

Graiseley Primary School



Maths Policy September 2023

Introduction

This document is a statement of the aims, principles and strategies for the teaching and learning of Mathematics at Graiseley Primary School. Mathematics is a core subject and this policy has been written in accordance with the National Curriculum.

All pupils can achieve in mathematics! At Graiseley Primary School, it is our belief that pupils are not learning to be mathematicians but that they are mathematicians.

'Mathematics is a creative and highly inter-connected discipline...a high-quality mathematics education should provide 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.' (National Curriculum for Mathematics, 2014)

Intent

We strive to ensure that our children develop a healthy and enthusiastic attitude towards mathematics that will stay with them and support them in the next stage of their education and beyond. At each stage of learning, children are actively supported to reach their full potential as mathematicians.

The National Curriculum for mathematics aims to ensure that all pupils:

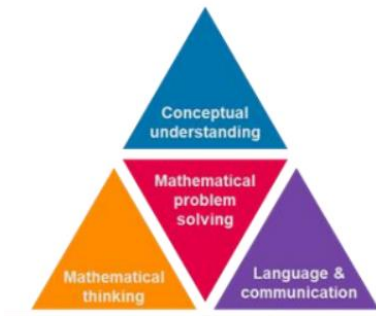
- ✚ become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- ✚ reason mathematically by following 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.



Implementation

At Graiseley Primary School we recognise the importance of mathematics as it enables pupils to access the wider world. Mathematics is an interconnected subject and we aim to develop a deep conceptual understanding and mastery of mathematical concepts which they can apply in problem-solving and practical tasks. An important element of this is learning and memorising Key Instant Recall Facts such as number bonds, step counting and related multiplication and division facts. We enhance our mathematics provision by providing opportunities for pupils to use and apply these learned skills in other areas of the curriculum. Here at Graiseley Primary School, we have adopted the My Mastery fully resourced curriculum to ensure that our children have the best start to their mathematic journey. Our lessons are focused on developing the 'Dimensions of Depth', which are interdependent and, together, make effective Maths lessons:

The Dimensions of Depth



Language and Communication

Mathematics has a precise formal language, which is distinct from everyday language. At Graiseley, we explicitly teach accurate mathematical language through the sharing of key vocabulary and opportunities to rehearse the use of this language in full sentences to ensure pupils have the language required to be competent and confident mathematicians. We expect pupils to respond to questions, justify choices and explain their thinking. We wish to ensure all pupils have the confidence to develop their reasoning skills through the skillful use of challenging, open-ended questions and investigations.

Conceptual understanding

We have embedded the development of Concrete, Pictorial and Abstract representations in our planning and policies which enables pupils to make explicit links and connections in their learning as they progress throughout the school. This approach allows pupils to deepen their understanding by representing concepts using objects and pictures and, more abstractly, with words and symbols. We expect pupils to use appropriate pictorial and concrete representations as scaffolds for explanations of their mathematical thinking. We ensure conceptual variation is used to explore the different representations of the same mathematical idea which promotes connections between areas of mathematics and allows pupils to make sense of increasingly complex problems.

Mathematical thinking

We encourage pupils to approach problems in an organised and systematic way. Pupils are asked to deepen their understanding by giving an example or conjecturing about what they notice. Over time pupils will forge connections between different mathematical ideas, and will begin to identify familiar structures and patterns in unfamiliar contexts and problems. We ask pupils to evaluate their work and their understanding with the expectation that they will become increasingly proficient at solving problems over time.

All teachers follow a termly overview plan and are encouraged to design lessons using the My Mastery teaching sequence. My Mastery is a fully resourced curriculum but allows flexible for teachers to adapt lessons to meet the needs of the children within their class. A typical Maths lesson provides the opportunity for all children, regardless of their ability, to become confident and capable learners. We are committed to building on prior learning and enabling our children to demonstrate a deep, conceptual understanding of each topic that they can develop over time. They are encouraged to develop fluency in their recall of key facts and a whole school approach to the teaching of calculation strategies is deployed across the school. This ensures a consistent and progressive approach and prepares our

children for the upper key stage 2 curriculum. Reasoning and problem-solving skills are explicitly taught to enable children to become independent learners who are prepared to take risks.

