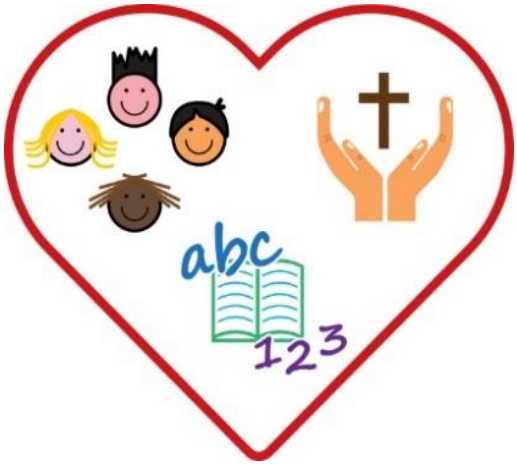
ST. MATTHEW'S C.E. PRIMARY SCHOOL & NURSERY



MATHEMATICS POLICY

Reviewed: April 2021
By: S Bryden
Date of next review: April 2024

Be blessed by God, be happy and aspire to be….

St Matthew's Church of England Primary School and Nursery

Mathematics Policy

Mission Statement:

St. Matthew's C.E. Primary School and Nursery is dedicated to providing an education which enables every child to fulfil their best potential. It seeks to promote academic, emotional and spiritual growth in a Christian environment, welcoming children drawn from diverse cultures.

Vision Statement:

Inspired by Jesus' words (Matthew 5: 1-12), we strive to promote academic, emotional and spiritual growth in a Christian environment for all members of our school family.
We can all **'Be blessed by God, be happy and aspire to be…'**

Introduction

This policy reflects the values and philosophy of St Matthew's in relation to the teaching and learning of Mathematics. It sets out a framework within which teaching and non-teaching staff can operate and gives guidance on planning, teaching and assessment. The policy has been drawn up as a result of staff discussion and has the full agreement of the Governing Body. The implementation of this policy is the responsibility of all the teaching staff.

Our Philosophy

Mathematics is a tool for everyday life. It is a whole network of concepts and relationships, which provide a way of viewing and making sense of the world. It is used to analyse and communicate information and ideas and to tackle a range of practical tasks and real life problems. It also provides the materials and means for creating new imaginative worlds to explore.

Aims of Mathematics at St Matthew's

Mathematics is a core subject within the National Curriculum. At St Matthew's we aim to develop numerate pupils who are confident enough to tackle mathematical problems without going immediately to teachers or friends for help.

Our pupils should:

- Have a sense of number and where it fits in the number system
- Know by heart number facts such as number bonds, multiplication tables, doubles and halves
- Use what they know by heart to help work out answers mentally
- Calculate accurately and efficiently, both mentally and with pencil/paper, and recognise the operations needed to solve them
- Explain their methods and reasoning using correct mathematical terms
- Judge whether their answers are reasonable and have strategies for checking them, where necessary
- Suggest suitable units for measuring and make sensible estimates of measurements
- Explain and make predictions from numbers in graphs, diagrams, charts and tables.

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

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

Teaching and learning

Organisation and Curriculum Coverage

At St Matthew's, we recognise that children need to be confident and fluent across each yearly objective. To ensure consistent coverage, teachers follow the Power Maths scheme of learning to support their planning. Teachers are also developing their understanding of mastery whilst working within the Maths Hub and regular in-house CPD. Power Maths is an exciting and inspiring class mastery approach, which has been recommended by the Department for Education.

Every year group has an hour's Power Maths lesson. Every Power Maths lesson is divided into sections that involve plenty of discovery, sharing, thinking together, practice and reflection.

Children begin with a short 'Power Up' (starter) 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 are also encouraged to 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. Children who complete this are provided with further 'rich and sophisticated' problems from the deepening tasks.

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. Children are encouraged to solve problems each day through the use of concrete resources, pictorial representations and abstract thinking.

At the heart of this programme is the idea that all children can be successful mathematicians with the right mind-set. Children learn alongside five characters, each with different mathematical characteristics. These characters are:

High quality resources are used in conjunction with Power Maths, such as White Rose Maths, NRich and NCETM to support, stretch and challenge all children within the classroom. In addition, the school's calculation policy is used to ensure a coherent approach to teaching the operations across our school.

Our curriculum builds on the concrete, pictorial, abstract approach. By using all three, the children can explore and demonstrate their mathematical learning. Together, these elements help to cement knowledge so children truly understand what they have learnt. All children have access to a wide range of concrete Mathematical resources to help them build on their concrete understanding of Mathematical concepts.

All children when introduced to a new concept for the first time are encouraged to physically represent mathematical concepts. Objects and pictures are used to demonstrate and visualise abstract ideas, alongside numbers and symbols. Throughout St Matthew's, you will see these three methods being used:

Concrete – children have the opportunity to use concrete objects and manipulatives to help them understand and explain what they are doing.

Pictorial – children then build on this concrete approach by using these pictorial representations, which can then be used to reason and solve problems.

