**St Mary’s RC Primary School – How do we teach Maths?**

Intent

At St. Mary’s Primary School we aim to teach children how to make sense of the world around them by developing their ability to calculate, reason and solve problems. We aim to support children in achieving economic well-being by equipping them with a range of computational skills and the ability to solve problems in a variety of contexts by delivering a mastery curriculum.

Our aims in the teaching of mathematics are:

to promote enjoyment of learning through practical activity, exploration and discussion; to develop confidence and competence with 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, and developing measuring skills in a range of contexts; to help children understand the importance of mathematics in everyday life; to 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; to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.

The children at St Mary’s are taught in three separate classes all with a Class Teacher and a Teaching Assistant;
> Reception
> Years 1, 2 and 3
> Year 4, 5 and 6

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 RC Primary School, 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

* 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. Differentiation is achieved by emphasising deep knowledge and through individual support and intervention.
* Teaching is underpinned by methodical curriculum design and supported by carefully crafted lessons and resources to foster deep conceptual and procedural knowledge.
* 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.

To ensure whole consistency and progression, the school uses the DfE approved ‘Power Maths scheme. This is fully aligned with the White Rose Maths Hub scheme. New concepts are shared within the context of an initial related problem, which children are able to discuss in partners. This initial problem solving activity prompts discussion and reasoning. In KS1, these problems are almost always presented with objects (concrete manipulatives) for children to use. Children may also use manipulatives in KS1. Teachers use careful questions to draw out children’s discussions and their reasoning. The class teacher then leads children through strategies for solving the problem, including those already discussed. Independent work provides the means for all children to develop their fluency further, before progressing to more complex related problems. Mathematical topics are taught in blocks, to enable the achievement of ‘mastery’ over time. Each lesson phase provides the means to achieve greater depth, with more able children being offered rich and sophisticated problems, as well as exploratory, investigative tasks, within the lesson as appropriate.

Impact

1. 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 can’t do it or are not naturally good at it. The Power Maths programme 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. This ensures that we are able to maintain high standards.

2. Teaching and Learning
A typical lesson using Power Maths lasts approximately 1 hour. Maths is taught daily during the morning. Children begin with a short ‘Power Up’ activity which supports fluency in and recall of number facts. Following this, the main lesson begins with a ‘Discover and Share’ task in which a contextual problem is shared for the children to discuss in partners. This helps promote discussion and ensures that mathematical ideas are introduced in a logical way to support conceptual understanding. In KS1, these problems are almost always presented with objects (concrete manipulatives) for children to use. Children may also use manipulatives in KS2. Teachers use careful questions to draw out children’s discussions and their reasoning and the children learn from misconceptions through whole class reasoning. Following this, the children are presented with varied similar problems which they might discuss with a partner or within a small group. At this point, scaffolding is carefully reduced to prepare children for independent practice. This is the ‘Think together’ part of the lesson and the children might record some of their working out in their Maths books or on a mini whiteboard. The teacher uses this part of the lesson to address any initial errors and confirm the different methods and strategies that can be used. The children are then shown a ‘challenge’ which promotes a greater depth of thinking.
The class then progress to the ‘Practice’ part of the lesson, which is designed to be completed independently. This practice uses conceptual and procedural variation to build fluency and develop greater understanding of underlying mathematical concepts. A challenge question and links to other areas of Maths encourages children to take their understanding to a greater level of depth.
The final part of the sequence is a ‘reflect’ task. This is an opportunity for children to review, reason and reflect on learning and enables the teacher to gauge their depth of understanding.

3. Assessment

3.1 Assessment for Learning:

Children receive effective feedback through teacher assessment, both orally and through written feedback in line with the success criteria.

* Success criteria are shared with the children prior to independent work. The process- based success criteria in Maths is linked directly to skills and knowledge required to complete the ‘think together’ part of the lesson and the independent practice tasks.
* Children will have a label with the success criteria in their Maths books, for referral during the lesson.
* At the end of the lesson, the children review their work against the success criteria as a means to identifying target areas and areas of weakness.
* The children’s judgements are then verified by the teacher, who also assesses the outcome against these criteria during marking.

3.2 Formative Assessment:

Short term assessments are part 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 Power Maths is designed to support this process and the reflect task at the end of the each lesson also allows for misconceptions to be addressed.
At the end of each blocked unit of work, the children complete a short end of unit check. This consists of five varied questions and an opportunity to demonstrate greater depth. There is a subsequent related task which allows for more open ended outcomes to give further indication of the depth of each child’s understanding.

The outcome of this mini assessment is in the children’s Maths books. Marking and verbal feedback ensure that gaps in understanding can be addressed before the next unit is taught.

