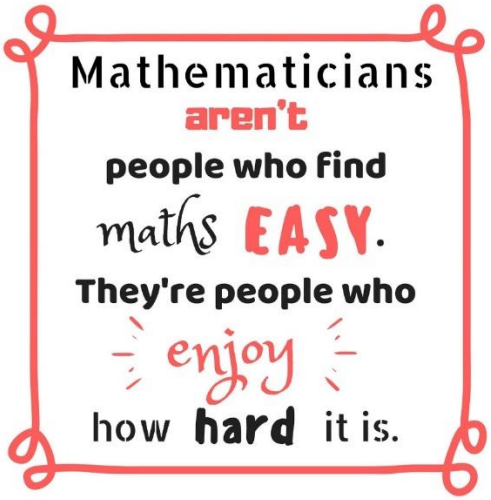
Burley St. Matthias

C of E Primary School

everyone is special

Whole School Maths Strategy



May 2024

Rationale

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject. At Burley St Matthias we are responsible for putting mathematical foundations in place, securing key concepts and building confidence. We understand how important maths is for our children to be successful in later life.

Through our maths teaching and learning, we nurture children's attitude to maths – ensuring they have a positive approach, a drive to succeed and they never give up.

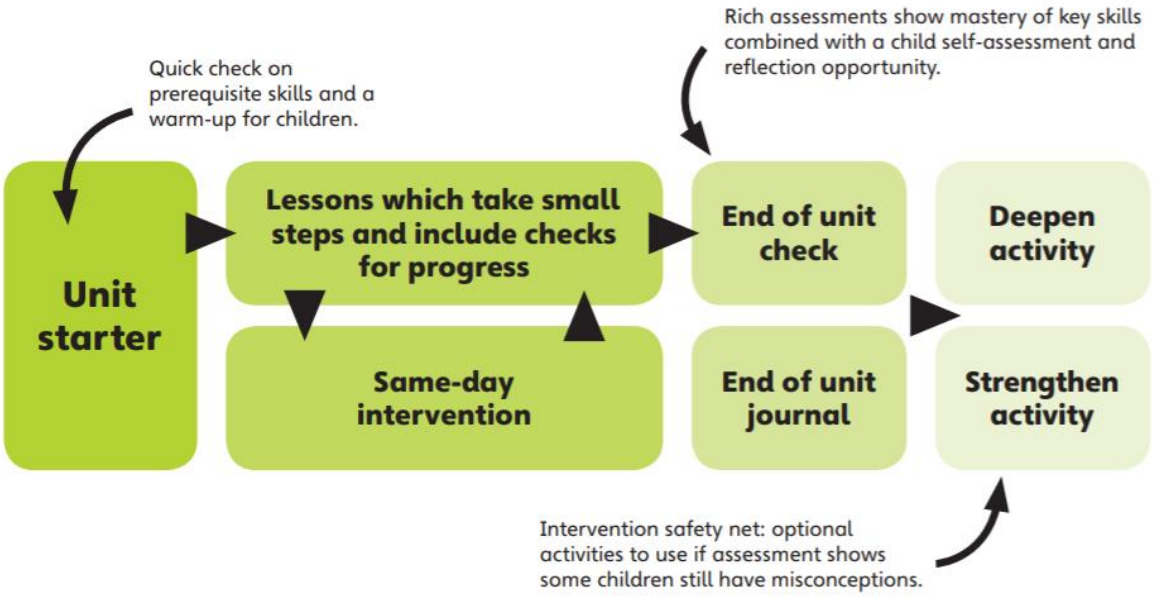
Mastering Mathematics

In order to make this vision a reality, the school will develop a 'mastery' approach to teaching and learning in maths. Mastery Learning has, amongst other things, the following characteristics:

- The belief that every child can and should succeed
- A focus on depth of understanding rather than curriculum coverage
- The belief that a child's mindset is more important than prior attainment in determining the progress they will make
- There should therefore be no preconceived ideas about which pupils have more or less potential – we must think carefully about how to support pupils who find a concept difficult, and how to challenge pupils who find it more accessible, but there is no need to decide in advance which pupils this will be.
- Deciding which pupils should work on which task should be based on observations and questioning rather than generalised assumptions about overall ability. Flexible groups which are highly responsive to assessment information are key to the approach.
- Where pupils do not fully grasp a new concept at first, teachers (and teaching assistants) try alternative approaches and explanations until they do
- There is an expectation that around 85% of pupils 'master' a skill or concept before the class moves on to new content. Challenge is provided by increased depth, rather than acceleration of content.

