies-ncetms-big-ideas/

Fiwe Big Ideas Lesson design principles for teachers	Five Core Competencies Demonstrated by learners	Feature	
I. Representation and structure	1. Visualisation	Relational understanding is all about visualising and understanding the underlying structure behind problems. Incorporates manipulatives and bar models.	
	2. Generalisation	Making connections, spotting links,	
2. Mathematical thinking	3. Communication	noticing patterns and reasoning — which all help to build a connected body of knowledge.	
3. Fluency	4. Number sense	Partitioning facts, times tables facts and using connected facts like equivalent fractions. When learners are fluent, they can use the known to work out the	
4. Variation			
5. Coherence		can use the known to work out the unknown — an important component of relational understanding.	
	5. Metacognition	The ability to think about one's thinking.	

- Each evidence-based unit of work is grounded in research and theory, incorporating the seminal work of Piaget,
 Bruner Dienes, Vygotsky and Skemp.
- 1. Piaget letting students have ample processing time to accommodate new ideas.
- 2. Zoltan Dienes learning of ideas in an informal way, through exploration, before structured learning.
- 3. Lev Vygotsky an emphasis on cooperative learning or collaborative structures during learning that derives from
- 4. Richard Skemp emphasis on relational understanding, not just instrumental understanding.
- 5. Jerome Bruner: CPA approach, which is the use of concrete experiences to move learners to abstract learning. Learners begin with concrete representations, before moving to pictorial and finally abstract once they have a deeper conceptual understanding. We believe that manipulatives should be used to reveal useful information but not as an external memory device (supported by the research of OFSTED).
- As a core feature of instructional teaching, our teaching of mathematics is also widely applicable to Rosenshine's Principles of Instruction in order to develop conceptual understanding. Reviewing material checking prior learning

has been activated where it relates to new learning and supporting students to remember what they've been taught over time with regular formative assessment. Questioning and checking for understanding - finding out whether all students are making sense of the ideas being explored and adapting the teaching accordingly. Sequencing Concepts; modelling; scaffolding - building up learning from small steps, showing how to do things, providing structured support through use of the anchor test. Stages of Practice guiding practice securing a high success rate, building fluency and confidence, before supporting students to practice independently - making sure they can do things for themselves without help during the independent practice section.

- To minimise 'Cognitive Load', all of our teachers also prioritise the four following steps to support the transition of knowledge to long-term memory. Focused Learning Objective (we always provide our learners with a very clear idea of what we want our learners to achieve). Activate Prior learning (At the start of the lesson, teachers choose to design a task that encourages learners to retrieve essential skills. This means their working memory can hold on to new learning during the lesson). Present Information Clearly (Our teachers take time when designing lessons to make sure information is presented clearly. We avoid unnecessary extras which may detract from the learning goal, as we know that if the design is inconsistent, learners need to expend effort in making sense of it). Avoid Cognitive Overload (Our teachers break questions up into chunks so that learners can digest each part separately this includes full understanding new vocabulary).
- The promotion of metacognition (the ability to think about one's thinking) is a key feature of our approach to teaching and learning within mathematics. Teachers are aware that there a direct link between learners' metacognition and their achievement in mathematics. Our teachers will actively, ask questions that give learners a starting point, ask questions that stimulate mathematical thinking, ask assessment questions and ask final discussion questions.
- Reading and Oracy are both at the centre of our mathematics curriculum to promote the development of articulate learners. In lessons, progressive STEM sentence starters are utilised in addition to carefully mapped vocabulary that adheres to our calculation policy. A key feature of mathematics lessons is live marking and feedback. This takes place to support, challenge and extend children's thinking in the moment and reduce teacher workload. See 'Marking and Feedback' policy for more detailed information.

Assessment Procedures:

- <u>Self-Assessment</u> (We utilise 'assessment as learning' to develop and support children's metacognitive skills. This form of assessment is a crucial part of our Mathematics lessons in helping children become lifelong learners as it focuses their efforts 'reflecting' on their own learning. It powers a growth mindset where they see their maths ability as something that can change and improve).



- Formative Assessment (Frequent low-stakes testing. If we have ASSESSED that a child needs support, we DIAGNOSE why by exploring the following factors: finding the basic facts answered incorrectly: determine if the same basic facts appear more than once: if they were answered incorrectly then there could be a real misconception: determine if the pupil sometimes answered correctly and sometimes incorrectly: the incorrect answers could be due to sloppy work habits (if there are more wrong answers towards the later part of the worksheet) or it could be a real misconception: try to understand the pattern of reasoning used by the pupil. Once the cause has been diagnosed, we REMEDIATE effectively by
 - breaking down the problem into smaller sub-tasks, identifying the skills required to complete each sub-task and focusing in on where a pupil's misconceptions lie. This should be completed as close to completion the task as possible to ensure misconceptions do not persist).
- <u>Summative Assessment</u> (Across school, NFER assessments or appropriate end of Key Stage Assessments [Y2 and Y6] are utilised termly to assess pupil progress. Question level analysis occurs using Ask Eddi to check pupils' understanding to inform teaching, and to help pupils embed and use knowledge fluently to develop their understanding).

Staff Professional Development:

- All teaching staff have attended accredited Maths No Problem! Training highlighting our commitment to a mastery approach across the school.
- As part of LDST, extensive trust wide networking takes place through School Improvement Liverpool and curriculum networking teams, ensuring the latest curriculum updates and disseminated and implemented.
- Internal to school, coaching cycles also regularly take place to show how to model an aspect of maths or establishing best practice across year groups.

