Mathematics learning Policy

The current Mathematics curriculum states:

“Mathematics is a **creative** and highly **inter-connected** discipline that has been developed over centuries, providing the solution to some of history’s most intriguing problems. It is **essentia**l 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.”

Therefore, it is our role as practitioners to develop an **engaging, challenging and creative** curriculum which will inspire and motivate the children to become better mathematicians, whilst teaching them the everyday skills to be prepared for their future life. This is further out lined in the new curriculum where it shares the main mains of the mathematics curriculum. These therefore are now our aims at Brickhouse Primary School with regards to teaching mathematics.

Aims of the National Curriculum

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 have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
 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.

By using the above aims, we can reach the ultimate goal in mathematics of making it a much loved and appreciated subject.

From September 2023, Brickhouse Primary School will be using a scheme of work called “Mathematics Mastery” from Ark Curriculum.

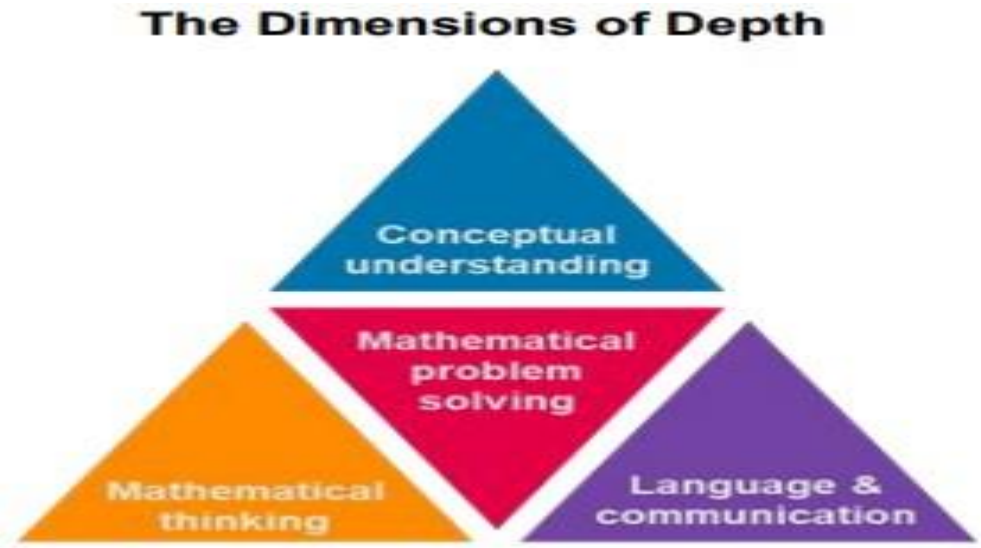
Mathematics Mastery at Brickhouse

The Mathematics Mastery Scheme is a rich curriculum that allows for cumulative development of both knowledge and skills. Our curriculum goes beyond the requirements for intent, whilst the ongoing training and professional development for teachers enables schools to continually enhance their implementation and quality of learning for the children.

Mathematics Mastery shares the same design principles as all Ark Curriculum Plus programmes. These are to be academically ambitious for all; knowledge-rich; discipline-led and logically sequenced. The scheme is designed to support memory, and supports our commitment to diversity and inclusion for all pupils.

Our Maths Mastery Curriculum focuses on the following key concepts:

Dimensions of Depth:
The Dimensions of Depth (language and communication, conceptual understanding and mathematical thinking) are central to problem solving. They are integrated into lesson resources to support students in becoming confident problem solvers.



Six-part lesson structure:
A six-part lesson gives a structure in which to implement the pedagogic principles of the curriculum. The different parts of the lesson allow teachers to bring to the Dimensions of Depth to the foreground. Having a consistent structure for each lesson ensures that learners are exposed to the pedagogies associated with each dimension and assessment opportunities are embedded within each part. (Further explained later in this policy.)

One Curriculum for all:
To ensure one curriculum for all, in line with the National Curriculum, it is expected that pupils will move through the programmes of study at broadly the same pace, ensuring no ceiling is imposed on what learners can achieve. While there is only one curriculum, we recognise that not all learners come to each lesson at the same starting point.
For this reason, we provide additional resources, such as Ready to Progress interventions and response signposts (i.e. re-teach concepts and booster units/lessons) for every diagnostic question which are designed to help learners access the main curriculum. Differentiated independent tasks are provided as a starting point for teachers to increase challenge and increase support, which exemplify a range of adapting techniques including scaffolding, constraints, Ideas for Depth, applying the Dimensions of Depth and applying learning within an unfamiliar context.

