

Maths

Curriculum intent:

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 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.

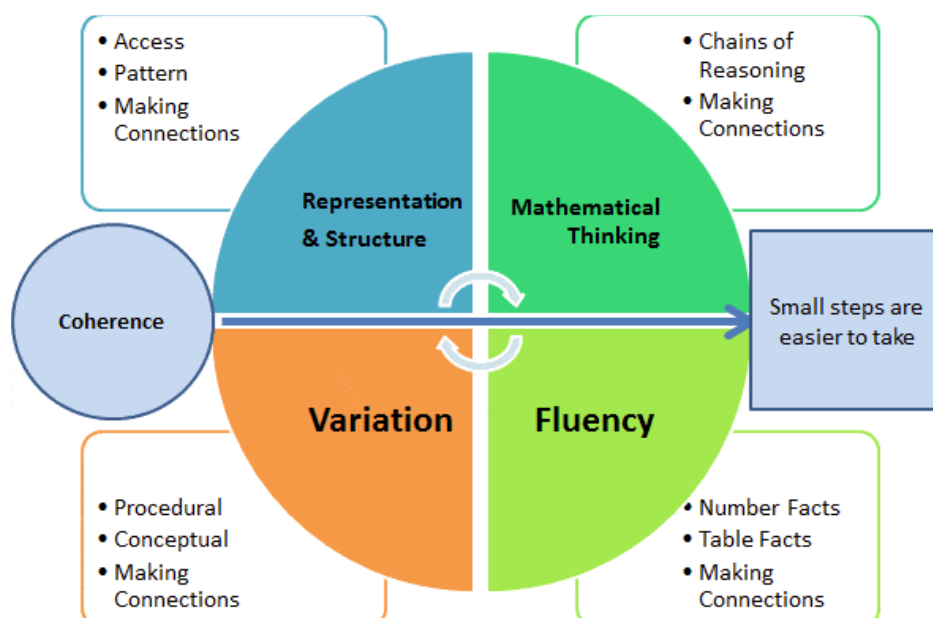
The Curriculum

In line with the Government's introduction the 2014 National Curriculum, we at Clifford Road aim 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.

The Curriculum is one which values the mastery of key skills before moving children on.

*Mastering maths means pupils of all ages acquiring a **deep, long term, secure and adaptable** understanding of the subject. The phrase 'teaching for mastery' describes the elements of classroom practice and school organisation that combine to give pupils the best chances of mastering maths. Achieving mastery means acquiring a solid enough understanding of the maths that's been taught to enable pupils to move on to more advanced material (National Centre for Excellence in the Teaching of Mathematics).*



Coherence

Lessons are broken down into small connected steps that gradually unfold the concept, providing access for all children and leading to a generalisation of the concept and the ability to apply the concept to a range of contexts.

Representation and Structure

Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation.

Mathematical Thinking

Taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned with and discussed with others.

Variation

Variation is firstly about how the teacher represents the concept being taught, often in more than one way, to draw attention to critical aspects, and to develop deep and holistic understanding. It is also about the sequencing of the structure, activities and exercises used within a lesson and follow up practice, paying attention to what is kept the same and what changes, to connect the mathematics and draw attention to mathematical relationships and structure.

Fluency

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics.

At Clifford Road, pupils are challenged to develop their familiarity and fluency with number through intelligent and purposeful practice; build on their reasoning skills through varied and frequent problem-solving activities and apply these skills to mathematical investigations and other curriculum areas such as science and computing before being moved on to new content.

The Curriculum is divided into the following sections:

- Number – including Number and Place Value Addition and Subtraction, Multiplication and Division and Fractions (including decimals in year 4 5 & 6 and percentages in years 5 & 6)
- Measurement
- Ratio and Proportion (year 6)
- Algebra (year 6)
- Geometry – including position and direction
- Statistics

The curriculum at Clifford Road is designed to provide a broad and balanced education that meets the learning needs of all pupils. Children are encouraged to be independent, creative learners with high aspirations. Our ethos is that all children can be successful in maths and that no child should feel limited by prior experiences, instead we aim to inspire children to become life-long mathematicians.

