



Policy Header

Policy Title	Mathematics & Calculation Policy
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"Growing together at the heart of God's community"



OUR TRUST'S PRAYER

Heavenly Father,
Let peace, friendship and love grow in our schools.
Send the Holy Spirit to give excellence to our learning,
love to our actions and joy to our worship.

Guide us to help others, so that we may all
Learn, Love and Achieve,
Together with Jesus.
Amen

The HEART of our Curriculum:, growing with God.

E – Embracing Christian Values.

A - Achievement for all.

R - Reading at the heart of our school

T – Teaching a knowledge rich curriculum.



Policy & Guidance

School values central to life in our community

At Glazebury CE Primary our core values of **Love and Wisdom** are at the centre of all that we do and all

H – Helping children prepare for life that we are. We feel that the values of friendship, truthfulness, hope, peace, creation, trust, compassion, justice, humility and forgiveness are fundamental to the growth of all.

Love never fails, 1 Corinthians 8:13

For the Lord gives wisdom : from his mouth comes knowledge and understanding. Proverbs 2:6

Intent:

This policy outlines the intent, implementation and impact of mathematics at Glazebury CE Primary School. Each element has been discussed and agreed by all teaching staff and reflects the ethos of high expectations and drive for the highest standards which underpins all aspects of teaching and learning at our school.

Maths rationale

Mathematics equips pupils with a uniquely powerful set of tools to understand and change the world. These tools include logical reasoning, problem solving skills and the ability to think in abstract ways. It enables children to understand relationships and patterns in both number and space in the world around them. Through their growing knowledge and understanding, children learn to appreciate the contribution made by many cultures to the development and application of mathematics. It is integral to all aspects of life and with this in mind we endeavour to ensure that children develop a positive and enthusiastic attitude towards mathematics that will stay with them.

At Glazebury CE Primary School we use the National Curriculum for Mathematics (2014) as the basis of our mathematics programme. We are committed to ensuring that all pupils achieve mastery in the key concepts of mathematics, appropriate for their age group, in order that they make genuine progress and avoid gaps in their understanding that provide barriers to learning as they move through education. Assessment for Learning, an emphasis on investigation, problem solving, the development of mathematical thinking and development of teacher subject knowledge are therefore essential components of our approach to this subject.

Embracing Christian Values.

At Glazebury Church of England Primary School, we encourage children to have a positive and resilient attitude towards mathematics and an awareness of the fascination of mathematics throughout their time at the school and beyond. The maths curriculum fosters a healthy curiosity in children about God's world.



Aims

The aim of teaching mathematics is based on **three** key principles:

- To **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 their knowledge.
- To **reason mathematically** by following a line of enquiry, building relationships, developing an argument and using mathematical language.
- To **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing confidence, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Implementation:

Achievement for all.

Teaching and learning style

At Glazebury CE Primary School, we are committed to providing exciting and challenging learning experiences for all of our children. We are on a journey of teaching for mastery at Glazebury C of E Primary School. It is based on the NCETM's research into primary mathematics teaching in East Asian jurisdictions, especially Shanghai, and on the experience of English primary schools involved in the China-England mathematics education research project. It is fully consistent with the Primary National Curriculum in England.

Teaching principles

- Teaching is underpinned by a belief in the importance of mathematics and that the vast majority of children can succeed in learning mathematics in line with national expectations for the end of each key stage.
- The whole class is taught mathematics together, with no differentiation by acceleration to new content. The learning needs of individual pupils are addressed through careful scaffolding, skilful questioning and appropriate rapid intervention, in order to provide the necessary support and challenge.
- Factual knowledge (e.g. number bonds and times tables), procedural knowledge (e.g. formal written methods) and conceptual knowledge (e.g. of place value) are taught in a fully integrated way and are all seen as important elements in the learning of mathematics.
- The reasoning behind mathematical processes is emphasised. Teacher/pupil interaction explores in detail **how** answers were obtained, **why** the method/strategy worked and what might be the most efficient method/strategy.



