

Bispham Endowed

CE Primary School



Mathematics

Policy

Mathematics Policy

(see also Mathematics Written Calculation Policy & Mathematics Glossary for Teachers in Key Stages 1 to 3)

Vision

At Bispham Endowed, our mastery mathematics curriculum aims for all children to:

Have an attitude that they 'can do maths' and rejects the idea that a large proportion of people 'just can't do maths'. All pupils are encouraged by the belief that by working hard at maths they can succeed.

A lot of time is spent developing deep knowledge of the key ideas that are needed to underpin future learning. The structure and connections within the mathematics are emphasised, so that pupils develop deep learning that can be sustained.

Lessons are taught through whole-class interactive teaching, where the focus is on all pupils working together on the same lesson content at the same time. This ensures that all can master concepts before moving to the next part of the curriculum sequence, allowing no pupil to be left behind.

Learning where a child/children fail to grasp a concept or procedure, is identified quickly and early intervention ensures the pupil is ready to move forward with the whole class in the next lesson.

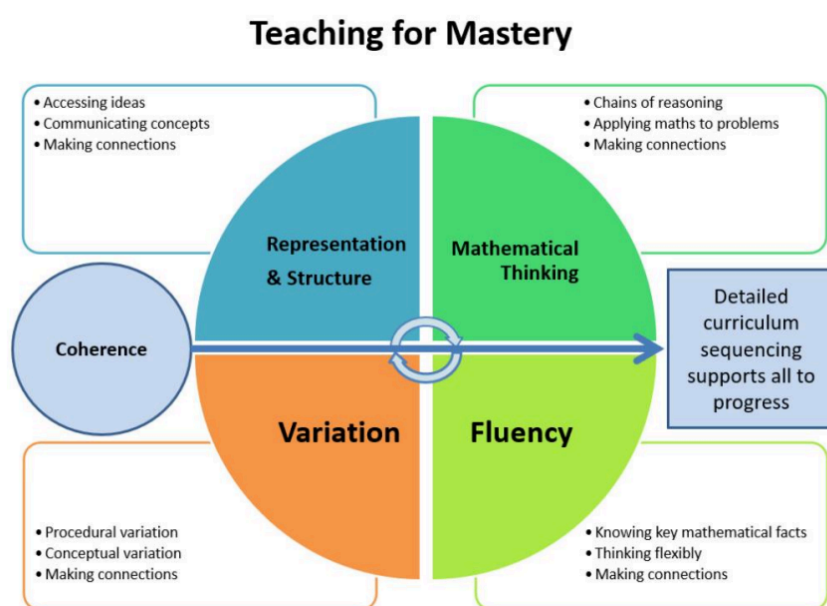
Procedural fluency and conceptual understanding are developed in tandem because each supports the development of the other.

All lessons are designed to identify the new mathematics that is to be taught, the key points, the difficult points and a carefully sequenced journey through the learning. Lessons enable children's discussions and interaction including questioning, short tasks, explanation, demonstration, and discussion.

Reinforcement of pupils' procedural fluency and develops their conceptual understanding, this is achieved through intelligent practice

Key facts such as multiplication tables and addition facts within 10 are learnt to automaticity to avoid cognitive overload in the working memory and enable pupils to focus on new concepts.

At Bispham Endowed, our approach to teaching in mathematics is underpinned by the principles of teaching for mastery.



Underpinning principles

- Mathematics teaching for mastery assumes everyone can learn and enjoy mathematics.
- Mathematical learning behaviours are developed such that pupils focus and engage fully as learners who reason and seek to make connections.
- Teachers continually develop their specialist knowledge for teaching mathematics, working collaboratively to refine and improve their teaching.
- Curriculum design ensures a coherent and detailed sequence of essential content to support sustained progression over time.

Lesson design

- Lesson design links to prior learning to ensure all can access the new learning and identifies carefully sequenced steps in progression to build secure understanding.
- Examples, representations and models are carefully selected to expose the structure of mathematical concepts and emphasise connections, enabling pupils to develop a deep knowledge of mathematics.
- Procedural fluency and conceptual understanding are developed in tandem because each supports the development of the other.
- It is recognised that practice is a vital part of learning, but the practice must be designed to both reinforce pupils' procedural fluency and develop their conceptual understanding.

