SMFR Approach to Maths

This guidance outlines the teaching, organisation and management of the Maths curriculum taught and learnt at SMFR. The implementation of these guidelines is the responsibility of all teaching staff.

SCHOOL VISION

Through FAITH, as a FAMILY we aspire to grow. Thriving for all our FUTURES, enabling us to FLOURISH individually and as a community.

For I know the plans I have for you, plans to prosper you and not harm you, plans to give you hope and future
Jeremiah 29:11

INTRODUCTION

At SMFR, we are a FAMILY committed to ensuring all children FLOURISH in our care; We take pride in providing our children with a broad and engaging curriculum, and fostering their desire and curiosity to learn.

"Mathematics is a creative and highly interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas." (NC 2014)

At St Mary's Farnham Royal, *we take great care in the teaching of mathematics from EYFS through to Year 6 and preparing children for every stage of their learning*. Our emphasis is to ensure that all our pupils are able to make rich connections across mathematical ideas to develop fluency and mathematical reasoning. Maths is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. We are committed to encouraging our pupils to apply their mathematical knowledge and skills confidently in other subjects and areas of their lives in a range of different contexts. We believe that all children are mathematicians and we want our pupils to enjoy mathematics, to be confident mathematicians, experience success in the subject, to show curiosity and an appreciation of the beauty and power of mathematics.

INTENT

We aim to equip pupils with the tools to understand Maths. These tools include reasoning, problem solving and the ability to think in abstract ways. Mathematics is integral to all aspects of life; with this in mind, we strive to ensure that our children develop a healthy and enthusiastic attitude towards mathematics that will stay with them and support them in the next stage of their education and beyond. At each stage of learning, children are actively supported to reach their full potential as mathematicians.

The National Curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non- routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Subject Aims:

The basis for each year groups' work is found in the National Curriculum for Maths. Teachers will use a wide range of resources, including those that support children to visualize problems and the number system; resources to support understanding of place value; Computing including interactive resources; real life objects and scenarios.

In Maths lessons, children will have the opportunities to participate in; the practical use of resources to develop understanding of key concepts; activities to develop fluency; problem solving including in real life contexts; exploring different possibilities in open ended investigations; Activities to develop Maths language/ vocabulary and ability to explain their thinking.

IMPLEMENTATION

A mastery approach to the teaching of mathematics has been adopted at St Mary's, so that we have high expectations of all our pupils. We endeavor to make the maths curriculum accessible to all pupils; moving them through the programme of study at broadly the same pace, with opportunities to work on the objectives more deeply for those who grasp concepts rapidly. Teachers from Reception to Year 6 follow the National Curriculum and use year group planning and resources from White Rose Maths to support the delivery of mathematics throughout the whole school.

White Rose is based on a small steps approach that keeps all learners together. By using the resources across the school we can ensure consistency of the mathematical concepts and comprehensive coverage of the curriculum. Teachers use the resources to plan lessons that are accessible to all children.

Within each of the math's learning sequences our children will experience:

- Real life problem solving and investigation.
- Taking risks and learning from mistakes.
- Opportunities to prove and explain ideas.
- Opportunities to build resilience and encouragement to self-challenge in their learning.
- Deep levels of questioning and reasoning.
- Peer support through discussion.

Across each year group, fluency, reasoning and problem solving are threaded throughout each lesson. Pupils are encouraged to build upon previous learning, use mathematical vocabulary and their reasoning skills when answering questions, and challenged to extend their thinking through questioning. Mistakes are valuable and are used as opportunities to learn and build knowledge. We value depth rather than speed, and want to encourage a life – long love of mathematics.

Concrete. Pictorical and Abstract

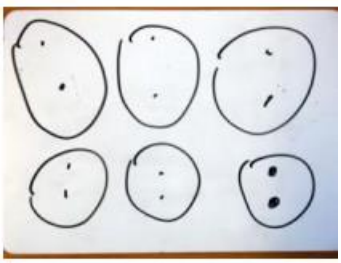
Our concrete, pictorial and abstract (CPA) approach to teaching and learning ensures that teachers combine all 3 elements within their practice, which supports pupils' understanding.

Concrete representation:

The children are first introduced to an idea or a skill by acting it out with real objects. In division, for example, this might be done by separating apples into groups of red ones and green ones or by sharing 12 biscuits amongst 6 children. This is a 'hands on' approach using real objects and it is the basis for conceptual understanding. Concrete apparatus such as numicon, double sided counters, base 10 apparatus and place value counters are used widely across school.

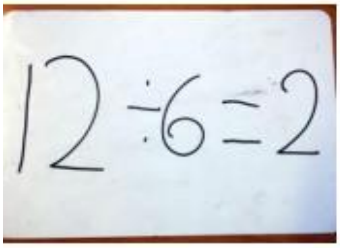
Pictorial representation:

This is used when a child has sufficiently understood the hands-on experiences performed and can now relate them to representations, such as a diagram or picture of the problem. In the case of division this could be the action of circling objects.