- Interim methods (e.g. expanded methods for addition and multiplication) to support the development of formal written algorithms are used for a short period only, as stepping stones into efficient, compact methods.
- Precise mathematical language, couched in full sentences, is **always** used by teachers, so that mathematical ideas are conveyed with clarity and precision. Pupils are required to do the same (e.g. when talking about fractions, both the part and its relationship to the whole are incorporated into responses: "*The shaded part of the circle is one quarter of the whole circle*").
- Conceptual variation and procedural variation are used extensively throughout teaching, to present the mathematics in ways that promote deep, sustainable learning.
- Carefully devised exercises employing variation are used. These provide **intelligent practice** that develops and embeds fluency and conceptual knowledge.
- Sufficient time is spent on key concepts (e.g. multiplication and division) to ensure learning is well developed and deeply embedded before moving on.
- Frequent additional practice, outside the lesson, is encouraged, in order to develop pupils' fluency and consolidate their learning.

Lesson design- **Teaching a knowledge rich curriculum**

- Programmes of study and lesson content are carefully sequenced, in order to develop a coherent and comprehensive conceptual pathway through the mathematics. At Glazebury C or E we use high quality resources, including Oak Academy maths, as well as Mastering Number, to plan a continuous progressive curriculum.
- Learning is broken down into small, connected steps, building from what pupils already know.
- Difficult points and potential misconceptions are identified in advance and strategies to address them planned.
- Key questions are planned, to challenge thinking and develop learning for all pupils.
- Contexts and representations are carefully chosen to develop reasoning skills and to help pupils link concrete ideas to abstract mathematical concepts.
- The use of high quality materials and tasks to support learning and provide access to the mathematics, is integrated into lessons. These may include textbooks, visual images and concrete resources.

Features of teaching



- Lessons are sharply focused; digression is generally avoided.
- Key new learning points are identified explicitly.
- There is regular interchange between concrete/contextual ideas and their abstract/symbolic representation.
- Mathematical generalisations are emphasised as they emerge from underlying mathematics, which is thoroughly explored within contexts that make sense to pupils.
- Making comparisons is an important feature of developing deep knowledge. The questions *"What's the same, what's different?"* are often used to draw attention to essential features of concepts.
- Repetition of key ideas, often in the form of whole class recitation, is used frequently. This helps to verbalise and embed mathematical ideas and provides pupils with a shared language to think about and communicate mathematics.
- Teacher-led discussion is interspersed with short tasks involving pupil to pupil discussion and completion of short activities.
- Desks are arranged so that all pupils can face the teacher and can work in pairs or small groups when needed.
- Formative assessment is carried out throughout the lesson; the teacher regularly checks pupils' knowledge and understanding and adjusts the lesson accordingly.
- Gaps in pupils' knowledge and understanding are identified early by in-class questioning and by reviewing homework. They are addressed rapidly through individual or small group intervention, either on the same day or the next day, separate from the main mathematics lesson, to ensure all pupils are ready for the next lesson.
- Teachers discuss their mathematics teaching regularly with colleagues, sharing teaching ideas and classroom experiences in detail and working together to improve their practice.

A typical math's lesson

Retention question/s- children are presented with challenge to retain knowledge from previous lesson/ small step. Opportunities to identify what students already know.



New learning- Step by step approach – journey through the mathematics identifying the key points – the new knowledge. Within the new learning difficult points/ misconceptions are planned for. Questions are used to challenge/support thinking.

Guided practise- through a ping/pong approach the children practise the key concepts using variation theory. Opportunities to develop reasoning and deep understanding (contexts and representations of mathematics) are carefully planned Discussion and feedback from students is utilised.

Independent practise-Use of quality resources including Oak Academy, NCETM PD Lead materials to promote depth of understanding of the concepts.

Before next lesson:

Review, revisit it, push it- opportunities to review fluency errors, revisit any misconceptions or 'push' greater depth opportunities used.

Inclusion- Achievement for all.

It is the right of every child at our school to be provided with a meaningful and enjoyable education regardless of gender, ethnicity, disability or special need. Staff will always ensure that every effort possible is made to support or challenge children with specific needs in an environment where every child is equal. Pupils who grasp concepts rapidly will be challenged through depth of understanding and not be accelerated through new content. Those who are not sufficiently fluent with earlier material will consolidate their understanding, including through additional practice, before moving **on. We achieve this through pre and post teach.**

Guidance on mathematics planning

The National Curriculum 2014 has six main areas of study:

- Numbers (including place value, addition, subtraction, fractions, decimals and percentages)
- Ratio and Proportion
- Algebra
- Measurement
- Geometry
- Statistics

Teachers use the NCETM resources, Mastering Number and Oak Academy Materials to support the development of maths mastery. Teachers plan on a weekly basis from the Oak Academy MTP.

