



HIGHFIELD FARM PRIMARY SCHOOL

Maths Policy

Date of Policy approval _____

Date of Policy review _____

“The mathematician does not purely study mathematics because it is useful; they study it because they delight in it and they delight in it because it is beautiful.”

George Cantor

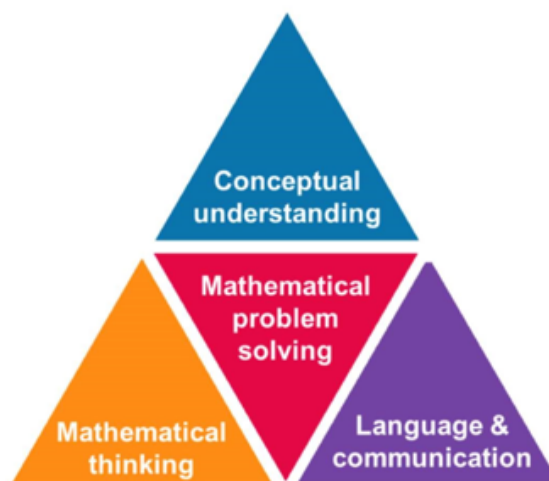
Statement of Intent

At Highfield Farm, we are committed to developing children’s curiosity along with the appreciation of the beauty and power of mathematics. Mathematics is a creative and highly inter-connected subject that has been the catalyst for solutions to some of history’s most significant and intriguing problems. It is essential to everyday life and necessary in most forms of employment, including engineering, medicine, information technology, finance and astronomy. It is our ambition for every pupil to become mathematically proficient, confident to explore connections and patterns, to seek solutions, to share their insights, understanding and reasoning. We aim to provide **every pupil** with a comprehensive mathematical education to ensure that they feel **empowered** and **confident** in their pursuits, ensuring more children **secure** and **exceed** the national standards. Our lessons are inclusive, engaging, challenging and supportive: enabling all pupils to participate and experience success in a safe and well-equipped learning environment. This enables our pupils to move on to the next stage of their learning well-prepared, ready for the next challenge and to succeed later in life in whatever career they choose.

The national curriculum for mathematics aims to ensure that all pupils:

- become **fluent** in the fundamental of maths
- are able to **reason** mathematically
- can **solve** a range of **problems** by applying their mathematical knowledge.

In line with three aims outlined by in the national curriculum statements above, we work flexibly with the **Mathematics Mastery** resourced curriculum. This ensures that pupils develop the confidence to apply their mathematical knowledge in a range of situations, use their sound knowledge to reason and consistently challenge themselves to fully realise their potential. The central pillar that underpins the aim of Mathematics Mastery is for pupils to build strong mathematical problem solving. It is through the three pillars- **conceptual understanding, mathematical thinking and language** and **communication**- that pupils develop the skill of problem-solving. This is shown below:



Conceptual understanding – Pupils deepen their understanding by representing concepts using objects and pictures, making connections between different representations and considering what different representations stress and ignore.

