



Shotton Hall Primary School
Working together to
SHINE
Successful, Happy, Inspired and Nurtured towards Excellence
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Mathematics Policy

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Signed J Bowmaker (Head Teacher)

T Watson (COG)

Introduction

Mathematics is a skill which is acquired through effective mathematical teaching. Mathematics helps children to make sense of the world around them through developing their ability to calculate, to reason and to solve problems. It enables children to understand and appreciate relationships and pattern in both number and space in their everyday lives. Through their growing knowledge and understanding, children learn to appreciate the contribution made by many cultures to the development and application of mathematics.

Rationale

- To establish an entitlement for all pupils
- To provide a clear and agreed framework for the teaching of Mathematics in our school
- To promote continuity and coherence across the school

Purpose

- To provide a framework to enable teachers to meet their statutory obligations with regards to the teaching of mathematics.
- To provide a consistent approach throughout the school to mathematics.
- To foster effective learning by suggesting appropriate ways of organising mathematics experiences in the classroom
- To provide procedures for planning and record keeping ensuring continuity and progression throughout the school
- To meet the National Curriculum requirements

Aims

At Shotton Hall Primary School we aim to:

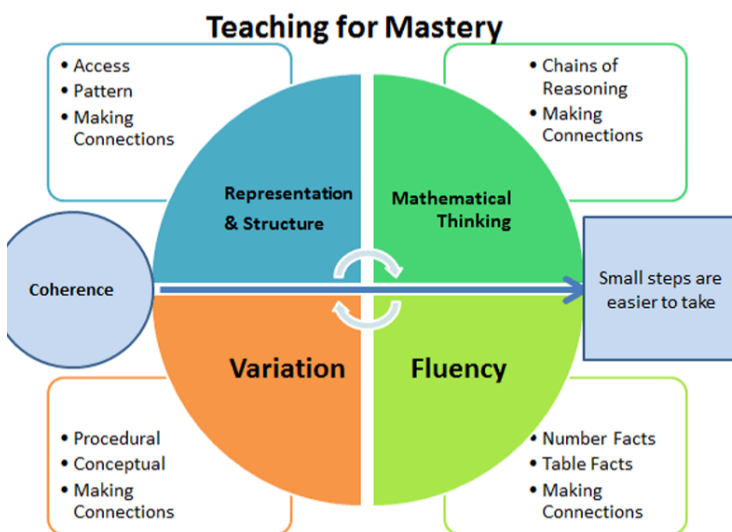
- Develop a positive attitude to maths as an interesting and attractive subject in which all children gain some success and pleasure
- Develop mathematical understanding through systematic direct teaching of appropriate learning objectives
- Encourage the effective use of maths as a tool in a wide range of activities within school and, subsequently, adult life
- Develop children’s ability to express themselves fluently, to talk about the subject with assurance, using correct mathematical language and vocabulary
- Develop an appreciation of relationships within mathematics
- Develop ability to think clearly and logically with independence of thought and flexibility of mind
- Develop an appreciation of creative aspects of mathematics and awareness of its aesthetic appeal
- Develop mathematical skills and knowledge and quick recall of basic facts in line with recommendations

Key Principles – Intent

At Shotton Hall Primary School, we use a teaching for mastery approach.

Maths teaching for mastery supports the idea that everyone can do maths. All pupils are encouraged by the belief that by working hard at maths they can succeed.

Principles of the Maths Mastery Approach (Five Big Ideas in Teaching for Mastery, NCETM 2022)



Coherence

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

Representation and Structure

Representations are carefully selected to expose the mathematical structure being taught. These representations become mental images that students can use to think about mathematics, supporting them to achieve a deep understanding of mathematical structures and connections.

Mathematical Thinking

To enable children to understand concepts deeply, mathematical thinking is central to how pupils learn mathematics and includes looking for patterns and relationships, making connections, conjecturing, reasoning, and generalising. Pupils should actively engage in mathematical thinking in all lessons, communicating their ideas using precise mathematical language.

Fluency

Efficient, accurate recall of key number facts and procedures is essential for fluency, freeing pupils' minds to think deeply about concepts and problems. Fluency also enables pupils to have the flexibility to move between different contexts and representations of mathematics, to recognise relationships and make connections, and to choose appropriate methods and strategies to solve problems.

Variation

The purpose of variation is to draw closer attention to a key feature of a mathematical concept or structure through varying some elements while keeping others constant.

- Conceptual variation involves varying how a concept is represented to draw attention to critical features. Often more than one representation is required to look at the concept from different perspectives and gain comprehensive knowledge.
- Procedural variation considers how the student will 'proceed' through a learning sequence. Purposeful changes are made in order that pupils' attention is drawn to key features of the mathematics, scaffolding students' thinking to enable them to reason logically and make connections.