Our Maths Mastery Curriculum focuses on the value of a high-quality mathematics education and is well recognised for its importance both to the individual and to society. Mathematics Mastery is premised on a belief that all learners can enjoy and succeed in maths with a mission to empower and equip teachers to provide the learning experiences needed to achieve success for all. What is crucial is that schools (and not just leaders but also all staff) have a shared vision and culture. The curriculum should aim to reflect the school's local context by addressing typical gaps.

Aims of our Mathematics Mastery Curriculum at Brickhouse:

1.We focus on the fundamentals
• The Mastery Mathematics curriculum is cumulative. Concepts that are taught earlier in the curriculum are revisited in the context of a new area of mathematics, enabling learners to make connections between different mathematical concepts.

• Retrieving, using and applying concepts regularly, transferring to new contexts helps develop fluency as well as conceptual understanding. Ready to Progress interventions, Maths Meetings, transitions and “Do-Nows” allow pupils more time to practice important facts and methods.
• The Mathematics Mastery curriculum is knowledge-rich and precisely defined. The rich and broad body of core knowledge is clearly and meticulously specified in the Programmes of Study for each year group. Pupils are provided with opportunities to rehearse key facts through Do Nows, transitions, Maths Meetings, diagnostic quizzes as well as the cumulative nature of the curriculum.
• In the Mathematics Mastery curriculum, extended time is spent within a single area of mathematics. This allows teachers to spend more time developing learners’ conceptual understanding and make connections with other areas of mathematics.

2.We focus on understanding

For learners to make sense of a new idea or relationship, they need to incorporate it into their current understanding to connect with ideas and relationships they have encountered previously. The greater their understanding of what has been taught previously, the more sense-making they will be able to do in the future with increasingly complex mathematics.
• Tasks are sequenced to help learners build a narrative through different topics.
• These topics are then sequenced in a logical progression that allows learners to establish connections and draw comparisons.
• Multiple representations are extendable within and between different areas of mathematics.
• Using these rich models encourages learners to develop different perspectives on a concept.
• Tasks are designed so that learners are active participants and construct their own understanding of concepts

3.We focus on language

Verbal and non-verbal communication is part of every sequence of learning in the curriculum including language, signs and symbols. This often starts with more informal language initially, building up to formal and precise mathematical language.
• Core facts are secured and rehearsed throughout the knowledge-rich curriculum
• Systematic progression in calculation methods
• Pupils access a range of different problem types Mathematical language strengthens conceptual understanding by enabling pupils to explain and reason. Talk is an essential element of every lesson and time is dedicated to developing confidence with specific vocabulary as well as verbal reasoning. Identifying the language knowledge of the children throughout the topic by using vocabulary prompts within the lesson (in full sentences) as-well-as using a vocabulary title page at the start.

We help children to develop their Mathematical language and communication skills by encouraging all pupils to **answer mathematical questions in full sentences** with a focus on the **correct mathematical vocabulary** and through the **use of sentence stems** for mathematical reasoning. **Mathematical vocabulary is shared** at the start of each lesson with an **expectation that this is used during ‘Talk Tasks’** with their peers and throughout the lesson. One of the reasons we explicitly teach mathematical language and insist on all pupils using it in sentences is because of the **complexity of the language required to be a competent and confident mathematician.** Mathematics has a **precise formal language,** which is distinct from everyday language.

4.We focus on mathematical thinking and reasoning

To experience mathematics in full, as it is described in the National Curriculum, learners need to be given opportunities to think mathematically. Throughout the curriculum you will see tasks that require learners to specialise and generalise, to work systematically, to generate their own examples, to classify and to make conjectures. This is aided by our Ideas for Depth which help make these important parts of mathematics more explicit. By the time they reach school, all pupils have demonstrated a significant range of innate ways of thinking that can be harnessed in the classroom to develop mathematical thinking. We must support pupils to develop mathematical ‘habits of mind’ -to be systematic, generalise and seek out patterns.

5. We focus on problem solving

Mathematical problem-solving lies at the heart of the Dimensions of Depth. Teachers promote these within every Mathematics Mastery lesson, allowing access for pupils to become better problem solvers. Task design purposefully incorporates all three Dimensions of Depth across a range of problem types, with the aim that all pupils will be able to solve non-standard problems in unfamiliar contexts. Pupils acquire a rich schema of knowledge – with facts and methods learnt to automaticity - and they gain familiarity with different problem types.