The school's Curriculum for maths set out on a year by year basis is available on the school website: www.cliffordroad.suffolk.org.uk/maths/

Multiplication tables

Children are now required to know all of their multiplication tables, up to 12×12 by the end of year four. From Summer 2022, this will be assessed via an online, national test. At Clifford Road we aim for learners to be familiar with all of their tables, up to the 6th multiple, by the end of year three as this gives the children a greater range of numbers with which to calculate. By "knowing their tables" we mean being able to say these with fluency, answer questions out of the tables sequence, application to related facts and knowing the associated division facts.

Curriculum Implementation

At Clifford Road Primary we begin all of our lessons with oral and mental practise which can involve chanting, singing and counting. This inclusive approach enables all children to develop their number facts, including multiplication tables, to improve their fluency skills.

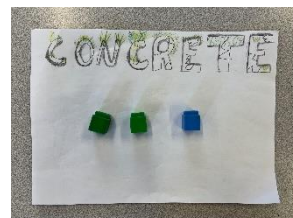
Lessons are then planned using the Power Maths scheme. This is a mastery approach that aims to develop the knowledge and understanding of mathematical concepts in a way that works for every child.

Each lesson is sequenced to allow children to apply their existing knowledge during the initial discovery of a concept followed by applying new learning in problem solving and reasoning. This approach gives children plenty of opportunity to explore, collaborate with peers, practise and reflect. Throughout the series of lessons, children are encouraged to solve problems using concrete resources, pictorial representations and abstract thinking to enable them to demonstrate mathematical ideas and deepen understanding.

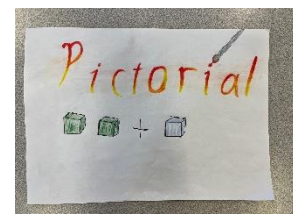
See ingredients of a great maths at Clifford Road Primary document attached below.

Concrete, pictorial and abstract

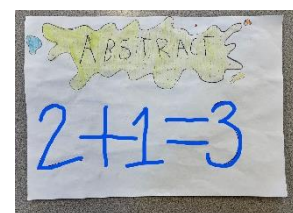
Concrete step: this is the 'doing' stage where children use concrete objects to model problems which enable the children to bring the concepts to life.



Pictorial step: this is the 'seeing' stage where visual representations are used to model problems to help make the problems more accessible.



Abstract step: this is the 'symbolic' stage where children use abstract symbols to model problems. Children will only progress to this stage after having a solid understanding of both concrete and pictorial stages of their learning. At this stage the children will use numbers, notation and mathematical symbols.



Power Maths encourages a growth mindset through the use of characters to prompt, encourage and question children. At the heart of all lessons is the idea that all children can achieve and be successful with hard work, practice and a willingness to see mistakes as learning opportunities.

Each lesson follows the same sequence:

Discover:

Each lesson begins with a core problem to solve which is often given as a practical real-life example. These are engaging and fun, and designed to get all pupils thinking. Children are encouraged to use concrete objects to explore their ideas and discuss possible strategies.

Share:

The class share their ideas and compare different ways to solve problems. Teachers use this opportunity to help children develop their understanding further.

Think together:

This part involved digging deeper into the concept and applying their knowledge in different ways and with increasing independence.

Practice:

Opportunities for children to work in their practice book individually or in small groups. Opportunities to build fluency, understanding and confidence. The practice books allow children to follow small steps of progression to deepen their learning.

Reflect:

Children are encouraged to reflect upon and record learning from each lesson. This section enables teachers the opportunity to check how deeply children have grasped the concepts in preparation for the next lesson.

Maths Eyes

Children are given the opportunity to take part in 'Maths Eyes'. This is where an ordinary picture is given to each class and the children 'find' the maths within it, giving individuals an opportunity to lead their own learning. Thoughts and concepts are then explored and developed before the ideas are shared with others.



Feedback

- ✓ Feedback is most effective in the presence of the child.
 - ✓ Distance marking should be presented clearly so that the children can understand it.
 - ✓ Children should be given time to read/reflect on/respond to feedback.
 - ✓ Improvements made as a result of feedback must be acknowledged by the teacher.
 - ✓ Effort should be acknowledged alongside attainment and progress.
 - ✓ Use green highlighter to promote positive aspects and orange highlighter to draw attention to errors or areas for development within a piece of work.
- See full policy within Assessment Policy

Additional practise of declarative and procedural knowledge outside of the lesson:

Teachers provide enough opportunities to practise taught facts, methods and strategies, and resources include:

- *Fluent five*
- *Tough ten*

- *Maths Shed – including 'Quick Maths'*
- *Homework*

Low stakes testing

Teachers plan frequent, low-stakes testing to help pupils to remember content. No fuss short quizzes and times short tests do not have to be a whole class activity. A teacher might work 1-1 or in small groups to assess retained knowledge. Resources the teachers might use include: The Teaching for Mastery: Questions, tasks and activities to support assessment (NCETM) / Power Maths End of Unit Check/ White Rose Assessments/ Quiz Shed (devise your own)/ Power Maths 'Power up'.

