Bilston Church of England Primary School

‘Hand in hand towards faith and high achievements’

Mathematics Policy

Our Vision

‘Hand in hand together with faith we will strive to achieve all things’

‘I am able to do all things through him (Jesus) who strengthens me’

Philippians 4:13

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This document is a statement of the aims, principles and strategies for the teaching and learning of Mathematics at Bilston Church of England Primary School.

At Bilston Church of England 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.

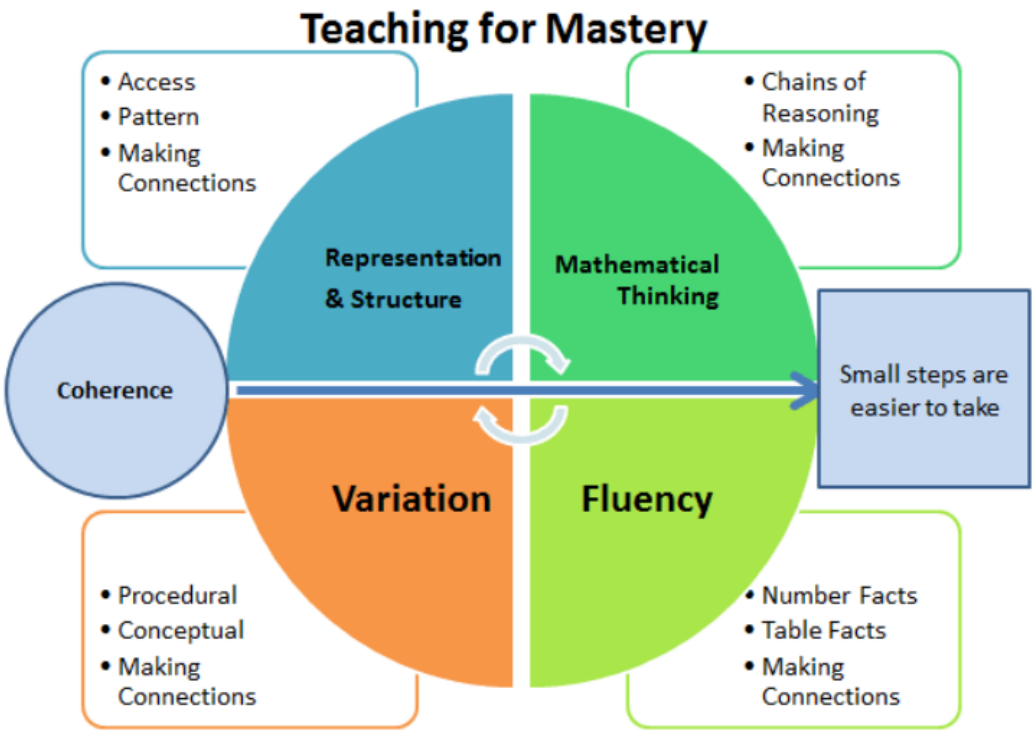
Our aim at Bilston Church of England Primary School is for all children to enjoy mathematics and have a secure and deep understanding of fundamental mathematical concepts and procedures when they leave us to go to secondary school. We want children to see the mathematics that surrounds them every day and enjoy developing vital life skills in this subject.

Aims for our pupils

- To develop a growth mindset and positive attitude towards mathematics.
- To become confident and proficient with number, including fluency with mental calculation and look for connections between numbers.

• To become problem solvers, who can reason, think logically, work systematically, and apply their knowledge of mathematics.
• To develop their use of mathematical language.
• To become independent learners and to work co-operatively with others.
• To appreciate real life contexts to learning in mathematics.

Principles of a Maths Mastery Approach



Our teaching for mastery is underpinned by the NCETM's 5 Big Ideas.

• Opportunities for Mathematical Thinking allow children to make chains of reasoning connected with the other areas of their mathematics.
• A focus on Representation and Structure ensures concepts are explored using concrete, pictorial and abstract representations, the children actively look for patterns and generalise whilst problem solving.
• Coherence is achieved through the planning of small, connected steps to link every question and lesson within a topic.
• Teachers use both procedural and conceptual Variation within their lessons and there remains an emphasis on Fluency with a relentless focus on number and times table facts.

Coherence

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

Representation and Structure

Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation.

Mathematical Thinking

If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student thought about, reasoned with, and discussed with others.

Fluency

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics.

