



The Curriculum Intent, Implementation and Impact for Mathematics

‘Opening the door to learning’ John 10:10 ‘to have life in all its fullness’

Intent

The aim of the curriculum at S. Andrew’s Leasingham 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. It is our belief that 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

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**

Our school vision is:

Everything we do, everything we say, everything we are about must ultimately be for the children, to develop them into positive participants in the world community’.

We promote our curriculum which we believe expands the experiences and ambitions of our pupils in order to achieve this.

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 TTRockstars and Mathletics. • National STEM weeks/ Maths weeks/ Number days to make explicit links between all curriculum subjects and provide more investigation and problem-solving activities. • Parent/child STEM competition (held each year during STEM week with a different problem for families to solve together). • St Georges Mathematics competition for Year 6 pupils. • Primary Engineers Project – links to RAF, BEAM, Kinex challenges. • Use of outside space for maths investigations and measuring activities, etc. • Visits to the school, such as the visit of a parent to talk about being an accountant. • Subject Revolution booked biannually (where possible) to continue to raise the profile of Mathematics. • Recognition of cross curricular experiences explicit in Long term framework. • Enterprise skills yearly part of the curriculum. KS1 – Christmas Fayre, Y5/6 Summer fayre. • Children organise, plan and run fundraiser activities – Race for Life, St Andrew’s Bake Off, Cake sales to support charities and understand where their money goes and their support of the wider community.
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.
<ul style="list-style-type: none"> • British Values • 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. • The classroom environment is a safe space to make mistakes. • As above – links to fundraisers. • Support for local food banks and charities.

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**
- **Expression**
- **Interpretation**
- **Application**
- **Analysis;**
- **Synthesis**
- **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

- 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

Implementation

At St. Andrew's Leasingham, 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 Maths No Problem, 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 Maths No Problem Mastery Scheme 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 **TIMESTABLE ROCKSTARS** (TTR) as an online and fun learning platform for learning times tables and also **Mathletics** which also offers the quick recall of all calculations and resources in other areas of mathematics. Mathletics, TTR and their partner **Numbots** (KS1+) 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 chronology and dates in History, 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 lessons. In addition, we send groups of Year 6 pupils to take part in the mathematics competitions held annually in St. Georges Academy. We take part enthusiastically in online TTRockstars competitions, across the classroom, across different year groups and nationwide, which are run regularly

Throughout each lesson, formative assessment takes place and feedback is given to the children through discussions, marking and where appropriate 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

As part of the Maths No Problem Scheme all children from Year 1 – Year 5 complete an end of unit review, which allows them to demonstrate the knowledge developed and the use of the skills too. This can be done a week after the end of the unit as a COLD task to ensure the children have developed a solid conceptual understanding.

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-up' 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. Children also complete a **STAR MATHS** assessment online which also identifies areas that require additional help and those where they may particularly excel.

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). Those who are not sufficiently fluent with earlier material are given the opportunity to consolidate their understanding, including through additional practice, 'catch-up' 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 importance 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.