Merton Bank Primary School

Mathematics Policy

Approved by Full Governing Body on _____

To be reviewed on or before _____

Signed _____ **Chair of Governors**

Signed _____ **Headteacher**

September 2023

Merton Bank Primary School

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1.0 Introduction

1.1 In September 2023, Merton Bank Primary School will embark on its journey towards a whole school mastery approach to the teaching and learning of mathematics. We understand that this will be a gradual process and may take time to fully embed. The rationale behind changing our school approach to teaching mathematics, through involvement in the NCETM Maths Hub and Teaching for Mastery Programme, arose from our desire to provide a consistent approach to the teaching of mathematics and also a belief in the philosophy that all children can achieve, as well as the 2014 National Curriculum, which states:

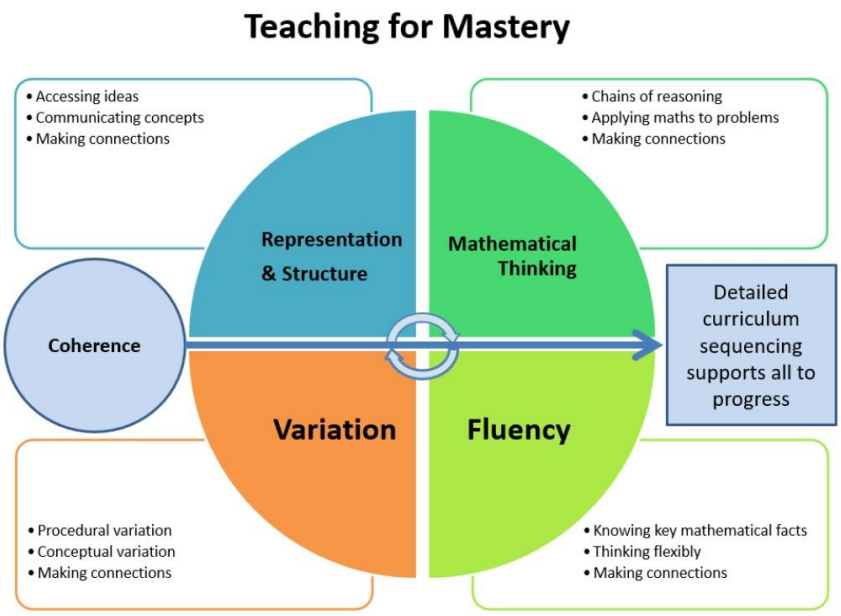
• The expectation is that most pupils will move through the programmes of study at broadly the same pace.
• Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content.
• Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

2.0 Intent

2.1 The intent of our Primary Mathematics curriculum at Merton Bank is to deliver an engaging, balanced mathematics curriculum which is accessible to all and that will maximise outcomes for every child so that they know more, remember more and understand more. Our aim is to deliver quality teaching that will enable each and every one of our pupils at Merton Bank to become a mathematician, who can confidently apply their skills to everyday situations.

2.2 At Merton Bank, we understand that Mathematics is a fundamental part of everyday life and that it plays an essential role in the understanding of our world. Therefore, it is vital that a positive attitude towards mathematics is encouraged amongst all our pupils to foster confidence and achievement in a skill that is essential in our society. Mathematics enables us to make sense of the world through developing an ability to think abstractly, calculate, to reason, to understand relationships and patterns, to understand shape and space in their world and to solve problems. At Merton Bank, we are committed to ensuring that all pupils achieve mastery in the key concepts of mathematics, appropriate for their age group, in order that they make genuine progress and avoid gaps in their understanding that provide barriers to learning as they move through education.

2.3 These fundamental characteristics from NCETM underpin our teaching of mathematics at Merton Bank.



2.4 Coherence
Teaching is designed to enable a coherent learning progression through the curriculum, providing access for all pupils to develop a deep and connected understanding of mathematics that they can apply in a range of contexts.

2.5 Representation and Structure
Teachers carefully select representations of mathematics to expose mathematical structure. The intention is to support pupils in 'seeing' the mathematics, rather than using the representation as a tool to 'do' the mathematics. These representations become mental images that students can use to think about mathematics, supporting them to achieve a deep understanding of mathematical structures and connections.

2.6 Mathematical Thinking
Mathematical thinking is central to how pupils learn mathematics and includes looking for patterns and relationships, making connections, conjecturing, reasoning, and generalising. Pupils should actively engage in mathematical thinking in all lessons, communicating their ideas using precise mathematical language.

2.7 Fluency
Efficient, accurate recall of key number facts and procedures is essential for fluency, freeing pupils' minds to think deeply about concepts and problems, but fluency demands more than this. It requires pupils to have the flexibility to move between different contexts and representations of mathematics, to recognise relationships and make connections, and to choose appropriate methods and strategies to solve problems.

