



Mathematics Policy

Introduction

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary in 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.

Mathematics is a proficiency which involves confidence and competence with numbers and measures. It requires an understanding of the number system, a repertoire of computational skills and an ability to solve number problems in a variety of ways in which information is gathered by counting and measuring and is presented in graphs, diagrams, charts and tables.

Mathematics gives children a way of coming to terms with their environment. Practical tasks and real-life problems can be approached from a mathematical point of view. Mathematics provides children with imaginative areas of exploration and study and gives them the materials upon which to exercise their mathematical skills. These skills are a necessary tool of everyday life. Mathematics should help children to develop an appreciation of, and enjoyment in, the subject itself; as well as a realisation of its role in other curriculum areas.

Intent

The aim of the curriculum at The Emmaus Federation is to prepare the children for the future, both in education and in life. To do so, the children need to have a solid understanding of the National Curriculum, which is taught in full and brought to life through a variety of rich and vibrant cultural experiences.

Mathematics is a creative and highly inter-connected discipline that 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, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

All children should:

- 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
- 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
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

We use the strap-line, "Small Village, Big Horizons" to articulate our vision for the school. This is because Lincolnshire is an isolated area in terms of transport, culture and location. We want our curriculum to expand the experiences and ambitions of our pupils.

The ambitions for our curriculum:

- High aspirations permeate across the school
- The school offers a host of cultural experiences and enrichment opportunities
- Our pupils develop a love of life-long reading
- British Values are an intrinsic part of the school

Teaching and Learning

When referring to "knowledge" in the field of mathematics, two types of knowledge are conceivable.

1. Knowledge of facts and concepts. This corresponds to literacy in symbols, rules of operation, definitions and theorems concerning numbers and figures. This type of knowledge is easy to verbalize. That is, it is possible to explain the details of the knowledge to other people both orally and in writing.

2. Knowledge of performing procedures. Put another way, it is "Skill" or "Know-how." It includes skills such as calculating quickly and accurately. This type of knowledge is difficult to describe in words, but it allows actions in an orderly manner without thinking.

In order to strengthen conceptual knowledge, verbalization or an activity of explaining knowledge in words is effective. On the other hand, repetitive practice is effective for strengthening procedural knowledge. These two types of knowledge support each other and constitute academic achievement in mathematics.

1. Knowledge and conceptual understanding

Ensures that children develop a secure understanding of each key block of knowledge and concepts to progress to the next stage – number and place value; calculations; fractions, decimals and percentages; ratio and proportion; algebra; measurement; geometry and statistics.

2. Process knowledge

All curriculum areas in our primary curriculum have process knowledge. Process knowledge is closely linked to our enquiry-based approach to learning. The process knowledge that are required to be developed in mathematics in order that pupils can become mathematicians are investigation, expression, interpretation, application, analysis, synthesis and evaluation.

Investigation

- Asking relevant questions;
- Knowing how to approach different types of problems presented in different ways (fluency).
- The ability to make links and explore patterns in numbers and relationships

Expression

- The ability to explain concepts and strategies;
- The ability to identify and articulate mathematical understanding

Interpretation

- The ability to suggest meanings to mathematical equations, graphs and sets of data.

Application

- The ability to be able to use a range of mathematical knowledge and skills in a variety of contexts.

Discernment

- Making judgements about which strategy would be the most useful or efficient in different contexts.

Synthesis

- Linking significant features of mathematics, technology and science together in a coherent pattern.

Evaluation

- The ability to assess an approach to solving a problem as to whether it answered the problem fully, was efficient and can be understood.

Personal Qualities for Effective Learning in Mathematics:

- Independent enquirers
- Critical thinkers
- Team workers
- Problem solvers
- Open-minded
- Creative

Mathematics in the Early Years Foundation Stage

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. By providing frequent and varied opportunities to build and apply this understanding – such as using manipulatives, including small pebbles and tens frames for organising counting – children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. 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.

The EYFS curriculum starts from birth and children progress through each stage of development aiming to achieve the Early Learning Goals by the end of their Reception year. EYFS Mathematics will enable the children to:

- Count objects, actions and sounds.
- Subitise.
- Link the number symbol (numeral) with its cardinal number value.
- Count beyond ten.
- Compare numbers.
- Understand the ‘one more than/one less than’ relationship between consecutive numbers.
- Explore the composition of numbers to 10.
- Automatically recall number bonds for numbers 0–5 and some to 10.
- Select, rotate and manipulate shapes to develop spatial reasoning skills.
- Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can.
- Continue, copy and create repeating patterns.
- Compare length, weight and capacity.

