



Smile – Learn – Excel

Mathematics Policy

*Mathematics is the most beautiful and most powerful
creation of the human spirit.*

Stefan Banach

Policy Reviewed: Sept 21

Next Review: Sept22



Introduction

At Shortlanesend School we believe Mathematics is not just a tool for everyday life, but a wonderfully beautiful subject to learn. Mathematics teaches us how to make sense of the world around us through developing our ability to calculate, communicate, reason and to solve problems.

We endeavour to ensure all children become fluent in the fundamentals of mathematics so that they develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. Children are taught to use and apply their mathematics in practical tasks and real-life situations and to use these skills to acquire further knowledge and understanding.

Aims

At Shortlanesend we strive to ensure all our children:

- 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 is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas.

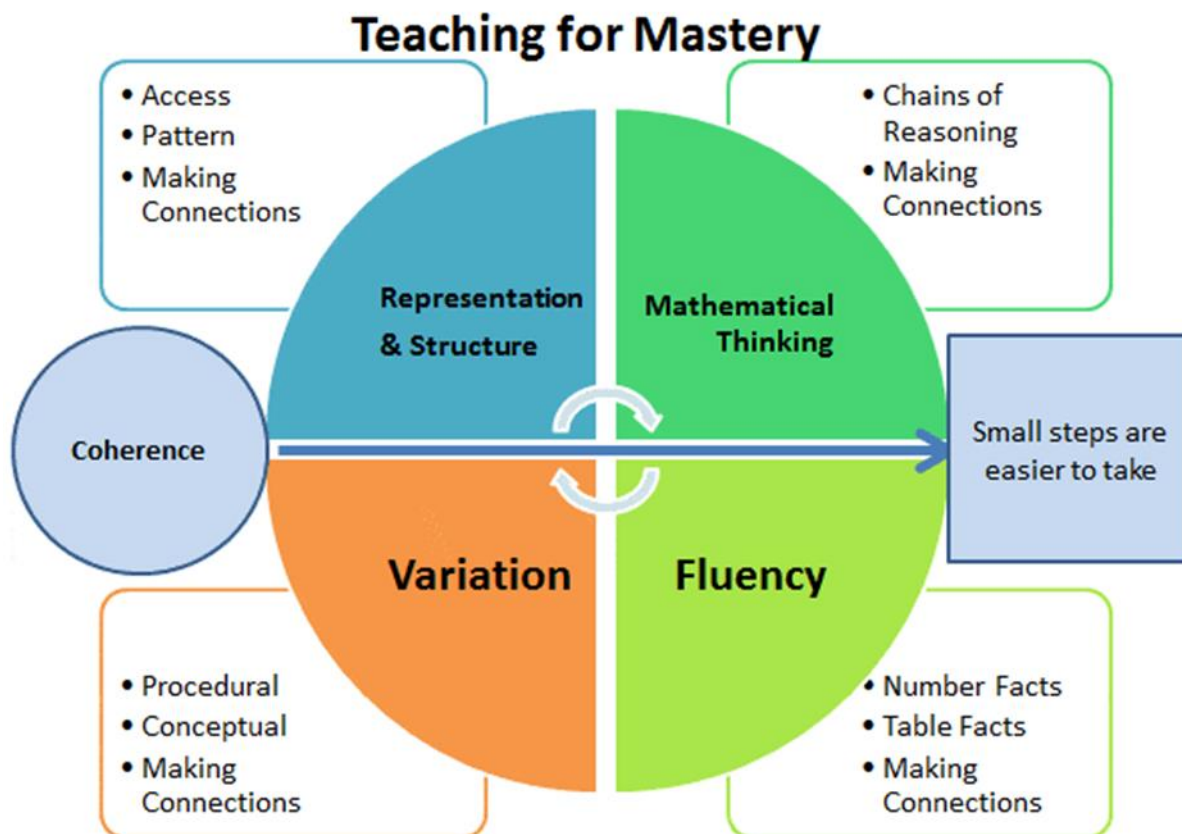
Teaching and Learning Mathematics

Our mathematics curriculum at Shortlanesend School follows the programme of study and aims of the National Curriculum and is supported with White Rose resources.



A Mastery Approach

The teaching and learning of mathematics at Shortlanesend School follows a Teaching For Mastery approach.



What is Fluency?

Fluency comes from deep knowledge and practice. This is the first stage of children's understanding. Fluency includes conceptual understanding, accuracy, rapid recall, retention and practice. The key to fluency is deep knowledge and practice and making connections at the right time for each child. Fluency involves the following aspects:

- Accuracy – Pupils carefully completing calculations with no or few careless errors.
- Pace – Pupils are able to quickly recall the appropriate strategy to solve the calculation and progress through a number of questions at an age-appropriate pace.
- Retention – Pupils will be able to retain their knowledge and understanding on a separate occasion to when the concept was first introduced.



