

Developing an approach to teaching and learning in mathematics

Mathematics is a creative and highly interconnected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It 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. NC 2014

At Wormley CE Primary School, our vision and aim is to promote maths as a **social, creative and interconnected subject**. We believe that **everybody** is capable of being a successful mathematician. We aim to nurture a **love and curiosity** of the subject for all. The subject is **essential** to everyday life and provides a **foundation** for understanding the world. Our aim is to provide our learners with **rich opportunities** in maths to learn **independently and actively** in order that they:

- Become **fluent** in the fundamentals of mathematics;
- Are able to **reason** and justify mathematically;
- Can **solve problems** within a range of contexts.

Equity in maths education means that **all** our pupils are supported to succeed mathematically. For an equitable mathematics education we use an appropriate and inclusive pedagogy and curriculum, recognising systemic barriers to achievement that have historically affected pupils with characteristics such as gender, socio-economic status, ethnicity, special educational needs and disability (SEND).

Our approach to teaching and learning mathematics is informed by the work of the NCETM on a mastery approach to maths; the EEF research into 'Improving Mathematics' (2020); and Ofsted's Review of mathematics (2023). We have adopted the **essence of teaching maths for mastery (NCETM)** which underpins our beliefs and approach to teaching and learning mathematics:

Underpinning principles

- Mathematics teaching for mastery assumes everyone can learn and enjoy mathematics.
- Mathematical learning behaviours are developed such that pupils focus and engage fully as learners who reason and seek to make connections.
- Teachers continually develop their specialist knowledge for teaching mathematics, working collaboratively to refine and improve their teaching.
- Curriculum design ensures a coherent and detailed sequence of essential content to support sustained progression over time.

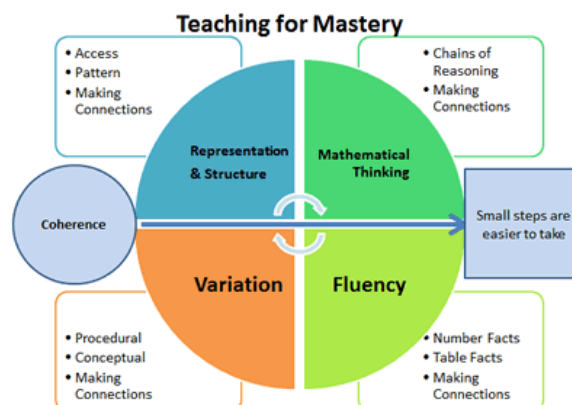
Lesson design

- Lesson design links to prior learning to ensure all can access the new learning and identifies carefully sequenced small steps in progression to build secure understanding.

- Examples, representations and models are carefully selected to expose the structure of mathematical concepts and emphasise connections, enabling pupils to develop a deep knowledge of mathematics. All children will use concrete resources to aid their understanding and reveal the underlying mathematical structures.
- Procedural fluency and conceptual understanding are developed in tandem because each supports the development of the other.
- It is recognised that practice is a vital part of learning, but the practice must be designed to both reinforce pupils' procedural fluency and develop their conceptual understanding.

In the classroom

- Pupils are taught through whole-class, mixed ability, interactive teaching, enabling all to master the concepts necessary for the next part of the curriculum sequence before moving on.
- In a typical lesson, the teacher leads back and forth interaction, including questioning, short tasks, explanation, demonstration, and discussion, enabling pupils to think, reason and apply their knowledge to solve problems. Lesson design is based around the 5 'big ideas of: coherence; representation and structure; mathematical thinking; fluency and variation.



- Use of precise mathematical language enables all pupils to communicate their reasoning and thinking effectively. A culture of oracy is intentionally developed to enable all pupils' voices to be valued.
- Children are encouraged to '**pause and notice**' to be mathematically observant, and, so, make connections, identify efficient methods, estimate answers, avoid careless mistakes and to create space for deliberate thinking.
- Mistakes are valued and shared in our classrooms as learning points and as evidence of the 's[arks]' created in children's brains as they learn new concepts
- If a pupil fails to grasp a concept or procedure, this is identified quickly, and gaps in understanding are addressed systematically to prevent them falling behind.

- Significant time is spent developing deep understanding of the key ideas that are needed to underpin future learning.
- Key number facts are learnt to automaticity, and other key mathematical facts are learned deeply and practised regularly, to avoid cognitive overload in working memory and enable pupils to focus on new learning.