Abstract – with the foundations firmly laid by using the concrete and pictorial methods the children can move onto an abstract approach using numbers and key concepts with confidence.

Teachers teach Maths using the online interactive tool, enabling them to model pictorial and abstract concepts which children can replicate and apply to their own learning.

Children practise their times tables frequently and children from Y4 onwards are expected to chant up to, and including, their 12 times tables. All children (from Y1-Y6) have access to Times Table Rock Star. In Year 4, children practice their times tables (and the inverse) under timed conditions, similar to those they will tested under in the national Year 4 Multiplication Tables Check from Spring 2022. In the Early Years and in KS1, all children have access to Numbots which allows them to practice counting, number bonds, halves and doubles and simple number patterns.

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 may include: a number line; place value cards; dienes; tens frame; place value counters and grids; money or coins; measuring equipment for capacity, mass and length; bead strings; the interactive whiteboards and related software; 3D shapes and/or nets; Numicon; multilink cubes; clocks; protractors; calculators; dice; 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, number 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.

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 'activelearn' platform. As well as overviews of learning, these include short videos which demonstrate new methods to ensure accuracy.

EYFS

Children in Nursery have a short daily Maths teaching session, during which time they begin to develop their understanding of simple mathematical concepts such as counting, maintaining 1 to 1 correspondence, simple pattern making, to recognise and describe simple 2d and 3d shapes. Children are taught these concepts using physical resources, pictorial resources, songs, games and role-play.

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 (class may be divided into 2 smaller groups)
3. Focus activity - grouped according to current attainment and taught by a supporting adult/teacher 10-15 min

Throughout the week independent activities are put into provision to allow children to apply their mathematical skills and knowledge practically.

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 Nursery 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.

Calculation policies

The calculation policies can be found on the school website; these are split into Reception, KS1, LKS2 and UKS2 and show the Power Maths progression in calculation (addition, subtraction, multiplication and division) and how this works in line with the National Curriculum. The consistent use of the CPA (concrete, pictorial, abstract) approach across Power Maths helps children develop mastery across all the operations in an efficient and reliable way. These policies show how these methods develop children's confidence in their understanding of both written and mental methods.

Key facts recall - 'Learning by Heart' programme

Developing children's knowledge of mathematical facts so that they know them 'by heart' is a valuable tool to support calculation strategies, and also helps to build confidence. Regular practice is needed to secure knowledge and help children instantly recall facts.

At St Matthew's, we encourage children to think 'Can I do this in my head?' Having a range of number facts at their fingertips really empowers the children and enables them to approach tasks with confidence.

Each year group has half termly targets set that aims to improve the children's rapid recall of key facts: number bonds, times table and division facts, halves and doubles, counting on and back in different steps.

These are shared with all staff, children and parents with ideas, vocabulary and websites designed to support the children in the rapid recall of these important facts. They are shared on Class Dojo and are available on the school website.

Displays

Each class is expected to have an up-to-date Maths working wall, which changes with each maths unit, modelling the concrete > pictoral > abstract Mathematical concepts. Unit vocabulary should also be up on displays and changed when a new unit starts.

Planning

All planning should be readily available in year planning folders.

Power Maths interactive tool and resources should be used throughout all lessons to ensure high quality delivery.

Plans should be available from the beginning of the week, should anyone need to take your class.

Teachers plan strategically to take advantage of opportunities to make cross-curricular links. They will plan for pupils to practise and apply the skills, knowledge and understanding acquired through Maths lessons to other areas of the curriculum.

Examples of cross curricular learning could include:

Department	Mathematical content
Art	Symmetry; other transformations; paint mixtures as a ratio
Geography	Representing data; finding averages; use of spreadsheets
History	Timelines; sequencing events
Digital Literacy	Collecting and representing data
MFL	Dates; counting in other languages
PE	Collecting real data; timing; measuring
Science	Formulae; calculating means and percentages; calculating with positive, negative and decimals; substitution; rearranging formulae; collecting and representing data.
DT	Measurement; properties of shape; scaling and ratio.
English	Identifying important information in a text will help them to better understand problem solving questions.
Music	Sequencing

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

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: '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 directed by the SENDCo, in collaboration with the class teacher and with the knowledge of SLT. Specific arrangements for the provision of children with SEND will be communicated to parents and carers during SEND reviews, using Provision Map.

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.

British Values (SMSC) SMSC

Children will have opportunities to:

Spiritual Education

- Use imagination and creativity to explore ideas while learning mathematics by: identifying and applying patterns and rules to everyday problem-solving; writing own problems and challenges that use those patterns or rules.

Moral Education

- Understanding the consequences of actions: Eg. If you perform a particular action to one number, will the same outcome apply to other numbers? Is it always the case? 'Sometimes, always, never' statements.

Social Education

- Developing personal qualities and using social skills: Working in pairs or groups to solve problems;

- Perseverance when struggling to answer questions; not being afraid to try – it's ok to be wrong, it's not ok not to try; taking turns when playing maths games.