To provide adequate time for developing key skills in fluency, reasoning and problem solving, each class teacher from Years 1-6, will provide at least five, 60 minutes, daily mathematics lessons per week. Additional mathematics may be taught within other subject lessons when appropriate. Class teachers provide high quality Maths lessons ensuring that there is emphasis on direct whole-class teaching, groups/partner work and independent work. We use a range of approaches (concrete, pictorial and abstract methods) following the My Mastery approach, with teaching of mathematical concepts through small steps. Staff are expected to teach and model correct mathematical language, which scaffolds children's reasoning and explanation skills - sentence stems are used to develop this.

Lessons in Year 1-6 follow a six part structure. (See below) Reception build up to this six part structure over the academic year.

Do Now (max 5 mins)	<ul style="list-style-type: none"> • Everyone is engaged in the task, 100% of the time • Everyone experiences success with no taught input • The practice they are doing will a) help them later in the lesson OR b) build fluency in a key skill
Transition	<ul style="list-style-type: none"> • All children are chanting/singing as they move between the carpet and the tables • The transition takes less than 30 seconds
New Learning	<ul style="list-style-type: none"> • Everyone says the most important star words • The teacher (and children ideally) model using concrete manipulatives • Everyone uses words and symbols accurately • Everyone is ready to answer questions • Everyone answers in full sentences • Misconceptions are anticipated and incorporated • The Talk task/Let's Explore task is modelled
Transition	<ul style="list-style-type: none"> • All children are chanting/singing as they move between the carpet and the tables • The transition takes less than 30 seconds
Talk Task/Let's Explore	<ul style="list-style-type: none"> • Everyone is speaking in full sentences • Everyone uses words and symbols accurately • Everyone is manipulating objects when appropriate • <i>Recording is not expected</i>
Transition	<ul style="list-style-type: none"> • All children are chanting/singing as they move between the carpet and the tables • The transition takes less than 30 seconds
Develop Learning	<ul style="list-style-type: none"> • References are made to previously learnt models/ representations/ skills/ concepts • Everyone is ready to answer questions • Everyone answers in full sentences • Everyone uses words and symbols accurately • Misconceptions are anticipated and incorporated • The Independent Learning task is modelled
Transition	<ul style="list-style-type: none"> • All children are chanting/singing as they move between the carpet and the tables • The transition takes less than 30 seconds
Independent Task	<ul style="list-style-type: none"> • Everyone is engaged in completing the task, 100% of the time • Everyone has access to appropriate concrete manipulatives • Everyone is engaged in learning about the same mathematical concept or skill, with an appropriate amount of scaffolding • Emphasis on understanding and developing fluency, not rushing to 'cover' ideas • Extension tasks involve deeper understanding of the same mathematical concept or skill – through solving less routine problems, demonstrating using concrete manipulatives/ drawing diagrams, explaining in full sentences or asking their own questions
Transition	<ul style="list-style-type: none"> • All children are chanting/singing as they move between the carpet and the tables • The transition takes less than 30 seconds
Plenary	<ul style="list-style-type: none"> • Includes celebration of success and reaffirmation that success comes from effort

Maths in Early Years

In EYFS (Nursery and Reception) we follow the EYFS framework. Teachers ensure the children learn through a mixture of adult led activities and child-initiated activities both inside and outside of the classroom. Mathematics is taught through an integrated approach using material from My Mastery in Reception and Master the Curriculum in Nursery. The children have a wide range of structured play resources available to them throughout the year - this is known as "continuous provision". The adults model the use of these resources and the appropriate mathematical language as they support the children in their play.

Maths in Years 1 and 2

In Years 1 and 2, the focus of Maths is to ensure the children develop confidence and mental fluency with whole numbers, counting and place value. This often involves working with numerals, words and the four operations (+ - x ÷). The children should be precise in using and understanding place value and know number bonds to 20.

The children also develop their ability to recognise, describe, draw, compare and sort different shapes. The children will use a range of measures to describe and compare different quantities (such as length, mass, capacity/volume, time and money).

Maths in our Lower Key Stage 2 (Years 3 and 4)

In Years 3 and 4, the focus is to ensure the children become increasingly fluent with whole numbers and the four operations (including number facts and place value). Pupils begin to develop efficient written and mental calculations with increasingly large whole numbers. They begin to develop their ability to solve a range of problems, including simple fractions and decimal place value. The children develop mathematical reasoning to help them analyse shapes and their properties and confidently describe their relationships.

