At St. Mary's we live and learn, sharing God's love.

MISSION STATEMENT

'As a Catholic school community, we strive to live as a Christian family showing our love for God in the way we treat each other with dignity and respect and by promoting the development of each child as a unique individual.'

Math's Policy

Contents

1. **Curriculum Statement**
   Intent

The 2014 National Curriculum for Maths aims to ensure that all children:

- Become fluent in the fundamentals of Mathematics
- Are able to reason mathematically
- Can solve problems by applying their Mathematics

At St. Mary's, these skills are embedded within Maths lessons and developed consistently over time. We are committed to ensuring that children are able to recognise the importance of Maths in the wider world and that they are also able to use their mathematical skills and knowledge confidently in their lives in a range of different contexts.

We want all children to enjoy Mathematics and to experience success in the subject, with the ability to reason mathematically. We are committed to developing children's curiosity about the subject, as well as an appreciation of the beauty and power of Mathematics.

Implementation

The content and principles underpinning the 2014 Mathematics curriculum and the Maths curriculum at St. Mary's reflect those found in high-performing education systems internationally, particularly those of east and south-east Asian countries such as Singapore, Japan, South Korea and China. These principles and features characterise this approach and convey how our curriculum is implemented:

- Teachers reinforce an expectation that all children are capable of achieving high standards in Mathematics.
- The large majority of children progress through the curriculum content at the same pace; significant time is spent developing deep knowledge of the key ideas that are needed to underpin future learning. This ensures that all can master concepts before moving to the next part of the curriculum sequence, allowing no pupil to be left behind.
- 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 in the next lesson.
- The structure and connections within the mathematics are emphasised, so that pupils develop deep learning that can be sustained.
- Lesson design identifies the new mathematics that is to be taught, the key points, the difficult points and a carefully sequenced journey through the learning. In a typical lesson pupils sit facing the teacher and the teacher leads back and forth interaction, including questioning, short tasks, explanation, demonstration, and discussion.
- Practice and consolidation play a central role. Carefully designed variation within this builds fluency and understanding of underlying mathematical concepts.
- Teachers use precise questioning in class to test conceptual and procedural knowledge and assess children regularly to identify those requiring intervention, so that all children keep up.

- Children's explanations and their proficiency in articulating mathematical reasoning, with the precise use of mathematical vocabulary, are supported through the use of stem sentences provided by the teacher.
- Key facts such as multiplication tables and addition facts within 10 are learnt to automaticity to avoid cognitive overload in the working memory and enable pupils to focus on new concepts.

https://www.ncetm.org.uk/media/uhjhtxy1/the-essence-of-maths-teaching-for-mastery-june-2016.pdf

To ensure whole consistency and progression, the school uses the nationally recognised White Rose Math's scheme. The White Rose curriculum is a cumulative curriculum, so that once a topic is covered, it is met many times again in other contexts. For example, place value is revisited in addition and subtraction and multiplication and division. The curriculum ids designed to have an emphasis on number, with a large proportion of time spent reinforcing number to build competency.

Lessons are planned to provide plenty of opportunities to build reasoning and problem solving elements into the curriculum. When introduced to a new concept, children have the opportunity to use concrete objects and manipulatives to help them understand what they are doing. Alongside this, children are encouraged to use pictorial representations. These representations can then be used to help reason and solve problems. Both concrete and pictorial representations support children's understanding of abstract methods.

Mathematical topics are taught in blocks, to enable the achievement of 'mastery' over time. These teaching blocks are broken down into smaller steps, to help children understand concepts better. This approach means that children do not cover too many concepts at once which can lead to cognitive overload. Each lesson phase provides the means for children to achieve greater depth, with children who are quick to grasp new content, being offered rich and sophisticated problems, within the lesson as appropriate.

The school's status as a mastery specialist school, as part of the DfE funded Maths Hubs programme, continues to ensure that staff at all levels understand the pedagogy of the approach.

