

Jesus said, "I am the vine; you are the branches. If you remain in me and I in you, you will bear much fruit; apart from me you can do nothing." John 15:5



GREAT HORWOOD CHURCH OF ENGLAND SCHOOL MATHEMATICS CURRICULUM STATEMENT

AIMS

At Great Horwood Church of England School, the academic, emotional and spiritual well-being of all individuals is at the heart of all that we do; where everyone is valued. We are a safe, welcoming school within the heart of the village community that aims to provide all our children and adults with the learning opportunities to flourish, be healthy, grow in resilience and realise their full potential; being fully equipped and prepared for a successful future. Great Horwood CE School is committed promoting inclusivity and equality of opportunity for all pupils. When planning and teaching maths staff will make reasonable adjustments to promote equality of opportunity for all pupils based on individual needs.

Our aim is to foster a love of learning where pupils' curiosity is encouraged enabling them to confidently explore and investigate mathematical concepts. In our ever-changing world, we recognise the importance of maths in everyday life and it is our intent to prepare our children for their future. We believe that Mathematics is vital for the life opportunities, skills and knowledge our children will need to enable them to flourish as individuals and be successful. Through our practical and challenging maths curriculum, we aim to inspire and excite our children and foster an eagerness to learn. We believe that these opportunities will ensure that our children are confident and resilient life-long learners who explore and investigate mathematical concepts with enthusiasm.

Curriculum Intent for Maths across Foundation Stage, Key Stage 1 and Key Stage 2

INTENT

At Great Horwood CE School, we use a mastery approach in the teaching and learning of mathematics, which is currently being embedded across the school. Using this approach to develop a curriculum model focused on 'digging deeper' into mathematical concepts, we strive to challenge our children to develop a secure knowledge of mathematical concepts; accessing age-appropriate ideas, making links between learning, providing reasoning for answers and using their mathematical fluency to solve one and multi-step problems.

Following the mixed year group planning and progression from White Rose, we provide opportunities for revisiting and recall of learning, digging deeper into the distinct domains. Additionally, this is further supplemented by a variety of problem solving and reasoning tasks, supporting and challenging pupils to prove their answers within each domain.

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

At Great Horwood CE School we are successful mathematicians when:

- Children think mathematically, secure with fluency, enabling mathematical learners to reason and use their knowledge to solve problems
- Children deepen their mathematical understanding through the use of concrete, pictorial and abstract approaches to ensure a full understanding and altering long term memory
- Children use a variety of different equipment to support learning and understanding in maths
- Children use STEM sentences to support their reasoning and to clarify their mathematical thinking

IMPLEMENTATION

At Great Horwood CE School, our whole curriculum is shaped by our school vision of ‘I am the vine and you are the branches,’ John 15:5 which aims to enable all children, regardless of background, ability, and additional needs, to flourish to become the very best they can be. The National Curriculum provides the structure and skill development for the maths curriculum being taught throughout the school. Within the mastery approach, we follow the White Rose Mixed Age Schemes of Learning which are built around an age-appropriate small step approach to teaching and learning. There is a focus on mastery and ‘going deeper’ to ensure that concepts are embedded before moving on. Concepts are then applied through varied and frequent practice (throughout the year) with increasingly complex problems over time, supporting the development of conceptual understanding and the ability to rapidly and accurately recall and apply knowledge. Children are challenged with 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.

We offer children a wide and balanced mathematics curriculum to ensure they are prepared for the wider world. Maths is taught in a language rich environment, using a wide range of resources and practical activities, enabling all pupils to explore concepts through the CPA (Concrete, Pictorial, Abstract) approach. Knowledge walls are used to model key concepts and age-appropriate mathematical terminology, another resource which children are encouraged to use to further support autonomy in learning.

Teachers carefully model mathematical processes, breaking these down into small steps to further support understanding and aid recall. Pupils are encouraged to actively participate in all maths lessons, giving answers, collaborating with peers and discussing challenges and solutions with their teachers. Modelling used in lessons is then added to the maths working wall, further documenting the learning journey of year groups throughout the mathematical domains.

At Great Horwood CE School we have mixed age classes and use the White Rose joint mixed aged planning to ensure children are accessing a curriculum which is age appropriate. Children are given an input to their lesson and tasks are set to consolidate the learning that has taken place. Maths is generally taught as a discrete subject, although it is used within other curriculum areas, such as Design and Technology and Science, where appropriate.