By the end of Year 4, children should have memorised their multiplication tables up to and including the 12 times table and be able to show precision and fluency in their work.

Pupils in Year 4 are prepared for the Multiplication Tables Check (MTC)

Maths in our Upper Key Stage 2 (Years 5 and 6)

In Years 5 and 6, the focus of Maths is to ensure that children extend their understanding of the number system and place value to include larger integers. Pupils should be able to make connections between multiplication and division with fractions, decimals, percentages and ratio. Children should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems that demand the use of efficient written and mental methods of calculation. Children are introduced to algebra as a means for solving a variety of problems.

The children's understanding and knowledge in geometry and measures consolidates and extends the knowledge they have developed in number; children should be able to classify shapes with increasingly complex geometric properties, using the vocabulary they need to describe them with accuracy and confidence.

Maths Meeting, are used to consolidate key areas of mathematics in each class and are delivered to the whole class. Maths Meetings provide an opportunity to teach and revise 'general knowledge Maths' which may not explicitly be covered during the Maths lesson, and also allows the daily integration of Maths into the surrounding environment. This means that pupils are practising concepts and skills on a regular basis, meaning they are continually building on their mastery of these concepts. Maths Meetings take 3 x a week for 10-15 minutes day outside of the Maths lesson, for all children. This equates to an additional 45 minutes of maths learning per week from Years 1-6.

Maths Meetings are a positive part of your day that everyone looks forward to and pupils are fully engaged with. Singing and chanting should form an integral part of the Maths Meetings. The elements of Maths covered in Maths Meetings should be fun and enjoyable for pupils, as it is important that pupils appreciate, learn from and relish these experiences.

Calendar Maths and place value are included in every Maths Meeting and the rest of the meeting should change regularly according to the topics teachers wish to revise and consolidate. Maths Meetings are used in all year groups, as it gives teachers opportunities to reinforce and consolidate key areas of the curriculum, and also allows time to introduce topics and concepts that may be part of the next unit. It is also useful to practise recall and number fluency.

Example of Year 2 Autumn Term Maths Meeting

Term	Detail
Autumn	<p><u>Number:</u></p> <ul style="list-style-type: none"> Count on and back in 2s, 3s, 5s and 10 from any number within 100 along a number line (vertical and horizontal) Recognise the place value of each digit in a 2-digit number (tens, ones) Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 Add and subtract tens and ones to 1 and 2-digit numbers within 100 (no regrouping) <p><u>Shape and Pattern:</u></p> <ul style="list-style-type: none"> Use vocabulary related to shape accurately including the number of sides, edges, vertices and faces on 2-D and 3-D shapes Describe position, direction and movement, including whole and half turns (clockwise and anti-clockwise) <p><u>Measures:</u></p> <ul style="list-style-type: none"> Introduce cm as a standard unit for length (and continue to use m) Compare the length of objects using cm and m <p><u>Time:</u></p> <ul style="list-style-type: none"> Tell the time to the hour and half past <p><u>Money:</u></p> <ul style="list-style-type: none"> Coin recognition of all coins and notes (£5, £10, £20) Use £ and p symbols <p><u>Data:</u></p> <ul style="list-style-type: none"> Interpret tables and scaled pictograms, block diagrams and simple graphs

Routes through Calculation

Our routes through calculation have been devised to meet requirements of the National Curriculum 2014 for the teaching and learning of mathematics, and are also designed to give pupils a consistent and smooth progression of learning in calculations across the school. Children have access to a wide range of counting tools and apparatus throughout.



It is important that any type of calculation is given a real life context or problem solving approach to help build the children's understanding of the purpose of calculation, and to help them recognise when to use certain operations and methods when faced with problems - this is a priority within our lessons. Children are taught and encouraged to use the following processes in deciding what approach they will take to solve a calculation, to ensure they select the most appropriate method for the numbers involved: "Can I do it in my head using a mental strategy?" "Could I use some jottings to help me?" "Should I use a written method to help me work it out?" Mathematical vocabulary is important with each operation so this is a key part of their learning, for example, we will use the term 'ones' and 'units'. E.g. Th, H, T, U /Th H T O or 1000s 100s 10s 1s. Vocabulary specific to each method is shown within each route through calculation.