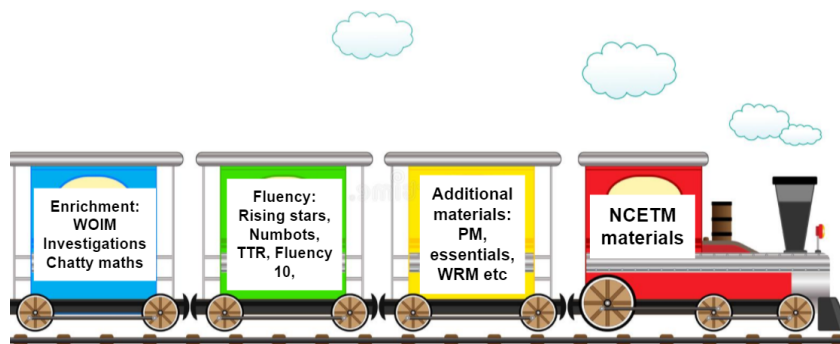
Curriculum

We follow the **NCETM prioritised curriculum** which forms the spine of our curriculum and meets the requirements of the National Curriculum 2014 for the teaching and learning of mathematics (see appendix 1).

We focus on securing the **DfE Ready-to-Progress criteria** within each unit of learning in recognition that these high value objectives are essential to pupils moving forward in their maths understanding.

The NCETM materials are supplemented with high quality additional intelligent practice materials drawn from Oak academy, White Rose mathematics, Third space learning, Twinkl, past SATs questions, RtP questions etc matched to what the children need to practise

This is represented in the image below:



Fluency is highly valued and is practised daily. YR - Y5 follow the age appropriate Mastering Number programme.

Curriculum coverage is monitored through ongoing discussion, the completion of the formative assessment trackers within Arbor and other monitoring activities.

Structure of maths teaching and learning

Maths lesson	KS1 KS2	50 mins daily*	These lessons follow the small steps of learning as set out in our prioritised curriculum and the NCETM spine materials. Each lesson will be designed to incorporate the 5 big skills of mastery providing opportunities to
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			practise fluency skills, reason mathematically and to talk about mathematics. Each pupil has access to the same teaching. Children are not grouped by attainment.
Fluency	EY KS1 KS2	10 - 15 mins daily	EY / KS1: Mastering Number Programme Year 3: Mastering Number Programme (targeted pupils) LKS2: Times table booklets Y4 / Y5: Mastering Number All year groups: regular arithmetic practice
Flashbacks	KS1 KS2	10 mins at least 3 x week	In order to interrupt forgetting and help children to remember and recall previous learning: ➤ Children answer 3-4 maths questions ➤ Questions are a variety of fluency, problem-solving and reasoning ➤ Questions are drawn from mathematical concepts learnt: recently; last month; last term; and last year using the Key learning per year group
Online resources	EY KS1 KS2	Support home and class learning	EY: Numberblocks, Numbots KS1: Numbots, Numberblocks KS2: Freckle, Times table rockstars
Inspirational maths	EY KS1 KS2	Whole school days / weeks	Opportunities for practical and creative investigation and problem-solving with a focus on developing maths skills, collaborative working and positive mindset. These opportunities usually take place at the start of a term or between units.

EYFS:

Nursery: In Nursery, mathematics focuses on developing early number sense and confidence with counting, using the White Rose Early Years materials. Learning is embedded through playful, practical experiences and adult-led activities that introduce numbers, patterns, and mathematical relationships.

Practitioners support children to:

- Recognise and explore numbers 1-5 and their composition.
- Count reliably and link numbers to quantities.
- Subitise small groups of objects.
- Compare quantities and use simple mathematical language.
- Notice and create simple patterns in shape, size, or colour.

Learning is reinforced in continuous provision and guided play, with practitioners observing and adapting activities to ensure children consolidate understanding. This builds secure foundations for progression into Reception and the Mastering Number programme.

Reception: In Reception, the teaching and learning of mathematics is grounded in developing a deep understanding of number, supported by the **NCETM Mastering Number programme**. Our approach prioritises number sense, flexibility, and fluency, ensuring that all children secure firm foundations for future mathematical learning.

Through daily, short and engaging Mastering Number sessions, alongside rich opportunities within continuous provision, children are supported to develop:

- a secure understanding of the **composition of numbers** up to 10;
- fluency in **subitising, counting, and comparing quantities**;
- confidence in using **mathematical language** to reason and explain their thinking;
- an appreciation of **numerical patterns** and relationships between numbers.

Teachers plan and deliver a carefully sequenced progression of experiences that build conceptual understanding through **concrete, pictorial, and verbal representations**, using high-quality manipulatives such as rekenreks and structured resources. These experiences are designed to encourage children to see number structure rather than rely solely on rote counting.

Learning is revisited and deepened through playful and practical contexts that are meaningful to children. Mathematical ideas are embedded across the curriculum and the continuous provision to promote application and generalisation.