6. We focus on key skills:

Maths Meetings are a vital part of the Mathematics Mastery programme and are used to consolidate key learning outside of the maths lesson. Maths Meetings provide an opportunity to teach and revise 'general knowledge maths' which may not explicitly be covered during the maths lesson. They also provide opportunity to teach and embed arithmetic skills for the children to use and apply. This enables pupils to practise applying concepts and skills on a regular basis, meaning they are continually building on their mastery of these concepts. These are taught in all classes at Brickhouse Primary daily for 10 minutes daily or 15 minutes.

To meet these aims, responsility is placed on the teaching staff to meet the needs of the pupils and to ensure the scheme has maximum impact.

Teaching and responsibilities at Brickhouse

Teachers at Brickhouse Primary school use a variety of teaching and learning styles in mathematics lessons. Our principal aim is to develop children's knowledge, skills and understanding in mathematics. We do this through a daily lesson that has a high proportion of challenging whole-class and group-direct teaching with the use of the Mathematicss Mastery scheme. Children are taught in differentiated groups within their class and are supported wherever necessary.

At the **centre of the mastery approach to the teaching of mathematics is the belief that all pupils have the potential to succeed**. They should have access to the same curriculum content and, rather than being extended with new learning, they should deepen their conceptual understanding by tackling challenging and varied problems; this is the teacher's responsibility to ensure this happens. Similarly, with calculation strategies, pupils must not simply rote learn procedures but demonstrate their understanding of these procedures through the use of concrete materials and pictorial representations.

Teachers spend time studying and understanding the learning journey required within each year group. The scheme is structured so that the skills are built on in a cumulative way and to support this, every year group has long, medium and daily planning prepared for them. It is the teacher's responsibility to be familiar with the unit planning and daily planning and therefore what is being taught to the children.

To go with the planning, each Mathematics Daily lesson has lesson resources available to use and edit. It is the teacher's responsibility to make sure the lesson is pitched correctly and the resources are used to meet the needs of the children. When this occurs, the structure of the lesson, supported by the resources and concepts enable the children to take their skills to Mastery,

Each Mathematics Mastery lesson, is provided in a six-part lesson structure. The Dimensions of Depth underpin the six-part lesson. Each part provides opportunities to focus on conceptual understanding, language and communication and mathematical thinking for the mathematical concept being covered.

The six-part lesson consists of:

Do Now: This is a quick five-minute task that all pupils can access without any teacher input as an introduction to the mathematics lesson.

New Learning: The New Learning segment introduces the lesson's main mathematical concepts.

Talk Task or Let's Explore: The Talk Task or Let's Explore is a chance for all pupils to practise using mathematical vocabulary related to the lesson's concept.

Develop Learning: This segment builds on the New Learning and develops a deeper understanding of the maths concepts of that lesson. It also addresses misconceptions or inaccuracies discovered during the preceding segment.
Independent Task: The Independent Task provides pupils with the opportunity to practise the learning from that lesson. This may be independently and/or in pairs/small groups.
Plenary: The Plenary segment recaps on the lesson, checking understanding and celebrating success

At the end of the lesson, and at the end of the unit, teachers are required to use a variety of assessment procedures to support and monitor the progress of the children.

Assessment Procedures of Maths at Brickhouse

At Brickhouse, we assess children's work in mathematics from three aspects (long-term, short-term and medium-term). We make short-term assessments, which we use to help us adjust our daily plans. These short-term assessments are closely matched to the WALTS and WILFS developed that run through the scheme of work and units.

At the beginning of each topic, a Cold Task (pre-diagnostic) is carried out to see what the children can remember in their knowledge. This Cold Task is based upon the content of learning from the previous year group and will show the teacher where there are gaps and misconceptions in learning. The purpose of this is to then use the Daily Lessons and make adaptations where required to cover any gaps or misconceptions they have. The teacher can also develop consolidation lessons to support the needs of the children.

At the end of each unit, there is a Hot Task (post-diagnostic) that covers the content covered during the daily lessons – it is a different task to the Cold Task. The purpose of this task is to see whether the children have learnt the new curriculum content the daily lessons have taught them.

