

Bishop Perrin Church of England Primary School

Maths Policy

Non-Statutory Policy



Our school is a Church of England School and works in partnership with our two local parish churches, St Augustine's and St Philip & James'. We aim to reflect the values, traditions and beliefs of the Christian Faith and therefore our Spiritual Values underpin everything that we do.

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1 THE IMPORTANCE OF MATHS – WHY DO WE TEACH IT?

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. 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.

'Good mathematics teaching is lively, engaging and involves a carefully planned blend of approaches that direct children's learning...the pitch and pace of the work is sensitive to the rate at which children learn while ensuring expectations are kept high and progress is made by all children.'

(The Primary National Strategy)

2 AIMS

In September 2018, Bishop Perrin School began transitioning towards a mastery approach to the teaching and learning of mathematics. We understood that this would be a gradual process and take several years to embed. The rationale behind changing our approach to teaching mathematics lay within the NCETM Maths Hub Programme as well as the 2014 National Curriculum, which states:

- The expectation is that most pupils will move through the programmes of study at broadly the same pace.
- 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.

Our aims in teaching mathematics are that the children will:

- develop their conceptual understanding and fluency in mathematics including fluency with mental calculation and to look for connections between numbers
- achieve high standards in mathematics

- develop a positive ‘can do’ attitude, resilience in their learning and determination to succeed
- use and apply mathematical skills in range of real-life situations with confidence, independence and understanding
- use and understand mathematical vocabulary and equipment appropriately and accurately

The National Curriculum for Maths aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- 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.

3 PLANNING AND ORGANISATION

Maths is a core subject in the National Curriculum. Teachers at Bishop Perrin School use long-term and medium-term planning materials devised by The [White Rose Maths](#) alongside [DfE National Curriculum guidance](#) the basis for implementing the statutory requirements of the Program of Study for Mathematics:

- Number (*number and place value, addition and subtraction, multiplication and division, fractions -including decimals and percentages, ratio and proportion and algebra*)
- Measurement
- Geometry (*properties of shapes, position and direction*)
- Statistics

The focus is on the whole class progressing together. Learning is broken down into small, connected steps, building from what pupils already know. The [Maths Subject Framework](#) outlines which concepts are taught and when. The learning journey is detailed and evident on flipcharts (ActivPrimary or PowerPoint). There is no requirement for teachers to produce detailed paper plans in addition to their weekly flipcharts which identify daily small-step objectives alongside appropriate teaching strategies; scaffolding and

challenge approaches and resources; focus pupils; possible misconceptions; resources; key questions; stem sentences; appropriate representations and concrete resources and key mathematical vocabulary.

The use of high quality materials and tasks to support learning and provide access to the mathematics, is integrated into lessons. These may include White Rose Maths resources and assessment Materials, Power Maths textbook activities, NCETM Mastery professional development and assessment materials, NRICH resources, visual images and concrete resources. Opportunities for extra fluency practice (instant recall of key facts, such as number bonds, times tables, division facts, addition and subtraction facts) are provided outside mathematics lessons (morning activities, transition activities, movement breaks, after lunch, before going home etc).

[Mastering Number \(NCETM\)](#) is used in reception and KS1 to develop a strong foundation in number sense. In KS2, [Number Sense](#) is used as a basis for small group and 1:1 interventions to continue this focus on the development of a strong foundation in number.

In addition, [The Statutory Framework for Early Years Foundation Stage](#) is used in Reception which outlines expectations for understanding of number and shape, space and measures at the end of the Reception year.

The Senior Leadership Team and Mathematics Leader monitor mathematics planning in line with the annual monitoring schedule. Weekly planning is ~~displayed in each classroom and~~ is available on the server to reflect progress and adaptations over the course of the week.

The mathematics curriculum is taught discretely. Each class has a daily mathematics lesson, lasting between 45 and 60 minutes although maths lessons can be extended and restructured over course of the day and week to facilitate oral and mental starters and lengthier investigations and projects. Links are made between objectives in order to ensure links to real life and curriculum themes and to encourage deep conceptual understanding alongside procedural fluency.

4 TEACHING AND LEARNING STRATEGIES

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. Pupils are also encouraged to think whether their method for tackling a given calculation or problem is appropriate, reliable and efficient.
- 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.

