

# Mathematics Policy

Blessed John Duckett School is a Catholic School and God's love is at the centre of our community.

We experience prayer and worship together, share and recognise pupils' understanding and deepening of the Christian faith.

By working together, we strive to meet the spiritual, pastoral and academic needs of our children and community.

We demonstrate our love by caring for God's world and the diverse people in it.

We aim for respect, fairness and justice in all we do.

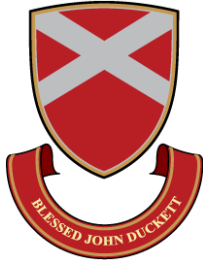
Policy agreed by Staff Summer Term 2020

Signed *Mrs S. McQuiggin* Headteacher

Agreed by Governors Summer Term 2020

Signed *Mrs E. McGurk* Chair of Governors

To be reviewed Summer Term 2022

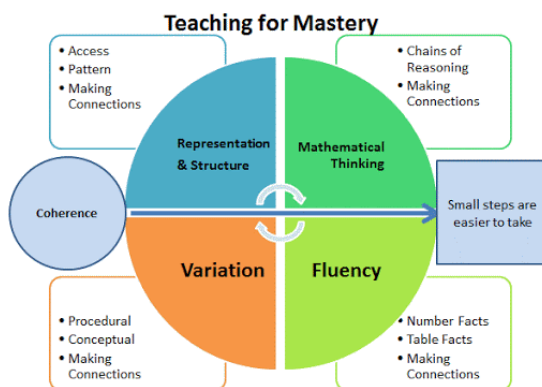


### Introduction

At Blessed John Duckett Primary School, we are committed to providing all children with learning opportunities to engage in Mathematics. This policy reflects our school's values and philosophy in relation to teaching and learning. It sets out a framework within which teaching and non-teaching staff can work, and gives guidance on planning, teaching and assessment. It has been developed through a process of consultation with school staff and Governors.

### Rationale

At Blessed John Duckett Primary School we use a mastery approach to the teaching and learning of mathematics; underpinned by the NCETM's 5 big ideas:-



We design learning experiences to promote the embedding of mathematical thinking, to enable able children to make connections between areas of mathematics and apply reasoning skills. We pay careful attention to the use of a variety of representations and lessons structures, to ensure concepts are explored using concrete, pictorial and abstract representations. Coherence is facilitated by the planning of small connected steps to link each question and lesson within a topic. Variation, both procedural and conceptual, ensures that connections between areas of learning in maths is made on a lesson by lesson basis. A clear and consistent focus on number and times table facts enables the pupils to become fluent in their mathematical skills.

This methodology provides pupils with a set of tools that include reasoning and problem-solving skills and the ability to think in abstract ways. We aim to instil an enthusiastic attitude towards mathematics that will stay with them for life.

#### **Mathematical Thinking:**

- Looking for pattern and relationships
- Logical Reasoning
- Making Connections

#### **Representation & Structure:**

Mathematical structures are the key patterns and generalisations that underpin sets of numbers – they are the laws and relationships that we want children to spot. Using different representations can help children to ‘see’ these laws and relationships.

**Variation:**

**Procedural variation** – This is a deliberate change in the type of examples used and questions set, to draw attention to certain features.

**Conceptual variation** – When a concept is presented in different ways, to show what a concept is, in all of its different forms.

**Fluency:**

- Quick recall of facts and procedures
- The flexibility and fluidity to move between different contexts and representations of mathematics.
- The ability to recognise relationships and make connections in mathematics

**Statement of Intent**

At Blessed John Duckett RC Primary School, it is our intention to provide a mathematics curriculum:

That is high-quality therefore providing 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. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment.

Maths 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.

At BJD to expect all children to:

- 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.
- be able to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- 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.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas.

The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.

The expectation is that 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.

Every opportunity is provided to enhance children's experiences both in and outside the classroom, by way of outdoor learning, community links, educational visits and visitors.