Variation

This is twofold. It is firstly about how the teacher represents the concept being taught, often in more than one way, to draw attention to critical aspects, and to develop deep and holistic understanding. It is also about the sequencing of the episodes, activities and exercises used within a lesson and follow up practice, paying attention to what is kept the same and what changes, to connect the mathematics and draw attention to mathematical.

Teaching for Mastery Principles

- It is achievable for all – we have high expectations and encourage a positive 'can do' mindset towards mathematics in all pupils, creating learning experiences which develop children's resilience in the face of a challenge and carefully scaffolding learning so everyone can make progress.
- Deep and sustainable learning – lessons are designed with careful small steps, questions, and tasks in place to ensure the learning is not superficial.
- The ability to build on something that has already been sufficiently mastered – pupils' learning of concepts is seen a continuum across the school.
- The ability to reason about a concept and make connections – pupils are encouraged to make connections and spot patterns between different concepts (E.g., the link between ratio, division, and fractions) and use precise mathematical language, which frees up working memory and deepens conceptual understanding.
- Conceptual and procedural fluency – teachers move mathematics from one context to another (using objects, pictorial representations, equations, and word problems). There are high

expectations for pupils to learn times tables, key number facts (so they are automatic) and have a true sense of number.
• Problem solving is central – this develops pupils' understanding of why something works so that they truly have an appreciation of what they are doing rather than just learning to repeat routines without grasping what is happening.
• Challenge through greater depth - rather than accelerated content, (moving onto next year's concepts) teachers set tasks to deepen knowledge and improve reasoning skills within the objectives of their year group.

Aim

Mathematics equips pupils with the uniquely powerful set of tools to understand and change the world. These tools include logical reasoning, problem solving skills and the ability to think in abstract ways. Mathematics is a creative and highly inter-connected discipline that is essential to everyday life, critical to science, technology, and engineering and necessary for financial understanding and most forms of employment. We believe, as the National Curriculum for England Mathematics Programme of Study: Key Stages 1 and 2 states:

> *A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.*

The school's policy is informed and guided by the statutory requirements for the subject set out in the **Mathematics Programme of Study: Key Stages 1 and 2 National Curriculum in**

England September 2014. In Early Years the curriculum is guided by the Early Years Profile.

Principles of teaching and learning Mathematics

Good mathematics teaching is lively and engaging and involves a carefully planned blend of approaches and use of manipulatives that direct and support children's learning. Spoken language is also important to the teaching and learning of mathematics. We believe that the quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary, being able to make mathematical justifications and is essential for clearing up misconceptions. The pitch and pace of work is sensitive to the rate at which children learn while ensuring that expectations are kept high, and progress is made by all children. Our expectations are in line with the Mathematics Programme of Study: Key Stages 1 and 2 which states:

> ***... the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.***

Strategies for the teaching of Mathematics

Long Term Planning

At Bilston Church of England Primary School, we follow the National Curriculum 2014 for England Mathematics Programme of Study: Key Stages 1 and 2 which will underpin our long-, medium- and short-term planning across Key Stage 1 and Key Stage 2.
The Early Years Profile is used as the basis for planning for the Early Years class.

Medium Term Planning –At Key Stage 1 and 2, the National Curriculum guidelines group maths into 6 areas of learning.

These are:

1. Number
- Number and place value
- Addition and subtraction
- Multiplication and Division
- Fractions (including decimals from Y3 and percentages from Y5)
2. Ratio and proportion (from Y6)
3. Algebra (from Y6)
4. Measurement
5. Geometry
- Properties of shapes
- Position and direction
6. Statistics (from Y2)

<u>Curriculum design and planning</u>

• Medium term planning has been mapped out for years 1- 6 using The National Curriculum, Power Maths, NCETM and White Rose as a starting point to develop a coherent and comprehensive conceptual pathway through the mathematics. The focus is on the whole class progressing together. Collaborative planning with year group colleagues is encouraged to ensure consistency.

• Learning is broken down into small, connected steps, building from what pupils already know. The lesson journey should be detailed and evident on Smart Notebooks as there is no requirement for teachers to produce detailed paper plans.
• Difficult points and potential misconceptions are identified in advance and strategies to address them planned.
• Key questions are planned, to challenge thinking and develop learning for all pupils.
• Contexts and representations are carefully chosen to develop reasoning skills and to help pupils link concrete ideas to abstract mathematical concepts.
• The use of high-quality materials and tasks to support learning and provide access to the mathematics, is integrated into lessons. These may include Power Maths, White Rose Maths Schemes of Learning and Assessment Materials, NCETM Mastery Assessment materials and the Ready to Progress Materials
• Opportunities for extra fluency practice (instant recall of key facts, such as number bonds, times tables, division facts, addition, and subtraction facts) should be provided outside mathematics lessons (morning starters)

Short term planning
Lessons are planned using a WALT (What am I learning today) which sets out the key learning in the lesson. This is shared with the class during the lesson so that children can assess whether they have been successful.

