

Mathematics at Stephenson Memorial Primary School

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.

The national curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, 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

Mathematics Policy (New Curriculum July 2014)

At Stephenson we expect all pupils to achieve in mathematics. Pupils should develop technical proficiency and conceptual understanding, in parallel, to become flexible and efficient thinkers who are able to visualise, estimate, communicate, reason and apply their knowledge and understanding to problems. They should progress through the curriculum at the same pace, except in exceptional cases.

As teachers we plan collaboratively, considering prior learning and planning sequences to layer learning over time and use carefully crafted lessons and resources throughout the school to promote deep knowledge of concepts and procedures, encouraging connections to deepen knowledge and sustain learning towards mastery.

We use precise questioning and other forms of continuous formative assessment to inform teaching and to provide instant intervention for those who have difficulties or address misconceptions, including supporting absences, in order to leave no child behind.

Curriculum and Lesson Design (planning, assessment and teaching & learning)

We use year group National Curriculum objectives and LA Progression Maps to create Medium Term Plans, incorporating enrichment through links with cross-curricular PBL topics, other subject areas, investigations and books.

Discussions with previous teaching staff should also inform planning to ensure continuity.

Our collaborative Short Term Plans will be based on prior assessment (using both pupil observations and adapted pre-assessment questions) with carefully chosen activities which all pupils engage in, to make mathematical relationships and structures explicit and encourage discussion with a variety of representations. Activities focus on quality over quantity, focusing on key features of ideas, using variation to deepen learning rather than just practise steps.

We use Classroom Monitor, **keeping in mind the Key Indicators of learning**, and pre-assessments to guide us to deepen learning. Rubrics or layered criteria targets (must/should/could) are included to show how learning can be deepened and supported with daily formative assessment to enable the adaptation of carefully layered sequences to connect, consolidate and apply, informing future lessons and any instant intervention needed. Assessment questions are revisited at the end of topics and also used formatively.

Pupils should work on the same objectives and activities except in exceptional cases. Differentiation should focus on how new concepts and techniques are presented or approached by pupils, through thoughtful questioning, sometimes the use of different apparatus, images and representations in class and/or through immediate intervention for those who need it. Challenges could include explaining, creating their own versions or deepening understanding through more complex rich problems.

Discussions (whole class, peer and group) are a large part of lessons and pupils are expected to take an active role in their learning, displaying resilience and looking to challenge themselves within lessons. Children should work in mixed ability groups for the most part. Children are expected to justify and evaluate their own and others responses to create a climate of ownership and sense of learning as a group. Feedback and formative assessment are integral to teaching and learning.

Apparatus, images and representations are carefully chosen to enable concepts to be fully explored and connected. These should be used throughout the school as mental models to support and deepen understanding of new and known concepts and be readily available to pupils.

Calculation

Mental strategies are to be used as a first resort and underpinned by secure place value. Daily Hi Five/Trio Time sessions will be used to practise, introduce or consolidate skills and used to prepare for future topics, work on weak areas and return to topics already taught.

Our online calculation provides guidance but written methods which should be alongside practical representations throughout (see NCTEM videos) but year group specific objectives should be followed, catching up where needed, but without moving ahead with methods. Language should be a focus and in sentences to embed alongside problem solving and reasoning, including missing number problems practised at every calculation stage.

Amended by H. Connor and J. Morrison
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Glossary

Conceptual

procedural

deep knowledge key indicators (appendix)

variation

intelligent practice

connections

References:

Discussions with teaching staff and their feedback

<https://www.gov.uk/government/publications/national-curriculum-in-england-mathematics-programmes-of-study>

ideas from training and resources of 'Maths - No Problem!' Singapore Maths

English National Curriculum 2014

NCETM Jane Jones blog

NCETM Charlie Stripp blog

Mastery approaches to mathematics and the new national curriculum Oct 2014

Ofsted handbook

Notes from speech by Jane Jones HMI

<http://mrreddy.com/blog/2015/03/ofsted-and-mastery-of-maths-direct-from-jane-jones-hmi/>