Rainbow Promises:

R	Resilience and	Strategies for developing metacognition woven throughout the mathematics curriculum.
	Perseverance	Inclusive approach to lessons - "keep up with new content", as opposed to having to "catch
		up" for all learners.
Α	Articulate	Use of STEM sentence starters and progressive vital vocabulary woven into all lessons.
	Learners	Extensive opportunities to reason and discuss problems within journaling.
I Influence Mathematical careers discussed, Deepening Understanding Maths Cl		Mathematical careers discussed, Deepening Understanding Maths Club, and Money Mentors
Aspirations in Y4/Y		in Y4/Y5/Y6. Utilise 'assessment as learning' to develop and support children's
		metacognitive skills - empowers a growth mindset where children can see their maths ability
		as something that can change and improve.
Ν	N Nurture Curiosity Child led learning as a feature of the three-part lesson - children to articulate	
		understanding and methods.
В	British and British Values (Rule of Law and Mutual Respect).	
	Christian Values	Christian Values (Courage and endurance). SMSC woven throughout
0	Opportunities for	Subject planning and delivery sequenced through a spiral curriculum with extensive retrieval
	Wider Skills	opportunities built around Rainbow Promises. Development of Computational Thinking with
		clear links to the Computing Curriculum.
W	Wellbeing and	Curriculum Content including Money Mentors.
	Health	Application of Mathematics to real life contexts.

At Parish, we instill Christian Values in the subject of Mathematics by:

<u>Faith:</u>

In Mathematics lessons, pupils are always encouraged to delve deeper into their understanding of Mathematics and how it relates to God's world around them. Extensive opportunities for problem solving are provided through the mastery approach of curriculum delivery in line with the Christian faith which is made stronger when you work together with the Lord to find solutions to problems.

Hope:

In Mathematics, we aim to influence the children's aspirations and provide many exciting opportunities that the children can be a part of. Furthermore, we hope to provide children with mathematical skills that they can use in later life.

Love:

In Mathematics, we show love for different beliefs and attitudes as we collaborate and work together to journal and express our ideas.

At Parish, we instil British Values in the subject of Mathematics by:

Individual Liberty:

With 'Maths No Problem' children have the opportunity to make individual choices based on the strategies they are fluent with. They also have the opportunity to share these strategies with others. Each year, all classes have the opportunity to take part in an Enterprise project which allows children to take the lead in learning, expressing ideas and creating a product.

Rule of Law:

Children will learn specific Mathematical rules and look at these in differentiated variations to ensure they have mastered concepts. Children will develop an attitude that recognises consequences to mistakes when solving problems and look for ways to self-correct.

Democracy:

With our 'Maths No Problem' scheme, children are encouraged to take into account the views of others in shared activities. Children will share a range of strategies to solve problems in various ways, encompassing the mastery approach. Also, in Statistics lessons, children will vote when collecting and interpreting data.

Mutual Respect and Tolerance of those with Different Faiths and Beliefs:

As children develop a 'Mastery' approach, they will become more fluent with a range of strategies to solve problems. These strategies will come from a range of backgrounds including Singaporean methods. Mathematics encourages children to work in social situations reinforcing our school's values.

Social learning and peer- assessment plays an integral part in children's learning and understanding. Each child has the opportunity to work through and solve problems collaboratively, looking at similarities and differences between individual styles and approaches to solving problems.

At Parish, we develop SMSC in the subject of Mathematics by:

<u>Spiritual</u>		
Mirrors	A core focus on understanding the 'Universal Language' of Mathematics.	
(Reflection on	In Mathematics lessons, pupils are always encouraged to delve deeper into their	
thoughts and	understanding of Mathematics and how it relates to the world around them. Extensive	
feelings).	opportunities for problem solving are provided through the mastery approach of curriculum	
	delivery.	
	Through the Maths No Problem Scheme of work, the open-ended 'Explore Task' provides	
	opportunities to develop resilience and reflect on a variety of methods.	
Windows	Opportunities for the application of Mathematics across the curriculum including a real	
(Looking out) focus on STEM subjects.		
	Appreciating the beauty of Maths through 'awe and wonder all around them.'	
	 Opportunities for Maths in nature experiencing God's world. 	
Doors	Pupils are making connections between numeracy skills and real life. Maths can be used to	
(Stepping out into	explain the world around them.	
the world)	Understanding different perceptions with progression in concrete, pictorial, and abstract	
	representations ready for application in the world around them.	
	• Following of Money Mentors in Years 5 and 6 to prepare children for use of money in the	
	outside world.	

Moral

Maths supports moral development by encouraging children to make rational judgements and express their views with confidence, justifying their answers and the methods used, but also being willing to review and alter their initial views.

Maths supports social development by encouraging children to cooperate and work well as a team to solve problems, sensitively challenging the opinions of others when necessary. We expect children to show excellent behaviour, and we aim to develop their understanding of the positive contribution that can be made to society through maths.

Cultural

Maths supports cultural development by providing a rich range of experiences, placing maths in real life contexts to develop children's awareness that maths is a life skill in all cultures around the world. Children enjoy cultural experiences such as number activities in French and using practical maths. We aim to develop community links

through maths related fundraising activities, supporting maths students from universities, and inviting visitors to speak to pupils about how maths is linked to a wide range of careers.

Impact:

As measured through standards, survey results, assessment data and monitoring cycles.

- Improving results in EYFS, Key Stage I and Key Stage 2 this year with a focus on SEND, Pupil Premium and girls. [Data].
- Closing gap between arithmetic and reasoning results. [Data]
- Children can demonstrate a quick recall of facts and procedures (including multiplication tables). [Monitoring]
- Children can now more accurately recognise relationships and make in depth connections in mathematics more regularly [Monitoring].