Implementation

To provide adequate time for developing numeracy skills each class teacher will provide at least five daily mathematics lessons per week. This may vary in length but will usually last for about 45 to 60 minutes.

Additional mathematics may be taught within other subject lessons when appropriate.

Teachers of the Reception children base their teaching on objectives in the Framework for Reception; this ensures that they are working towards the 'Early Learning Goals for Mathematical Development'. Towards the end of Reception teachers aim to draw the elements of a daily mathematics lesson together so that by the time children move into Year 1 they are familiar with the 45-minute lesson.

Planning and Teaching

The Mathematics Progression Documents and Progression in Calculation Policies for Shotton Hall Primary School outline the key strands and objectives children are required to be taught under the National Curriculum for Mathematics 2014, the DfE's 2020 mathematical guidance (Ready to Progress Criteria), Birth to 5 Matters 2021 and the Early Learning Goals (Number, Numerical Patterns). These documents provide the long-term planning for mathematics taught in the school.

The structure and sequence of the small steps in the progression documents are based on White Rose Maths scheme of learning, as this is designed to give pupils a consistent and effective progression of knowledge and skills across the year via the mastery approach. White Rose Maths supports a mastery approach to teaching and learning and has number at their heart. These progression documents have been developed to ensure children's mathematical skills are gradually built upon each and that children are taught the curriculum and skills appropriate to their key stage. They also enable teachers to plan and deliver high quality maths lessons which support the Maths Mastery model and ensure children have

access to all aspects of maths mastery (coherence, representation and structure, mathematical thinking, fluency and variation).

The suggested small steps in the progression documents and White Rose Maths scheme of learning outline the learning objectives that children should work towards. However, these do not equate to one small step per lesson. It is at teachers' discretion how they plan and deliver these lessons. They may be able to cover several small steps in one lesson, or alternatively split a step over several lessons.

Where appropriate teachers may supplement or replace White Rose Maths resources with other high quality maths mastery materials for example, NCTEM mastery materials, Power Maths and other appropriate researched resources, which support children's mathematical learning.

Differentiation

Teachers differentiate learning through the dimensions of depth; ensuring that children are not accelerated through topics but instead develop a deep conceptual understanding of mathematics. Each teacher is responsible for adapting daily lessons so that they suit the individuals and class that they teach. In some instances, it may be appropriate to revisit and recap concepts, skills and methods taught in previous year groups for less able children and those with SEND.

More Able / Gifted and Talented (Greater Depth)

Children who are more able or gifted and talented within mathematics are provided with further challenge through greater depth - rather than accelerated content (moving onto next year's concepts). Teachers will set tasks to deepen knowledge and improve reasoning skills within the objectives of their year group. This will enable more able pupils to solve problems of greater complexity and demonstrate creativity in their approach.

Concrete/Pictorial/Abstract Approach

To support the teaching of maths mastery, we follow the Concrete, Pictorial, Abstract Model (CPA). This is an approach to be used with the whole class and teachers should promote each area as equally valid. Manipulatives in particular must not only be presented as a resource to support the less confident or lower attaining pupils.

Written methods are complementary to mental methods and should not be seen as separate from them. The aim is that children use mental methods when appropriate, but for calculations that they cannot do in their heads they use an efficient written method accurately and with confidence. It is important children acquire secure mental methods of calculation and efficient written methods of calculation which they know they can rely on when mental methods are not appropriate.

The Progression in Calculation Policy outlines the steps taken and the methods used in each year group as children develop their calculation skills. By the end of Year 6, children should be able to choose the most appropriate approach to solve a problem: making a choice between using jottings (an extended written method), an efficient written method or a mental method.

Concrete

The children are first introduced to an idea or a skill by acting it out with real objects. In division, for example, this might be done by separating apples into groups of red ones and green ones or by sharing 12

biscuits amongst 6 children. This is a 'hands on' approach using real objects and it is the basis for conceptual understanding. Concrete apparatus such as Numicon, double sided counters, base 10 apparatus and place value counters are used widely across school.

Pictorial Representation

This is used when a child has sufficiently understood the hands-on experiences performed and can now relate them to representations, such as a diagram or picture of the problem. In the case of division this could be the action of circling objects. Other representations widely used in school are part whole, bar models, and place value charts.

Abstract Representation

The symbolic stage – a student is now capable of representing problems by using mathematical notation, for example: $12 \div 6 = 2$. This is clearly the more confusing representation and without the 'hands on' and pictorial steps can be tricky for children to understand. Therefore, in order to achieve fluency and deep mathematical understanding it is essential that children have been exposed to concrete and pictorial representations first.