### **Legal Framework: The National Curriculum**

We use the National Curriculum for Mathematics (2014) building on the principles of the EYFS Statutory Framework Guidance as the basis for our mathematics programme. With a great commitment to ensuring pupils achieve mastery in the key concepts that are appropriate for their age group, in order to make good progress and avoid developing gaps in their understanding.

Maths is taught daily. Children are given opportunities at the start of lessons to refer back to previous learning and also embed fluency in number bonds and times tables.

The aims of the 2014 National Curriculum are for our pupils to:

- become fluent in the fundamentals of mathematics through varied and frequent practice with complexity increasing over time.
- develop conceptual understanding and ability to recall and apply knowledge rapidly and accurately.
- reason mathematically; follow a line of enquiry, conjecture relationships and generalisations.
- develop an argument, justification and proof by using mathematical language.
- problem solve by applying knowledge to a variety of routine and non-routine problems, breaking down problems into simpler steps and persevering in answering.

The National Curriculum sets out year-by-year programmes of study for key stages 1 and 2. This ensures continuity and progression in the teaching of mathematics. The EYFS Statutory Framework 2014 sets standards for the learning, development and care of children from birth to five years old and supports an integrated approach to early learning.

The EYFS Framework in relation to mathematics aims for our pupils to:

- develop and improve their skills in counting
- understand and use numbers
- calculate simple addition and subtraction problems
- describe shapes, spaces, and measures

### **Aims and Objectives**

- To 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.

- To reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- To 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.
- To promote children's curiosity and enable them to safely take risks and learn from first hand experience wherever necessary
- To support the children to become fluent in mathematical understanding from the most basic level so that they can build upon their own understanding.
- To enable our children to develop conceptual understanding, recall of number facts and patterns and apply their knowledge rapidly and accurately.
- To promote children's ability to reason through opportunities to discuss their thinking and understanding. This emphasis may result in less written work but much deeper understanding.
- To promote problem solving and solution finding. This is not only true in mathematical learning but in almost all aspects of school life.
- To ensure children progress at their own pace.

### **Roles and Responsibilities**

The Maths Subject Lead is expected to:

- teach demonstration lessons
- ensure that teachers and trainee teachers are familiar with the framework for maths and plan accordingly
- lead by example in respect of planning, teaching and assessment in own classroom.
- prepare, organise and lead CPD, with support of the Head Teacher
- support the Head Teacher in carrying out the audit and setting targets for the future
- work co-operatively with the SENCO in providing advice and support for staff
- monitor and evaluate standards in maths across the school
- analyse results
- support staff in provision for all pupils, considering the use of resources and allocation of time.
- attend relevant CPD and Network meetings

### **Subject Content Overview**

#### **EYFS**

Mathematics within the EYFS is developed through purposeful, play based experiences and will be represented throughout the indoor and outdoor provision. The learning is based on pupil's interests and current themes. Mathematical understanding is developed through stories, songs, games, imaginative play, child-initiated learning and structured teaching. As pupils progress, they are encouraged to record their mathematical thinking in a more formal way.

#### **Key Stage One**

The principal focus of mathematics teaching in key stage 1 is to ensure pupils develop confidence and mental fluency. The essential idea behind the mastery approach is that all children have a deep understanding so that future learning continues to build on solid

foundations. The subject is represented using concrete materials, pictorial representations and abstract symbols, to allow children to visualise maths in varied ways, see connections and to independently explore and investigate a topic. Practical activities and resources offer the children a deeper mathematical understanding of more complex concepts. Providing children with visual representations also offers a scaffold when developing a more robust understanding of maths.