Within the Trust and small schools' partnership we work alongside other teachers to compare and moderate learning to ensure consistency in assessment and to provide side-by-side support in identifying and planning for next steps for individual pupils.

Mathematics at Great Horwood CE School

At Great Horwood C E School, we believe that every child is entitled to a high-quality mathematics education, which will provide a foundation for them understanding the world. As a result, pupils will have an appreciation of the beauty and power of mathematics, plus a sense of enjoyment and curiosity about the subject. It is our belief that our children should have a positive learning attitude modelled and:

- be provided with a broad range of counting experiences at an early stage of them developing a sense of number
- learn about key early mathematics concepts and skills, which need to be understood before they begin to calculate
- develop a depth in understanding linked with calculation, including mental maths strategies that can be associated with various structured models and images

Building Fluency

Early Years Foundation Stage (EYFS)

The main aim in foundation stage mathematics is for children to reach the Early Learning Goals. The focus is on:

- counting reliably with numbers from 1-20, place them in order and state which number is more or less
- recall of number bonds to 10
- using quantities and objects, adding and subtracting single digit numbers and count on or back to find the answer. Whilst most children achieve this using practical resources, some children will go on to use number lines, and exceeding children will develop fluent mental recall of these facts
- teaching strategies include regular use of the counting stick for counting and recall of 2's, 5's and 10's and the use of songs, games and chanting. These activities are carried out daily as part of maths lessons, both in whole class teaching and as part of small group interventions

At Great Horwood CE School our Early Years provision is based around the curiosity approach, with a natural theme as seen across the whole school. Here, pupils are encouraged to use natural resources and loose parts to aid counting and number knowledge. Within the continuous provision of Early Years, all maths is practical, and investigation based. Pupils are encouraged to use STEM sentences through adult modelling and verbal discussions when in provision. Across our Early Years and Key Stage One classrooms, books are also used to support the learning in maths, using them as a stimulus to introduce new concepts.

With inclusivity at the forefront of all we do at Great Horwood, maths too is taught through a variety of different approaches to suit the needs of individual pupils. There are elements of some whole class teaching with some small group teaching also taking place. In addition to this, provision in Early Years is designed with pupils' interests in mind, encouraging them to explore mathematical concepts in ways that interest them most. In EYFS, a multi-sensory approach to learning maths is taken to ensure progression from nursery into reception, with outdoor learning, painting, storytelling, chalk, shaving foam and sand just a few of the mediums through which pupils are encouraged to demonstrate mathematical understanding.



Key Stage One

In Key Stage One maths lessons, fluency is a key focus and daily maths lessons start with recall of prior learning before new learning is introduced and problem solving activities are introduced.

In Key Stage One, this may look like:

- Children regularly counting and chanting their 2's, 5's and 10's to ensure that these number facts are securely embedded
- Number bonds to 10/20
- Class arithmetic sessions with opportunities to apply the skills to answer test style questions

Continuing from the concrete and abstract methods of learning mathematics used in EYFS, in Key Stage pupils use the CPA to demonstrate their understanding in maths. Pupils begin to move from verbal reasoning to using both verbal and written reasoning which can be seen in maths books. To further support reasoning, in Key Stage One pupils are introduced to 'prove it', where they are encouraged to prove their answer or a peer's answer to demonstrate understanding. With continuous provision in Key Stage One, pupils are also provided with numerous opportunities to learn through play and mathematical investigation and challenges are always available for pupils to self-select from the working wall when in provision. In Key Stage One, children are taught using split teaching, where they will get teacher input before being set a task where they will be supported to demonstrate their understanding of the concept.

Key Stage Two

Maths in Key Stage Two is also taught through split-teaching to ensure individual year groups get the full curriculum coverage as stated in the National Curriculum. The CPA approach is also evident in the teaching and learning of maths in Key Stage Two, where pupils are challenged to 'prove' their understanding of increasingly challenging concepts using a variety of different mediums. Pupils are always provided with varied levels of challenge in all maths lessons. In Key Stage Two, pupils are asked to select their own challenges in lessons, encouraging them to persevere in maths and challenge themselves whilst respecting their own insight. As throughout the school, Key Stage Two pupils are also taught using split-teaching to ensure full curriculum coverage in all year groups. Google Classroom is used in Key Stage Two to support learning and to set tasks for groups of pupils. The mastery approach is present in all Key Stage Two maths lessons, where pupils are encouraged to use STEM sentences to remember and recall key mathematical information. STEM sentences are displayed on working walls in class and pupils are encouraged to use these to support them in their problem solving and reasoning.

