Bretherton Endowed Primary School

Mathematics Policy

MATHEMATICS POLICY

Introduction

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 healthy and enthusiastic attitude towards mathematics that will stay with them.

This policy outlines what we are aiming to achieve in respect of pupils' mathematical education. It also describes our agreed approach to the planning, delivery and assessment of the mathematics' curriculum.

This Maths and Calculation Policy has been produced in line with the 2014 National Curriculum for Mathematics and the New EYFS Statutory Framework 2021, to ensure consistency and progression in teaching throughout the school that is age appropriate and in line with current development.

This policy has been designed to teach children through the use of concrete, pictorial and abstract representations. This policy will underpin our work to ensure that all pupils are confident in each of the areas of mathematics including Number and Place Value; Addition and Subtraction; Multiplication and Division; Fractions; Measurement; Geometry and Statistics. It will ensure high standards are achieved; that mathematics is taught well and that pupils make good progress at every stage.

• Concrete representation— a pupil is first introduced to an idea or skill by acting it out with real objects. This is a 'hands on' component using real objects and is a foundation for conceptual understanding.

• Pictorial representation – a pupil has sufficiently understood the 'hands on' experiences performed and can now relate them to representations, such as a diagram or picture of the problem.

• Abstract representation—a pupil is now capable of representing problems by using mathematical notation, for example 12 x 2 = 24. As children begin to understand the underlying ideas, they develop ways of recording to support their thinking and calculation methods, use particular methods that apply to special cases and learn to interpret and use signs and symbols involved.

This policy shows the natural progression that a child should make in their mathematical education. Children should not progress onto the advanced stages of formal written methods until they have a secure conceptual understanding. 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.Maths is a journey and long-term goal, achieved through exploration, clarification, practice and application over time. At each stage of learning, children should be able to demonstrate a deep, conceptual understanding of the topic and be able to build on this over time.

Our overall aims for when children leave Bretherton Endowed are:

● To develop a positive attitude to mathematics as an interesting and attractive subject in which all children gain success and pleasure.
● To promote and develop children's enjoyment and enthusiasm for maths through exciting, practical, first-hand learning and opportunities to explore and investigate.
● To have access to a high- quality maths curriculum that is both challenging and enjoyable, and builds upon previous learning.
● To be provided with a variety of mathematical opportunities, which will enable them to make the connections.
● To ensure children are confident mathematicians who are not afraid to take risks.
● To ensure that from the EYFS onwards, pupils are confident in their understanding and application of their basic skills in number and the number system and that they build upon their prior learning at every stage.
● To develop an ability to express themselves fluently, to talk about the subject with assurance, using correct mathematical language and vocabulary.
● To develop mathematical skills and knowledge and recall of basic facts and the four operations
● To be able to use this knowledge and understanding to carry out calculations mentally
● To make use of diagrams and informal notes to help record steps and part answers when using mental methods that generate more information than can be kept in their heads
● To have an efficient, reliable, compact written method of calculation for each operation that children can apply with confidence when undertaking calculations that they cannot carry out mentally. They will do this by always asking themselves: Can I do this in my head? Can I do this in my head using drawings or jottings? Do I need to use a pencil and paper procedure of a formal written method?
● To ensure that the school's schemes of work and guidelines for mathematics are taught thoroughly, systematically and progressively to all pupils by all staff.
● To bring mathematics to life and make it real, to ensure that children understand the importance of maths in their everyday lives.
● To develop mathematical skills and enquiry skills in a range of curriculum areas including Computing, Science, Art & Technology, Humanities, P.E., Music and PSHE.
● To make certain that all children, particularly those with special educational needs or disability; those who are stuck and those finding it hard are well supported.

Our implementation is developed through secure understanding of the curriculum and subject area. Planning Maths is a core subject in the National Curriculum. We have used the Mathematics Programme of Study: Key Stages 1 & 2; NCETM Spine Materials; Early Year Foundation Stage Statutory Framework (2021) and the White Rose Maths support materials to create a curriculum which aims to broaden the children's mathematical understanding. Key areas of learning within year groups are developed with a greater emphasis on the breadth and depth of subject knowledge, providing children with the confidence to express their ideas using mathematical language and vocabulary.

Planning is undertaken at three levels:

Long term: The National Curriculum 2014 has 3 central aims:

● Become fluent in the fundamentals of mathematics, including 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. In order to achieve this we need to provide opportunities for children to investigate numbers by counting, cardinality (how many there are in the group), comparison and composition. They need to practice decomposing and recomposing numbers, recalling number bonds and multiplication tables to improve mathematical fluency.

● Reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language. The conversations we have and questions we ask are key to developing reasoning skills. We can ask children to describe, explain, convince others, justify and prove to promote their reasoning skills. Adults can support children to develop reasoning by modelling, using mathematical language, using sentence stems, group work and understanding how others work and making personal notes and recordings.

● 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. Activities should be provided where children can solve number problems, practical problems and missing number problems. Problem solving is not just about solving the problem, it is about how they solved the problem. What strategies and mathematical concepts did they use? All pupils should have the opportunity to apply their mathematics to solve problems. The use of mathematical language, modelling and the bar model can all help support children to develop their problem-solving skills. Higher attaining children need to solve problems that require more demanding reasoning and problem-solving skills, such as open-ended possibilities, rather than harder numbers. We must ensure that children have the opportunity to conjecture when problem solving. Problem solving is more than learning and following a procedure.