2.8 Variation
The purpose of variation is to draw closer attention to a key feature of a mathematical concept or structure through varying some elements while keeping others constant.

- Conceptual variation involves varying how a concept is represented to draw attention to critical features. Often more than one representation is required to look at the concept from different perspectives and gain comprehensive knowledge.
- Procedural variation considers how the student will 'proceed' through a learning sequence. Purposeful changes are made in order that pupils' attention is drawn to key features of the mathematics, scaffolding students' thinking to enable them to reason logically and make connections.

2.9 The aims of Maths at Merton Bank are:

- To promote enjoyment and enthusiasm for learning mathematics through practical activity, exploration and discussion;

- To develop logical thinking and reasoning skills through a natural curiosity and investigative approach and the ability to verbalise their reasoning;
- To promote confidence, independence and competence in mathematics and in applying mathematics;
- To develop a thorough knowledge and understanding of numbers and the number system;
- To develop the ability to solve problems through decision-making and reasoning in a range of contexts;
- To develop a practical understanding of the ways in which information is gathered and presented;
- To explore features of shape and space, to develop spatial awareness and develop measuring skills in a range of contexts;
- To know by heart number facts and bonds that are required to be known by heart;
- To understand the importance of mathematical skills in everyday life.

3.0 Implementation

3.1 At Merton Bank, our teaching of Mathematics begins in the Early Years, where children are introduced to key mathematical concepts. Practitioners recognise that maths needs to be explicitly taught before pupils can be access it in exploration and discovery within the continuous provision. Carefully chosen stories provide a 'hook' for learning in daily Maths meetings, allowing quality maths talk and mathematical thinking to take place. Maths Mastery resources from NCETM and White Rose Maths schemes are used in conjunction with each other to provide a high-quality Early Years Maths curriculum, which is based on the needs of our learners.

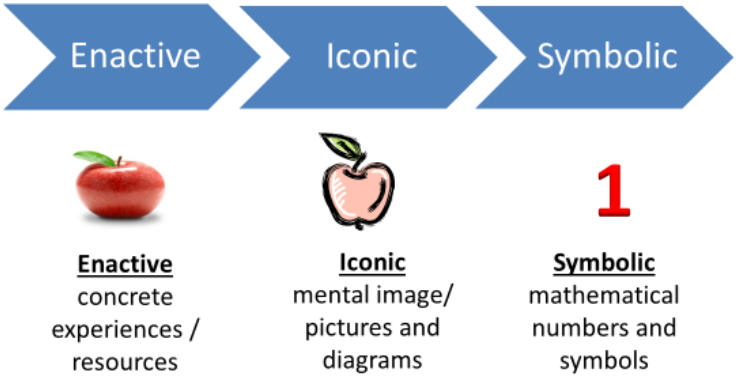
3.2 Mathematics teaching in KS1 and KS2 builds on the firm foundations set in the Early Years. At Merton Bank, we follow The White Rose Maths schemes of learning, which support a mastery approach to teaching and learning and are consistent with the aims and objectives of the National Curriculum. These schemes provide teachers with exemplification for mathematics objectives and are broken down into fluency, reasoning and problem solving, key aims of the National Curriculum, which give our children the knowledge and skills they need to become confident mathematicians. The schemes ensure teachers stay in the required key stage and support the ideal of depth before breadth. They support our pupils working together as a whole group and provide plenty of time to build reasoning and problem solving elements into the curriculum.

3.3 At the start of each year, all year groups at Merton Bank spend a significant amount of time reinforcing number in order to build competency and ensure our children can confidently access the rest of the maths curriculum.

3.4 In all year groups, our mathematics teaching follows the concrete, pictorial, abstract approach so that our pupils gain a secure understanding during their learning. During the concrete stage, pupils have the opportunity to use concrete objects and manipulatives, such as cubes, numicon, base 10 or counters in order to bring the maths to life and to build understanding of what they are doing. At the pictorial stage, pupils then build on their concrete experience by using pictorial representations, for example using or drawing a number line, drawing a bar model or using pictorial representations of the concrete materials used previously. Visualising a problem in this way can help children to reason and to solve problems. With the foundations firmly laid in the concrete and pictorial stages, pupils are then able to move to an abstract approach using numbers and key concepts with confidence.

3.5 This method of working links to Bruner's theory of learning.

1966 - BRUNER'S THEORY OF LEARNING



Enactive - manipulate directly, Iconic - manipulate images, Symbolic - manipulating abstract symbols

3.6 By planning our maths lessons in a way that revisits and extends previous knowledge, we can create a learning environment that fosters deeper understanding and long-term retention of mathematical concepts.

3.7 Summative assessments take place before a unit of work as a Pre-learning assessment (to ascertain the starting points). After analysing pre-learning assessments, teachers are able to plan pre-teach interventions, which are individually tailored to the pupils based on misconceptions: these help to match teaching activities to the needs of the children.