Power Maths

To support this curriculum, the school will follow the *Power Maths* scheme published by Pearson as a basis for teaching the National Curriculum in Years 1-6. The scheme matches the expectations of the National Curriculum for Mathematics and is approved by the DfE.



mathematically. This is done through a series of carefully structured representations – using physical objects (concrete), diagrams or pictures which represent these objects (pictorial) and ultimately using representations such

as numerals (abstract). The structured apparatus such as **base 10 (Dienes equipment), Numicon** and other **models and images** are fundamental to this, as is the **bar model** which enabling children to translate a calculation or word problem into a picture.

Power Maths helps children to use **heuristics** to solve problems. Heuristics refers to the different strategies that children can adopt to solve unfamiliar or non-routine problems. These strategies include drawing the bar model, pattern-spotting, using diagrams and estimating or 'guess and check'.

The pathway for learning calculation methods is outlined in a series of calculation policies produced by Power Maths which are available on our school website.

Teaching of Maths

Maths teaching should take place in a supportive **learning environment**. The use of 'working walls' and rich visual imagery, related to the mathematical concepts being taught are vital. All classrooms are equipped with basic equipment including number lines, hundred squares, Numicon, Base 10, bead bars/ strings, fractions imagery etc. For this reason, teachers should think carefully before allowing children to work outside the room in other, potentially less supportive, spaces.

The teaching cycle: Review (assess) – Teach – Practice – Apply is built into the *Power Maths* teachers' planning and should be a feature of all teaching, whether over a lesson or series of lessons. At Burley St Matthias, particular emphasis needs to be placed on the Review stage: due to high mobility and gaps in knowledge (some, though not all caused or exacerbated by the Covid-19 school closures), teachers conduct a pre-unit assessment, by careful use of the starter activities at the beginning of each unit. These review key vocabulary for the unit, models and images which will be used to support children's understanding and any key written methods which children have previously covered, and that are built on in the unit. This should be undertaken with sufficient time for the teacher to adjust planning in the light of what it reveals about how secure pupils' pre-requisite knowledge is.

Alongside the taught content in the teacher's books there should be regular **Retrieval lessons,** which may be preclude or be separate from the main lesson. This is a whole class session used to consolidate previously taught, key areas of mathematics. It may include singing, chanting, whole class 'call and response' together with 'cold-calling' questioning where any child can be chosen to answer. Retrieval lessons give the teacher opportunities to reinforce and check pupil's growing knowledge. As the planning overviews provided by Power Maths are so detailed, teachers are not required to complete weekly planning and can sequence their learning through their lesson slides. Learning in lessons is structured through the use of IWB slides whilst embedding Rosenshine's Principles of Instruction. The use of slides allows for teachers to plan for progress and ensure learning is sequenced to secure understanding of the concept being taught. Although the slides provide a base for the structure of the learning that should take place, teachers adapt these slides to meet the needs of the pupils they are teaching.

Learning involves fluency, reasoning and problem solving at all stages. This adds appropriate breadth and depth to pupil understanding. The adoption of the new version of Power Maths in September 2024 has allowed for increased opportunities for fluency and rehearsal, again returning to our use of Rosenshine's Principles of Instruction.

As learning is so collaborative and practical, the use of worksheets is minimal. Pupils complete tasks in a Power Maths 'pupil workbook' but also have a maths exercise book for consolidation, daily review and retrieval practice. When working in books, work is dated (short date) and matched with a title which supports the area of maths being taught. There is no requirement for children to copy the learning challenge into their books as this is not the best use of learning time.

Working walls are a key part of learning in each classroom. They are used as an age and stage appropriate scaffold for current learning and reference point to support pupils with key information. They are structured and organised to support the current maths learning. Relevant mathematical language is displayed on the working wall alongside appropriate mathematical representations to help pupils understand and apply their use of language whilst committing learning to the long-term memory. Visitors to school tell us that "*Vocabulary is prominent in maths teaching and is ambitious. Most children across all year groups used maths vocabulary to a good standard within their explanations and to demonstrate their knowledge. Many children know, do and remember more in maths."*

From September 2024

To support the use of mathematical language, sentence stems are used at all stages. These encourage pupils to speak in full sentences, articulate their understanding clearly, including how they know. This allows pupils to recognise that there are different ways to solve mathematical problems/questions and supports them in exploring mathematical ideas. By pupils exploring the process of mathematical working and verbalising it, it allows them to identify where they went wrong in the process and build resilience to problem solve and work out the correct answer. The sentence stems are progressive across school, appropriate to age and year group.

Teachers insist on high level of success before pupils move on to new content. This is particularly seen as we achieve mastery as pupils have complete independence in a concept, skill or in their knowledge, including being fluent and consistent in their application.

Intervention within the mastery model, becomes a very dynamic tool, with teachers and teaching assistants working together to immediately address (either within a lesson or very soon after it) pupils' difficulties in grasping the concepts being taught. Alternative approaches and explanations must be sought and there are various materials available in school to support this (e.g. White Rose Maths materials, Springboard, Numicon, Gap Pack). For pupils who are new to English 'pre-teaching' upcoming vocabulary is a useful strategy to ensure pupils have the best chance of accessing the central teaching input or lesson.

