

Mathematics Curriculum

‘Small Village, Big Horizons ‘

On the Road to Emmaus – Luke 24: 13 – 35

Two travellers are transformed and enriched by sharing their journey with a guide.

Our distinctive Christian vision continues to underpin our aspiration to provide the highest educational standards possible in order to realise the potential of everyone in our school. The school has a clear Christian vision, which is rooted in our statement: Two travellers are transformed and enriched by sharing their journey with a guide. We view our work to be similar in making a difference to future lives. We travel together on our journey of transformation and commit our school to always being supportive, enriching and challenging.

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.

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

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.

Intent

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

Within mathematics, we have identified the knowledge needed to allow our pupils to become successful mathematicians.

Knowledge in Mathematics

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

- 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

- To 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

Small Village, Big Horizons Examples of the Intent for Mathematics in Practice	
High aspirations	<ul style="list-style-type: none"> • High standards of expectations across all subjects core and non- core. • Questioning throughout the lesson that extend knowledge and tests for reliability. • Encourage children to embrace challenge, question themselves and enjoy working hard.
Cultural experiences and enrichment	<ul style="list-style-type: none"> • Children take part in county and national maths competitions through Sumdog. • National STEM week to make explicit links between all curriculum subjects and provide more investigation and problem-solving activities. • Boston High School STEM day for Year 5 girls – a range of problem-solving activities involving all STEM subjects. • Boston Grammar School mathematics competition for Year 6 pupils.
Life-long love of reading	<ul style="list-style-type: none"> • Mathematical stories are used and available so children can read stories with a mathematical concept.
British Values <ul style="list-style-type: none"> • Democracy • Rule of Law • Individual Liberty • Tolerance & Respect 	<ul style="list-style-type: none"> • Children’s views count and that everyone is encouraged to value each other’s opinion. • Children respect that others may have different solutions to a problem. • Children share their knowledge and strategies and help each other to explain their reasoning. • Children share resources respectfully and take turns. • Children can choose the resources they need and can decide the strategy they want to use to solve a problem.

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. Alongside daily maths sessions, an additional 15 minutes a day is spent focusing on arithmetic skills to build confidence and precision in these areas and to provide the essential building blocks for more complex ideas and strategies. Each lesson also contains an element of reasoning and problem solving, using resources from White Rose Hub, the Mastery documents produced by the NCETM and other published resources. This 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.

We use a set of textbooks that follow the National Curriculum (Busy Ant Maths) to ensure that all children receive work in line with their age and ability and to ensure progression within and across year groups. These are accompanied by online resources to both support and extend pupils in their learning.

From the 2020 academic year onwards, schools in England will be required to administer an online multiplication tables check (MTC) to year 4 pupils. The purpose of the MTC is to determine whether pupils can recall their times tables fluently, which is essential for future success in mathematics. It will help schools 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' as an online and fun learning platform which also offer resources in other areas of mathematics. It also enables targeted support from Year 1 to Year 6 and it will be used weekly, both in school and at home, to support learning across the school.

Pupils will be 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).

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 in Sleaford and 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).

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, either for small groups of learners in 'catch-the-bus' sessions or for the whole class. 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.

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. Pupils who grasp concepts rapidly are challenged through being offered rich and sophisticated problems before any acceleration through new content (problem solving, RPS, Maths Herald). Those who are not sufficiently fluent with earlier material are given the opportunity to consolidate their understanding, including through additional practice, 'catch-the-bus' sessions and differentiated activities in lessons, before moving on.

Impact

Mathematics develops pupils'...

- Knowledge and understanding of the specific concepts of mathematics;
- Understanding of the important of mathematics for the world's future prosperity;

- Skills of enquiry through exposure to different methods and processes;
- Ability to articulate their understanding of taught concept through the use of rich vocabulary;
- High aspirations, which will see them through to further study, work, and successful adult life;
- Ability to foster ambition and see that investigations often lead to bigger opportunities.

The teaching of mathematics encourages pupils to...

- Recognise the power of rational explanation;
- Develop a sense of excitement and curiosity about mathematics;
- Understand how mathematics can be used to explain what is happening;
- Predict how things will behave in investigations.

The teaching of mathematics enhances pupils'...

- Awareness and understanding of the world around them as well as the future;
- Ability to reflect on, consider, analyse, interpret and evaluate mathematical findings both of their own and others.

The teaching of mathematics offers:

- Opportunities for all pupils to explore problems and evaluate their approaches to problem solving;
- Preparedness for life in a global society, where the understanding of mathematics will be key to everyday activities.