Blessed Robert Widmerpool Catholic
Primary and Nursery School

Mathematics Policy

Mathematics - "… the seal of perfection, full of wisdom and perfect in beauty."
Ezekial 28:12

INTENT:

To

- teach our children to make sense of the world around
- enable our children to understand and appreciate relationships and pattern in both number and space in their everyday lives
- develop mastery of maths in our pupils: confident, resilient mathematicians with deep understanding, who choose the most fluent methods; reason in a range of ways; and understand how to problem-solve securely
- support our children in learning to appreciate the contribution made by many societies to the development and application of mathematics

IMPLEMENTATION:

By

- developing children's ability to calculate, to reason and to solve problems
- providing and building on a rich, engaging and creative maths curriculum for all children that uses a range of representations to connect concepts across objects, images, symbols and words
- ensuring learning is sequenced, progressive and systematic with clear feedback for improvement and support that enables children to know what to do to improve
- using a mastery approach that breaks the learning down into manageable, small-steps accessible to the majority of pupils
- providing opportunities that challenge children, teaching them to value mistakes and approach learning positively
- planned repetition to support revisiting, recalling and practicing to ensure learning is embedded into long-term memory
- working across our community to ensure children receive adequate support at home in order to continue to make good progress

IMPACT:

So that children

- understand the importance of mathematics in everyday life
- feel enjoyment and enthusiasm for learning through a range of creative, real-life, cross-curricular explorations of maths
- develop true depth of thinking through fluency, reasoning and problem-solving
- are resilient, confident and competent masters of all areas of the mathematics curriculum
- make even greater academic attainment and progress in the subject of maths

The below policy explains in more depth how our intentions and impacts are implemented,.

→ Learning and Teaching

A variety of learning and teaching pedagogies are used. Children's knowledge, skills, and understanding in mathematics is developed through whole-class, group teaching and peer-to-peer teaching.

Opportunities are provided for children to use skills in relevant and meaningful ways. Children are encouraged to take responsibility for their learning in a metacognitive atmosphere where targets are shared and children encouraged to recognise their own and other's strengths and weaknesses. Children are supported and

challenged in small, sequential steps accessible to the majority. Differentiation is present in the form of adult support. Lessons are very fluid and formative feedback informs in-the-moment intervention in each lesson, as well as in pre and post follow up teaching. Challenge tasks are made available for children . They decide when to challenge themselves and when to boost their confidence, and they know how to do this.

Daily mathematics lessons where appropriate include ten minutes of fluency practise and recall, as well as whole-class, group-direct teaching and one-to-one teaching that promotes reasoning and problem-solving opportunities. Recall quizzes are planned in twice a week to revisit learning from days, weeks and years gone by. Metacognitive opportunities are provided to enable children the chance to self-assess as well as identify effective strategies for success. These are supported and scaffolded with the use of sentence stems to aid reasoning. During maths lessons, children are encouraged to ask as well as answer mathematical questions independently and collaboratively.

Planning reflects a commitment to taking learning outside and provides high quality outdoor learning opportunities. In addition, opportunities are provided so that children use a wide range of resources such as number lines, number squares, digit cards, Numicon, Cuisenaire, place values counters, ten frames and apparatus to support and master their understanding. Mathematical dictionaries are available in all classrooms. Children use computing (iPads, visualisers and interactive whiteboards) in mathematics lessons where it will enhance their learning, as in modelling ideas and methods. Online resources such as Times Table Rock Stars, NumBots and Mathletics are used to pre-teach, assess and consolidate learning also.

Our mathematics curriculum is a mastery curriculum. This means that pupils access the same tasks, however, too cater for a range of abilities, learning opportunities are provided for all children through adult-supported groups within the lesson as well as before and after. Formative assessment takes place throughout a lesson to enable teachers to identify pupils that may need confidence-boosting as well as challenging. These strategies support the school to fulfil the expectation that children move through the curriculum at broadly the same pace. by matching the challenge of the task to the ability of the child. Where possible, opportunities to practise fluency, reasoning and problem-solving are provided in every maths lesson.

Children are encouraged to apply their learning in new and everyday situations. Children are encouraged to work in pairs throughout lessons as well as on rich, investigative, open-ended problems or games. Teaching assistants support children and enable work to be matched to the needs of individuals.

→ Curriculum Planning

Mathematics is a core subject in the National Curriculum. The 2014 Primary Curriculum is used as the basis for implementing the statutory requirements of the programme of study for mathematics.

