Moorside Primary School

Mathematics policy

MOORSIDE PRIMARY SCHOOL

PURPOSE, VISION & VALUES

Our Purpose

Moorside Primary is a school at the heart of our diverse community in the West End of Newcastle.

We pride ourselves in being a caring school community where everyone is welcome.
We strive to deliver an outstanding education for all our children.
We help everyone to become caring and active citizens.
We encourage everyone to thrive and achieve their full potential.

Our Vision

We want everyone in our school to work together to make us as good as any school can be.
We want to create new opportunities for everyone to succeed.
We want to create a culture which broadens all of our horizons.
We want everyone to be able to tackle the challenges we will face in an ever changing world.
We want all of our children to effectively engage with each other and with our community.

Our values

We all believe that….

Our local community deserves a school they can be proud of.
We are a caring community where everyone is welcome.
We all value, respect and support each other.
Our community has the right to be safe and healthy.
Our children should have the chance to enjoy and be enthused by their time in our school.

We all believe that….

Everyone always tries their best and take pride in all that they do.
Everyone demonstrates good manners at all times.
Everyone respects each other and show consideration.
Everyone respects and cares for our environment and resources.
Everyone celebrates each other's successes and achievements.

Introduction

Mathematics equips children with a uniquely powerful set of tools that helps children make sense of their world. It helps build a solid foundation for success not only during their school years but for later stages in their lives. These tools include logical reasoning, problem solving skills and the ability to think in abstract ways.

Mathematics is important in everyday life. It is integral to all aspects of life, and with this in mind we endeavour to ensure that children develop a positive and enthusiastic attitude towards mathematics that will stay with them in their next stage of education and beyond.

The National Curriculum order for Mathematics describes in detail what children must learn in each year group. Combined with our Calculation Policy and, for our younger children, the Early Years Foundation Stage (EYFS) Development Matters, this ensures continuity, progression and high expectations for attainment in mathematics across the school.

Early Years Foundation Stage

Mathematics is one of the four specific areas of the Early Years Foundation Stage. It involves providing children with opportunities to develop and improve their skills in counting, understanding and using numbers, calculating simple addition and subtraction problems; and to describe shapes, space and measures.

Through our approaches, we provide frequent and varied opportunities to enable our young children to build, apply their understanding and develop a secure base of knowledge and vocabulary. We work towards providing a curriculum that includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and their peers about what systems they notice and not be afraid to make mistakes

Opportunities

Early mathematics is an important part of the Early Year's Foundation Stage. It is the responsibility of practitioners to fully embrace this area of the EYFS and promote mathematics throughout the learning environment.

Maths Curriculum at Moorside

Children should work towards being able to use, by the end of Key Stage Two:

- A range of strategies for mental calculations *appropriate to the numbers involved.*
- One secure formal written method (for each number operation) for calculations that cannot be done mentally.

Schemes of work and key resources

Our mathematics curriculum provides breadth and balance. It is relevant, engaging and differentiated to meet the needs and abilities of all our children to ensure all children are able to excel.

Our long term planning follows the Development Matters framework (2021) and the National Curriculum (2014). Further documentation and planning aids used are:

- Gateshead Local Authority scheme of work, which outlines intended learning from Year 1 to Year 6. This is presented in unit blocks of work which will be taught and revisited.
- Maths Overviews – Each term, units of work and coverage from the development matters framework, the National Curriculum and Gateshead scheme of work are

planned out to ensure there is coverage of all units throughout the term. At Moorside, children receive three days of number work and two days focusing on other areas of the maths curriculum such as: time, measurement, position and direction. This ensures all units are being taught and revisited each term. Where appropriate, the two days of other areas of the maths curriculum are linked to the number work taught that week to ensure continuity and consolidation.

- Calculation Policy - this document outlines the progression of strategies and methods to be taught.

Use of manipulatives

Maths manipulatives refer to the hands on resources used in maths classrooms to develop children's understanding of mathematical concepts, often in a practical, tactile way. When using manipulatives with children, they need to be secure with using one type of manipulative for a mathematical concept before introducing a new one. Manipulatives are used from EYFS up to Year 6. As children develop through their primary school mathematical journey, manipulatives are used to enhance their mathematical ability, using them to develop reasoning and problem solving skills.

Children are taught and modelled how to access the manipulatives as well as securing an understanding of why specific resources are used for specific mathematical concepts. This is modelled and supported repeatedly to develop the children's independence and confidence to use them. Over time children will seek the resources independently which best match the learning activity.