Each class undertakes a daily mathematics lesson which will include a recap starter on prior learning e.g., Flashback 4, recap on yesterday's learning, whole class teaching input (new Learning), independent, paired or group work. During mathematics lessons pupils have the opportunity to engage in a

variety of learning activities using the My Turn Your Turn approach to develop confidence in new learning

Concrete/Pictorial/Abstract Approach

Concrete representation

The children are first introduced to an idea or a skill by acting it out with real objects. 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.

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 and mysterious of the three and without the 'hands on' and pictorial steps can be tricky for children to understand.

Additional teaching

In addition to a daily Maths lesson, there are other timetabled sessions within the school week where the children develop mental fluency, practice recall of number facts and specific procedures as part of arithmetic (during Registration)

In EYFS and KS1 children also work through the Number Sense programme for 10 minutes every afternoon to develop their number bonds.

Maths Interventions are carefully planned for specific pupils within each year group and focuses on:

- Learning number bonds and counting
- Recall of multiplication and division facts
- Arithmetic procedures
- Solving one and two step word problems

Children practice these skills for a short period (5/10 mins approx.) 3 or 4 times per week using their Continuum targets.

Maths in the Early Years

Maths in EYFS is taught in a practical way, with the use of manipulatives to support children's understanding of number and key mathematical concepts. We follow the progression model from NCETM as well as resources and teaching ideas from Power Maths and White Rose, in line with the rest of the school. In Autumn Term, Maths learning is centred around children's self-chosen activities, during which time adults carry out objective led planning to ensure that children are learning in line with the NCETM progression model through the activity or area of the learning environment that has been chosen by the child. This ensures that children's play is uninterrupted, and children are motivated. Number Sense is used as a daily resource to develop children's understanding of number, introducing pictorial representations and numerals.

As children become more settled and independent, a daily practical Maths lesson is introduced where children work in mixed ability learning partners with a box of manipulatives. Objective led planning and learning opportunities within the setting allow

children to practise and embed the skills that they learn during these sessions. *There is also continuous access to Maths resources in the indoor and outdoor learning environments, these are enhanced to reflect current teaching.*

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.

SEND

The daily mathematics lesson is appropriate for almost all children. At Bilston Church of England Primary School, we aim to include all SEND pupils fully in daily mathematics lessons, so that they benefit from the emphasis on oral and mental work and

participating in watching and listening to other children demonstrating and explaining their methods.

Where pupils learning difficulties extend to mathematics the teacher must: -

1. Adapt lessons appropriately.
2. Use a rage of manipulatives and resources to support children with their learning.
3. use adults to support their learning where appropriate.
4. Target questions at individual children at their level during oral and mental starter etc.
5. minimise written instructions make use of appropriate apparatus.
6. modelling using My Turn Your Turn strategies to develop confidence.
7. interventions to address misconceptions and gaps in learning through individualised targets (Continuum)

Assessment, Recording and Reporting

Assessment is an integral part of teaching and learning and is a continuous process. It is the responsibility of the class teacher to assess all pupils in their class. We are continually assessing our pupils and recording their progress. We see assessment as an integral part of the teaching process and strive to make our assessment purposeful, allowing us to match the correct level of work to the needs of the pupils, thus benefiting the pupils and ensuring progress.

Day to day formative assessment will be gathered in a variety of ways such as questioning, work samples, marking, pupil voice and observation notes. These assessments will help formulate targets,

inform planning, and decide which children require extra support/intervention programs.

All pupils work will be marked regularly with feedback given as appropriate (see Feedback and Marking Policy for further detail).

Termly Assessment- review and record progress children have made over time. Termly and half termly teacher assessments using Stat Sheffield are also made.

Long Term Assessments – At the end of the school year each class will assess and review pupil's progress and attainment through

1) National tests for Y2and Y6
2) NFER testing for Y3,4, and 5
3) Teacher assessment

Reporting

Parents are kept informed of their child's progress through interviews at Parents Evenings and through termly reports sent to parents, guardians.

Reporting in mathematics will focus on each pupil-

- Attitudes to mathematics
- Competence in basic skills
- Ability to apply mathematical language to new situations.