Implementation

At the Emmaus Federation, the children study mathematics daily, covering a broad and balanced mathematical curriculum including elements of number, calculation, geometry, measure and statistics. We use a mastery approach, following the White Rose Maths curriculum, for our daily maths lessons. Each lesson starts with an arithmetic focus, which reinforces previous learning. The lessons are structured to provide scaffolded learning through the use of concrete and pictorial representations of key skills that the children then practise. All lessons also have an element of reasoning and problem solving embedded with the questions. Furthermore, they are provided with additional reasoning problems from White Rose or NCETM resources at the end of each lesson that consolidate their learning; it is an opportunity for the children to apply their knowledge of different strategies to different contexts and to explore their understanding through varied fluency and reasoning. Additional stretch and challenge is provided through Maths Herald, NRICH problems or other sources, such as Open Middle.

In Year 1 and Year 2, they also follow the Mastering Number programme (NCETM) which provides support with fluency in number and is carried out four times each week for 15 minutes, separate from the daily maths lesson. They use concrete materials, such as Rekenreks, Hungarian number patterns and tens frames, to represent numbers in different ways and build their confidence when working in number. In Reception, this is the sole maths resource for the teaching input each week and additional practise and opportunities to support and enhance the children's learning are provided in their daily activities. This project aims to secure firm foundations in the development of good number sense for all children from Reception through to Year 1 and Year 2, with the aim over time being that children will leave KS1 with fluency in calculation and a confidence and flexibility with number.

All Year 4 pupils have daily multiplication tables practise. The purpose of the Multiplication Tables Check (MTC) is to determine whether pupils can recall their times tables fluently, which is essential for future success in mathematics. It has helped us to identify pupils who have not yet mastered their times tables so that additional support can be provided. To support the children with their multiplication practice, we use 'Sumdog' and 'Maths Frame'. Sumdog is an online and fun learning platform which also offers resources in other areas of mathematics. It can be targeted to support learners from Year 1 to Year 6 and it is used, both in school and at home, to support learning across the school.

Pupils are introduced to the mathematical vocabulary required to understand and solve problems and to reason and explain the strategies employed at an age-appropriate level (as stated in the National Curriculum 2014). This is embedded in the Mastery Programme and the use of talk to explain ideas and strategies and talk partners is a vital part of the daily maths lesson across the school.

Throughout each lesson, formative assessment takes place and feedback is given to the children through marking and next-step tasks to ensure they are meeting the specific learning objective. Teachers then use this assessment to influence their planning and ensure they are providing a mathematics curriculum that will allow each child to progress.

Children from Year 1 and above complete a summative assessment termly to demonstrate their understanding of the topics covered. Gaps analysis is performed on all summative assessments for maths to help identify areas that need additional teaching and focus and time is provided for this in the curriculum overview. Additional support is provided for small groups or individuals through 'catch-the-bus' sessions which take place before or after the maths lesson to help consolidate the children's learning and offer specific support. The aim of this targeted approach is to ensure that gaps are closed and the children have a firm understanding of the concepts and strategies covered before moving onto more complex ideas.

Mathematics is used across the curriculum, with statistics in science and geography and measures in D&T, for example. All pupils take part in a variety of problem-solving activities during our annual STEM week and the Year 5 girls have the opportunity to participate in the Girls' STEM Day at Boston High School. In addition, we send groups of Year 6 pupils to take part in the mathematics competitions held annually at Boston Grammar School. We take part enthusiastically in online Sumdog competitions, which are run regularly (approximately every 3 months for county-wide competitions and every 6 months for national competitions).

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 are based on the security of pupils' understanding and their readiness to progress to the next stage.

Equal Opportunities

The teaching of mathematics follows the school's policy on SEND and differentiation and aims to provide all children with equal opportunities. The Governing Body ensures that the school does not discriminate against any pupil on the ground of disability, sex or race in deciding admissions, providing the curriculum, teaching and guidance; in applying standards of behaviour, dress and appearance; and in the allocation of resources and other benefits and facilities which the school provides. The school prides itself on its ability to welcome and involve children of all abilities, backgrounds and heritage. Children are recognised as individuals and both supported and challenged at their own level of development. Our main principal aim is that all children achieve the best that they can be, in all aspects of their development, during their time within the Federation.

Role of the Mathematics Coordinator

- Endeavour to promote a dynamic approach to the development of mathematics ensuring that it has a high profile.
- To evaluate the standards of mathematics teaching through the analysis of assessment data, book looks and learning journeys.
- To update the mathematics curriculum and oversee its implementation by other staff.
- Keep up to date with developments in mathematics.
- Report back on training attended.
- Advise and support staff with the teaching and learning of mathematics.

- Be responsible for overall auditing and upkeep of all school mathematics resources and facilities. To organise any budgets made available from various funds and to ensure money is used to its best advantage.
- Regularly review and update the school policy statement and guidelines as required.
- To work closely with the lead governor for mathematics.

Signed By: H Ratcliff and D Terjung

Position: Mathematics Co-ordinator

Date: October 2022