Abstract representation:

The symbolic stage – a child is now capable of representing problems by using mathematical notation, for example: 12 ÷ 6 = 2. This is clearly the more confusing and mysterious of the three and without the 'hands on' and pictorial steps can be tricky for children to understand



Supporting SEND learners:

A key aim of the White Rose Maths scheme of learning is to be inclusive for all pupils. The use of one curriculum that works for all, with everybody studying the same topic and being provided with support and challenge as needed. The small steps structure, the progression documents and the assessments that underpin the White Rose Maths curriculum help our teachers to identify gaps. Teachers then take steps to support all pupils to make progress, by using material or structures from earlier year groups.

Planning and Teaching:

To provide adequate time for developing mathematical skills each class teacher will provide at least four daily mathematics lessons per week. This may vary in length but will usually last for about 45 to 60 minutes. In Year 1 to 6, one 45-minute lesson is dedicated to developing children's mental fluency, practicing recall of number facts and specific procedures as part of arithmetic.

Lesson progression is guided primarily by White Rose (WR) structure and small steps. All lessons are planned to use the White Rose Teaching slides as the basis. Videos are used to support teacher's understanding and subject knowledge of the lesson content and model tasks and descriptive methods – not as the lesson content.

- Teachers model and go through examples/misconceptions carefully questioning as they progress the lesson.
- Any additional adults are planned in and are clear about their role in each part of the lesson.
- Stem sentences are highlighted
- Stems should be repeated on subsequent slides for use answering questions.
- Children should be encouraged to use stems to explain concepts and ideas.
- All Maths planning is saved in the Planning Folder on Teachers Shared Drive in the individual year group folders.

Lessons are planned using a LI **(Learning Intention)** which sets out the key learning in the lesson. *Must, should could statements* is shared with the class during the lesson so that children can assess their understanding and also stretch their learning.They are subsequently used by the teacher during the assessment and reviewwork of children's work and are used to identify individual target area.

Mental and Written Calculations

An ability to calculate mentally lies at the heart of numeracy; therefore, it is important to emphasize mental methods from the early years. It is important that we have a consistent approach to calculating for all four operations - addition, subtraction, multiplication and division. Our calculation policy is produced by the White Rose. It begins with the models, images and resources that can be used to introduce each operation. At St Mary's we use a variety of these models. As a child progresses through school it is important that they have a consistent approach to recording their calculation so that they feel confident and to ensure that they have a deep conceptual understanding of each operation.

EYFS Statutory Framework:
The EYFS framework promotes teaching and learning to ensure children's 'school readiness' and gives childrenthe broad range of knowledge and skills that provide the right foundation for good future progress through schooland life. Through this curriculum, children will be exposed to aspects of knowledge, skills and understanding thatwill be built upon once they enter the National Curriculum Programmes of Study.

Maths Curriculum Link to EYFS Framework:

EYFS follow the White Rose Maths scheme. Children in Early Years will be given lots of opportunity to explore maths through adult led activities and independent learning. They will use a range of concrete resources and pictorial representations to explore different concepts. Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically.

Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

Subject Enrichment: See Teaching, Learning & Assessment Policy

Inclusion for all Children: See Teaching, Learning & Assessment Policy

IMPACT

The impact of our Maths curriculum is that at the end of Key Stage 2 our pupils achieve and make progress in line with other pupils nationally, evident through:

- Fluency in their recall of key number facts and procedures
- Accuracy in the formal calculation methods for all four operations
- The flexibility and fluidity to move between different contexts and representations of mathematics
- The ability to recognise relationships and make connections in mathematics
- The confidence and resilience to reason mathematically and solve a range of problems.

The subject leader will ensure they monitor the teaching and learning and hence the standard of work across the school, matching the knowledge, skills and understanding to the curriculum overview and age-related expectationsof the subject. Each leader will be expected to produce an annual report (Deep Dive) informing the senior leaders and governors of their findings.

Standards of pupil work

Children are to take pride in their books, driven by the high expectations of Teachers and Learning Support Assistants. They are to ensure that their presentation and handwriting within Maths are of a high standard.

- Pencil only in Maths books and rulers used for drawing lines and representations.
- Short date and LI written/printed on work
- Number formation should be clear and unambiguous and practiced if necessary (Rec-Y6)
- All writing by children in their Maths books must be in pencil, all editing and responding to be done in purple pen.
- Children in KS2 should draw a margin with a pencil and a ruler on each new page they write on.
- Rubbing out should be discouraged. Any errors within calculations should be crossed out with one line to reinforce that 'mistakes' are part of their learning journey.
- Exit messages are used which vary from KS1 (e.g. using of faces) to KS2 (e.g. written messages).