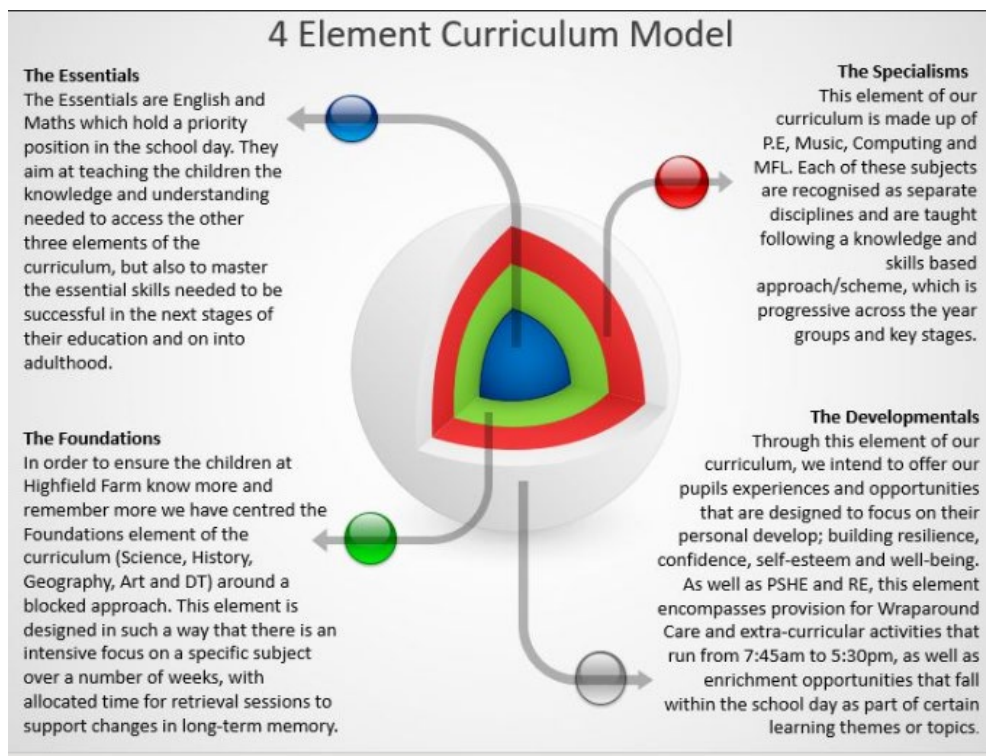
Language and communication – Pupils deepen their understanding by explaining, creating problems, justifying and proving using mathematical language. This use of language also acts as a scaffold for their thinking.

Mathematical thinking – Pupils deepen their understanding by asking and exploring great questions, by giving examples, by sorting and comparing or by looking for patterns and rules in the mathematics they are exploring.

We teach for mastery, with the highest expectations for every pupil, every lesson, every day so that their understanding is deepened, with the aim that they will be able to solve non-standard problems in unfamiliar contexts. As Dr. Drury, Director for Mathematics at Ark Mathematics Mastery, states:

“A mathematical concept or skill has been mastered when, through exploration, clarification, practice and application over time, a person can represent it in multiple ways, has the mathematical language to be able to communicate related ideas, and can think mathematically with the concept so that they can independently apply it to a totally new problem in an unfamiliar situation.”

Our mathematics curriculum is designed to provide our children with the language and vocabulary they need to reason and apply their thinking to everyday mathematical concepts. To this end, maths is one of the essential aspects of our curriculum which acts as a catalyst for our entire curriculum offer.



We provide pupils with the opportunity to create links between mathematics and other areas of the curriculum, such as geography and science, in order for pupils to appreciate the significance of developing strong numerical skills and the transferable nature of a rich and varied mathematical education.

Implementation – Mathematics at Highfield Farm

Our mathematics curriculum has been developed to motivate and support every child to achieve excellence in mathematics. It provides pupils with a deep understanding of the subject to ensure pupils have a strong understand of the learning taking place. We use the Mathematics Mastery resourced curriculum flexibly to plan maths across school. Long-term plans are used to ensure progression and coverage of the National Curriculum. Teachers may adapt the sequence and length of units of learning depending on the needs of their pupils and assessments. Teachers plan small steps of learning to structure the learning journey and assess the development of concepts, key skills and procedures. Lessons may include the following elements:

- Maths Meetings – including during transition times – to support practise and retrieval of previously taught concepts and/or new teaching of key areas of the curriculum eg time, measurement, geometry
- Multiplication Tables and Arithmetic practise - to enable practise of previously taught number facts and operations, and to develop mathematical fluency, accuracy and confidence
- Big Picture tasks – to elicit talk and rich discussion about mathematics
- Do Nows – fluency and retrieval tasks linked to the small step being taught
- Vocabulary – “Star Words”
- New Learning – taught in small steps

- Talk Task – opportunities to practise using new learning in paired discussion and tasks
- Developing Learning – this may include e.g. explicit modelling, worked examples, ‘my turn, your turn’ practice
- Independent Practice - applying new learning to carefully designed tasks and to solve problems, with challenge built in to engage and enthuse pupils
- Plenary – review and celebrate learning

Reasoning and problem solving lie at the heart of our mathematics curriculum. Within learning sequences, every pupil has access to rich, varied and interesting tasks and questions that facilitate discussions, and enable children to apply their understanding to new and unusual problems.