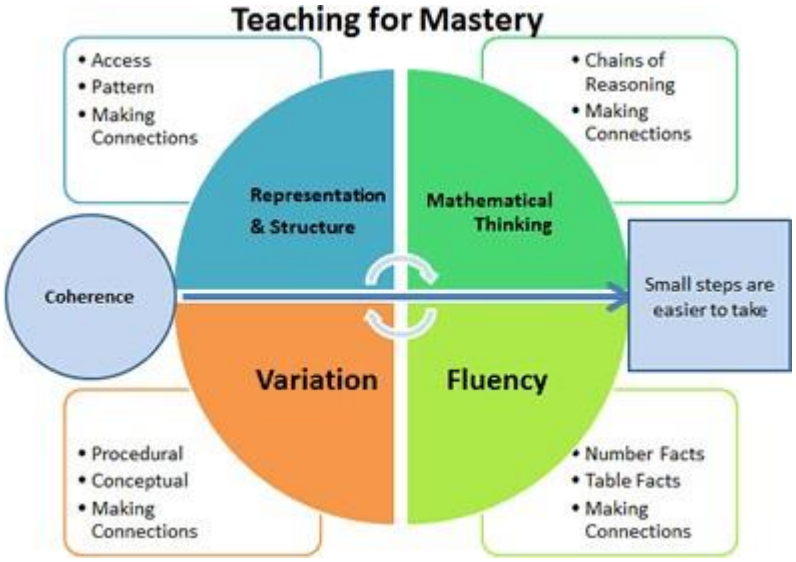
Impact

The school has a supportive ethos and our approaches support the children in developing their collaborative and independent skills, as well as empathy and the need to recognise the achievement of others. Students can underperform in mathematics because they think they cannot do it or are not naturally good at it. The school's use of White Rose Maths addresses these preconceptions by ensuring that all children experience challenge and success in mathematics by developing a growth mindset.

Regular and ongoing assessment informs teaching, as well as intervention, to support and enable the success of each child. These factors ensure that we are able to maintain high standards, with achievement at the end of KS2 at least in line with the national average, as well an increasingly high proportion of children demonstrating higher standard, at the end of each phase.

2. **Teaching and Learning**

Effective teaching for mastery is underpinned by five big ideas, first published by the National Centre for Excellence (NCETM) in mathematics in 2017 -



Coherence

Lessons are broken down into small connected steps that gradually unfold the concept, providing access for all children and leading to a generalisation of the concept and the ability to apply the concept to a range of contexts.

Representation and Structure

Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation.

Mathematical Thinking

If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned with and discussed with others

Fluency

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics

Variation

Variation is twofold. It is firstly about how the teacher represents the concept being taught, often in more than one way, to draw attention to critical aspects, and to develop deep and holistic understanding. It is also about the sequencing of the episodes, activities and exercises used within a lesson and follow up practice, paying attention to what is kept the same and what changes, to connect the mathematics and draw attention to mathematical relationships and structure.

Source: https://www.ncetm.org.uk/teaching-for-mastery/mastery-explained/five-big-ideas-in-teaching-for-mastery/

Maths is taught daily during the morning. A typical maths lesson lasts approximately 1 hour and begins with a short activity called 'Flashback 4' which retrieves prior learning. However, in Reception class, Key Stage 1 and some of Year 3 they undertake the NCETM's 'Mastering Number' programme instead, or in addition to this, to ensure a deep understanding of number. Times Tables are practised daily using 'Times Table Rockstars', pupils can also access this at home.

The small step for the lesson is then shared with the children and they revisit key concepts from previous learning that support the key learning of the lesson. Children then solve contextual problems as a class, with the teacher that expose the structure of the mathematical concept. In this part of the lesson, teachers use careful questions to draw out children's discussions and their reasoning and the children learn from misconceptions through whole class reasoning. To support this, the teacher will often use a stem sentence to scaffold children's articulation of mathematical ideas and reasoning, and/or a generalisation that supports application of the concept. The variation in this part of the lesson enables a deeper understanding of the concept and may include the use of related concrete resources, as well as representations of the problem to provide a secure base of understanding.

Children will then complete their initial tasks in their White Rose math's workbooks. The teacher will review responses and then share answers and strategies, addressing any misconceptions, before children continue with their practice. This practice uses conceptual and procedural variation to build fluency and develop greater understanding of underlying mathematical concepts. This 'intelligent practice' supports mathematical thinking and enables children to:

'Recognise and use connections among mathematical ideas; understand how mathematical ideas interconnect and build on one another to produce a coherent whole; recognise and apply mathematics in contexts outside of mathematics'.