For summative assessment information please see the Assessment Policy appendix.

Curriculum Impact

Our approach to mathematics enables children to develop a positive attitude and confidence in this subject, while making connections across mathematical ideas that helps to develop their fluency, reasoning and competence in solving increasingly sophisticated problems.

Children are also given frequent and relevant opportunities to apply their mathematical knowledge in other contexts. These include areas such as: Science, History, Geography, Art and Design & Technology. We believe it is vital in helping our pupils learn the relevance and uses of maths in the wider world and is a valuable way to apply skills learned in the daily math lesson.

Visitors will notice the variety and importance of questioning and talk in our mathematical lessons. They will hear questions such as: "How do you know? Can you prove it? What's the same/different? Can you show me in another way? Do you agree that...?" Children are required to use precise mathematical language from the earliest stages and are expected to listen to their peers, building on ideas and challenging them when they do not agree.

At Clifford Road we measure the children's mathematical understanding through:

- pupil perceptions
- what pupils produce in their work
- learning walks and drop ins
- discussions with staff

All teachers must make reference to planning documents found in their Power Maths teaching guides and within T:1 Curriculum Areas \ Maths \ planning

Ingredients of a great mathematics lesson- mastery approach

Oral and mental practise (5 minutes)

Counting – forwards/ backwards; in decimals/fractions; in jumps of units of ones/ tens/ hundreds etc; starting from places other than 0
Counting stick (no numbers)
Chanting
Singing

Power Maths Anchor Task

One problem or stimulus is presented to pupils (based on what is in the textbook) and they are encouraged to explore it. The teacher uses this time to observe their responses and prompt further exploration with questioning to ensure that all pupils are challenged.

Ensure their brains are switched on and ready to think mathematically (5 minutes)

Developing basic number facts fluency – number bonds, times tables
spending a short time every day on these basic facts quickly leads to improved fluency
‘Teachers provide enough opportunities to practise taught facts, methods and strategies, as well as additional opportunities for overlearning...Systematic rehearsal does not always require textbooks, pencil and paper... rehearsal of number bonds and sequences can draw on a canon of games and songs involving dice, dominoes and counting sequences.’ Ofsted Review of Maths 2021

Power Maths Reflect and Refine

Teachers refer back to yesterday's learning (when lessons follow on). Older children review distance marking. The textbook is used and the teacher guides the class through the textbook solutions to the problem they have been discussing. There is a greater emphasis on teacher explanation during this phase.

Power Maths Practise

The teacher starts off by guiding the class through examples of similar problems to the one they have just done. Then, pupils work through more examples independently with the teacher supporting them if necessary. All questions are typified by their mathematical variation – they are designed to extend pupil's thinking rather than just be lots of examples presented in the same kind of way.

Reflection

Regular self-reflection following a maths lesson, or at the end of the lesson, boosts progress. Maths journals are an effective tool for older children - use the reasoning stickers; some Talk Less teaching strategies support reflection; self-reflection resources on the network.

Feedback

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Low stakes testing

‘Teachers plan frequent, low-stakes testing to help pupils to remember content. Lessons incorporate timed testing to help pupils learn maths facts to automaticity.’ Ofsted Review of Maths 2021

No fuss short quizzes – children need to put in the effort and peer-marking is an effective way of improving engagement without increasing anxiety (McDermott et al, 2014).

Quizzes or testing knowledge does not have to be a whole class activity. In the early years of education, teachers will work 1-1 or in small groups to assess retained knowledge. This model will work in any age group with support staff to monitor and support the learning of the rest of the class.

Can Do Maths / Power Maths End of Unit Check/ Quiz Shed (devise your own)/ Power Maths ‘Power up’

Additional practise of declarative and procedural knowledge (outside of the lesson)
Fluent five
Tough ten
Maths Shed
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