Medium term planning

The sequencing of teaching reflects the needs of the learners. Place value and arithmetic are given priority at the start of each academic year as these are the building blocks for mathematical learning. We follow the White Rose Maths Block planning, ensuring that the small steps planning is adapted to suit the needs of the class at the time. Recap steps are built in, along with the use of NCETM Ready to Progress Materials and DEF Mathematics Guidance to ensure that all children have the key fundamentals ready for their next year.

Short term planning

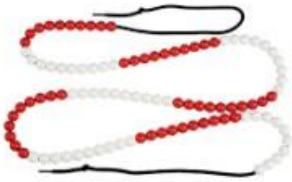
Short term planning is carried out weekly by the class teacher supported by the use of the White Rose Maths small steps and our Calculation Policy. These plans list the specific learning objectives and details of how the lessons are to be taught, including key vocabulary and resources required.

- Daily lessons include a clear lesson intention

- Daily lessons are taught using a variety of activities to support retrieval practice, development of Maths Talk language, group work, partner work which then leads to the confidence in individual work. Concrete, pictorial and Abstract (CPA) approach.

At Bretherton, we recognise that the Concrete Pictorial Abstract (CPA) approach is highly effective in the teaching of Maths to develop conceptual understanding. This approach will vary between year groups and the individual abilities of children within each class. Objects, pictures, words, numbers and symbols are everywhere. The mastery approach incorporates all of these to help children explore and demonstrate mathematical ideas, enrich their learning experience and deepen understanding. Together, these elements help cement knowledge so pupils truly understand what they have learnt. All pupils, when introduced to a key new concept, should have the opportunity to build competency in this topic by taking this approach. Pupils are encouraged to physically represent mathematical concepts. Objects and pictures are used to demonstrate and visualise abstract ideas, alongside numbers and symbols. Concrete – The doing stage There is a clear focus on the use of manipulatives and visual images to support understanding in every year group. Each new concept or calculation strategy will be introduced using appropriate manipulatives, giving the children a clear picture of the theoretical mathematics, they are learning. It is important that children have access to a wide range of manipulatives in every year group. Consequently, we encourage children to be independent in their use of manipulatives throughout the school and access resources as they see fit. This is the foundation for conceptual understanding.

Concrete resources that may be found in classrooms will include:


These resources will vary depending on year group and individual needs.

Pictorial – The seeing stage A child has sufficiently understood the hands-on experiences performed and can now relate them to representations, such as a diagram or a picture of the problem.

Representations such as bar models, part part-whole models, tens frames will be used and children will be exposed to a wide range of pictorial representations.

Abstract- The symbolic stage A child is now capable of representing problems by using mathematical notation, for example 10 ÷ 2 = 5

Teaching 'Quality first teaching' linked to teaching standards:
All teachers:
1. 'Know where their children are' through the use of summative assessment, prior learning, assessment, maths talk
2. 'Understand where their children need to be' through a secure understanding of year group expectations and/or pre key stage expectations and ongoing, formative assessment
3. 'Know how they are going to get them there' through the use of a range of strategies to promote independence, mastery and high expectations of ALL.
4. Cooperative learning will be embedded into lessons to develop Maths Talk language, communication skills and an acknowledgement that peers working together is an effective way of building skills vital for work and throughout the future. Also, it helps to build confidence before independent work is undertaken. Cooperative Learning also encourages deeper and critical thinking skills as the follow up questions we usually ask are: How? and Why?
5. Effectively deploy adults, specifically during introductions, plenaries & catch-up sessions 6. Plan for progression during and between lessons.

Teaching Mathematics to Children with Special Needs
At Bretherton Primary School we aim to provide a broad and balanced education to all pupils. Quality First Teaching is considered an entitlement for all pupils. Effective pupil tracking enables identification of pupils who may benefit from 'intervention' at an appropriate level

Assessment
1. Summative/reported - (EYFS, Yr 2, Y4, Yr 6)
2. Standardisation (Year 1 – 6) - Termly assessments for each year group/End of Block assessments (White Rose)

3. Diagnostic – Pre Unit assessment (White Rose/DFE Mathematics Guidance 2020
4. Formative – See Feedback Policy for daily formative assessment opportunities
5. All of the above will be monitored and discussed during pupil progress meetings and staff performance management.

Impact
Pupils will leave us prepared for the next stage in their lives with:
● Quick recall of facts and procedures
● Fluent and competent in the fundamentals of mathematics
● The flexibility and fluidity to move between different contexts and representations of mathematics
● The ability to recognise relationships and make connections in mathematics
● The ability to reason mathematically by following a line of enquiry, understanding relationships and generalisations, developing an argument, justification or proof using mathematical language
● The ability to apply their mathematics to problems, with increasing sophistication including breaking down problems into a series of simpler steps and persevering in seeking solutions.

A mathematical concept or skill has been mastered when a child can show it in multiple ways, using the mathematical language to explain their ideas, and can independently apply the concept to new problems in unfamiliar situations and this is the goal for our children. These will be assessed through assessment, tracking, pupil progress meetings, performance management, moderation and standardisation.

Policy updated September 2022