In the classroom

- Pupils are taught through whole-class interactive teaching, enabling all to master the concepts necessary for the next part of the curriculum sequence.
- In a typical lesson, the teacher leads back and forth interaction, including questioning, short tasks, explanation, demonstration, and discussion, enabling pupils to think, reason and apply their knowledge to solve problems.
- Use of precise mathematical language enables all pupils to communicate their reasoning and thinking effectively.
- If a pupil fails to grasp a concept or procedure, this is identified quickly, and gaps in understanding are addressed systematically to prevent them falling behind.
- Significant time is spent developing deep understanding of the key ideas that are needed to underpin future learning.
- Key number facts are learnt to automaticity, and other key mathematical facts are learned deeply and practised regularly, to avoid cognitive overload in working memory and enable pupils to focus on new learning.

(NCETM, 2022)

Curriculum Design

Mathematics in the EYFS

The first few years of a child's life are especially important for mathematics development. Research shows that early mathematical knowledge predicts later reading ability and general education and social progress. Conversely, children who start behind in mathematics tend to stay behind throughout their whole educational journey.

The objective for those working in Early Years, then, is to ensure that all children develop firm mathematical foundations in a way that is engaging, and appropriate for their age.

There are six key areas of early mathematics learning, which collectively provide a platform for everything children will encounter as they progress through their maths learning at primary school, and beyond.

Cardinality and Counting - understanding that the cardinal value of a number refers to the quantity, or 'howmanyness' of things it represents.

The cardinal value of a number refers to the quantity of things it represents, e.g. the numerosity, 'howmanyness', or 'threeness' of three. When children understand the cardinality of numbers, they know what the numbers mean in terms of knowing how many things they refer to. Counting is one way of establishing how many things are in a group, because the last number you say tells you how many there are. Children enjoy learning the sequence of counting numbers long before they understand the cardinal values of the numbers. Subitising is another way of recognising how many there are, without counting.

Comparison - understanding that comparing numbers involves knowing which numbers are worth more or less than each other.

Comparing numbers involves knowing which numbers are worth more or less than each other. This depends both on understanding cardinal values of numbers and also knowing that the later counting numbers are worth more (because the next number is always one more). This understanding underpins the mental number line which children will develop later, which represents the relative value of numbers, i.e. how much bigger or smaller they are than each other.

Composition - understanding that one number can be made up from (composed from) two or more smaller numbers.

Knowing numbers are made up of two or more other smaller numbers involves 'part-whole' understanding. Learning to 'see' a whole number and its parts at the same time is a key development in children's number understanding. Partitioning numbers into other numbers and putting them back together again underpins understanding of addition and subtraction as inverse operations.

Patterns - looking for and finding patterns helps children to notice and understand mathematical relationships.

Seeking and exploring patterns is at the heart of mathematics (Schoenfeld, 1992). Developing an awareness of pattern helps young children to notice and understand mathematical relationships. Clements and Sarama (2007) identify that patterns may provide the foundations of algebraic thinking, since they provide the opportunity for young children to observe and verbalise generalisations.

The focus in this section is on repeating patterns, progressing from children copying simple alternating AB patterns to identifying different structures in the 'unit of repeat', such as ABB or ABBC. Patterns can be made with objects like coloured cubes, small toys, buttons and keys, and with outdoor materials like pine cones, leaves or large blocks, as well as with movements and sounds, linking with music, dance, phonics and rhymes. Children can also spot and create patterns in a range of other contexts, such as printed patterns, timetables, numbers and stories.

Shape and Space - understanding what happens when shapes move, or combine with other shapes, helps develop wider mathematical thinking.

Mathematically, the areas of shape and space are about developing visualising skills and understanding relationships, such as the effects of movement and combining shapes together, rather than just knowing vocabulary. Spatial skills are important for understanding other areas of maths and children need structured experiences to ensure they develop these. Here, the focus is on actively exploring spatial relations and the properties of shapes, in order to develop mathematical thinking (rather than on shape classification, which requires prior knowledge of properties). This section is concerned with developing the two aspects of spatial awareness and shape awareness, with some progression identified within each.