Practitioners use ongoing formative assessment and observation to identify next steps and to intervene promptly where children need additional support. The emphasis is on **depth of understanding** rather than acceleration, ensuring all children are secure in the key concepts before moving forward.

By the end of Reception, children are expected to:

Number (ELG):

- Have a deep understanding of number to 10, including the composition of each number.
- Subitise (recognise quantities without counting) up to 5.
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

Numerical Patterns (ELG):

- Verbally count beyond 20, recognising the pattern of the counting system.
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

This approach ensures coherence and consistency with the whole-school **Maths Mastery** principles, building confident, curious, and fluent young mathematicians who are well prepared for the transition into Key Stage 1.

SEND

We believe that inclusive education means supporting all pupils to learn, contribute and participate in all aspects of school life alongside their peers. Our curriculum includes, not only the formal requirements of the National Curriculum, but also a range of additional opportunities to enrich the experiences of our children. Our curriculum also includes the social aspects that are for life-long learning, personal growth and development of independence.

Some of the actions we may take to achieve this are:

- Help all pupils achieve the best of their abilities, despite any special educational need or disability they may have.
- Ensure that staff are aware of and sensitive to the needs of individual pupils and that teaching is appropriate to meet those needs.
- Make suitable adaptations to the curriculum for children with SEND to fully develop their abilities, interests and aptitudes and gain maximum access to the curriculum.
- In Maths, in order for all children to be successful, we use assessment for learning to ensure that children are developing their skills at their own level and pace. We plan for adaptations, such as, access to additional resources, additional time, adult support and small group pre-teaching or overlearning.

Learning Environment and resources

Each classroom has a maths learning wall and display material such as vocabulary, a number line and a hundred square. Display materials are age appropriate. Maths resources are available and readily accessible by children in every lesson and in every year group. Resources are kept in a central place for all to access. There are 2 maths displays in public areas.

Each class keeps a maths investigation book to capture and evidence practical maths activities.

Pre-teaching & Intervention

Pre-teaching is delivered for those who would benefit as regularly as can be timetabled. This will prepare children for the learning they will encounter in class and also be in direct response to teacher AfL. The sessions will be ideally delivered by teachers.

Numberstacks is an intervention programme delivered by TAs to support pupils who have gaps in previous knowledge which is holding them back. These will be delivered in blocks of 12 in groups of no more than 3 with similar need (as identified in the initial assessment)

We may, on occasions, run a small group tutoring to support pupils over a defined period. These are primarily targeted at children in receipt of **pupil premium funding** who have evident gaps which need addressing outside of the normal maths lesson.

Some children in receipt of pupil premium funding have weekly online tutoring from **Third Space learning**.

Children who have been identified as having **dyscalculia** have dedicated support.

Assessment

We assess against the **DfE Ready to progress criteria**. Assessment is recorded on an ongoing basis using the **formative assessment grids** on **Arbor**. These trackers are accessed by subsequent class teachers in order to provide a historic and complete picture of a child's progress.

At termly intervals, **summative judgements** are made and are recorded on Arbor.

Understanding of a concept is assessed using '**assessment pit stops**', such as from the **Ready to progress exemplification materials**, talk tasks, Twinkl, HfL, White Rose or Testbase, some time after the initial teaching.

In Y2-Y6, the children all take a diagnostic star maths assessment each half term. The output measures progress and determines teacher planning for lessons and intervention sessions.

Progress is also assessed through arithmetic test scores, SATs practice papers (in year 6) and day to day assessment for learning.

In Early Years, Summative assessments are recorded on Arbor, with ongoing observations logged in Tapestry Online Learning Journal to support continuous monitoring of progress. Each term, three focus children are selected to provide in-depth insights and inform targeted assessment.

Marking and feedback

Children are encouraged to provide collaborative feedback wherever appropriate.

In 24/25 staff worked together to agree these expectations for maths books:

There is evidence **over time** and **appropriate to their age**, that **all pupils**

- are working through cohesive small steps in a learning sequence;
 - have opportunities to practise fluency;
 - have opportunities to reason; problem solve; and to apply their learning in a variety of ways;
 - have opportunities to provide written responses to explain their thinking, supported by sentence stems where appropriate;
 - are using a range of mathematical representations, some of which they are drawing themselves
 - are receiving feedback on their learning - in line with the school's [Feedback and Marking policy](#) - and have the chance to correct mistakes and respond to this feedback.
 - are receiving support swiftly when they start to fall behind (or have pre-teaching)
 - are recording their learning neatly and forming digits correctly in such a way as to enhance their mathematical understanding and show pride in their learning
 - are including any working out in their books
- There is evidence **over time** and **appropriate to their age**, that **all pupils**
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Monitoring and Moderation

Maths is **monitored** through a variety of means e.g. observations, learning walks, pupil consultations, planning reviews and book looks.

