Mugginton Church of England Primary School

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Mathematics Policy

This policy has been written in accordance with the Christian ethos of our school, our recognition of British values, an awareness of our position in the Global community and taking account of all current Safeguarding and Child Protection guidance.

'Mathematics is a creative and highly inter-connected discipline. 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 and a sense of enjoyment and curiosity about the subject.' (National Curriculum, 2014, p. 99)

'Confidence in numeracy and other mathematical skills is a precondition of success across the national curriculum.' (National Curriculum, 2014, p. 9)

All pupils should become fluent in the fundamentals of mathematics, including through varied and frequent practice so that pupils develop conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems. The majority of pupils are expected to move through the programmes of study at broadly the same pace. Pupils who grasp concepts rapidly should be challenged through rich and sophisticated problems before any acceleration through new content. Those not sufficiently fluent with earlier material must consolidate their understanding through additional practice before moving on.

Once procedural mathematics (such as times tables recall and written arithmetic) is fluent, pupils should be taught to apply their mathematics to a variety of problems. This may require the breaking down of problems into a series of simpler steps or the use of mathematical reasoning to follow a line of enquiry, conjecture and develop an argument, justification or proof using mathematical language.

At Mugginton, we promote pupils' SMSC development in Mathematics in the following ways:

We try to create moments of pleasure and wonder when a pupil solves a problem for the first time, or discovers a more elegant solution to that problem, or suddenly sees hidden connections.

We help pupils to recognise how logical reasoning can be used to consider the consequences of particular decisions and choices; mathematics is used to give pupils the confidence to question, investigate, prove and explain.

We support and encourage pupils to work together productively on complex mathematical tasks: to recognise the power of collaboration when using collective talent and ability to solving problems.

We help pupils to appreciate the contribution that mathematical excellence has made to the development of our society, and continues to make in our increasingly technical world.

Intent

Mathematics is a creative discipline that transcends cultural boundaries. Our aim is for it to be taught as part of a rich and progressive curriculum, where we plan and sequence mathematical lessons carefully, to build upon previous learning, and secure new learning successfully.

At Mugginton CE Primary School, we aim to help all children reach their full potential in Mathematics. Fundamental to our maths teaching are the following aims:

- Taking the 'fear' out of mathematics. We promote enjoyment and enthusiasm for the subject by delivering lessons with clear, attainable objectives, celebrating successes and supporting pupils with areas of difficulty.
- Appreciate the importance of mathematics in daily life and to future life-chances. Wherever possible, we encourage children to use and apply their learning in everyday situations (such as time-management and money-use).
- Develop a secure foundation of thorough understanding of the number system and numerical knowledge (for example, place value) in preparation for secondary school.
- Through daily practice, we expect *every* child to be able to swiftly recall times tables facts and use written methods to multiply, divide, add and subtract numbers with accuracy and efficiency by the end of their primary school career.
- By celebrating success and through effective planning, teaching and evaluation, we encourage pupils to develop greater independence, resilience and determination to succeed.
- All children are taught and encouraged to develop logical thinking and reasoning skills through the use of effective 'real-life' problems. Children who master new concepts rapidly are continually challenged to broaden their understanding through rich and increasingly complex written problems.
- Children at risk of falling behind their peers are identified quickly and additional support work is planned, implemented and reviewed on a termly basis.
- Through effective questioning, teaching staff assess individual pupil's procedural and conceptual understanding and can subsequently identify those requiring additional support so all pupils keep up.
- Promote positive attitudes to maths amongst parents.

In line with the National Curriculum our Mathematics teaching has three core 'aims'

1) Ensure ALL pupils become fluent in the fundamentals of mathematics through varied and frequent practice.

2) Encourage children to reason mathematically. This is achieved by following lines of enquiry, conjecturing relationships and developing an argument, justification or proof using mathematical language.

3) Ensure that children can solve problems by applying their mathematics to problems with increasing sophistication, including breaking down problems in to a series of simpler steps.

It is strongly emphasised that our pupils be able to 'move fluently between representations of mathematical ideas' and that 'rich connections' should be made between mathematical ideas. We believe children must develop secure understanding of fundamental numerical and arithmetical content before moving on to more abstract concepts. Children not sufficiently fluent in earlier material consolidate their understanding through additional practice before moving on. Children who grasp concepts rapidly are challenged through rich and sophisticated problems (termed 'Reasoning') before any acceleration through new content.

Curriculum objectives for Years 1 - 5 are separated into 7 domains, 4 of which have a number focus:

1) Number & Place Value 2) Addition & Subtraction 3) Multiplication & Division 4) Fractions

The 3 remaining domains are measurement, geometry and statistics. Once again this underlines the overwhelming number focus. By Year Six, the four number operations are grouped together under a single domain heading and additional focus on ratio and proportion and algebra is introduced.

Implementation

Reception

Children's first year in school focuses on familiarity with numbers to 20. Children learn using concrete and visual apparatus, accessing stimulating tasks to 'overlearn' counting and the number system.

Key Stage 1

The three main focus-points in KS1 are 1) confidence and mental fluency with whole numbers, 2) counting and 3) place value. The children should have experience with the four number operations, shape and a range of measures when they join our school. It is expected that every child should know their number bonds to 20 and be precise with place value and the 2, 5 and 10 times tables by the end of year 2.