Mastery

At Moorside Primary School, mastery means delivering the content of the Development Matters and the National Curriculum to all children with appropriate differentiation (adaptation) following our group teaching and learning model (See Teaching and Learning Policy). At Moorside Primary School this means ensuring all children are secure in a range of maths skills and that they have the opportunity to apply these in different contexts.

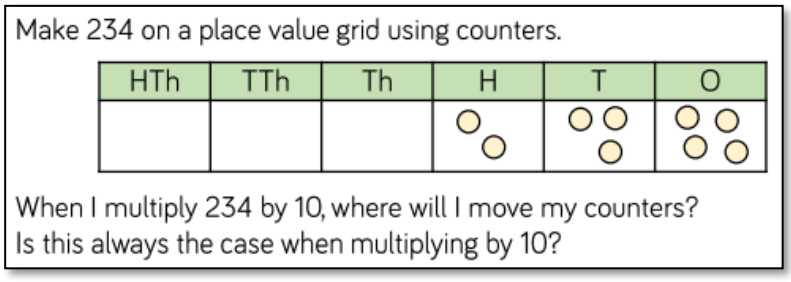
Developing short term into long term memory

At Moorside Primary School, teachers will ensure maths skills are embedded in at least four different ways. This will ensure children are secure with their understanding in maths and are able to draw upon this subject knowledge promptly when tackling new and challenging areas of maths.

Fluency

The Development Matters framework (EYFS) states: "Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers."

The National Curriculum refers to all children becoming '**fluent** in the fundamentals of mathematics', including through varied and frequent practice with increasingly complex problems over time, so that children develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.'



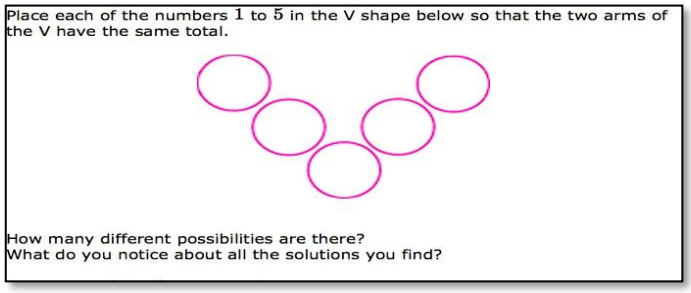
Reasoning

The Development matters framework (EYFS) highlights "It is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes"

The National Curriculum aims to ensure that all children '**reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.'

For children to be able to reason mathematically, they need to:

- Draw on their understanding of number value and calculations in which they are fluent
- Encounter a new challenge
- Be able to use logical thinking
- Have exposure to a range of starting points
- Use different strategies to solve a problem
- Select a problem-solving skill
- Evaluate a solution in appropriate context
- Understand there can be more than one solution.



Problem Solving

Although problem solving is a feature of teaching and learning across all areas of learning, and is important within the Characteristics of Effective Learning, it is important that this aspect is not lost in mathematical development.

In mathematics young children should be:

- using their curiosity and questioning
- thinking logically
- making simple estimates and predictions
- solving simple problems/puzzles in a practical context
- sorting/matching objects, pictures or themselves, talking about decisions made
- talking about, recognising and recreating simple patterns
- interpreting information
- recording information in a variety of ways
- developing mathematical ideas and methods to solve practical problems

The National Curriculum aims to ensure that all children '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.'

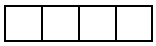
In order to solve a problem, children need to be able to draw on one or more problem – solving skills. To do this children need to be able to:

- Work systematically
- Carry out trial and improvement strategies
- Logical reasoning
- Identify patterns
- Visualise

You have two sets of the digits from 0 – 9.

0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9

Arrange these digits in the five boxes to make four- digit numbers as close to the target number as possible. You can use each digit once only.



It is important that teaching staff are aware that word problems are not the only way of addressing problem solving skills. Some word problems are still fluency but in a word context. For example:

Teachers need to **model** both problem solving and reasoning skills in order for children to be able to adopt these skills. All children regardless of their mathematical ability will have access and exposure to fluency, reasoning and problem solving.

Reasoning and problem solving will need to be adapted in order for skills to be taught and applied. This can be done in a variety of ways including:

1) Teach the reasoning or problem-solving skill using knowledge children have. For example if the children are secure in their two times tables, teacher to teach/unpick how to reason or solve a problem based on the two times table. Children are then able to think about their reasoning and problem solving skills logically as the mathematical number skills are already embedded.