Measures - comparing different aspects such as length, weight and volume, as a preliminary to using units to compare later.

Mathematically, measuring is based on the idea of using numbers of units in order to compare attributes, such as length or capacity. Although young children engage with using rulers and experience being measured in centimetres, kilos - and years - the measuring units themselves are hard to understand.

Children need to realise which attribute is being measured, e.g. weight as opposed to size, and the idea of conservation: that the amount stays the same, even if the appearance alters, e.g. if dough is stretched out or in bits. In order to understand units, they need to realise that two items can be compared using a third item, or 'go between', such as a stick.

Finally, children need to understand how equal size units are used repeatedly to express an amount as a number. While young children can engage actively in making comparisons and exploring equivalence of length, volume, capacity and weight in different ways.

At the end of Early Years, children are assessed against the Early Learning Goals; the Early Learning Goals define the level of development children are expected to attain by the end of the Reception year.

Number Early Learning Goal

- Have a deep understanding of number to 10, including the composition of each number;
- Subitise (recognise quantities without counting) up to 5;
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

Numerical Patterns Early Learning Goal

- 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.

Mathematics in Key Stage 1 and Key Stage 2

At Bispham Endowed, we teach for mastery in mathematics supported by the White Rose Maths scheme of work.

Programmes of study and lesson content are carefully sequenced, in order to develop a coherent and comprehensive conceptual pathway through the mathematics. Teachers use assessment for learning to adapt learning so that it is appropriate for classes and individual needs. Although the scheme is followed, it is expected that teachers omit and add content as necessary.

Lesson content is provided in the Teachers' Guide, this is accessed through the online platform - teachers prepare lessons through careful study of the guide, using key questions, specific mathematical language, representations and manipulatives to provide consistency and progression in children's mathematical experiences across the whole school.

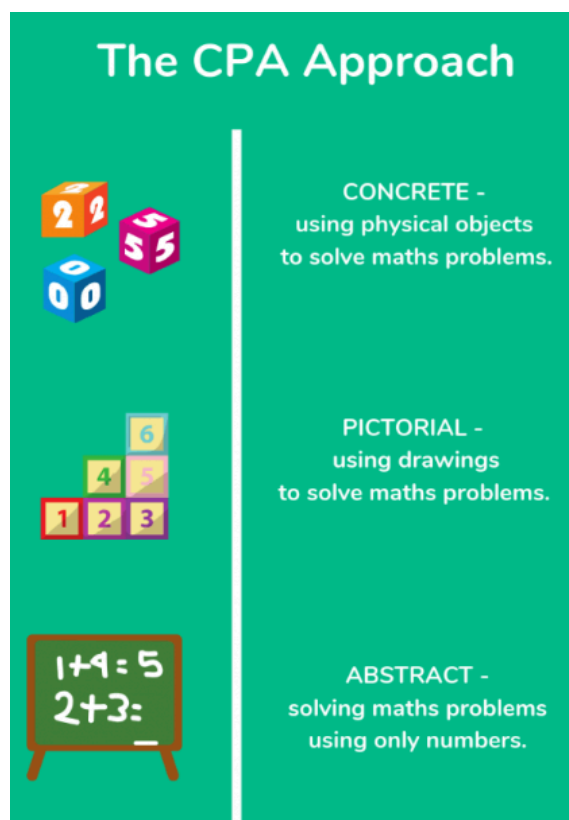
Learning within the scheme of work is broken down into small, connected steps, building from what pupils already know.

Difficult points and potential misconceptions are identified in advance and strategies to address them anticipated and planned. Where misconceptions are identified within or

after lessons, these are addressed rapidly through teaching, intervention and feedback.

Contexts and representations are carefully presented to develop reasoning skills and to help pupils link concrete ideas to abstract mathematical concepts.

Features of teaching



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

Pupils are introduced to a new mathematical concept through the use of **concrete** resources (e.g. fruit, counters, base 10 etc).