The staff at Bishop Perrin use a variety of teaching strategies in mathematics lessons. Our principle aim is to develop children’s conceptual understanding and procedural fluency in mathematics whilst facilitating deep and sustainable learning. Lessons are structured to include whole-class and group teaching as well as self-directed inquiry. Paired and group discussions are promoted as well as opportunities to develop team-working skills. Children are actively encouraged to ask and seek answers to mathematical questions. The children have the opportunity to use a wide range of manipulatives such as number lines and squares, digit cards, Numicon, beadstrings, Multilink, Base 10, Cuisinaire, rekenreks and a wide range of representations including the ‘part-part-whole’ and ‘bar’ models to support their mathematical development.

Mathematical dictionaries are available in all classrooms. Children use ICT in mathematics lessons where it will enhance their learning.

Teaching and Learning Assistants provide appropriate support to individuals or to groups of pupils, mostly within the classroom situation. Small group and one-to-one interventions take place under the direction of the class teacher and in liaison with the Inclusion Leader outside of the daily maths lesson.

Children are taught a range of strategies to calculate using the four operations as well as quick recall of number facts and key mathematical knowledge (see Maths Calculation Policy for further information). Teachers demonstrate and explain using a range of teaching tools using appropriate and accurate mathematical language so that children can read, spell and pronounce mathematical vocabulary correctly. Children are encouraged to explain, reason and justify their ideas and methods in order to consolidate understanding and to progress their learning.

5 KNOWLEDGE, SKILLS AND UNDERSTANDING

At the Foundation Stage:

Mathematics is taught in Reception using the Statutory Framework for Early Years Foundation Stage in Number, Shape, Space and Measures, working towards the Early Learning Goals and NCETM Mastering Number. The children are provided with rich opportunities to develop their understanding of number, calculating, measurement, pattern and shape and space through structured and child initiated play-based activities both indoors and outdoors. Children's learning develops through playing and exploring, active learning, creating and thinking critically.

Number

At Key Stages 1 and 2

Number, Algebra and Ratio and Proportion

At Key Stage 2

Problem solving
 Communicating
 Reasoning
 Counting
 Number patterns and sequences
 The number system
 Using and understanding place value
 Relationships between numbers
 Mental methods for four operations
 Solving numerical problems and puzzles
 Fractions

Multiplication and division tables to 12x12
 Fractions, decimals and percentages
 Ratio and proportion
 Formal methods for number operations
 Calculator methods
 Using formulae
 Solving number puzzles
 Linear sequences
 Ratio and proportion including shapes, percentages and fractions

Geometry and Measures

Statistics

At Key Stages 1 and 2

At Key Stage 2

Using and applying knowledge and understanding of shape, space and measures
 Patterns and properties of shape
 Properties of position and movement
 Measure

Processing, representing and interpreting data including pie charts and use of the mean as an average

Pupils will learn by:

<i>Playing</i>	<i>Making patterns</i>	<i>Making conjectures</i>	<i>Convincing others</i>
<i>Sorting</i>	<i>Identifying patterns</i>	<i>Asking questions</i>	<i>Ordering and sequencing</i>
<i>Matching</i>	<i>Investigating</i>	<i>Analysing problems</i>	<i>Generalising</i>
<i>Reflecting</i>	<i>Proving and justification</i>	<i>Using symbols</i>	<i>Visualising</i>
<i>Competition</i>	<i>Working systematically</i>	<i>Talk and discussion</i>	<i>Reasoning</i>

6 DIFFERENTIATION

One of our key principles is that maths learning 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.

Whilst we recognise that classes are made up of children with differing mathematical ability, in accordance with our key principles that maths learning is achievable for all – we have high expectations and encourage a positive ‘can do’ mindset towards mathematics in all pupils. We create learning

experiences that develop children's resilience in the face of a challenge and carefully scaffolding learning so everyone can make progress.