Children gain a secure knowledge of number and place value and become confident when using the four operations in both formal methods as well as problem solving where often the approach is not immediately evident. Alongside number work, pupils begin to identify fractions using shapes, objects and quantities and make connections to equal sharing and grouping. Pupils are taught to count to ten in fractions, recognise equivalent fractions and develop their understanding of fractions on a number line. At this stage, pupils will also develop their ability to recognise, describe, draw, compare and sort different shapes. Pupils have the opportunity to use a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money and are expected to use related vocabulary for all topics.

### **Key Stage Two**

**Lower Key Stage 2:** The principal focus of mathematics teaching in lower Key Stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. Pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. Pupils develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching ensures that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. Children are encouraged to use measuring instruments with accuracy and make connections between measure and number. By the end of Year 4, pupils are expected to have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

**Upper Key Stage 2:** The principal focus of mathematics teaching in upper Key Stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. Pupils develop an understanding of the connections between multiplication and division with fractions, decimals, percentages and ratio. They are given the opportunity to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures consolidates and extends knowledge developed in number. Teaching ensures that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of Year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.

### **Planning**

Our curriculum planning is in three phases, long-term, medium-term and short-term.

### **Long term planning**

The National Curriculum for Mathematics 2014 and the Early Learning Goals (Number, Shape Space & Measure) provide the long term planning for mathematics taught in the school.

### **Medium term planning**

Blessed John Duckett use the White Rose Maths Hub schemes of learning as their medium-term planning documents. These schemes provide teachers with exemplification for maths objectives and are broken down into fluency, reasoning and problem solving, key aims of the National Curriculum. They support a mastery approach to teaching and learning and have number at their heart. They ensure teachers stay in the required key stage and support the ideal of depth before breadth. They support pupils working together as a whole group and provide plenty of time to build reasoning and problem-solving elements into the curriculum.

### **Short term planning**

Teachers base their short-term planning on the areas indicated by the White Rose Hub scheme together with the mastery approach to ensure learning is achieved through small incremental steps with the emphasis on varied representation and fluency. All lessons are design with an element of recap linking previous learning to new learning and the opportunities for children to develop their reasoning and problem-solving skills.

### **Teaching and Learning**

Teachers use a range of teaching strategies to engage the children in maths and ensure progress is made by all children within a class; no set formula is used. A typical lesson would include:

- Both teaching input and pupil activities,
- A balance between whole class, guided grouped and independent work, (groups, pairs and individual work)
- Effectively differentiated activities/objectives and appropriate challenge
- Fluency, reasoning and problem-solving activities

Sometimes the focus for the session is new learning, at other times pupils may be practising, to master the application of a concept they have learned earlier. The focus of the session may vary for different children depending on their learning needs.

At times there may be opportunities to develop skills and understanding of mathematics through additional activities, some of which may take place at home.

The expectation is that 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 are challenged by 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.

Teachers break the mathematics down into small steps to develop mastery and address all aspects in a logical progression, this will ensure a deep and sustainable learning for all pupils. As a result of teaching and learning in mathematics, our aim is that pupils will be able to meet the key aims of the National Curriculum for maths.

## **Assessment**

Teachers integrate the use of formative assessment strategies such as effective questioning, clear learning objectives, the use of success criteria and effective feedback and response in their teaching.

The school's Assessment and Marking Policies inform high quality feedback and pupils' response to it in mathematics. Throughout lessons teachers continuously appraise each child's learning and progress in order to meet each child's individual need. Children are also encouraged to self-assess their learning and progress on a lesson by lesson basis giving them a sense of success. Children's work is marked in line with the Marking Policy providing feedback, modelling, opportunities for consolidation, to enable misconceptions to be addressed or provide further challenge.

This continuous and regular assessment in a wide variety of ways feeds in to each teachers' future planning and thus each child's smooth progress through the curriculum targets.

Using termly tests, pupils are assessed against NC criteria every term. The school's progress tracking system is updated termly. National Curriculum tests are used at the end of KS1 and 2; teachers use past and sample papers to inform their assessments as they prepare pupils for these assessments.