(Annenberg Foundation, 2017)

Where appropriate and depending on the topic, children will continue to have access to concrete resources which they can use to complete the practice task. Some children might be supported through additional scaffolding provided by the teacher.

Children who complete this are provided with further 'rich and sophisticated' problems from the White Rose Maths problem solving, NCETM materials or previous SATs questions, which they complete in their own math's book. The final part of the sequence is a 'True or False' question, which requires the children to use mathematical reasoning to prove or disprove a related statement or mathematical problem related to the key learning.

3. **Assessment**

3.1 Assessment for Learning:

Children receive effective and immediate feedback through teacher assessment within the lesson, and AfL is integral to the design of each lesson;

- The structure of the teaching sequence, ensures that children know how to be successful in their independent work. Teachers will make informed choices as to when they should progress to new content according to the degree of fluency that children are able to demonstrate.
- The 'Get Ready' part of the lesson is when a new mathematical concept is introduced and the guided practice aspect of this part of the lessons means that children are well prepared to be able to apply the skills, knowledge and strategies taught they have learnt during their independent work.
- Common misconceptions are identified and addressed within the teaching sequence and key understanding within each 'small step' is reviewed and checked by the teacher and the children before progression to further depth.
- The final phase of the lesson is a whole class 'True or False' statement. Teachers use the children's responses as a means to assess the depth of their understanding.
- Opportunities for additional practice and correction are provided by the teacher, as appropriate, following the assessment of a child's success during the lesson. Additional intervention is provided before the following lesson to ensure all pupils are able to access the next small step.

3.2 Formative Assessment:

Short term assessment is a feature of each lesson. Observations and careful questioning enable teachers to adjust lessons and brief other adults in the class if necessary.

The lesson structure of a White Rose Maths lesson is designed to support this process and the 'True of False' statement at the end of each lesson also allows for misconceptions to be addressed.

At the end of each blocked unit of work, the children also complete the carefully aligned White Rose Maths 'End of Unit Assessment'. The outcome of this is used by the teacher to ensure that any identified gaps in understanding can be addressed before the next unit is taught. This also informs dialogue with parents and carers during parent consultations, as well as the judgements made at the end of the term as to the extent that each child has achieved the expectation for their year group.

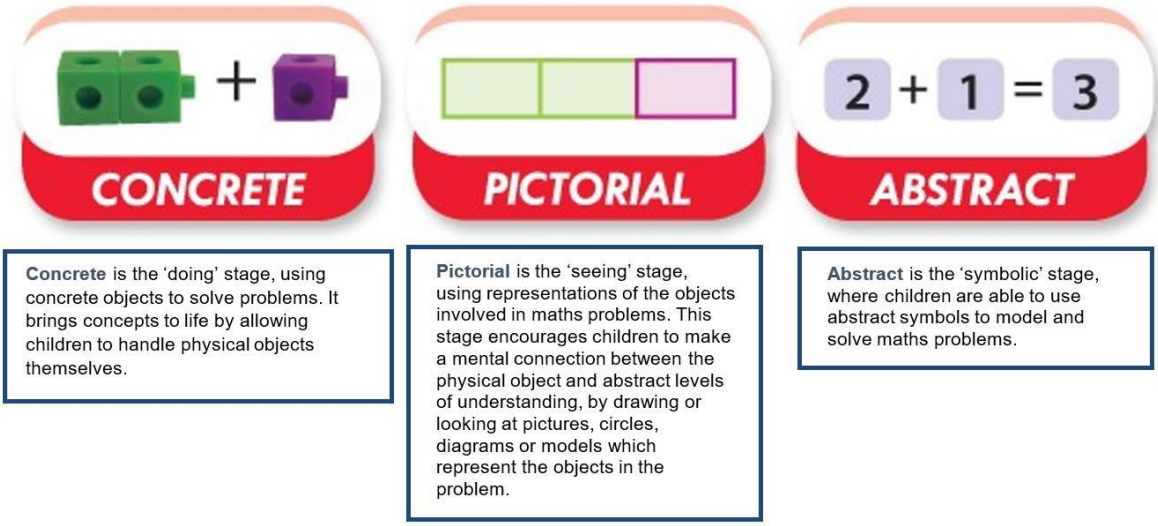
3.3 Summative Assessment:

Teachers administer a termly White Rose arithmetic paper and reasoning and problem-solving paper which specifically links to the coverage for that term. The results of these papers are used to identify children's ongoing target areas, which are communicated to the children, as well as to parents and carers during parent consultations. They are also used alongside the end of unit assessments and outcomes of work, to inform the whole school tracking of attainment and progress of each child.