2) Year group expectations - Through clear modelling and scaffolding, children will be taught to apply their skills to a problem using a variety of strategies appropriate to their year group. This can be differentiated by support and equipment to aid learning.

Concrete, Pictorial and Abstract approach

The **Concrete Pictorial Abstract** (CPA) approach is a method of learning that uses physical and visual aids to build a child's understanding of abstract topics.

Concrete

As part of the CPA approach, new concepts are introduced through the use of physical objects or practical equipment. These can be physically handled, enabling children to explore different mathematical concepts. These are sometimes referred to as maths manipulatives and can include mathematical resources such as: base ten, numicon or place value counters.

All children, regardless of ability, benefit from the use of practical resources in ensuring understanding goes beyond the learning of a procedure.

Practical resources promote oracy reasoning and discussion, enabling children to articulate and explain a concept. Teachers are also able to observe the children to gain a greater understanding of where misconceptions lie and to establish the depth of their understanding.

Pictorial

Once children are confident with a concept using concrete resources, they progress to drawing pictorial representations or quick sketches of the objects. By doing this, they are no longer manipulating the physical resources, but still benefit from the visual support the resources provide. A variety of different pictorial representations can be used such as: number lines, part- part whole models or base ten jottings.

Abstract

Once children have a secure understanding of the concept through the use of concrete resources and visual images, they are then able to move on to the abstract method. To be able to access this stage effectively, children need to have accessed the previous two stages alongside it. Examples of abstract methods are: column addition/subtraction, short multiplication/division.

For the most effective learning to take place, children need to constantly go back and forth between each of the stages. This ensures concepts are reinforced and understood.

If concrete resources, pictorial representations and abstract recordings are all used within the same activity, the children will be able to make strong links between each stage.

Teaching of key vocabulary

Using correct mathematical language is crucial for thinking, learning and communicating mathematically. Children may build on their knowledge through remembering information that they hear, but it is only when they put these ideas into their own words that it becomes clear whether concepts have been learned effectively. It is in listening to children talking about mathematics that teachers can best assess what they are actually learning and understanding. This enables us to identify and address any misconceptions that might be developing.

Using mathematical vocabulary can help all children to make links across areas of mathematics, across the curriculum as a whole and also within real-life situations.

Teachers should plan for and explicitly teach the key mathematical vocabulary they want children to learn throughout each maths lesson. Through the use of effective modelling and appropriate group teaching, children should be exposed to mathematical vocabulary consistently. Within maths lessons, speaking and listening opportunities should be incorporated to ensure children are given the time to practise and apply the use of

mathematical vocabulary verbally. Children will transition smoothly in to including key vocabulary in their written responses after having consistent exposure to it from all teaching staff.

Assessments

At Moorside Primary School, formative assessments form part of daily teaching and learning. We base our teaching on our knowledge of the child's level of attainment and adapt learning activities accordingly to provide challenge for each child's level of ability. Teachers should use ongoing assessment for learning strategies to establish children's understanding of specific mathematical concepts and adapt their teaching accordingly.

Summative assessments are used ongoing throughout the year and are updated when appropriate. Staff use summative assessments to identify where children are in relation to a mathematical unit and refer back to these assessments when revisiting a specific unit.

To help show progression for individual children, teachers follow a specific criteria.

(.)The use of one dot next to a learning intention indicates it has been taught and the child is successful when heavily supported.

(..)Two dots marked next to a learning intention indicates it has been taught and the child is successful but inconsistencies are evident.

If a learning intention is highlighted, this indicates that a child is secure with this learning intention and has applied the mathematical skill in a range of different ways.

Greater Depth

Within our assessment procedures and daily teaching, children will achieve greater depth if they can apply fluency, reasoning and problem-solving skills in a range of contexts. They will be able to solve problems of greater complexity, demonstrating creativity and imagination. Children working at a greater depth level, will be able to: independently explore and investigate mathematical contexts and structures, communicate results clearly and systematically explain and generalise the mathematics.

EEF Recommendations

EEF guidance reports summarise the best available research evidence on a particular aspect of teaching and learning, and present actionable recommendations for practice. The Senior Leadership Team and Middle Leadership Team have used and will continue to use evidence based documents to identify next steps across the school and strengthen any areas for development.

Improving Mathematics in the Early Years and Key Stage One

Improving Mathematics in Key Stages Two and Three – Guidance Report

For calculations and teaching methods, please refer to the Calculation Policy.

Date to be implemented	March 2023
Date to be reviewed	March 2025