When they are comfortable solving problems with physical aids, they are given problems with pictures - usually **pictorial representations** of the concrete objects they were using.

They are then able to solve problems where they only have the **abstract** i.e. numbers or other symbols. Building these steps across a lesson can help pupils better understand the

relationship between numbers and the real world, and therefore helps secure their understanding of the mathematical concept they are learning. The regular interchange between concrete/pictorial/abstract is not linear.

Lessons are sharply focused; digression is generally avoided to focus children's attention to the core mathematical understanding being taught in the lesson.

Mathematical generalisations are emphasised as they emerge from underlying mathematics structure, which is thoroughly explored within contexts that make sense to pupils. Children are encouraged to be mathematically observant and seek their own generalisations using mathematical thinking.

Making comparisons is an important feature of developing deep knowledge. The questions "What's the same, what's different?" are often used to draw attention to essential features of concepts.

Repetition of key ideas (for example, in the form of stem sentences or repeating to talk partners etc.) is used frequently. This helps to verbalise and embed mathematical ideas and provides pupils with a shared language to think about and communicate mathematics.

Oracy in mathematics lessons is promoted and valued. Mathematics has its own language, to become fluent in a spoken language, learners need to be able to think in that language. In mathematics, we need to think in, speak in, and express ourselves in mathematical terms. We provide opportunities for children engage in dialogue and argue about their ideas. This supports the unpacking of mathematics and the unfurling of mathematics language skills.

Mathematical vocabulary terminology is used accurately and children are encouraged to be precise in their use of vocabulary. See Mathematics glossary for teachers in Key Stages 1 to 3

Formative assessment is carried out throughout the lesson; the teacher regularly checks pupils' knowledge and understanding and adapts the lesson accordingly.

Gaps in pupils' knowledge and understanding are identified early by in-class questioning. They are addressed rapidly through individual or small group intervention (often using the NCETM 'Ready to Progress' support materials/resources). Either on the same day or the next day, which may be separate from the main mathematics lesson, to ensure all pupils are ready for the next lesson.

Teachers discuss their mathematics teaching regularly with colleagues, sharing teaching ideas and classroom experiences in detail and working together to improve their practice.

Lesson Structure (see appendix for White Rose Guidance)

- Children seated in mixed ability groups
- Manipulatives used where appropriate
- Wipe Boards used for jottings and assessment feedback ('show me')
- Introduction pitched at a level accessible by all (Those children with SEN preventing them from accessing age appropriate work will be supported in small groups using the Ready to Progress teaching resources)
- Regular discussion, with key vocabulary used and encouraged
- White Rose teaching slides and resources used as a basis for each lesson but teachers may include activities and resources of their own choice
- Pupils encouraged to support each others learning
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Books and Presentation

Each child in Key Stage 2 has a Maths Jotter that allows recording of mathematical ideas and calculations throughout the shared parts of lessons, whiteboards may also be used.

- Short date - underlined
- Title - underlined
- Squares
- Working will always be ordered and legible to support children's systematic working and accuracy
- Not marked, but monitored by teachers through classroom observation - live marking may be used - sticker is placed on the front of book with an explanation

Each child has a blue mathematics book that is for lesson activities, practise/deepening activities, cross-curricular activities or learning required aside from the White Rose Maths scheme of work.

- Short date - underlined
- Learning Objective (LO) - underlined
- Blank pages
- Squared paper may be used for activities where children are developing procedural fluency in arithmetic
- Worksheets may be stuck in to books
- Working will always be ordered and legible to support children's systematic working and accuracy

Marking and Feedback

Marking of mathematics books should be completed in line with Bispham Endowed's Feedback and Marking Policy.

- Blue maths books should be predominantly marked by teacher/TA - especially explanation responses
- Child marking can be used but the teacher must review this and show this with acknowledgement marking

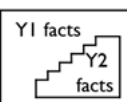
Next steps marking may not always be necessary as the next lesson is normally the next step in learning. However, it is essential that all marking is diagnostic, picking up and addressing any misconceptions/mistakes and thorough questioning ensures children have clarified their thinking clearly before moving learning forwards.