Assessment data in maths is reviewed throughout the year to inform interventions and to also ensure that provision remains well-informed to enable optimum progress and achievement. End of year data is used to measure the extent to which attainment gaps for individuals and identified groups of learners are being closed. This data is used to inform whole school and subject development priorities for the next school year.

4. **Planning and Resources**

The use of manipulatives objects is an integral part of the White Rose Maths scheme which incorporates the concrete – pictorial – abstract pedagogy:



Each classroom has its own supply of mathematical equipment, in line with the school calculation policies, which the school has adopted

Teachers also have access to the White Rose Maths Interactive Teaching Resources for the purpose of modelling strategies and demonstrating the use of concrete resources.

The school subscribes to the White Rose Maths Premium Resource Centre. This provides access to visual resources (including lesson slides that teachers can adapt), as well as small steps planning guidance and reasoning and problem solving questions that accompany each small step, to inform and use in lessons.

The subject leader attends regular training through Abacus NW math's hub and the Mastering Number programme.

5. **Organisation**

The school has implemented a blocked curriculum approach to the teaching of Mathematics. This ensures that children are able to focus for longer on each specific area of Maths and develop a more secure understanding over time. This approach is also designed to enable children to progress to a greater depth of understanding.
Subsequent blocks continue to consolidate previous learning so that the children continually practise key skills and are able to recognise how different aspects of Maths are linked. For example, when children have completed a block which has enabled them to master the multiplication of two-digit numbers, a subsequent block on area and shape might provide opportunities to use this understanding when calculating the area of shapes with 2-digit length and width dimensions.

6. **EYFS**

EYFS concentrate on number.

ELG: Number:

Pupils are expected to;

- Have a deep understanding of number to 10, including the composition of each number.
- Subitise up to 5.
- Automatically recall number bonds up to 5 and some number bonds to 10, including double facts.

ELG: Numerical Patterns:

- Verbally count beyond 20, recognizing the pattern of the counting system.
- Compare quantities up to 10 in different contexts, recognizing when one quantity is greater than, less than or the same as the other quantity.
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed evenly.
- Measures.

Teaching and learning might include:

- Identifying different amounts of up to three objects so that children are able to recognise amounts without counting them (subitising).
- Activities which expose the composition and cardinality of numbers to five.
- Manipulating shapes and talking about 2D and 3D shapes, using mathematical and informal language.
- Investigating, describing and creating sequences and repeating patterns with different colours and objects.
- Make comparisons between objects relating to size, weight, measure and length.

Children are taught these concepts using physical resources, pictorial resources, songs, games and role-play.

Throughout the week a child will work with an adult - either a teacher or a supporting adult - on a task. This activity is completed in 10 - 15 minutes. There are daily whole class sessions, following the White Rose and Mastering Number units of study.

In both Nursery and Reception, the continuous provision activities link to the focus for the week. In addition to these planned independent activities, children also have the opportunity to self-select Maths resources to consolidate their learning during child- initiated activities. We recognise the importance of play-based learning and therefore encourage children to develop their understanding during their play. Such opportunities are provided in both the inside and outside environment.

Regular observations and assessments help to ensure that children that need additional intervention to consolidate their mathematical understanding are identified and supported by appropriate interventions.

7. **KS1 and KS2**

Through Years 1 to 6 we use a coherent programme of high-quality materials and exercises, which are structured with great care to build deep conceptual knowledge, alongside developing procedural fluency.