Number fluency is taught through the progression of skills for each year phase. We use the Mathematics Mastery Progression of Calculation document, which embeds a progression of concrete, pictorial and abstract representations. In Foundation Stage and Key Stage One, the programme Number Sense Maths <https://numbersensemaths.com/> is taught daily to provide a systematic and structured approach to develop confidence and flexibility with number and fluency in addition and subtraction facts. It is also used as an intervention for pupils that require additional practice to develop fluency in Key Stage Two.

We ensure that the implementation of our mathematics curriculum is embedded across our school so that all pupils have a strong foundation of mathematical skills and knowledge that can be built upon year after year. To achieve this, teachers and learning support assistants are supported with regular continuing professional development sessions that are planned within our School Improvement Cycle, match the whole school development priorities and are responsive to emerging priorities throughout the year. This support can take the form of SKEWs (subject knowledge enhancement workshops), training, regular co-planning and delivery opportunities, and feedback pertaining a range of monitoring activities and assessments.

Our Maths curriculum is designed to ensure that children retain knowledge by building upon previous learning. To enable children to retain as much knowledge as possible, teachers implement a number of strategies outlined by Barak Rosenshine’s research around the principles of instruction (see Appendix 1). We give consideration for how these Principles can apply to mathematics by:



EYFS

Pupils are taught a daily mathematics lesson, informed by the Development Matters Framework as well as the six key areas of early mathematical learning. This ensures that they develop their understanding of mathematical concepts. Teachers use the long term plans and draw upon the Mathematics Mastery curriculum flexibly to plan sequences of learning. This provides a strong conceptual understanding of number. Pupils also access their number rich learning environment, including classroom resources and child-led play, and are supported in their mathematical thinking and interest through probing questioning and discussions with teaching staff and pupils.

Assessment

Children receive effective feedback through teacher assessment and feedback, which is integral to the design of each lesson (see our 'Feedback and Marking Policy'):

- A review/fluency activity supports children's recall of key number facts, which frees working memory. Teachers use the information here to plan for and address misconceptions.
- Observations and careful questioning enable teachers to adjust lessons and brief other adults in the class, as required.

- The structure of the teaching sequence ensures that children know how to be successful in their independent work.
- Common misconceptions are identified and addressed within the teaching sequence and key understanding within each 'small step' is reviewed and checked before progression to further depth.

Teachers can use the pre-unit 'Diagnostic Assessment' to plan to address misconceptions, errors and gaps in learning prior to the teaching of a unit, and ensure appropriate, temporary scaffolding is provided to support pupils within teaching sequences. At the end of each blocked unit of work, the children can complete the post unit 'Diagnostic Assessment'. The outcome of this is used by the teacher to ensure that any identified gaps in understanding can be addressed.

Summative Assessment

Teachers administer a termly assessment paper which specifically links to the coverage for that term, apart from in Year 6 where End of Key Stage maths papers are utilised. The results of these papers are used to identify children's ongoing target areas, which are communicated to the children, as well as to parents and carers at Parents Evening. They are also used alongside the end of unit assessments and outcomes of learning, to inform the whole school tracking of attainment and progress of 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.