The BRW Calculation Policy gives an outline of key mental and written methods to be taught, while key objectives are identified through assessment descriptors for both teachers and pupils.

The 2014 Primary Curriculum, the White Rose Schemes of Work and the NCETM's 'Ready-To-Progress' documents form the basis of our Teaching Overview and out 'Knowledge, Skills and Progression' (KSPs) documents. These show clear blocks broken down in smaller, mastery steps that form the key knowledge and progression expected in each strand: Place Value, Four Operations, Fractions, Decimals, Percentages, Geometry, Measurement, Statistics and Algebra. These define what is to be taught and when and are adjusted with teacher professionalism and discretion. They ensure an appropriate balance and distribution of work across each term according to the expectations of the curriculum, and are complemented with a range of other resources such as White Rose Premium, CGP Text Books, Maths No Problem, Target Your Maths and I See Reasoning.

Class teachers complete a weekly plan for the teaching of mathematics. This plan lists the specific learning objectives for each lesson and gives details of how the lessons are to be taught. It also includes predictions of how each group of children will be learning in each lesson.

The class teacher keeps these individual plans and they can also be found on the server.
The Mathematics curriculum team monitor the subject, through book looks, learning walks, governor meetings and pupil / teacher voice.

→ Home School Links

Parents are involved in the school's maths curriculum through informal discussion and the use of home school diaries as well as Maths Passports and parent consultation meetings. They support the learning of key number facts and consolidation of work done in school where necessary in the form of homework tasks. Online resources such as Times Table Rock Stars, NumBots and Mathletics also provide weekly opportunities for parents to support their child's learning at home.

Targets are communicated to both parents and children at the beginning of each academic year and reiterated during each term through consultations and annual reports. This ensures that parents are part of the target setting process and that children are taking responsibility for their learning.

→ Foundation Stage

The core aim of mathematical learning in the Foundation Stage is to develop number sense.

Number sense

1. An awareness of the relationship between number and quantity
2. An understanding of number symbols, vocabulary and meaning
3. The ability to engage in systematic counting, including notions of cardinality and ordinality
4. An awareness of magnitude and comparisons between different magnitudes
5. An understanding of different representations of number
6. Competence with simple mathematical operations
7. An awareness of number patterns including recognising missing numbers

Back (2014)

Children develop number sense within an enabling environment with positive role-models supporting their learning. At BRW, Teaching Assistants working in the Foundation Stage have had CPD to develop their confidence and their maths subject knowledge. This enables them to be positive, to support children to know how to deal with mathematical problems and to notice the mathematical opportunities throughout the continuous provision.

Maths Planning in Foundation Stage 1 and 2 is systematic and allows for the deepening of learning within the four key aspects of:

- Counting – finding how many
- Cardinality - quantity
- Comparison – relative size
- Composition – numbers made up of numbers

In addition, the importance of pattern is recognised and planned for systematically.

Pattern is less a topic of mathematics than a defining quality of mathematics itself. Mathematics "makes sense" because its patterns allow us to generalize our understanding from one situation to another. Children who expect mathematics to "make sense" look for patterns. Children need many opportunities to discover and talk about patterns in mathematics. These experiences help them form the attitude and confidence that mathematics should make sense, the crucial foundation all children need to become persistent and flexible problem solvers.

Erikson Institute

What is a pattern?

- Something that we perceive which helps us make sense and find order
- Any predictable sequence
- Includes single item patterns
- Repeating patterns have a unit of repeat (not an alternating element)
- 'Seeing' a pattern requires attention to specific characteristics

Lynn M. McGarvey (2012) What Is a Pattern? Criteria Used by Teachers and Young Children, Mathematical Thinking and Learning, 14:4, 310-337

For more information on the progression of pattern please see the Foundation Unit policy.

→ Contribution of Mathematics to Teaching in Other Curriculum Areas

Opportunities for linking the application of mathematics through other subjects has a high priority. The focus mathematics across all subjects can be achieved in the following ways:

→ English

Mathematics contributes significantly to the teaching of English by actively promoting the skills of reading, writing, speaking and listening. Children are encouraged to read and interpret multi-step problems in order to identify the mathematics involved. Children explain and present their work to others during plenary sessions. Younger children enjoy stories and rhyme that rely on counting and sequencing. Older children encounter mathematical vocabulary, graphs and charts when using non-fiction texts.