We make medium-term assessments to measure progress against the key objectives, and to help us plan the next unit of work. During each 2nd Half Term, the children complete an "assessment week" on the most recent teaching they have received. With the new scheme of work, there is also an opportunity in some year groups to do a half termly assessment to see if they have retained what has been previously taught.

We use Termly assessments as a way of recording children's progress in objectives covered across that specific term. Each child has a tracker which relates to the new curriculum and it is the teacher's responsibility to gather evidence and track the progress of the children.

We make long-term assessments towards the end of the school year, and we use these to assess progress against school and national targets. We can then set targets for the next school year and make a summary of each child's progress before discussing it with parents. We pass this information on to the next teacher at the end of the year, so that s/he can plan for the new school year. We make the long-term assessments with the help of end-of-year tests and teacher assessments. We use the national tests for children in year 6, plus the optional national tests for children at the end of years 3, 4, and 5.

At the end of every term, an in-depth moderation process (that has been developed by the school) is used to accurately monitor the learning of the children and the progress made.

IN EYFS, assessment takes place every day and evidence is gathered towards the early learning goals. The evidence is kept in the children's learning journeys as well as in their own mathematics books. EYFS follow the same principles of Mathematics Mastery but catered for the age of the children and is dependent on their starting points upon arrival. By Summer Term, the aim is for the children to be on the EYFS 6-part scheme in preparation for Year 1.

Calculations across Brickhouse

Children are required to have 'an efficient written method' for calculating each of the 4 operations. By following **one progression model from Years 1 – 6, outlined in the new curriculum,** we can ensure:
Children have a common language for calculation.
Learning builds on previous experiences.
Teachers can track back or extend ahead of age-related expectations.
Written methods are a continuation of mental strategies, each reinforcing understanding of the other.
Children can communicate their methods and understanding
Children, when at the required age, can choose the most suitable method for themselves

Whenever staff need guidance on strategies, it is their responsibility to see the subject leader who can help. All the new strategies are outlined in the new curriculum and can be found on the online portal for Mastering Maths

TO SUPPORT WITH THIS, A VISUAL CALCULATION POLICY WAS PURCHASED TO SHOW MODELS TO CHILDREN. THIS IS TO BE USED REGULARLY WITHIN LESSONS AND NUMBER FUN SESSIONS TO SUPPORT THE LEARNING OF THE CHILDREN. (See Number Fun Policy.)

WHAT Calculations?

+ Addition – Number lines, partitioning, adding least significant digits, compact method with carrying.
- Subtraction – Inverse of addition, number lines, counting on.
x Multiplication – Repeated addition, arrays, grid method.
÷ Division – Sharing, inverse of multiplication, number lines, bus-stop "Guzinter"

All moving onto more formal methods as outlined in the new curriculum, which again are supported by the VCP to support.

N.B. To support teachers in other areas of the mathematics curriculum, there is also:
- A Fractions Visual Policy
- An Algebra Visual Policy

Who is responsible for what in Mathematics at Brickhouse?

The teaching and learning of mathematics is mapped out for teachers by the Mastering Maths scheme and is monitored by the subject leader.
It is the responsibility of the class-teacher to plan engaging Number Fun, Mastering Maths and Mathematics lessons that meet the needs to ALL children within the lesson through the use of the Mastering Maths Scheme.
All who support children in mathematics must be familiar with strategies taught (teachers, LSPs, families, supply teachers) and have sound subject knowledge to teach the children. If needed, at the start of every unit, there are CPD videos available to watch to improve subject knowledge and pedagogy.
If teachers are still unsure of strategy and method it is their responsibility to inform maths leader who can then support.
Assessment is the responsibility of the class teacher, but can be informed by observations of teaching assistants. Assessment for learning needs to be evident in planning, evaluations and future teaching
Intervention to be delivered by LSPs as needed (In afternoons where children are identified to have specific extra needs on a provision map)
Class teachers are responsible for aiming teaching at the "level above" the current curriculum level of the children (to move learning forward)
Progression in calculation will be monitored by the Maths Leader. Evaluation and review is the responsibility of the School Leadership Team.

Maths leader to provide half termly feedback on quality of books and teaching and suggest areas for improvement.
Maths Leader to take part in mathematics observations and provide feedback and support where necessary.

Learning mathematics at home

Within home-learning tasks, there are a selection of Mathematics based home-learning which the children complete every half-term to enable parents to see what the children are covering within school.

This policy works in line with other Mathematics policies at Brickhouse Primary School.
September 2023