What is Reasoning?

Verbal reasoning demonstrates that pupils understand the mathematics. Talk is an integral part of mastery as it encourages students to reason, justify and explain their thinking. At Shortlanesend School our maths mastery classrooms are never quiet classrooms. The way pupils speak and write about mathematics transforms their learning. Mastery approaches use a carefully sequenced, structured approach to introduce and reinforce mathematical vocabulary.

To encourage talk in mathematics, teachers may introduce concepts by including sentence structures (stem sentences). Pupils should be able to say not just what the answer is, but how they know it's right. This is key to building mathematical language and reasoning skills. This gives pupils the confidence to communicate their ideas clearly, before writing them down.

Teachers maintain a high expectation upon pupils to repeat and use the correct mathematical vocabulary to explain their understanding verbally and in their reflection comments. By also displaying the vocabulary during the lesson, pupils will be able to use this independently.

When questioning and encouraging mathematical talk, teachers provide regular, purposeful question stems to encourage learning. For example:

- Show me how to complete the calculation
- How do you know which operation to use?
- Why have you chosen this method?
- How else can you represent this number?
- What have you learnt today?
- True or False
- Odd one out
- Sometimes, Always, Never

What is Problem Solving?

Mathematical problem solving is at the heart of the Mastery Approach. Pupils are encouraged to identify, understand and apply relevant mathematical principles and make connections between different ideas. This builds the skills needed to tackle new problems, rather than simply repeating routines without a secure understanding.

Mathematical concepts are explored in a variety of representations and problem-solving contexts to give pupils a richer and deeper learning experience. Pupils combine different concepts to solve complex problems, and apply knowledge to real-life situations. Through problem solving, pupils are required to select their mathematical knowledge and apply this to a new concept.



Problem solving is more than just word problems. It involves the child having to recall and apply their knowledge and justify the method they have chosen to tackle the question. Children are taught the following steps to finding their solution.

- 1) Read or look at the problem
- 2) Understand the problem by underlining or discussing: What is the problem about?
- 3) Choose – Choose the operation required, the number facts or the approach.
- 4) Solve – Solve the problem by completing jottings on the page
- 5) Answer – complete the answer to the problem
- 6) Check – have I correctly answered the given problem or is there another step?

Concrete, pictorial, abstract (CPA)

CPA is a highly effective approach to teaching that develops a deep and sustainable life-long understanding of maths and supports children's understanding of the mastery approach.



CONCRETE

Concrete is the “doing” stage, using concrete objects to model problems. Instead of the traditional method of mathematics teaching, where a teacher demonstrates how to solve a problem, the CPA approach brings concepts to life by allowing pupils to experience and handle physical objects themselves. Every new abstract concept is learned first with a “concrete” or physical experience.

For example, if a problem is about adding up the contents of four baskets of fruit, the pupils might first handle actual fruit before progressing to handling counters or cubes which are used to represent the fruit.

PICTORIAL

Pictorial is the “seeing” stage, using representations of the objects to model problems. This stage encourages pupils to make a mental connection between the physical object and abstract levels of understanding by drawing or looking at pictures, circles, diagrams or models which represent the objects in the problem.

Building or drawing a model makes it easier for pupils to grasp concepts they traditionally



find more difficult, such as fractions, as it helps them visualise the problem and make it more accessible.

ABSTRACT

Abstract is the symbolic stage, where pupils are able to use abstract symbols to represent a problem and solve it. Only once a child has demonstrated that they have a solid understanding of the **concrete** and **pictorial** representations of the problem, can the teacher introduce more **abstract** concepts, such as mathematical symbols. Pupils are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols, for example +, -, x, / to indicate addition, subtraction, multiplication, or division

Lesson Structure

EYFS

In EYFS, Mathematics is delivered through whole class teaching, adult led focus activities weekly/daily challenges in the maths area, though continuous provision and implemented throughout the daily routine.

Key Stage One

In KS1, Mathematics is delivered through whole class teaching in individual year groups which follows a set structure. The lessons are split into 3 distinct parts:

1. Number sense and fluency
2. Key learning input, focus and objectives and
3. Mini plenaries strategically focused throughout the lesson.

This structure fits well with the school's ethos of **know more, remember more** and **understand more** and provides the children with a well-structured lesson that facilitates learning, curiosity and engagement.