Our KS1 and KS2 teachers use White Rose Maths Premium lesson slides, which they adapt accordingly. Children record their work in printed workbooks and respond to additional problem solving and reasoning questions in their math's book. They might also use their math's book to record key number facts and make representations of mathematical concepts.

Short term planning is done on a weekly basis. Teachers also plan, modify and source activities and additional tasks which offer support and scaffolding where appropriate, and provide further challenge for children who are able to progress further in their learning.

Lessons in both key stages follow the same sequence (see section 2: Teaching and Learning). In Y1, the teacher might use 'mini-plenaries' to explain each question during the children's completion of the practice book and also to check children's understanding before they complete the next question. This ensures that all children are able to complete the task with confidence.

The White Rose Maths progression document provides an overview of how the scheme covers the statutory requirements of the 2014 National Curriculum (p3-25). It also shows how concepts build over time and how the teaching blocks are sequenced in each year group (p26-31):

https://whiterosemaths.com/wp-content/uploads/2019/National-Curriculum-Progression-Primary_Nov2019.pdf

8. **Equal Opportunities**

The school is committed to ensuring the active participation and progress of all children in their learning.

All children will be given equal opportunities to achieve their best possible standard, whatever their current attainment and irrespective of gender, ethnic, social or cultural background, home language or any other aspect that could affect their participation or the progress of which they are capable.

9. **Inclusion**

Taking a mastery approach, differentiation occurs in the support and intervention provided to different children, not in the topics taught, particularly at earlier stages. The National Curriculum states:

'Children 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.'

There is little differentiation in the content taught but the questioning and scaffolding individual children receive in class as they work through problems will differ, with higher attainers challenged through more demanding problems, which deepen their knowledge of the same content before acceleration onto new content. Children's difficulties and misconceptions are identified through immediate formative assessment and addressed with rapid intervention – commonly through individual or small group support later the same day or within the lesson.

A range of inclusion strategies, disseminated by the SENDCO, are embedded in practice and teachers are aware of the special educational needs of the children in their Math's class, as well as those who have English as an additional language.
Although the expectation is that the majority of children will move through the programmes of study at broadly the same pace, the 2014 National Curriculum states:

'Decisions about when to progress should always be based on the security of children's understanding and their readiness to progress to the next stage.'

If a child's needs are best met by following an alternative plan, including coverage of the content from a previous year, this will be overseen by the SENDCO, in collaboration with the class teacher and with the knowledge of SMT. Specific arrangements for the provision of children with SEND will be communicated to parents and carers during SEND reviews.

10. **Role of the Subject Leader**

- The subject leader will raise the profile of Maths at St. Mary's Primary School through best practice. They will lead CPD sessions during staff meetings to share and explore best practice.
- The subject leader will monitor progression and continuity of Maths throughout the school through lesson observations and regular monitoring of outcomes of work.
- The subject leader will ensure that all staff have access to year group plans and the relevant resources which accompany them.
- The subject leader will monitor children's progress through the analysis of whole school data. They will use this data to inform the subject development plan which will detail how standards in the subject are to be maintained and developed further.
- The subject leader will, on a regular basis, organise, audit and purchase central and class-based Maths resources.
- Through ongoing involvement in the DfE funded Maths Hubs programme, the subject leader will keep up to date on current developments in Maths education and disseminate information to colleagues.
- The subject leader will extend relationships and make contacts beyond the school.
- The subject leader will develop opportunities for parents/carers to become more involved in Math's education.
- The subject leader will ensure that all staff have access to professional development including observations of outstanding practice in the subject.

11. **Parents**

- The school recognises that parents and carers have a valuable role to play in supporting their child's mathematical learning. An overview of the Maths curriculum is available on the school's website, as well as guidance in the progression in calculation methods used by the school.
- Children are given Maths homework at least once a week from Reception to Year 6. Activities are to be set and accessed via the Mathletics website.
- Parents are informed of their child's progress at Parent Consultation Meetings and this is also communicated in written school reports.
- Parents and carers are encouraged to speak to their child's maths teacher at any point during the year, either informally or by making a specific appointment. Information about their child's standards, achievements and future targets in maths is shared during parent consultation meetings, as well as ways that parents/carers may be able to assist with their child's learning.

Date of Policy: **March 2023**
Policy Review Date: **March 2024**