Lower and Upper Key Stage 2

The National Curriculum makes a clear and important distinction between the lower and upper parts of key stage 2.

'The principle focus of teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four number operations, including number facts and the concept of place value.' (NC, p. 113)

We focus on number skills to a significant degree. By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table.

In upper key stage 2, our focus broadens, whilst not losing sight of the need for fluent mental and written methods.

'The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.' (NC, p. 126)

Once this foundation is secure, algebra is introduced as a means for solving a variety of problems. In line with the National Curriculum, our focus on number understanding remains:

'Teaching in geometry and measures should consolidate and extend knowledge developed in number.' (p. 126). By the end of Year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages. Using this toolkit they are ready to engage with richer, multi-step reasoning problems and meet the increased expectations of Key Stage 3.

Planning, Marking/Feedback & Assessment

Whilst there is no weekly planning 'pro-forma' which teachers are required to use, there are agreed features which all planning contains. This includes: links to specific national curriculum objectives, the identification of pupils with specific learning needs (for example, children with an EHC plan) and opportunities for the more-able to challenge themselves. Planning is monitored by the leadership team on a regular basis. Additional support in lesson and additional mathematics instruction outside of the daily mathematics lesson is used for children who require access to a more simplified objective or who require extension or additional challenge.

Children's work is marked on a lesson-by-lesson basis with written feedback a frequent feature. Children are often asked to correct mistakes using 'fixit' pen and are challenged to answer 'Next Step' challenge questions which provide the opportunity for further reinforcement of work covered. Children are encouraged to reflect on their learning by ticking and dating 'Key Objectives' recorded in the front of their maths books.

Short-term assessments are conducted during every lesson, through targeted questioning, written tasks, listening to the children's thoughts on their learning and through discussion with support-staff. This information is used to plan upcoming lessons. Medium-term assessments are carried out at the end of each half term. A range of assessment activities including formal tests, teacher-prepared tests, book scrutiny and pupil-discussion is used to measure progress. These data are shared with parents and used to inform planning and identify children for additional intervention programmes. Long term assessments are carried out towards the end of the school year (Year 6 pupils sit mathematics SAT assessments in May). Test data is analysed to provide information on each child's progress, their cohort and the school's progress in mathematics. Successes and areas for development are identified and implications for teaching are discussed as a leadership team and as a staff.

Impact

Children's work is marked on a lesson-by-lesson basis with written feedback a frequent feature. Children are often asked to correct mistakes and are challenged to answer 'Next Step' challenge questions which offers the opportunity for further reinforcement of work covered. Children are encouraged to reflect on their learning by ticking and dating objectives which they have completed.

Teaching staff make short-term assessments during every lesson. For example, by evaluating children's responses to questions and written tasks, listening to the children's thoughts on their learning and through discussion with support-staff. This information is then recorded in daily lesson evaluations and this knowledge then influences the upcoming sequence of lessons.

Medium-term assessments are carried out at the end of each half term. A range of assessment activities including formal tests, teacher-prepared tests, book scrutiny and pupil-discussion is used to measure progress. These data are also used to inform planning and identify children for additional intervention programmes.

Long term assessments are carried out towards the end of the school year (Year 6 pupils sit mathematics SAT assessments in May each year) and usually comprise QCA tests or old SAT papers. Test data is analysed to provide information on each child's progress, their cohort and the school's progress in mathematics. Successes and areas for development are identified and implications for teaching are discussed as a leadership team and as a staff.

Mathematics planning is monitored by the leadership team on a regular basis. Mathematics books are also scrutinized and pupil discussions take place to offer the children the opportunity to discuss their mathematics work. All teachers have two 'pupil progress' meetings with the head teacher to discuss in detail the progress of their class and particular successes and failures.

Progress data is reported to the governors and to the school improvement panel on a termly basis. Parents are invited to discuss their child's progress on two parents' evenings each academic year and receive a written report of their child's progress in the final term.

Monitoring and review

The mathematics subject leader, Mr J. Green, monitors the standards of children's work and the quality of teaching in mathematics. The work of the mathematics subject leader also involves supporting colleagues in the teaching of mathematics, being informed about current developments in the subject, and providing a strategic lead and direction for the subject in the school. The class teacher and maths subject leader discuss the strengths and weaknesses in the subject regularly and indicate areas for further improvement. The Headteacher allocates staff meeting time to review samples of children's work and offer professional development opportunities. He undertakes lesson observations of mathematics teaching across the school. A named member of the school's governing body is briefed to oversee the teaching of Numeracy. This Governor will meet regularly with the subject leader to review progress.

Money is set aside for resources to aid mathematics teaching as required. This might include 'concrete' objects such as Numicon or psychometric diagnostic tests such as 'Key Maths 3'. Whilst Mugginton does not use a particular scheme of work exclusively, resources from White Rose, Twinkl are used alongside our active school MyMaths and Timestable Rockstars accounts.

In a Mathematics lesson at Mugginton, you will see:

Happy children, working with purpose individually or in groups. The children will be able to tell you what they are learning and what skills/knowledge they need to use in order to succeed (in an age-appropriate manner). Their work will be well presented and the childre will be able to show a visitor work they are particularly proud of. Children will be able to talk about the progress they have made in the subject and what they would do if they find the work too hard or too easy. Based on the ability-levels of the child, you will see a mixture of concrete apparatus and opportunity for reasoning/real life questions.