Early Years Foundation Stage

In Reception, opportunities for maths and to develop mathematical understanding can be seen across the provision. As well as having a dedicated maths area, pupils are presented with several opportunities to explore maths.

It is important that pupils get the opportunity to explore the resources in a maths area of provision throughout the year. Pupils will use the resources in more formal maths lessons as well as accessing maths through provision. Resources are both formal and informal allowing children to explore their thinking and understand that maths is all around us.

Learning environments are language-rich with key mathematical language being displayed on the maths working wall. The areas of provision provide mathematical challenge, using key concrete resources to stimulate mathematical thinking and challenge. The provision provides opportunities for pupils to record their workings and this can be recorded on their individual wall lockers to show progression. Photographs are also used to capture pupil understanding and progression. Teachers and other adults scaffold mathematical thinking whilst the pupils access the provision, ensuring key mathematical language and stem sentences are modelled. Teachers and adults also work with small groups of pupils to address any identified gaps in learning as well as effectively challenging higher attainers.

When children are ready, focus maths groups take place each week. During this time, children begin to learn the foundations of mathematical concepts and have the chance to record their learning to be displayed in our Maths Floor Book. Teaching and learning here is organised into small ability groups and learning is then spread through provision allowing children to rehearse the skills they have learnt in group sessions. This is the start of independently exploring maths and also being able to practise articulating their learning and understanding.

The outdoor provision is an extension of the indoor maths provision in that maths activities are always available for the pupils to access. The resources outside give opportunity to learn on a larger scale and provide more opportunities through resources to explore shape, space and measure. Staff recognise opportunities for mathematical learning and use scaffolded questioning to support learning opportunities and to encourage challenge when pupils are engaged in their learning.

From EYFS, pupils are regularly exposed to counting in steps of 1, 2, 10 and 5 both verbally and exploring patterns. This continues into year 1 so that this knowledge is consolidated. This enables pupils to make links between 'skip counting' and times tables once they reach year 2 and start to learn the 2- and 10-times tables more formally. Once pupils can count confidently in these steps, they will be given opportunities to apply their knowledge to add breadth to their understanding.

Assessment in reception is an ongoing process and feeds into daily planning. Progress made is evidenced through workings displayed on their wall lockers, Tapestry and the maths floor book.

Maths in Key Stage One

As children join Year one, learning becomes more formal. A real focus on the learning and recall of key mathematical facts begins in Year one as is appropriate to the age and stage of learning. Key facts are taught at the beginning of maths lessons and at other times of the day where possible, to reinforce knowledge.

Children are taught in daily whole class maths lessons. Pupils break off into groups as appropriate to access key areas of learning linked to the small step being taught. The adults in the class then facilitate learning to support and challenge each pupil according to their need.

The concrete and pictorial resources are appropriate to the small step being taught, and demonstrate consolidation and progression from EYFS.

Learning environments continue to be language-rich with key mathematical language being displayed on the maths working walls as well as being made explicit to the pupils during teaching through the teaching slides. Stem sentences are modelled by the teacher and the pupils are expected to use stem sentences to articulate themselves appropriately.

Within teaching slides, the use of concrete and pictorial representations are made explicit within the area of learning being taught to enhance conceptual understanding.

As pupils progress through KS1, they get more opportunity to select their own resources based on having sufficient understanding, and through this process they can also see what resources are unsuitable/not efficient for the task. Teacher discussion and modelling helps the pupils to understand the most efficient methods and reasons that some methods are not efficient and the reasons why.

By the end of Year 2, it is key that pupils are secure with their knowledge of the 2-, 5- and 10-times tables and related division facts. It is key that pupils recognise the relationship between multiplication and division and demonstrate their knowledge through maths lessons using CPA representations to support their understanding of this key concept. Regular activities are imperative for the development of pupil knowledge and understanding and activities such as counting by rote, written starters and other regular focus tasks will support pupils with this.

By the end of Year 2 when pupils are secure with the 2-, 5- and 10-times tables, they will have a firm understanding of the pedagogy behind times tables – what they are and mean. This will give a basis for them to build upon when they enter Year 3. Intervention will be provided to support pupils with development of times tables.

Maths in Key Stage Two

As pupils move to LKS2, they have a firm understanding of the resources they have been exposed to in KS1 so can start to use their own discretion to explore the apparatus dependent on the teaching and learning taking place. Concrete and pictorial representations are continued to be used within teaching. When completing maths tasks, resources are organised in such a way that pupils can independently access them according to need. In Year 3, the pupils should continue to practise the 2-, 5- and 10-times tables and by the end of year 3, they should also be secure with the 3-, 4- and 8- times tables.