Termly **phase reviews** are also a source of information.

Phases are expected to **moderate** assessment at least termly. Teachers attend moderation clusters with local schools and we undertake a whole school moderation every year.

The subject leader holds **maths surgery** discussions termly to review progress and curriculum coverage as well as to provide support and advice to teachers.

Home Learning

Children have the opportunity for extending their maths skills through maths based activities which are usually delivered through the **Google classroom**. They are encouraged to use Freckle (KS2) and play maths games to practise fluency skills each night at home. All pupils from YR-Y6 have a log-in to **Numbots** to develop their mental fluency in number. They also have access to **TT Rockstars** to develop multiplication tables.

Website

This is an important interface with parents which has links an overview of learning and curriculum overviews for each year group as well as curriculum foci.

Resources

We recommend, and subscribe to where necessary, a few high quality resources for teachers to use to plan lessons: NCETM, Third space learning, White Rose Premium, Nrich, TTRockstars, Numbots, Numberblocks.

There are teaching and assessment materials available to teachers to help with lesson design and assessment to inform our teaching and learning.

CPD and research

Maths CPD for teachers is held at least termly and some attend specific Maths Hub training off site. Teachers are encouraged to observe each other teach and collaboratively plan. Materials from CPD sessions are available on the Google Drive.

ECTs have specific maths training through the Maths hub and are supported by the maths leadership team.

Teaching assistants CPD is delivered in the form of bite sized chunks and they do attend external training from time to time. Many have also undertaken collaborative development projects in maths

Our maths leadership is comprised of three teachers.

One of our maths leader is also Assistant Maths Hub Lead and a Primary Mastery Specialist for the Matrix Maths Hub. She has the MaST (maths specialist teacher) qualification and is an accredited Professional Development lead and School Development lead. She works regularly supporting other schools and has had articles published in educational publications about maths pedagogy.

The school works closely with the Matrix maths hub and regularly opens its classrooms for visiting teachers to observe live teaching. The school also runs maths leadership meetings and PD twilights for the local area.

The school worked with HfL to trial their development of Maths Essentials for YR and has been involved in a range of research projects with Herts for Learning and The University of Hertfordshire.

Teaching staff are provided with academic articles and teaching ideas when appropriate and it is also suggested that teachers subscribe to the NCETM newsletter to keep abreast of current thinking in maths teaching and learning.

We follow the recommendations of the Education Endowment Fund (EEF) documents 'Improving Mathematics in the Early Years and Key Stage 1' and 'Improving Mathematics in KS2 and 3'

Appendix 1: Maths Prioritised Curriculum Map

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Y1	Counting within 100	Comparison of quantities and part-whole relationships Numbers 0-5	Recognise, compose, decompose and manipulate 2D and 3D shapes Numbers 0 to 10	Additive structures Addition and subtraction facts within 10	Numbers 0 to 20	Unitising and coin recognition Position and direction Time
Y2	Numbers 10 to 100 Calculations within 20	Fluently add and subtract within 10 Addition and subtraction of 2 digit numbers (1) Introduction to multiplication	Introduction to multiplication (cont'd) Introduction to division structures	Shape Addition and subtraction of 2 digit numbers (2)	Money Fractions Time Position and direction	Multiplication and division - doubling, halving, quotitive and partitive division Sense of measure - capacity, volume, mass
Y3	Adding and subtracting across 10 Numbers to 1,000	Numbers to 1,000 (cont'd)	Right angles Manipulating the additive relationship and securing mental calculation	Column addition 2,4,8 times tables Column subtraction	Unit fractions	Non-unit fractions Parallel and perpendicular sides in polygons Time
Y4	Review of column addition and subtraction Numbers to 10,000	Perimeter 3, 6, 9 times tables	7 times table and patterns Understanding and manipulating multiplicative relationships	Understanding and manipulating multiplicative relationships (cont'd) Coordinates	Review of fractions Fractions greater than 1	Symmetry in 2D shapes Time Division with remainders
Y5	Decimal fractions Money	Negative numbers Short multiplication & short division	Area and scaling Calculating with decimal fractions	Calculating with decimal fractions (cont'd) Factors, multiples and primes	Fractions	Converting units Angles and transformations
Y6	Calculating using knowledge of structures Multiples of 1,000	Numbers up to 10,000,000 Draw, compose and decompose shapes	Multiplication and division Area perimeter, position and direction	Fractions and percentages	Statistics KS2 tests	Ratio and proportion Calculating using knowledge of structures Solving problems with 2 unknowns Order of operations Mean average