Mastering Number (NCETM National Project) in 22-23 for Rec/KS1

At Glazebury C of E Primary we have a commitment to continual development of maths mastery. We have committed to the Mastering Number project. This project aims to secure firm foundations in the development of good number sense for all children from Reception through to Year 1 and Year 2. The aim over time is that children will leave KS1 with fluency in calculation and a confidence and flexibility with number. Attention will be given to key knowledge and



understanding needed in Reception classes, and progression through KS1 to support success in the future.

Example of intended outcome of Mastering Number in Year 1:

Children: to develop

- good number sense
- fluency with number bonds within 10
- mathematical habits of learning, including: becoming mathematically observant (noticing and visualising), reasoning and explaining, working systematically, using spatial reasoning skills in number work.

Teachers: to develop

- understanding of year group expectations in relation to 'ready-to-progress criteria'
- subject knowledge
- pedagogical techniques which will improve pupils' fluency.

What is involved?

This programme focuses on the key knowledge and understanding needed in Reception classes, and progression through KS1. School will receive central training and a wealth of resources.

There is an expectation that schools will provide a daily teaching session for all children of 10 to 15 minutes, in addition to their normal maths lesson.

Outcome for teachers:

- Children at Glazebury be able to clearly communicate their mathematical ideas
- Teachers will develop a secure understanding of how to build firm mathematical foundations
- Teachers will work to develop intentional teaching strategies focused on developing fluency in calculation and number sense for all children
- Teachers will develop understanding and use of appropriate manipulatives to support teaching of mathematical structures

Environment

All classrooms will have a maths 'working wall'. This will be regularly updated and reflect current maths learning and vocabulary. It will support the key concepts of mastery; representations and structures, fluency, coherence, mathematical thinking and variation. It can also display age appropriate resources to support children's learning such as deans, fraction walls etc. All maths equipment will be clearly labelled and children encouraged to have regular access to concrete resources.

Early Years Foundation Stage



We teach mathematics in our Foundation Stage where we relate the mathematical aspects of the children's work to the objectives set out in the Early Learning Goals, which underpin the curriculum planning for children during the Early Years Foundation Stage. We give all the children ample opportunity to develop their understanding of number, measurement, pattern, shape and space, through varied activities that allow them to enjoy, explore, practise and talk confidently about mathematics. The curriculum is underpinned by the NCETM Mastering Number curriculum.

Presentation of Maths Work

Each lesson must include the short date (e.g. 03.09.15) on the left-hand side of the page with the Learning Objective written underneath. Both must be underlined with a ruler. Children are encouraged to present their written calculations in pencil as neatly as possible by putting one digit in a square. A ruler must be used for drawing straight lines. The emphasis of neatly produced work is important as poor presentation and careless setting out can lead to incorrect calculations.

Assessment

"... 'assessment' refers to all those activities undertaken by teachers, and by their students in assessing themselves, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged."

At Glazebury CE Primary School, we view assessment as having two main purposes:

- assessment of learning (also known as summative assessment)
- assessment for learning (also known as formative assessment).

Assessment for learning (AFL) - formative assessment

"Assessment for learning is the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to get there." Assessment Reform Group, 2002

AFL is any assessment activity that informs the next steps to learning. The key message is that AFL depends crucially on actually using the information gained. Our belief is that by creating a 2-way process of discussion, evaluation/review we create an environment where all learners have the confidence that they will improve.

Each lesson will have a very specific target. The children will write this target as an 'objective' at the start of their work. In line with a mastery approach, it is the expectation all pupils reach the same learning objective at varying depths of understanding. Pupils will be encouraged to class mark, when ever relevant, and time will always be given to respond to improvements.

Formative assessment in the Foundation stage

The Foundation stage team uses a formative assessment to aid their planning, support all children and make sure that they all achieve to the best of their abilities. The Foundation stage team engages



in formative assessment by taking photographs, by doing spot observations on post-its and by doing planned assessments.