4. Planning and Resources
The use of Mathematics resources is integral to the concrete – pictorial – abstract approach and thus planned into teaching and learning. The school has a wide variety of good quality equipment and resources, both tangible and ICT based, to support our learning and teaching.
These resources are used by our teachers and children in a number of ways including:

* Demonstrating or modelling an idea, an operation or method of calculation. Resources for this purpose would include: a number line; place value cards; dienes; money or coins; measuring equipment for capacity, mass and length; bead strings; the interactive whiteboards and related software; 3D shapes and/or nets; Numicon and related resources and software; multilink cubes; clocks; protractors; calculators; dice; number and fractions’ fans; individual whiteboards and pens; and 2D shapes and pattern blocks, amongst other things
* Enabling children to use a calculation strategy or method that they couldn’t do without help, by using any of the above or other resources as required

Standard resources, such as number lines, multi-link cubes, dienes, hundred squares and counters are located within individual classrooms. Resources within individual classes are accessible to all children who should be encouraged to be responsible for their use. Further resources (often larger items shared by the whole school) are located in the Hall.

An interactive teaching tool for the purpose of modelling strategies is available to all teachers as part of the Power Maths scheme. Resources to support teachers’ own professional development and understanding of new approaches as part of a mastery approach are available on the Power Maths ‘active learn’ platform. As well as overviews of learning, these include short videos which demonstrate new methods to ensure accuracy.

Teachers are encouraged to use the school playgrounds as an outdoor classroom when possible, for example, when teaching length, area or perimeter.

High quality textbooks and practice books, approved by the DfE, as part of the national approach to teaching for mastery are used in each year group and a digital version of the Power Maths textbooks allows these to be shared with the class, during the main teaching.

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
Children in Reception, children have a three part lesson from Autumn 1. This consists of:

1. Whole class oral and mental starter - 5 minutes
2. Whole class main teaching - 10 minutes
3. Focus activity in a group.

During this short daily Maths teaching session, the children begin to develop their understanding of simple mathematical concepts such as counting to 20, maintaining 1 to 1 correspondence, simple addition and subtraction facts, to recognise and describe simple 2d and 3d shapes. Children are taught these concepts using physical resources, pictorial resources, songs, games and role-play. There is no focus activity linked to these sessions.

Throughout the week the children will work with an adult - either a teacher or a supporting adult - on a differentiated tasks. This structure to the lesson enables teachers to secure a good balance between whole class work, group teaching and individual practice. It also enables teachers to establish regular routines thereby maximising teaching time. It supports assessment on a daily basis, as well as individual feedback to children, ensuring that children receive immediate intervention as required during the supported focus activity.

In both Pre-School and Reception, the independent activities at the Maths table link to the focus for the week. For example, if the focus for the week is addition, then activities on the Maths will often link to this. 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 Reception 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. All our teachers use textbooks and workbooks from DfE approved Power Maths series.

The Power Maths textbooks and workbooks are arranged in chapters and, over the course of the academic year, all units of the 2014 National Curriculum are covered. Short term planning is done on a bi-weekly basis, and includes the preparation of success criteria which accompany the learning intentions for each lesson. Teachers also plan activities and additional tasks which offer support and also provide further challenge for children who are able to progress further in their learning.

In KS1 and KS2, children record their work into their own Power Maths Practice book. The learning intention and success criteria for each lesson are recorded in the children’s individual Maths books and provide a record of the extent to which each child has achieved the LI, making reference to each activity in the practice book. Teachers mark outcomes of work in the practice books and then use the success criteria to verify children’s self- assessment and identify immediate target areas for each child, as outlined in the school’s marking and presentation policy. Where appropriate, children will record their responses to the ‘think together’ part of the lesson in their Maths books. Support tasks, further challenge questions and interactive questions in the form of green pen questions (which are completed in follow up of main independent work to consolidate or extend learning) are also recorded in the children’s own Maths books. This provides further evidence of differentiated learning.

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. A range of inclusion strategies, as listed on the school’s inclusion planning key, are embedded in practice and teachers are aware of the special educational needs of the children in their Maths 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:

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 SENCO, in collaboration with the class teacher. 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 RC Primary School through best practice. They will model lessons, as appropriate to new staff, NQTs and peers to support continued professional development. They will ensure the high quality of Maths displays around the school, present certificates of achievement during end of term assemblies and involve the school in ‘celebrations’ of Maths, including participation in events such as ‘World Maths Day’. The subject leader will support staff in providing opportunities for learning outside the classroom in Maths and will identify and organise opportunities which enable this, as appropriate.
* •  The subject leader will monitor progression and continuity of Maths throughout the school through lesson observations and regular monitoring of outcomes of work in Maths exercise books.
* •  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.
* •  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 Maths education.
* •  The subject leader will ensure that all staff have access to professional development including observations of outstanding practice in the subject.

11. Parents

•  We recognise 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. Paper copies of these documents are also available on request and the curriculum letter, sent home by each year group, also outlines the Maths topics to be covered.

* Children are given Maths homework at least once a week from Year1 to Year 6. The children are given 1 page from Math’s CPG Work Books to complete at home.
* Parents are informed of their child’s progress at Parents Evenings and in the annual end of year report.
* 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/carer meetings, as well as ways that parents/carers may be able to assist with their child’s learning.
* School also provides a number of opportunities for parents/carers to learn about what their child is learning and the way their child is being taught through parent workshops and online videos especially designed for parents.