3.8 A post-learning assessment is administered after each unit of work to assess pupils' progress and understanding. Analysis of this summative assessment allows teachers to plan interventions or next steps for individual learners.

4.0 Our Maths Lessons

4.1 To ensure a consistent approach across all year groups, a series of PowerPoint or Notebook slides should accompany each lesson:

- Date Slide
  This can take the form of a calendar page or a slide where you identify the day, date and month.

- Fluency in KS1:
  Year 1: Number of the day-this session should focus on one number and focus on its formation, position on a number line, numicon representation, base 10 representation, one more/less etc. This is followed by WRM Flashback 4.
  Year 2 will complete fluency questions, beginning with addition and subtraction and then including multiplication and division when they have been taught. This is followed by WRM Flashback 4.

- Fluency in KS2: Fluency questions so that pupils can practise key arithmetic strategies to develop speed and fluency on a daily basis. This is followed by WRM Flashback 4.
  Pupils are reminded that these starter activities improve retention and help them to know more and remember more. They are reminded that these questions are all based on prior learning: Q1 is from the last lesson; Q2 is from last week; Q3 is from 2 to 3 weeks ago; Q4 is from last term/year. This is displayed on the working wall.

- How is this maths used in real-life? Who uses this maths in real-life?
  This slide/slides will remain the same throughout your unit. This puts the learning into perspective. A copy should be on the maths working wall.

- Learning Sequence
  This slide will remain the same throughout your unit. Discuss the sequence with the pupils: it shows which lesson are they about to do, what have they learned so far and what will they be learning next and how each lesson builds on from the previous learning. A copy of this is also on the Maths working wall.

5.0 Whole Class Teaching

5.1 Pupils are taught as a whole class. During the lesson, the teacher models the maths on the board, taking opportunities to question the children on their understanding and identifying any misconceptions and addressing them straight away. All children should progress at a similar pace. Extra support is given to pupils who need it to help them keep up, not catch up. As for high attaining pupils, rather than letting them move on to new topics while others continue coming to grips with the lesson at hand, they are given the chance to consolidate and deepen their understanding with more challenging tasks and activities within the same learning objective.

5.2 The emphasis in lessons is to make teaching interactive and lively, to engage all pupils encouraging them to talk about mathematics. Lessons involve elements of:

- Instruction – giving information and structuring it well
- Demonstrating – showing, describing and modelling mathematics using appropriate resources and visual displays
- Explaining and illustrating – giving accurate and well-paced explanations
- Questioning and discussing
- Consolidating
- Reflecting and evaluating responses – identifying mistakes and using them as positive teaching points
- Summarising – reviewing mathematics that has been taught enabling pupils to focus on next steps

5.3 In addition to our daily maths lessons Reception, Year 1 and Year 2 are also following the NCETM Maths Mastery schemes, which will aid all pupils to develop and demonstrate good number sense and enable them to build firm mathematical foundations.

6.0 Impact

6.1 The impact of mathematics teaching at Merton Bank is monitored regularly as part of our monitoring cycle. As a school, we are continually committed to raising standards, establishing high expectations, and promoting effective teaching and learning and monitoring is a pivotal part of this process. Evaluating the information gathered from learning walks, book monitoring, pupil voice, staff feedback and maths surgeries enable good practice to be shared and identify where further improvements need to be made.

6.2 Assessment can be summative or formative. Both types are used to full benefit at Merton Bank Primary School.

6.3 At Merton Bank, children's mathematical ability is assessed throughout each maths lesson. It is quickly assessed through questioning, observing, listening and marking. These formative assessments are used to inform the teacher of the next steps needed for that child either within the lesson of for the beginning of the next one. Work is marked on a daily basis and then informs the planning for the following day. Together, this ensures that the lessons are pitched at the correct level of challenge. Marking forms just one part of our on-going teacher assessment in line with our school marking policy.

6.4 Summative assessments take place before a unit of work as a Pre-learning assessment (to ascertain the starting points), after the unit of work (to assess progress) and also during whole school assessment week. After analysing pre-learning assessments, teachers are able to plan pre-teach interventions, which are individually tailored to the pupils based on misconceptions: these help to match teaching activities to the needs of the children. Post-assessment analysis highlights any gaps in learning that still need to be addressed. End of year assessments and FFT data aid analysis and measurement of progress. End of Key Stage tests are conducted in accordance with the latest guidance and requirements. Data is recorded into INSIGHT, which is then used for target setting procedures to form the basis for medium and long-term targets for teaching and learning. Assessment is made of all areas of maths: calculation skills, number knowledge and skills, shape and space knowledge, handling data skills and applying mathematics, amongst other facts and knowledge learned.

Written by: Karen Weatherby (Subject Leader)
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Nurturing a Love For Learning