Children's work is marked when appropriate, from there teachers' planning is informed and individual need can be addressed e.g. support or additional challenge. Planning is annotated using evaluation sheets. Teachers indicate whether objectives have been understood, whether concepts have been delivered but not grasped or partly grasped. This provides a monitoring tool for planning and pupil progress. Specific pupil's names are used in evaluations to aid planning for individual needs.

Assessment of learning (AoL) - summative assessment

We make termly summative judgements of each child's achievement using development matters stages of development. We also use the White Rose assessment questions in conjunction with this.

Some of the evidence base for these assessments may come from day-to-day class work, this is backed up by evidence that comes from specific tasks and tests used to assess the degree of retention, independence and breadth of application shown. We use these judgements to assess progress and achievement against individual, school and national targets. We identify and target those children not making expected progress and intervene accordingly.

Assessment is tracked at least termly using the school's tracking system and pupils' progress is discussed in Pupil Progress Meetings. Children who haven't made progress are discussed and made note of so that they become a focus in teacher's planning for the next term. We pass all assessment and tracking information on to the next teacher at the end of the year, so that s/he can plan for the new school year.

We give parents termly updates alongside the opportunity to discuss their child's progress and attainment at a teacher/parent meeting. We also write a summary of each child's progress and achievement in the Annual Report for parents.

Summative assessment in the Foundation stage

In the Foundation Stage we formally assess the children at the end of each term. The EYFS teacher assesses the children using a profile which is based on the National Foundation stage profile and Early Learning Goals. The teacher uses evidence found in photographs, observations and children's work to aid their assessment. This assessment provides data which can be used by the teacher to inform planning and give feedback to children on their goals and how they can achieve them. At the end of the Foundation Stage the data from the Foundation Stage Profile is analysed by the class teacher providing evidence to monitor pupil progress, celebrate successes and highlight gaps in understanding or performance.

At the end of the Foundation Stage data is collected and recorded onto SIMS stating whether the children are emerging, expected or exceeding the Early Learning Goals.



Parents

At Glazebury CE Primary School, we recognise the vital role which parents and carers play in the education and development of their children. As a school with an 'open door policy', parents are encouraged to come and talk to staff after or before school about their child's progress, their goals and how they can support their child in reaching them. Individual progress is also discussed at Parents' evenings. Homework is given to children as appropriate to their needs and which develops their learning. See Homework policy.

The role of the Senior Leadership Team

The Head teacher will:

- Provide support by encouraging staff and praising good practice
- Monitor learning and teaching
- Give feedback to teachers
- Support staff development through CPD

Other senior leaders will:

- Provide a strategic lead and direction for Mathematics in the school
- Provide support and advice to staff in the delivery of the Mathematics programme of study
- Remain informed about current developments in the subject by attending network meetings
- Monitor and evaluate teaching and learning of Mathematics
- Monitor standards in the subject
- Monitor planning and books and interview children
- Order and maintain resources to enhance effectiveness of Mathematics teaching within the school
- Work with SLT members in the evaluation and planning of actions included within the School Development Plan.
- Regularly meet with staff
- Present regular updates to Governors

The Class teacher will:

- Be responsible for the teaching of Mathematics as set out in the policy.
- Provide samples of mathematics work to the Mathematics leader when required
- Assess children's work in order to detail future planning
- Be responsible for marking books
- Be responsible for the progress of children
- Use data to track and monitor progress and to inform planning
- Use working walls to support children in their learning

Impact: H.E.A.R.T.

What we want our children to have achieved:

All children develop 'wisdom' through:



"Growing together at the heart of God's community"



- **becoming fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understand and the ability to recall and apply their knowledge.
- **reasoning mathematically** by following a line of enquiry, building relationships, developing an argument and using mathematical language.
- **solving problems** by applying their mathematics to a variety of routine and non-routine problems with increasingly confidence, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

All children find a 'love' for mathematics though:

- having the opportunity to access and master a high-quality maths curriculum that is engaging, challenging and exposes the true beauty of mathematics within our classrooms.
- Belief in the beauty of mathematics and promoting opportunities to share the wonder of maths.