Times Tables

At Graiseley Primary School, we believe that through a variety of interactive, visual and engaging techniques, all children can achieve the full multiplication tables knowledge by the time they leave Primary School. The National Curriculum (2014) states that by the end of year 4, pupils should be able to recall multiplication and division facts for multiplication tables up to 12x12. Children in Year 4 are also required to take a multiplication tables check (MTC) in the Summer Term. The purpose of the check is to determine whether pupils can fluently recall their times tables up to 12, which is essential for future success in mathematics. This means it is important for the children to learn their multiplication tables facts and to be able to recall them quickly and accurately.

We teach times tables using the following progression:

Year 1 - Be able to count in multiples of twos, fives and tens

Year 2 - Be able to recall 2, 5 and 10 multiplication and division facts.

Year 3 - Be able to recall 3, 4 and 8 multiplication and division facts.

Year 4 - Be able to recall 6, 7 and 9 multiplication and division facts.

Year 5/6 application of multiplication and division facts to problem solve

To support children's learning of multiplication tables we have a designated Maths meetings where multiplication is visited weekly, along with transitions periods throughout the day, where children be heard developing their rapid recall of facts. Children also have access to Times Tables Rockstars. This is an online resource that Years 2-6 use to aid the teaching and fluency of Multiplication and division facts.

Impact

- Fluency in their recall of key number facts and procedures
- Accuracy in the formal calculation methods for all four operations
- The flexibility and fluidity to move between different contexts and representations of mathematics.
- The ability to recognise relationships and make connections in mathematics
- The confidence and resilience to reason mathematically and solve a range of problems.

Special Educational Needs

Children with additional needs are supported by using practical resources and differentiated activities where needed. They are also further supported by additional support staff whenever possible. Where applicable, children's provision maps will incorporate suitable objectives from the National Curriculum or the EYFS curriculum and teachers keep these objectives in mind when planning work. In addition to quality first teaching, interventions also take place during the afternoons and focus on those children who may need more specific targeted input.

Assessment, Recording and Reporting to parents

Assessment is an integral part of the Maths curriculum and not an addition to it. Children's work in mathematics is assessed from three aspects:

- 1) Informal, formative assessments are made continually by questioning the children, observing and monitoring their work. These short term assessments are closely related to the learning objectives for the lesson and help inform next steps.
- 2) Pre diagnostic tests are completed prior to the next teaching unit. This information is uploaded to Insight, where data analysis informs teachers of gaps within children's prior knowledge. Teachers then use this information to adapt their teaching block allowing for consolidation lessons to take place, prior to new learning. Where individual children have gaps and the aspect of Maths doesn't need to be revisited through a consolidation lesson, a pre teach sessions takes place.
- 3) Formal assessments take place termly - we use My Mastery assessments to check progress and understanding of content covered. This information also informs interventions.

Statutory Assessment Tests (SATs) are used for children in Year 2 (although no longer statutory from September 2023) and 6, plus children in Year 4 are also required to take a multiplication tables check (MTC) in the Summer Term. The purpose of the check is to determine whether pupils can fluently recall their times tables up to 12, which is essential for future success in mathematics.

A whole school tracking system is used to closely monitor children's progress throughout the school. Teacher assessments are entered termly and are closely analysed to identify children working at greater depth or who are at risk, appropriate intervention is then put in place to close gaps.

Monitoring

The Mathematics subject leader (Mrs V. Cartwright) has the overall responsibility of monitoring the standard of pupils work, the quality of the teaching and evaluating impact. The work of the subject leader involves supporting colleagues in the teaching of mathematics, being aware of current developments in the subject, and providing a strategic lead and direction for the subject in the school so that it remains high profile.

The school leadership team (& subject leader) will observe mathematics lessons and give feedback, staff will be directed to relevant CPD to develop their skills and support and improve their practice. Work scrutinies take place termly to monitor progress and standards and for the purpose of moderation. The school participates in external moderation. (See monitoring cycle)

This policy has been written with reference to and in consideration of the school's Disability Equality Scheme. Assessment will include consideration of issues identified by the involvement of disabled children, staff and parents and any information the school holds on disabled children, staff and parents.

Any questions or concerns regarding this policy should be made to the Mathematics Lead.