Newick Mathematics Curriculum Overview

Curriculum Aims

Wisdom – our children will make rich connections across mathematical ideas and vocabulary helping to develop their fluency, reasoning and problem solving. This will help children to apply their mathematical knowledge in other subjects and real life contexts.

Independence – our children will ensure their thinking is clear to themselves and others. The highlighting of misconceptions and mistakes will ensure that children become adept at spotting these independently and embracing mistakes as part of the rich learning process. Children will select and utilise concrete and pictorial manipulatives to help them see the structure of the mathematics and solve problems independently.

Creativity – our children will become powerful thinkers by making connections, thinking logically and using space, data and numbers creatively. Children will explore the beauty of mathematics by looking at patterns and forming their own lines inquiry. Children will create eloquent reasoning to explain their thinking.

Kindness – our children will develop a sense of curiosity and appreciation of the beauty that mathematics provides. They will work collaboratively with others to develop their reasoning, helping each other develop mathematical thinking with compassion. They will begin to have an awareness of the applications of mathematics in society in helping people to lead healthier and happier lives.

The Newick Mathematics Mastery Curriculum

Mathematics never stands still at Newick! We are constantly reflecting on our practice and refining it. We strive to make our mathematics curriculum world class by exploring the latest pedagogical research and bringing it into our classrooms. When our headteacher, Natalie Alty, took part in the Shanghai teacher exchange in 2014 to see what Mathematical Mastery was all about she noticed that the one factor that really stood out was the amazing curriculum the Chinese teachers had at their finger-tips. Fortunately the NCETM (National Centre for Excellence in Teaching Mathematics) has now written series of useful documents to support the English Curriculum called the PD spines.

We base our Newick mathematics scheme of work on the PD spines and the best resources we can source. This coherent curriculum breaks down concepts into small connected steps that gradually unfold, 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. We use representations (concrete or pictorial) to help children understand the structure of mathematical concepts, building on their previous knowledge in small steps, developing deep reasoning and problem solving abilities within and across mathematics topics as well as in the wider curriculum. These representations then help children in their understanding of abstract representations of mathematical concepts.

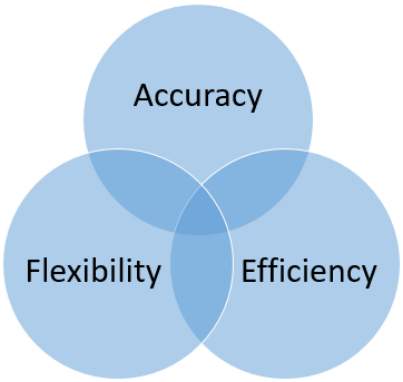
We enhance our curriculum further by using the DFE/NCETM Ready to Progress Criteria, published in July 2020, to help schools prioritise their curriculum in light of the pandemic. These criteria focus on the most important conceptual knowledge and understanding for each year group so that children can progress successfully.

All children work at broadly the same pace with provision for those that grasp a concept rapidly and those that need further help.

Fluency

We have recently introduced a new bespoke fluency programme that focuses on 'facts of the week'. Every Monday pupils explore a new addition fact and, in KS2, a new multiplication fact as well. On Fridays, children participate in quizzes to see if their addition/subtraction or multiplication/division fluency has moved on.

From September 2021 we will be participating in the Sussex Maths Hub 'Mastering Number' project to enhance fluency in EYFS and KS1. This project aims to secure firm foundations in the development of good number sense for ALL children. The aim over time is that children will leave Key Stage 1 with fluency in calculation and a confidence and flexibility with number.

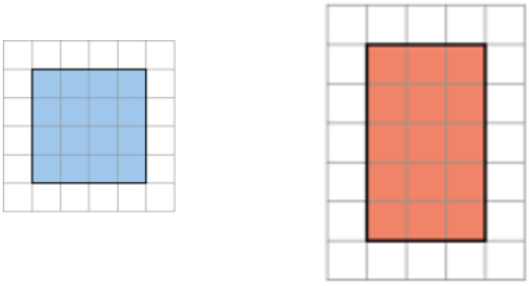


In the article named 'Is it true that some people just can't do math' by Daniel Willingham he states that, "automaticity with procedures and facts is important because it **frees [pupils] minds** to think about concepts". We want our children's working memory to be free to focus on understanding the deeper structure of mathematics and problem solving. Our fluency sessions aim to help pupils gain automaticity as well as gain flexibility, accuracy and efficiency (Russell, 2000). Children need to know which method works best when and therefore which one is the most efficient. Fluency is the central element to the diagram shown here, where accuracy, flexibility and efficiency overlap.

Challenge for all

It may sound odd but we encourage our children to struggle in mathematics as this helps children to learn due to synapses firing in their brains - which in turn actually makes their brains grow! Children are challenged through greater depth questions and through rich tasks. For example, rather than asking a year 4 pupil to calculate the area of each shape below they are asked to state which has the bigger area and **why**. Reasoning mathematically is an important skill for children to develop and we focus on this in the majority of lessons, using accurate mathematical vocabulary and diagrams or pictures to enhance explanations.

Which shape has the bigger area?



The _____ shape has the bigger area because

_____

_____

We respond to every pupils' needs through continual assessment for learning – by asking the right questions in the classroom and checking the children's understanding. We use immediate feedback and address any misconceptions to further children's progress. In addition, we use same day intervention to help children keep up. Our bespoke intervention programme ensures all children given the support needed to make progress.

Everyone can

We firmly believe that everyone can do maths. A mathematical mindset across the whole community means all children can access and enjoy mathematics, applying their mathematics to the real world. Our mission is that everyone can achieve, growing children's potential through high expectations.

What our pupils say about maths at Newick (from data collected in April/May 2021)

Most children in our school strongly agree that they 'enjoy mathematics lessons'. Here is a selection of what our children said about their enjoyment of mathematics: "I always really enjoy it", "the bigger the challenge the more I enjoy it", "it is my favourite subject".

All pupils unanimously agreed they want to do well in mathematics: "You can get a lot of jobs if you do well in maths", "maths helps you in life".

Pupils across all year groups agreed strongly that they knew how to improve their mathematics understanding: "you can get a maths box out and use number lines, bead strings, Dienes and multi-link to help you", "You can check the inverse", "I ask the people around me if they can help", "I write it down and go through it to see", "we look around to see the number line on the wall".

Pupils are proud of the work they produce in mathematics: "Because I have worked really hard"
"I'm particularly proud of my explanations"
"Really proud because before I looked at it I hadn't realised how much I knew."

Finally we ensure our learning is purposeful, children are given opportunities throughout the year to use and practise maths in context and to solve real life problems.

Any further questions, please contact our subject leads: Claire Clarke and James Winn