Further information on this model and details of which methods and representations are used in each year group, please see the 'Progression in Calculation Policy for Addition and Subtraction' and 'Progression in Calculation Policy for Multiplication and Division'

Maths Non-Negotiable Skills

At Shotton Hall Primary School we have compiled a list of non-negotiable mathematical 'basic' skills which we believe are crucial for children's mathematical progress. This is detailed in Appendix A. These skills should be taught daily either as part of mental and oral starter, revision session or at other appropriate times during the day. These basic skills should be re-visited regularly during the school year to ensure that children have a thorough and deep understanding of these concepts. They may also be the focus of maths intervention groups.

Additional Teaching

In addition to a daily Maths lesson, there may be other timetabled sessions and maths interventions within the school week where selected children are given further targeted opportunities to develop mental fluency, practice recall of number facts and specific procedures as part of arithmetic. In these sessions, teachers may use digital technologies such as Numbots, Times Table Rock Stars, online games as well as worksheets, concrete apparatus etc.

Maths in the Early Years

Teachers in the EYFS ensure the children learn through a mixture of adult led activities and child-initiated activities both inside and outside of the classroom. Mathematics is taught through an integrated approach. This is supported by the Development Matters non statutory guidance as well as White Rose Medium term plans for EYFS Maths and the NCTM Mastering Number resources.

The EYFS Framework in relation to mathematics aims for our pupils to achieve the following

Early Learning Goals: ELG: Number

- develop a deep understanding of number to 10, including the composition of each number.

- Subitise up to 5.
- Automatically recall number bonds up to 5 and some number bonds up to 10, including double facts.

ELG: Numerical Patterns

- Verbally count beyond 20, recognising the pattern of the counting system.
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

In addition, the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures.

Assessment

Assessment is an integral part of teaching and learning and is a continuous process.

Teachers make assessments of pupils daily through:

- daily marking of work
- analysing errors and picking up on misconceptions
- asking questions and listening to answers
- facilitating and listening to discussions
- making observations

These ongoing assessments inform future planning and teaching. Lessons are adapted readily, and short term is planning evaluated in light of these assessments. However, teachers are advised not to 'over test' children (ie weekly arithmetic tests) as these do not show progress and testing should not be used to replace a daily maths lesson.

Formative assessment is completed on an ongoing basis and recorded in Insight against year group objectives.

Summative assessments are carried out at the end of every school term and recorded on Insight. Teachers use information from, formal assessments, outcomes from intervention programmes, input from teaching assistants, observations and assessments, alongside their own teacher assessments, to determine whether a child is meeting age related expectations and submit data.

In EYFS, children are measured at the end of Foundation stage against the Early Learning goals criteria for the mathematics specific area of development and are graded as 'emerging' or 'expected' for number and numerical patterns Early Learning Goals.

Special Educational Needs

Pupils identified on the SEND register are assessed against National Curriculum Age related expectations in the year group in which they are in or from an earlier year group.

Marking and Feedback

The Feedback, Marking and Presentation Policy states that maths work will be 'quality marked' with an improvement comment/ prompt (shown through use of pink highlighter) at least twice per week. If a child has not achieved the learning objective (pink or orange tick), there must be a clear moving on comment or intervention shown afterwards. Please see the policy for further details.

When a child uses concrete resources during a lesson to support their learning. It may be appropriate to note on the child's work which resource they used, to aid the teacher's assessment in the child's progress and understanding of a mathematical concept to ensure they are reaching deep mathematical thinking.

Presentation

For maths lessons children from Year 1 – Year 6 are provided with exercise books with squared paper. As children progress through the Concrete / Pictorial / Abstract model they will be encouraged to draw representations and write calculations directly into their books. However, worksheets and scaffolds may be used when appropriate, to ensure that recording work does not hinder children's mathematical learning. Children should write in pencil and use rulers for all straight lines. Numbers should be written with 1 digit per square, except for mixed number fractions where the whole number is written across two vertical squares. All pictorial representations should be neat and well proportioned. Please see the Feedback, Marking and Presentation Policy for further details.

As we follow the CPA model there will be lessons when children explore mathematical concepts and challenges practically via manipulative concrete resources rather than written methods. To ensure that the child's learning and progress is recorded in these instances the date and learning objective should be written in the child's book and ticked as appropriate, in line with the marking policy. There should also be evidence and detail of the mathematical learning which has taken place. This evidence could be a commentary by the child or teacher, photographs or reflections to enable accurate assessment and inform future planning.

Role of Parents / Carers

We ask for parents and carer's to support children in their mathematical learning. Maths homework will be sent out every Friday and must be returned by the following Thursday. For children in Years 1 - 4, the focus of this homework will be consolidating basic maths skills (such as times table practice). Children in Years 5 will be given a maths workbook to work from. Completed work will be uploaded onto Class Dojo. Children are also provided with online resources which they can access at home, NumBots in EYFS and KS1 and TT Rockstars in KS2.