All assessments and teaching inform teachers understanding of a child's ability in maths and this is recorded on each child's personal KPI tracking grid.

## **Monitoring and Review**

Monitoring of children's progress begins with performance management review meetings but continues with the subject leader evaluating further evidence (such as data and scrutiny of pupil work) to ensure that the children are making progress. This informs decisions in respect of CPD required which may be whole school or individual. The subject lead meets regularly with a link governor to review the mathematics action plan.

## **Resources and Equipment**

Each class uses maths display in an interactive manner to enhance lessons on a day to day basis. Each classroom contains a range of level appropriate resources, concrete and pictorial to support children to grasp concepts. Mathematical vocabulary is displayed on a lesson by lesson basis in the form of stem sentences to support the explanation of thought processes when undertaking reasoning tasks. Example of good work are placed on display to model work and encourage a positive attitude and enthusiasm towards mathematics. **[Appendix 2 – Resource List]**

## **Curriculum Links**

We look for ways to incorporate maths into everyday life and into other areas of the curriculum as many subjects may have strong links to some maths topics allowing cross-curricular teaching; for example, measure in science; date order in history, distance, direct and co-ordinates in geography. This enables children to deepen their understanding of key concepts and make better informed design decisions and provides a context for developing learning in several areas. Children's achievement in mathematics is given a tremendous boost by looking across the curriculum for engaging context ensuring we continually maximise learning opportunities for all pupils across the entire curriculum.

## **Home School Links**



Topic overviews provide information to parents about what their children will be studying throughout the term. Parents are also informed of termly school visits and/or visitors which are organised to further enrich our curriculum.

Parents have the opportunity to attend consultation evenings on a termly basis. This concludes with an annual written report outlining pupil progress within all curriculum subjects. Curriculum Information is also provided on the school website.

Homework tasks are given on a termly basis in line with the topic being studied. This provides children with the opportunity to investigate, research and reinforce their skills in a practical, creative way. Homework tasks are cross curricular and designed in such a way to engage children and families in their own learning. [Homework Policy]

### **Equal Opportunities**

At Blessed John Duckett RC Primary School we have due regard for our duties under the Equality Act 2010. Children are given opportunities to work with others, listen to each other and treat everyone with respect. We will ensure that we eliminate discrimination, advance equality of opportunity and foster good relations. We aim for every pupil to fulfil their potential no matter what his/her background or personal circumstances.

Please refer to our Equality Statement.

### **SEND**

Through our maths teaching we provide learning opportunities that enable all pupils to make progress. We all recognise the importance of ensuring that children with identified Special Educational Needs and/or Disabilities have access to an ambitious curriculum. Within Mathematics, children with SEND will be provided with reasonable adjustments through their tasks and level of challenge provided. Advice can be sought from the school's SENDco where applicable.

Please refer to the SEND Policy

### **Health and Safety**

Where children use computers for work in Mathematics, the school has an e-safety policy to protect the staff, pupils and the school. Full risk assessments on all aspects of off-site visits are carried out by class teachers to ensure that all children, staff and adult helpers are kept safe and secure whilst away from the school environment.

### **SMSC**

In line with our mission statement, in working together, we strive to meet the spiritual, pastoral and academic needs of our children and community.

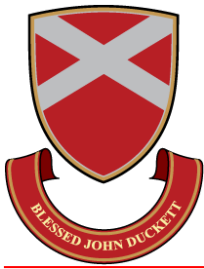
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### **Safeguarding**

This school is committed to safeguarding and promoting the welfare of children and young people and expects all staff and volunteers to share this commitment.

Please refer to the Safeguarding Policy.