We provide suitable learning opportunities by ensuring that the challenge of the task allows opportunities for success for all children. This is achieved through a range of strategies including the setting of 'high ceiling, low threshold' activities; the range and variety of resources available for support; differentiated group/individual work, where appropriate; flexibility in structure of groupings and seating arrangements in the classroom and additional adult support. Activities are planned to allow for success and progression for all learners. Classroom seating is organised according to the current needs of children and activities depending on their most recent progress to prevent gaps in learning developing and to provide opportunities for challenge. Seating is flexible to ensure all children are able to achieve and receive the support they need.

7 SPECIAL EDUCATIONAL NEEDS AND DISABILITY (SEND)

Additional adult support is used to provide appropriate support to individuals and groups of pupils, mostly within the classroom situation but also outside of the classroom for specific interventions. Effective pupil tracking enables identification of pupils who may benefit from intervention at an appropriate level. In these cases, support staff may remove children from the classroom setting to carry out the intervention. These interventions are carried out outside of the daily maths lesson. Children with Learning Support Plans (LSPs) have specific targets which are created and reviewed at regular intervals by the class teacher and Inclusion Leader and parents.

We also recognise, and make provision for, pupils who have a particular ability in mathematics by providing opportunities for challenge and deep learning in the maths lesson. To ensure an inclusive approach to teaching, all children are supported to engage with the learning and to be supported and challenged as appropriate. Meta-cognition skills are taught to children through modelled self-reflection and explicit opportunities planned for to engage children in learning from their errors and mistakes. Regular and frequent opportunities for recall and review of prior learning are embedded into lessons to aid the transfer of skills and knowledge to long term memory. Children are directed to use metacognitive prompts to encourage deep reflection.

8 HOMEWORK

Mathematics homework is set on a weekly basis from Year 1 to Year 6 using the online platform [Mathletics](#) and [Timestables Rockstars](#). Assigned tasks may reinforce knowledge learned in class, give opportunities to apply skills and knowledge, encourage the child to learn mathematical facts or be of a more open-ended nature, such as a game or investigation. Activities can be tailored to children's particular learning needs.

A maths focus is included in at least one homework project during the year in Key Stage 2.

In Reception, children have access to maths activities online and are encouraged to play mathematical games at home with their families.

Parents are encouraged to support their children's homework and participate in activities. Communication with parents occurs through the use of the homework diary (See Homework Policy).

9 INFORMATION COMPUTER TECHNOLOGY (ICT)

The use of ICT is an integral part of mathematics teaching and learning. Teachers will use a range of software and hardware to enhance learning opportunities, including calculators, laptops and tablet devices. Teachers will decide when it is appropriate to use such equipment. [Mathletics](#) and [Timestables Rockstars](#) are used at home and at school to support the curriculum and to reinforce understanding.

10 SPEAKING AND LISTENING

[The 2014 National Curriculum for mathematics](#) reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. They must be assisted in making their thinking clear to themselves as well as others and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

11 ASSESSMENT, RECORDING AND REPORTING

To ensure understanding is secure and the progress is being made, assessment is ongoing. Assessment in mathematics is in line with the school's Assessment Policy, which contains a timetable for assessment for each year group. Assessment information is kept in the Assessment Folder on the school server.

12 TARGET SETTING

Targets are set in line with the school's Assessment Policy.

13 MARKING

The marking of Maths is in line with the school's Marking and Feedback Policy.

14 MONITORING AND EVALUATION

The purpose of monitoring and evaluation is to raise the overall quality of teaching and learning and levels of pupil attainment. The Mathematics Leader, Headteacher and Deputy Headteacher will monitor the quality of teaching and learning in line with the school's monitoring policy. Mathematics is also monitored by the Governing Body and Local Authority School Improvement Partner.

15 EQUAL OPPORTUNITIES

All children have equal access to mathematics education at Bishop Perrin School. We pay particular attention to ensuring there is no gender bias in materials or in access to resources, including ICT. Teachers particularly focus

on the equal distribution of their questions across all groups. Any displays and references to mathematics in society, show positive role models of gender, race, ethnicity and disabilities.

16 SPIRITUAL, MORAL, SOCIAL, CULTURAL EXPERIENCE

There are many opportunities to develop a sense of awe and wonder in mathematics including figuring out divine proportions and the golden ratio, walking mosaic floors to investigate symmetry, cracking codes and appreciating and understanding the maths of art and design. Teaching will also emphasise that the mathematics we know and use today is the result of development over a very long period of time and from cultures around the world including the Romans and Ancient Egyptians.