Assessment, Recording and reporting to parents

The teaching and assessing of mathematics at St Mary's follows the Assessment for Learning (AfL) cycle of; plan, teach, review, assess. Children's work is marked regularly, as part of our AfL policy and assessed against National Curriculum objectives. Children in EYFS are assessed regularly using the Early Learning Goals.

Children's work in mathematics is assessed from three aspects:

1) **Informal, formative assessments** are made continually by questioning the children, observing and monitoring their work. These short term assessments are closely related to the learning objectives for the lesson and help inform next steps.
2) **Periodic assessments** take place at the end of a unit– we use White Rose End of Block Assessments to check progress and understanding of content covered. Each child's scores are also input on a class data sheet which provides an overview of achievement in each specific area within the programme of study.

3) **Summative assessment-** Three per year at the end of T1/T2/T3 assessments. Teachers administer a termly arithmetic paper and reasoning and problem-solving paper produced by White Rose which specifically links to the coverage for that term. Data from these are then inputted on Termly Tracker.

Statutory Assessment Tests (SATs) are used for children in Year 2 and 6, plus children in Year 4 are also required to take a multiplication tables check (MTC) in the Summer Term. The purpose of the check is to determine whether pupils can fluently recall their times tables up to 12, which is essential for future success in mathematics.

A whole school tracking system is used to closely monitor children's progress throughout the school. Teacher assessments are entered at the end of every unit and termly. They are closely analyzed to identify children working at greater depth or who are at risk, appropriate intervention is then put in place to close gaps.

We see the relationship with parents as very important in supporting their children's mathematical skills. There is a dedicated Maths page on our school website with provides specific documents for parents outlining what is covered in each year group and ways they can support at home. Parents also receive an end of year report which provides information on their child's outcomes and progress

Marking and Pupil Feedback

Marking: See Marking Policy

As part of the on-going review and development of our curriculum, the Maths Subject Leader will hold learning conversations with children; this will be done in a variety of ways. Our teaching staff value pupil feedback and, within lessons, will informally seek the children's thoughts and ideas about their learning.

Resources:
The EYFS classes have the majority of the necessary mathematics equipment located within the classroom. KS1 and KS2 classes have the majority of their resources centrally stored in the shared area; however, some are located in the individual classes.

Classroom Maths Display Boards:
The Maths display boards within the classroom are to be accessible to, and useful for, children during each session. Walls should not be overloaded. They should include: Visual images/models to support conceptual understanding and modelled methods.

Times Tables:
At St Mary's, we believe that through a variety of interactive, visual and engaging techniques, all children can achieve the full multiplication tables knowledge by the time they leave Primary School. The new National Curriculum (2014) states that by the end of year 4, pupils should be able to recall multiplication and division facts for multiplication tables up to 12x12. Children in Year 4 are also required to take a multiplication tables check (MTC) in the Summer Term. The purpose of the check is to determine whether pupils can fluently recall their times tables up to 12, which is essential for future success in mathematics. This means it is important for the children to learn their multiplication tables facts and to be able to recall them quickly and accurately.

We teach times tables using the following progression:
Year 1 – Be able to count in multiples of twos, fives and tens
Year 2 - Be able to recall 2, 5 and 10 multiplication and division facts
Year 3 - Be able to recall 3, 4 and 8 multiplication and division facts
Year 4 - Be able to recall 6, 7 and 9 multiplication and division facts
Year 5/6 - application of multiplication and division facts to problem solving

To support children's learning of multiplication tables children have access to Times Tables Rockstars. This is an online resource that Years 1-6 use to aid the teaching and fluency of Multiplication and division facts.

Monitoring and Evaluating:

Monitoring children's learning together with the quality of Maths teaching is the responsibility of the Maths subject leader. The Maths subject leader monitors children's books, displays, planning and carries out pupil interviews and learning walks. The work of the Maths subject leader also involves supporting colleagues in the teaching of maths and keeping informed about current developments in the subject.

Role of Maths subject leader

- To produce an agreed curriculum statement that outlines the intent, implementation and impact for Maths within the SMFR curriculum.
- To produce an agreed progression of content and skills within a curriculum overview, that takes account of the EYFS curriculum and National Curriculum.
- To produce and maintain an annual subject action plan.
- To lead the development of Maths throughout the school.
- To monitor the planning, teaching and learning of mathematics throughout the school.
- To help raise standards in Maths
- To provide teachers with support in the teaching of mathematics.
- To provide staff with CPD opportunities in relation to Maths within the confines of the budget and the School Improvement Plan
- To monitor and maintain high quality resources.
- To keep up to date with new developments in the area of mathematics
- To monitor the standards of learning, supported by Senior Leaders i.e. through books, lesson observations, learning conversations, data analysis and ensuring that key knowledge is evidenced in outcomes.
- To develop own skills and knowledge through relevant courses; reading; accessing other sources of information.