- Participating, co-operating and resolving conflicts: as above, but also 'X thinks ___, Y thinks ___, who is right?' type questions.

Cultural Education

- Understanding and appreciating personal influences: taking into account other people's views and understanding how to express own views. Eg. How to explain to someone where they may have gone wrong in a question.

BRITISH VALUES

Democracy

- Take into account the views of others in shared activities. Voting when collecting data.

The Rule of Law

- Undertake safe practices, following class rules during tasks and activities for the benefit of all.
- Understand the consequences if rules are not followed.

Individual Liberty

- Work within boundaries to make safe choices during practical activities. Make own choices within data handling activities.

Tolerance of those with different faiths and beliefs

- Use maths to learn about different faiths and cultures around the world. Eg. looking at patterns/shapes within Islam / Hindu religions.

Mutual Respect

- To behave appropriately, allowing all participants the opportunity to work effectively.
- Take turns and share equipment.
- Review each other's work respectfully.
- Work collaboratively on projects/problems, help and advise others

Assessment

Children receive effective feedback through teacher assessment 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. Guided practice, which takes place within the 'Think Together' part of the lesson, provides further preparation for children to be able to apply the skills, knowledge and strategies taught during the 'Discover and Share' phase. Common misconceptions are 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.
- At the end of the lesson, the children review their work and self and peer assessment are used.
- The children's self-assessment is reviewed by the teacher during review of the children's work to inform where consolidation might be required. Opportunities for additional practice and correction are provided by the teacher, as appropriate, during marking, with a focus on promoting and achieving a growth mindset within the subject.

Class teachers continually assess the children's understanding as they move around the groups, questioning the children's understanding, observing them at work and through the marking of work. This information is recorded on a regular basis. In each year group, the Lancashire maths advisors have identified a range of skills and concepts needed to be covered during the year known as KLIPs

– Key Learning Indicators of Performance. For assessment purposes, a number of these KLIPs have been identified and underlined as essential objectives needed to be assessed against. Staff record their judgements against these underlined objectives throughout the term and use this information to help with their planning. Children may be entering (E), developing (D) or secure (S) against the end of year expectations. Children on IEPs may be working on and assessed against a lower year group's curriculum but are exposed to their own year group curriculum too.

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 Power Maths is designed to support this process and the reflect task at the end of each lesson also allows for misconceptions to be addressed.

Summative assessment

At the end of each blocked unit of work, the children also complete the 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 informs the judgements made at the end of the term as to the extent that each child has demonstrated mastery of each 'fundamental' objective.

Teachers administer a half termly Power Maths progress test which tests arithmetic, reasoning and problem-solving which specifically links to the coverage for that term. They are used alongside the end of unit assessments and outcomes of work, to inform the whole school tracking of attainment and progress for 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.

Termly assessments will be updated on the school assessment tracker for Maths. Teachers will record children's performance against the age-related objectives for the curriculum and decide whether children are working towards, at or above age related expectations. Assessments are used to inform planning and close gaps, in order to accelerate progress. Subject leaders will analyse termly data and address areas for curriculum development.

Children's attainment, progress and barriers to learning will be discussed in half termly Pupil Progress Meetings with senior leaders and clear actions to work on will be planned together, to support pupils and staff in closing gaps.

Exercise Books for Recording

It is school policy that the following pattern is used:

Year 2 1cm squares

Year 3 1cm squares

Year 4 1cm squares

Year 5 7mm squares

Year 6 7mm squares

When using squares, one square should be used for each digit.

In FS, the majority of work is practically based, and any recorded work is collated in a floor book. Evidence of mathematical work is recorded in an individual learning journey (Sparkle books).

Monitoring and review

The Role of the Mathematics Subject Leaders

Subject leads play an active role in the school self-evaluation cycle and throughout the year they will:

- Ensure there is clear progression throughout the school
- Create termly data reports
- Report to SLT & Governors
- Listen to 'Pupil voice'
- Carry out book looks and learning walks
- Update staff on new developments, ideas and resources
- Identify any training needs and offer extra support and guidance to staff when it is appropriate
- Take the lead in policy development designed to ensure progression and continuity throughout the school
- Assist the head teacher in carrying out the audit, reviewing and amending of the action plan
- To provide an example to the school by taking a lead in teaching mathematics and classroom organisation
- Promote websites (Times Table Rock Stas and Numbots) and set challenges
- Share Rapid Recall key skill targets for each year group with parents, staff and children with ideas, vocabulary and websites to support the children's learning
- Monitor and evaluate progress and standards within the subject
- Review planning and assessment
- Specify, order and maintain resources throughout the curriculum and make recommendations for future funding of mathematics
- Keep up to date with developments in mathematics through reading and training and share relevant information with colleagues
- Liaise with staff to inform future professional development requirements and to plan staff meetings and/or INSET where necessary
- Produce an annual subject development plan for the school improvement plan
- Liaise with the Maths Governor