17 RESOURCES

Mathematical equipment and resources are readily available in order to enable children to make appropriate choices about the level of scaffolding they need for a given task. Resources are stored centrally for use by all; key manipulatives that are used regularly in lessons are stored in individual classrooms.

Every classroom has a relevant mathematical display which children can refer to and interact with, in order to reinforce and develop understanding of mathematical concepts. Knowledge and understanding of time is reinforced by permanent clock displays in each classroom along with a 'how to form digits' display to ensure accurate formation of digits from Reception onwards. Numberlines are displayed in all classrooms.

18 PRESENTATION

In Reception, evidence of children's mathematics learning is annotated and collated in their individual learning folder. Children in Key Stage 1 record their learning in A4 books with blank pages. The shortened date and title is displayed at the beginning of each piece of work, either written by the children or word processed and stuck in. Additional work in KS1 is stored in individual children's folders. In Key Stage 2, A4 books with squares are used. It is

expected that children underline the date and title with a ruler and draw margins at the left of their page. The title at the beginning of each piece of work (written by children) communicates the focus of the learning for that lesson.

19 CONTRIBUTION OF MATHS TO THE WIDER CURRICULUM

English

Mathematics contributes significantly to the teaching of English by actively promoting the skills of reading, writing, speaking and listening. This is recognised within the National Curriculum for maths where speaking and listening objectives are suggested for each block within each year group.

Mathematics lessons can help to develop and support pupils' literacy skills: for example, by teaching mathematical vocabulary and technical terms, by asking children to read and interpret problems to identify the mathematical content, and by encouraging them to explain, argue and present their conclusions to others. Equally, English lessons can support the mathematics lesson. For example fiction and non-fiction texts can be chosen in which interpretation of mathematical vocabulary, graphs, charts and tables is required.

ICT

The effective use of ICT can enhance the teaching and learning of mathematics when used appropriately. When considering its use, we take into account the following points:

- ICT should enhance good mathematics teaching. It should be used in lessons only if it supports good practice in teaching mathematics.
- any decision about using ICT in a particular lesson or sequence of lessons must be directly related to the teaching and learning objectives for those lessons.
- ICT should be used if the teacher and/or the children can achieve something more effectively with it than without it.

Science

Science investigations are excellent opportunities to apply mathematical skills including classifying, measuring, calculating, estimating and recording in tables and graphs. Children will be required to order numbers, including decimals; calculate the simple mean and use and interpret percentages; use negative numbers; decide whether it is more appropriate to use a line graph or bar chart; and plot, interpret and predict from graphs.

Art and Design & Technology (DT)

Knowledge and understanding of maths can be linked to Art and Design and DT. Understanding of perspective can be linked to development of enlargement and scale factor; definition of 2D and 3D shapes links with similar and congruent shapes related to artists and periods of art such as Escher and Cubism; and the Fibonacci sequence can be linked with studies of the life and work of Leonardo da Vinci.

In DT, children put into practise their measuring skills, ability to read and interpret scales, and interpret data in cooking, sewing and construction.

History, Geography and Religious Education

The study of maps includes the use of co-ordinates and ideas of angle, direction, position, scale and ratio. The pattern of the days of the week, the calendar and recurring annual festivals all have a mathematical basis. For older children historical ideas require understanding of the passage of time, which can be illustrated on a time line. Themes such as 'Egyptology' in Year 3 and 'Romans' in Year 4 provide opportunities to explore ancient number systems.

Physical Education and Music

Athletic activities require measurement of height, distance and time, while ideas of counting, time, symmetry, movement, position and direction are used extensively in music, dance, gymnastics and ball games. In music, children explore patterns of sound and mathematical links between number and musical notation.

Personal, Social and Health Education (PSHE)

Mathematics contributes to the teaching of personal, social and health education. It encourages independent study and helps them to become increasingly responsible for their own learning. The planned activities that children do within the classroom encourage them to work together and respect each other's views. Financial literacy is actively taught in Upper Key Stage 2 including use and understanding of budgets. Children are encouraged to be enterprising in their efforts to raise money for charity.