In Year 4, pupils need to regularly consolidate the times tables learnt previously as well as learn the 6-, 7-, 9-, 11- and 12- times tables in preparation for the Multiplication Tables Check where pupils will be tested on 25 random times table questions. Regular practise of the **Soundcheck** game on TTRS on the run up to the test is essential to build pupil speed and fluency on a program similar to that of the times table test.

In UKS2, it is crucial that pupils continue to practise their times table knowledge and apply this knowledge to their maths lessons. Pupils should continue to use TTRS for accuracy and speed.

As pupils reach UKS2, concrete and pictorial resources are used as part of the teaching process to help the pupils understand some mathematical concepts but pupils will become less reliant on the use of concrete resources in their own work (unless they are not working at the expected level). Pupils have access to concrete resources (which they should access independently) when they first start learning new concepts but once they have conceptual understanding, they should move away from these concrete resources and use written methods modelled by the teacher.

The teaching of Times Tables:

Times table booklets are used throughout KS2 and are currently being trialled in Y2. Each booklet works progressively through learning a times table.

Key information about the booklets:

- The booklets have been adapted to learn the times tables in line with when they are learnt in Power Maths, and in accordance with the government's 'Ready to progress' criteria. They are taught in the following order:
    - 2, 5, 3, 4, 8, 6, 7, 9.
- We spend lots of time securing facts to 9 x 9, as these are the building blocks children need in Y5 and Y6 to do any written algorithm (short multiplication and division, and long multiplication). These booklets all build on the previous one, with a final section of mixed practice.
- There is a stand-alone book for the 10 times table (to be done in Y2).
- There are stand-alone books for the 11- and 12-times table, which need to be done for the Y4 times table check. These do not include division facts.
- There is a mixed practice booklet for all times tables up to 12 x 12 which can be used before the check. This includes far more rehearsal of the 6, 7, 8 and 9 times table facts as children tend to find these harder to remember. In line with the check, this does not include division facts.
- With the above exceptions, we include division facts in the booklets (about 1 in 5 questions is a division question) as it is so helpful for children in terms of understanding the inverse relationship between multiplication and division. However, there are not division facts in the MTC Y4 check.
- The booklets for times tables 2 – 5 and 10 include only division by that times table (e.g. 16 ÷ 2 but not 16 ÷ 8 in 2 times table) as this supports understanding of division by grouping. By the time children get to the 6, 7, 8 and 9 times table they should have a good understanding of both grouping and sharing so e.g. both 54 ÷ 6 and 54 ÷ 9 are included in the 6 times table booklet.

Assessment of Mathematics

The mastery approach puts assessment at the heart of day to day practice. Teachers should use the Insight Assessment Management system to regularly capture children's developing knowledge, understanding and skills. The system allows teachers to then use this information dynamically within lesson sequences to plan or adapt next lessons and intervention teaching. In Power Maths, each unit concludes with an End of Unit Check – teachers should make good use of the information this gives them about how secure pupil's knowledge is before moving on to the next unit. Rosenshine's Principles of Instruction will also be embedded into the teaching approach, providing constant opportunities for assessment for learning: daily review, think-pair-share, show-me boards, cold-calling, retrieval tasks etc.

Alongside day to day assessment, teachers will need to assess children's abilities 'at a distance' to ascertain how well they have mastered their learning. At the end of each term, pupils take the Rising Stars Progress in Understanding Mathematics (PUMA) tests and use the raw scores from this to generate an equivalent 'scaled score'. The Testbase database may also be used alongside other materials to check children's understanding. From here, teaching which addresses any gaps may become necessary in order to ensure children are secure before moving on to new content. Visitors tell us that because of our approach, children know, do and remember more in maths.

Equal opportunities, SEN and Inclusion

Our Mathematics Strategy has equality, achievement and opportunity for all at its heart. We will monitor closely the impact the policy has on different groups of pupils. Pupils identified with Special Education Needs may not be able to follow the teaching for the rest of their year group. Teachers can use Insight or B-Squared to select learning objectives from different year groups or to set personal objectives linked to a pupil's IEP. In Reception, the SENIT Developmental Journal is used to assess small steps of progress for some pupils with SEND. The *Power Maths* approach may not suit all pupils and additional materials and resources will remain in school and can be used by teachers as appropriate.

Challenge

Challenge is a key feature of all lessons at Burley St Matthias and is always planned for. This is done through carefully designed learning tasks along with challenge through questioning, exploring and opportunities to reason and explain

concepts. Planned opportunities for open-ended challenges and collaboration make invaluable learning opportunities for pupils to consolidate, extend their learning and support the mindset of a ‘can do’ approach. Power Maths also provides challenge for all pupils, and teachers are proficient at selecting additional materials (e.g. from the aligned White Rose Maths scheme) to further deepen opportunities for challenging thinking.