In Key Stage Two, maths is also taught by:

- Administering regular (informal) multiplication tests and quizzes to support the development of times table knowledge
- Completing Multiplication checks to support Year 4 in working towards to multiplication check.
- Providing opportunities for practical maths and collaborative working in maths where appropriate
- Pupils independently accessing Times Table Rockstars both in school and from home
- Pre-teaching to support pupils in familiarising themselves with new mathematical vocabulary and concepts
- Fluency in the four operations is revisited at the beginning of daily maths lessons to aid recall



Developing Reasoning and Problem-Solving Skills

At Great Horwood CE School, we follow the guidance and objectives of the National Curriculum and assess children's knowledge and skills using the following:

- All lessons involve reasoning of some description to apply fluency skills
- All children are exposed to reasoning skills and lessons promote connections within and across areas of maths
- Children whose fluency is not secure still have opportunities to access reasoning tasks ensuring that their curriculum is not being narrowed, but their learning is scaffolded to support identified gaps in fluency
- Within units, some lessons focus solely on use of reasoning skills to allow time for pupils to demonstrate and applying their learning
- Provide opportunities for children to explore problems, develop understanding of skills required to solve them and time is spent reviewing learning and learning from experiences
- Pupils are encouraged to use a variety of practical resources and representations when problem solving (CPA)

IMPACT

Through our mastery approach to teaching and learning in mathematics we encourage children to 'go deeper' with their learning. As a result, pupils develop a secure knowledge of mathematical concepts, as well as a fluent and flexible approach when applying their skills to enable them to reason and problem solve effectively. Through the White Rose small step approach, on-going assessment and early intervention, we identify and fill gaps in pupils learning, promoting good progress over time from their starting points.

This mastery approach to mathematics at Great Horwood results in:

- A fun and engaging curriculum
- Children who are actively involved in their learning
- Children who are fluent and flexible in their application of mathematical skills
- Children who persevere with their learning and are not afraid to 'have a go'
- Children who notice patterns and seek connections in their learning
- Children who can reason mathematically and are able apply their understanding to solve problems
- Children who are keen to learn and demonstrate a positive attitude in maths lessons

With the CPA approach present from EYFS through to Key Stage Two, pupils are encouraged to represent their understanding in a variety of formats, demonstrating the progression in knowledge through the year groups. The small steps ensure that learning is carefully broken down into logical and manageable chunks for pupils to understand, supporting secure mathematical foundations. In order to meet the expected standard in Mathematics by the end of Key Stage 2, children are required to:

Number and place value:

- use place value in whole numbers up to 1 000 000 to compare and order numbers and are beginning to become confident with numbers up to 10 000 000
- round any whole number to the nearest power of ten
- use negative numbers in practical contexts such as temperature and calculate intervals across zero



- count forwards or backwards in steps of any whole number with one significant figure, e.g. 9, 20, 3000 to generate, describe and complete linear number sequences

Addition and subtraction:

- show evidence of using mental methods, including jottings where necessary to speed up the process, to add and subtract whole numbers with up to two significant figures (e.g. $95 + 36$, $5700 - 2900$)
- add and subtract whole numbers with more than four digits, using formal written methods where appropriate

Multiplication and division:

- recognise and use multiples, factors, prime numbers less than 20 and square numbers up to 121
- Use their understanding of place value to multiply and divide whole numbers and decimals with up to two decimal places by 10 or 100 (e.g. $1532 \div 100 = 15.32$, $XX \div 100 = 6.3$)
- Multiply and divide whole numbers mentally drawing upon multiplication facts up to 12×12 and place value (e.g. 60×70) and begin to use these facts to work with larger numbers
- Multiply numbers with up to two digits by a two-digit number using a formal written method and becoming more confident with multiplication with larger numbers
- multiply and divide numbers with up to four digits by a single digit number using the formal written method and becoming more confident with two-digit divisors

Fractions, decimals and percentages:

- Recognise and use equivalent fractions
- Recognise and use the equivalences between simple fractions, decimals and percentages and become more confident with calculating decimal fraction equivalents
- Find simple fractions and percentages of whole numbers and quantities
- Add and subtract fractions with the same denominator, using mixed numbers where appropriate for the context
- Add and subtract fractions with the same denominator and multiples of the same number and become more confident with more complex fraction calculations
- Add and subtract decimal numbers that have the same number of decimal places
- Multiply a one-digit decimal number by a single digit number

Ratio and algebra:

- Use simple ratio to compare quantities
- Use simple formulae expressed in words (e.g. time needed to cook a chicken: allow 20 minutes plus 40 minutes per kilogram)
- Find possible values in missing number problems involving one or two unknowns (e.g. Ben thinks of two numbers: the sum of the two numbers is 10: multiplied together they make 24: What are Ben's numbers?)

Measurement:

- Read, write and convert time between analogue (including clock faces using Roman numerals) and digital 12 and 24 hour clocks, using am and pm where necessary
- Calculate the duration of an event using appropriate units of time (e.g. A film starts at 6:45pm and finishes at 8:05pm. How long did it last?)



- Convert between 'adjacent' metric units of measure for length, capacity and mass (e.g. 1.2 kg = 1200 g; how many 200 ml cups can be filled from a 2 litre bottle?; write 605 cm in metres)
- Find the perimeter of compound shapes when all side lengths are known or can be easily determined (e.g. a simple shape made from two identical rectangles joined together to make an L-shape with given dimensions of the rectangle)
- Estimate the area of irregular shapes by counting squares (including half squares and fractions of squares that join with others to make whole squares)
- Calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes by counting squares

Geometry:

- Compare and classify 3D and 2D shapes based on their properties (e.g. for 2-D shapes: parallel sides, length of sides, type and size of angles, reflective symmetry, regular / irregular polygons; for 3-D shapes: faces, vertices and edges)
- Recognise, describe simple 3D shapes, including using nets and other 2D representations
- Complete simple shapes using given lengths, such as 7.5cm, (accurate to +/- 2 mm) and acute angles that are multiples of 5° (accurate to +/- 2°)
- Know and use the facts that angles at a point sum to 360°, angles at a point on a straight line sum to 180° and angles in a triangle sum to 180° (e.g. calculate the base angles of an isosceles triangle where the other angle is 110°) and identify other multiples of 90°
- Identify, describe and represent the position of a shape following a reflection or translation
- Describe positions on a 2-D co-ordinate grid using axes with equal scales in the first quadrant (in the context of number or geometry) and use co-ordinates to complete a given rectangle; becoming more confident in all four quadrants

Statistics:

- Complete, read and interpret information presented in tables and bar charts (e.g. find the difference between two bars showing temperatures, where one is 20°C and the other is 13°C, on a scale labelled in multiples of 5)
- Interpret line graphs (e.g. beginning to find the difference between two temperatures on a line graph, where one is 20°C and the other is 13°C, on a scale labelled in multiples of 5) and simple pie charts (e.g. a pie chart cut into eight pieces for favourite fruit using whole numbers for each section)
- Calculate the mean as an average for simple sets of discrete data (e.g. find the mean mass of three parcels weighing 5kg, 3kg and 10kg)

When solving problems and reasoning mathematically children will learn to:

- Develop their own strategies to solve problems by applying their mathematics to a variety of routine and non-routine problems, in a range of contexts (including money and measures, geometry and statistics) using the content described above
- Begin to reason mathematically making simple generalisations, using mathematical language and searching for solutions by trying out ideas of their own
- Use and interpret mathematical symbols and diagrams, and present information and results in a clear and organised way; for example:
- derive strategies to solve problems with two or three computational steps using addition, subtraction, multiplication and division and a combination of these (e.g. extract and add prices)



from a table and calculate change, or solve problems such as ‘Jason bought some bags of green apples (6 for 75p) and some bags of red apples (10 for 90p). He spent £4.20. How many bags of each type of apples did he buy?’)

- solve problems involving numbers with up to two decimal places (e.g. find the two numbers which sum to 10 from this list: 0.01, 0.11, 1.01, 9.09, 9.9, 9.99)
- select appropriate strategies when calculating depending on the numbers involved
- use rounding and estimation to check their answers and determine, in the context of the problem, appropriate levels of accuracy
- identify simple patterns and relationships, and make simple generalisations. They can draw their own conclusions and explain their reasoning in simple contexts using mathematical language (e.g. an explanation to satisfy statements such as ‘If you add a two-digit number to a two-digit number you cannot get a four-digit number’)

Safeguarding

Safety is paramount in all lessons, specifically where pupils are using technology to support learning in maths. All forms of technology are regularly checked, and children are taught how to report any unwanted sites or images that may appear, despite filters applied and precautions taken. We have ensured our child protection policies cover the use of technology by adults and children within the school.