Inclusion

The SEND Code of Practice states that all children should have access to:

*'high quality teaching that is **differentiated** and **personalised**, which will meet the individual needs of the majority of children and young people. **Some children and young people need educational provision that is additional to or different from this.** This is special educational provision under Section 21 of the Children and Families Act 2014. Schools and colleges must use their best endeavours to ensure that such provision is made for those who need it. Special educational provision is underpinned by high quality teaching and is compromised by anything less.'*

See our SEND policy for further information. We support every pupil to succeed through scaffolding, explicit instruction, use of technology, flexible grouping and small steps of learning, as required and depending on their individual needs, and as recommended by the Education Endowment Foundation (EEF).

We follow a graduated response of assess, plan, do and review. We use targeted support in the form of small group intervention to accelerate progress and enable pupils to work at age-related expectations. If high quality teaching and targeted support are not enabling progress, then additional provision is required to enhance progress. Where progress continues to be a concern, we utilise a range of in-house assessments to identify barriers to learning and implement strategies to meet needs. If concerns continue, we seek the advice of professionals to inform our graduated response. Children with Education Health Care (EHC) plans access learning with their peers and may work on their individual targets throughout the day to help them achieve their long-term outcomes.

Impact

We are committed to:

- providing daily opportunities for every child to enjoy learning and appreciate the connections within mathematics;
- producing confident mathematicians who are able to approach problems, of differing forms, with the resilience that will help to ensure their success in fulfilling careers of their choice;
- ensuring that children have a deep understanding of not only mathematical concepts, but the rich vocabulary which accompanies the skills and methods that they develop as mathematicians;
- developing mathematicians who appreciate the role that mathematics plays in a range of subjects including geography, history and science, so that they can continue to make links across all areas of the curriculum and recognise the vital role of mathematics in a variety of careers that we want to see our pupils excel in;
- support every child to reach their own potential, raising attainment and increasing the number of children who achieve and exceed national standards, and who go on to study mathematics beyond when it is a compulsory subject.

Appendix 1 – Rosenshine’s Principles of Instruction

THE PRINCIPLES OF INSTRUCTION

Taken from THE INTERNATIONAL ACADEMY OF EDUCATION
By BARAK ROSENHINE
Based on strategies to optimise how we acquire and use new information

01 DAILY REVIEW



Daily review is an important component of instruction. It helps strengthen the connections of the material learned. Automatic recall frees working memory for problem solving and creativity.

02 NEW MATERIALS IN SMALL STEPS



Our working memory is small, only handling a few bits of information at once. Avoid its overload – present new material in small steps and proceed only when first steps are mastered.

03 ASK QUESTIONS




The most successful teachers spend more than half the class time lecturing, demonstrating and asking questions. Questions allow the teacher to determine how well the material is learned.

04 PROVIDE MODELS



Students need cognitive support to help them learn how to solve problems. Modelling, worked examples and teacher thinking out loud help clarify the specific steps involved.

05 GUIDE STUDENT PRACTICE



Students need additional time to rephrase, elaborate and summarise new material in order to store it in their long-term memory. More successful teachers built in more time for this.

06 CHECK STUDENT UNDERSTANDING



Less successful teachers merely ask “Are there any questions?” No questions are taken to mean no problems. False. By contrast, more successful teachers check on all students.

07 OBTAIN HIGH SUCCESS RATE




A success rate of around 80% has been found to be optimal, showing students are learning and also being challenged. Better teachers taught in small steps followed by practice.

08 SCAFFOLDS FOR DIFFICULT TASKS



Scaffolds are temporary supports to assist learning. They can include modelling, teacher thinking aloud, cue cards and checklists. Scaffolds are part of cognitive apprenticeship.

09 INDEPENDENT PRACTICE



Independent practice produces ‘overlearning’ – a necessary process for new material to be recalled automatically. This ensures no overloading of students’ working memory.

10 WEEKLY & MONTHLY REVIEW



The effort involved in recalling recently-learned material embeds it in long-term memory. And the more this happens, the easier it is to connect new material to such prior knowledge.

Summarised by Oliver Caviglioli | @91wercaviglioli | teachinghow2s.com