Key Stage Two

In KS2, Mathematics is delivered through whole class teaching in individual year groups. The lessons are split into 3 distinct parts:

1. Number sense and fluency through number recall, consolidation of the 4 operations and multiplication activities,
2. Key learning input, focus and objectives and
3. Mini plenaries strategically focused throughout the lesson.

This structure fits well with the school's ethos of **know more, remember more** and **understand more** and provides the children with a well-structured lesson that facilitates learning, curiosity and engagement.



Assessment

Assessment for Learning

Children receive effective feedback through teacher assessment, both orally and through our green and pink highlighting.

The structure of the teaching sequence ensures that children know how to be successful in their independent work. Common misconceptions are addressed within the teaching sequence and key understanding within each 'small step' is reviewed and checked by the teacher and the children before progression to further depth.

Opportunities for additional practice and correction are provided by the teacher as appropriate, during marking, with a focus on promoting and achieving a growth mind set within the subject.

Formative Assessment

Short term assessment is a feature of each lesson. Observations and careful questioning enable teachers to adjust lessons and brief other adults in the class if necessary.

At the end of each blocked unit of work, the children also complete the carefully aligned White Rose Maths 'End of Unit Assessment'. The outcome of this is used by the teacher to ensure that any identified gaps in understanding can be addressed.

Summative Assessment

Teachers administer a termly written test. The results of these papers enable teachers to identify any common areas of weakness so appropriate consolidation work can be done. Any individual areas of strength or personal targets derived from these tests are communicated to the children, as well as to parents and carers at Parents Evening.

They are also used alongside the end of unit assessments and outcomes of work, to inform the whole school tracking of attainment and progress of each child. End of year data is used to measure the extent to which attainment gaps for individuals and identified groups of learners are being closed. This data is used to inform whole school and subject development areas during the current school year, as well as informing priorities for next year's action planning .

Role of the Mathematics Leader

The Maths Leader is responsible for mathematics throughout the school. This includes:

- Leading by example by setting high standards in their own teaching



- Ensuring teachers understand the requirements of the new National Curriculum and support them to plan lessons, where needed
- Preparing, organising and leading CPD and joint professional development, sometimes supported by consultants
- Working with the Inclusion Leader
- Observing colleagues from time to time with a view to identifying the support they need
- Attending CPD and disseminate knowledge through staff meeting/INSET
- Keeping parents informed about mathematics issues
- Discussing regularly with the Strategic Leader, Head of School, SLT, Maths governor and/or Achievement and Standards governors, the progress mathematics in school
- Monitoring and evaluating mathematics provision in the school by conducting regular work scrutiny, learning walks and assessment data analysis and feed back to SLT
- Ensuring each classroom has the appropriate resources required to deliver the curriculum effectively and, where necessary, use maths budget to fill gaps

Learning environment

Every classroom is expected to have a Maths Working Wall which displays resources, images, vocabulary etc to support children's learning and understanding. These displays should be updated regularly to reflect the current learning objectives and, where suitable, include examples of children's learning. Resources and equipment (such as number squares, counting beads, Numicon) should be stored neatly and accessibly in each classroom and children should have access to these as needed. Additional equipment is stored in the centralised maths cupboards.

Resources

Resources have an important role in classrooms in allowing teachers to model or demonstrate representations of mathematical ideas, and in supporting children's developing mathematical understanding and thinking. Each class in the school has access to a variety of mathematical resources appropriate to **all** of the learners. The resources are carefully chosen to follow and align with the concrete, pictorial and abstract methodology of mastery and provide an easily accessible learning tool. Children are explicitly shown how to use the classroom manipulatives and are actively encouraged to use them if required to further their understanding.



The effective use of these resources helps the pupil develop mental imagery and how to utilise the resource to assist with children's understanding of particular mathematical concepts.

Inclusion

We incorporate mathematics into a wide range of cross-curricular subjects and seek to take advantage of the universality of mathematics. In the daily maths lessons, we support children with communication barriers in a variety of ways including repeating instructions, emphasising and displaying key words, using visuals, playing mathematical games, encouraging children to join in counting, chanting, finger games and rhymes.

All children should have access to a broad and balanced curriculum. Provision for children with SEN is the responsibility of the class teacher, support staff and SEN Co-ordinator as appropriate. Where applicable, children's Individual Education Plans (IEPs) incorporate suitable objectives from the National Curriculum and teachers keep these objectives in mind when planning work.

Teachers assess the individual needs of children continuously and adjust their teaching to reflect this. Differing needs may be met through the resources and equipment used, such as having number lines or counting beads available or having an adult sit at a table to support understanding and focus. However, this support should be fluid and in response to children's needs – teachers and support staff should not always be sat with the same child/children, nor should children always be sat with the same peers.