Fluency

Fluency demands more of children than memorisation of a single procedure or collection of facts. It encompasses a mixture of efficiency, accuracy and flexibility. Quick and efficient recall of facts and procedures is important in order for children to keep track of sub-problems, think strategically and solve problems. Fluency also demands the flexibility to move between different contexts and representations of mathematics, to recognise relationships and make connections, and to make appropriate choices from a whole toolkit of methods, strategies and approaches. At each stage of children's learning we adopt approaches that work to ensure that children are fluent in their recall of basic number facts and their written methods to calculate in order that children avoid overloading the working memory when working to solve more complex problems.

Fluency Progression Maps

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9	5+10
6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
10	10+0	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10



- Adding 1
- Adding 2
- Bonds to 10
- Adding 0
- Doubles
- Near doubles

- This grid shows the addition facts within 10 and strategies to recall or derive them.
- Children should also be fluent in the corresponding subtractions to be ready to progress to Year 2.

To secure firm foundations in the development of good number sense for all children from EYFS to Year 2, children have daily Mastering Number lessons. The aim is that all children will leave KS1 with fluency in calculation and flexibility with number. The lesson resources and training are provided by the NCETM.

Factual fluency progression

	Year 1	Year 2	Year 3	Year 4	Year 5
Additive factual fluency	Addition and subtraction within 10.	Addition and subtraction across 10.	Secure and maintain fluency in addition and subtraction within and across 10, through continued practice.		
Multiplicative factual fluency			Recall the 10 and 5 multiplication tables, and corresponding division facts.	Recall the 3, 6 and 9 multiplication tables, and corresponding division facts.	Secure and maintain fluency in all multiplication tables, and corresponding division facts, through continued practice.
			Recall the 2, 4 and 8 multiplication tables, and corresponding division facts.	Recall the 7 multiplication table, and corresponding division facts.	
				Recall the 11 and 12 multiplication tables, and corresponding division facts.	

The Role of the Mathematics Subject Leaders

- Monitor the progress and attainment in mathematics and address areas of need through targeted action plans
- Support colleagues in developing their practise and subject knowledge to maximise progress
- To take the lead in policy development
- To be responsible for the purchase and organisation of resources
- To keep up to date with developments in their particular area of responsibility and sharing this with colleagues
- To continue to engage in the work of NCETM Maths Hubs

Role of Parents

Parents have a fundamental role to play in helping children to learn. They are informed about what and how their children are learning by:

- Holding regular consultation evenings in which the progress made by each pupil and his/her next steps in learning are explained and discussed
- Sending a midterm report and an annual report to parents explaining the progress made by their child and indicating areas for improvement;
- Explaining to parents how they can support their children with homework;
- Holding parent workshops to explain the work covered and the strategies and methods taught to the pupils.
- School Calculations Policies can be accessed for all year groups in children's planners

- Sending information to parents at the start of each term in which we outline the learning areas and topics that the pupils will be covering that term; this information is also available throughout the year on the school blogs
- Keeping parents informed of a pupil's progress on a more regular basis if appropriate

Role of Governors

Governors support, monitor and review the mathematics policies. In particular they:

- Support the use of appropriate teaching strategies by allocating resources effectively;
- Monitor teaching strategies;
- Monitor how effective teaching and learning strategies are in terms of raising pupil attainment;
- Ensure that staff development and performance management policies promote good quality teaching in mathematics;
- Monitor the effectiveness of the school's mathematics policies through the school's self-evaluation processes. These may include reports from subject leaders and the termly Headteacher's report to governors, as well as a review of the in-service training sessions attended by our staff

Monitoring & Evaluation

This policy will be used to support the monitoring of mathematics throughout the school. It will be regularly reviewed with staff and will be discussed with new staff working in school.

Review

This policy was updated to reflect current approaches and practices in September 2024 by Martin Jones and Karen Olley.

Appendix 1 – White Rose Maths:

- Full Term Schemes
- Guidance
- Calculation policy
- Small steps
- Assessments
- National Curriculum and Ready to Progress mapping

<https://whiteroseeducation.com/resources>