The school complies with “Inspecting Safeguarding in Early Years, Education and Skills Settings” and appropriate filters and monitoring systems are in place to protect learners from potentially harmful online material.

Inclusivity and Equality

Lesson plans detail how learning is scaffolded in many ways to ensure equality of access to all children, enabling them to be inclusive to whole class, quality first teaching. For children from disadvantage backgrounds, with special educational needs or who have English as an additional language, tasks may be broken down into smaller components, providing them with achievable goals. Lessons and tasks are translated for EAL pupils, where necessary, to ensure inclusivity across the curriculum. EAL pupils are also assisted by an in-school translator who works to support pupils in understanding written word problems and more complex mathematical concepts. Learning builds upon small steps and reinforced pupils understanding of content previously taught. As a result of this, all children will be enabled to achieve their full potential.

Great Horwood CE School is committed promoting inclusivity and equality of opportunity for all pupils. When planning and teaching maths staff will make reasonable adjustments to promote equality of opportunity for all pupils based on individual needs. This could include;

- Aids to support recall, including knowledge organisers and place value charts;
- Aids to support writing, including coloured overlays/paper, writing slopes and pencil grips;
- Translation of lessons, activities and resources scaffolded based on pupil need and experience;
- A variety of scaffolded support materials, including visual aids such as photographs, Makaton symbols; concrete and pictorial materials such as numicon and bar models; individual maths resource packs and adapted knowledge organisers;
- Modified tasks (e.g. working on the same objectives but with an alternative of using media, recording work in different ways or completing a slightly different task);
- Allocating adult small group support where appropriate;
- Mastery challenges, including advanced year groups for more able pupils;



- Access arrangements (e.g. scribes provided for maths test papers to ensure pupils mathematical understanding is correctly evidenced);
- See also 'SEN Policy'.

Spiritual, Moral, Social and Cultural (SMSC) Development in Maths:

Spiritual

At Great Horwood CE School we want children to be excited about Maths. We want them to feel delight when they have shown resilience and are able to solve questions that they found difficult to solve. Maths supports pupils' spiritual development by helping them to develop deep thinking and questioning about the way in which the world works. Through mathematics, children gain an appreciation of the richness and power of mathematics in our everyday lives.

Mathematics helps students to make informed decisions in life, based on the skills and confidence gained from choosing the most appropriate method in solving problems. These skills are transferable to real-life situations, and therefore help the students become reflective, responsible and insightful individuals.

Moral

We want children to have strong beliefs in what is morally right. We provide reasoning opportunities where the children are encouraged to prove their answer and give reasons for their thoughts. This allows them to evidence their views not just in Maths but in the wider world. Mathematics supports pupils' moral development through discussion about mathematical understanding and challenging assumptions, supporting children to question information and data that they are presented with. Mathematics helps children to understand and use rigorous and logical arguments, and to discourage them from jumping to conclusions when trying to determine the truth.

Social

At Great Horwood Mathematics supports pupils' social development by promoting self-esteem and building self-confidence. Maths encourages collaborative learning by listening and learning from each other, and through paired discussion and working with partners. We help pupils develop a mathematical voice and powers of logic, reasoning and explanation by offering explanations to each other.

We plan events and challenges for increased pupil involvement. We also encourage working effectively with others, including those from different backgrounds, using a range of social skills, developing tolerance of one another and supporting each other to recognise individual strengths and how this can benefit others.

Cultural

At Great Horwood CE School we see Maths as a universal language. Mathematics supports pupils' cultural development by developing an appreciation that mathematics, its language and symbols have developed from many different cultures around the world, for example, Egyptian, Indian, Islamic, Greek and Russian. Through mathematics we investigate and research cross cultural patterns, for example tessellation.

Our children are encouraged to develop an understanding of the history of Maths and how the number system has evolved. They value the things we share across cultural, religious, ethnic and socio-



economic communities. Our children are encouraged to appreciate the range of different cultures in the school and further afield as an essential element of their preparation for life in modern Britain.

October 2024