	Autumn	Spring	Summer
<b>EYFS</b>	<p><b>Phase 1:</b> Number - Match and Sort Compare Amounts Measure, Shape &amp; Spatial Thinking - Compare size, mass &amp; capacity Exploring Pattern</p> <p><b>Phase 2:</b> Number - Representing 1,2,3 Comparing 1,2,3 Composition of 1,2,3 Measure, Shape &amp; Spatial Thinking - Circles and Triangles Positional Language</p> <p><b>Phase 3:</b> Number - Representing numbers to 5 One more and less Measure, Shape &amp; Spatial Thinking – Shapes with 4 sides Time</p>	<p><b>Phase 1:</b> Number – Introducing Zero Comparing numbers to 5 Composition of 4 &amp; 5 Measure, Shape &amp; Spatial Thinking - Compare mass Compare capacity</p> <p><b>Phase 2:</b> Number – 6, 7 &amp; 8 Making pairs Combining 2 groups Measure, Shape &amp; Spatial Thinking – Length &amp; Height Time</p> <p><b>Phase 3:</b> Number – 9 &amp; 10 Comparing numbers to 10 Bonds to 10 Measure, Shape &amp; Spatial Thinking – 3D shape Pattern</p>	<p><b>Phase 1:</b> Number – Measure, Shape &amp; Spatial Thinking -</p> <p><b>Phase 2:</b> Number – Numbers to 20 Measure, Shape &amp; Spatial Thinking -Sequencing</p> <p><b>Phase 3:</b> Number – Measure, Shape &amp; Spatial Thinking – Pattern</p>
<b>KS 1</b>	<p>Week 1-3: Place Value Y1: Numbers to 20 Y2: Numbers to 100</p> <p>Week 4-9: Number: Addition and Subtraction Y1: Numbers within 20 (inc money) Y2: Numbers within 100 (inc money)</p> <p>Week 10-12: Number Y1: Place Value to 50 and multiplication Y2: Multiplication</p>	<p>Week 1-2: Number Y1: Division &amp; Consolidation Y2: Division</p> <p>Week 3-4: Y1: Place Value to 100 Y2: Statistics</p> <p>Week 5: Measurement: Length and Height</p> <p>Week 6- 8: Geometry Y1: Shape and Consolidation Y2: Properties of shape</p> <p>Week 9-12: Number Y1: &amp; 2 Fractions</p>	<p>Week 1: Geometry Y1&amp;2: Position and Direction</p> <p>Week 2-3: Measurement: Time</p> <p>Week 4-5: Problem solving and efficient methods</p> <p>Week 6-8: Measurement Y1: Weight and Volume Y2: Mass, Capacity and Temperature</p>
<b>LKS 2</b>	<p>Week 1-4: Number Place Value</p> <p>Week 5-8: Number Addition and Subtraction</p> <p>Week 9-12: Number Multiplication and Division</p>	<p>Week 1-2: Number Multiplication and Division</p> <p>Week 3-4: Measurement Length, Perimeter and Area</p> <p>Week 5-8: Number: Fractions</p> <p>Week 9-12 Y3: Measurement: Mass and Capacity Y4: Number: Decimals</p>	<p>Week 1-3: Number Decimals (including money)</p> <p>Week 4-5: Measurement: Time</p> <p>Week 6-7: Statistics</p> <p>Week 8-12: Geometry Properties of Shape (including Y4 Position and Direction)</p>
<b>UKS 2</b>	<p>Week 1-4: Place Value</p> <p>Week 5-9: Four Operations</p> <p>Week 10: Prime Numbers</p> <p>Week 11-12: Statistics</p>	<p>Week 1-4: Number: Fractions</p> <p>Week 5-6: Decimals</p> <p>Week 7-8: Percentages</p> <p>Week 9-10: Geometry Angles and Shapes</p> <p>Week 11: Geometry Position and Direction</p>	<p>Week 1: Converting Units</p> <p>Week 2: Area and Perimeter</p> <p>Week 3: Volume</p> <p>Week 4-5: Y5: Measures Y6: Algebra</p> <p>Week 6: SATs</p> <p>Week 7-12 Consolidation &amp; investigations</p>