→ Computing

Children use and apply mathematics in a variety of ways when solving problems using Computing. Younger children use Computing to communicate results with appropriate mathematical symbols. Older children use it to produce graphs and tables when explaining their results or when creating repeating patterns, rotations and translations. When working on control, children use standard and non-standard measures for distance and angle. They use simulations, coding, algorithms and programming to identify patterns and relationships and produce instructions. Furthermore, online resources provide chances for children to prepare for and deepen their learning.

→ Science

In Science, children have a range of opportunities to utilise their mastery of maths: when sorting and organising data in tables; when using statistics gathered from experiments to represent data visually in a range of different charts; when planning experiments and considering units of measurement; when considering dependent and independent variables such as time and position. Science demands a strategic way of thinking that develops the skills of making links across ideas and concepts. This is key in maths. The relational thinking that BRW Science fosters complements BRW Maths effectively.

→ Wider Curriculum

In the Wider Curriculum, maths again is intrinsically threaded throughout the learning and teaching. Children engage with high-quality tasks and activities that recall mathematical knowledge as well as deepen it.

- In PE, children rely on the ability to count; identify patterns and rhythms; divide and multiply and sort and classify in a range of sports such as athletics, dance and multi-sports

- In DT, children use measure, shape and position understanding to plan, make, test and evaluate products
- In Art, space, measure and shape play a large role in creating, with skills in depth, proportion and symmetry all playing a part in the process
- In Music, patterns, counting and algebraic thinking are used to support children's understanding of notation
- In History, the study of a range of significant people (scientists, engineers, doctors and inventors) encourages reflection on and appreciation of the contribution maths makes to society
- In Geography, map work, grid references and sorting, organising and classifying data all provide children with opportunities to connect their mathematical understanding
- In French, children count forwards and backwards as well as practice writing and saying the dates. They also learn directions

These are only a few examples, with more evidence available in the Maths portfolio online.

→ Spiritual, Moral, Social And Cultural Development and British Values

Mathematics contributes to the teaching of personal, social and health education, and citizenship. The work that children do outside their normal lessons 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.

Older children are presented with real-life situations in their work on the spending of money. Children also learn about the different scientists, mathematicians and regions of the worlds that have contributed to the discipline of maths. An appreciation of these different cultures and their impacts on maths is encouraged.

The teaching of mathematics supports the social development of our children through the way they are expected to co-operate with each other in lessons. Children are grouped so that they can work together, and are encouraged to discuss their ideas and results.

→ Special Educational Needs

Mathematics forms part of the school curriculum policy to provide a broad and balanced education to all children. Provision is highly personalised and high-expectations are set for all children. Quality First Teaching is at the heart of learning and teaching, with ambition for all pupils promoted in every lesson. Learning opportunities provided are matched to the needs of children. Targets are set for individual children in their Individual Provision Maps where appropriate. For further information, please refer to the 'BRW Whole School Provision' document and 'A Typical BRW Maths Lesson' document.

→ Resources

The school is well resourced and although some equipment is centrally stored, each class has a wide range of appropriate small apparatus and software for use with classroom computers. Mathematical dictionaries are available in all classrooms. Classrooms are organised so that resources are easily accessed and enable children to work independently.

Each class has a wide range of maths games all of which are linked to the curriculum, and central base of resources can be found in the staff room corridor.

A library of professional reading provides essential access for all staff to research and ideas.
The Maths Coordinator takes responsibility for regular review of resources in staff meetings and after CPD, as well as conducting and annual resource audit, so that priorities can be identified.

→ Assessment and Recording

Formative assessment takes place in an ongoing manner in lessons with the use of pre-teaching; mini-quizzes (pre-assessments) metacognitive planning, monitoring and evaluating; and post-teaching in the lesson or after. Self-checking is also encouraged in age-appropriate classrooms. Answers are made available in the lessons so that mistakes and misconceptions can be dealt with in a timely manner (within ten minutes of a lesson starting). Support is given accordingly.

Children receive 'next-step', 'consolidation' and 'recall' challenges a minimum of twice weekly based on the judgement of class teachers. These provide pupils with the means of revising, committing learning to long-term memory and teachers with another way to assess genuine understanding. Regular, planned repetition also aids this process.

Short-term assessments help teachers to adjust daily plans. These short-term assessments are matched closely to the teaching objectives. White Rose 'End of Block' assessments and weekly arithmetic tests form part of these short-term assessments. End-of-Term tests are also administered in order to help inform teacher assessments. These assess progress against school and national targets.

Teacher assessments measure progress against the key objectives, and enable teachers to plan effectively for the next unit of work. They enable teachers to set targets for the next school year and summarise the progress of each child. These assessments are communicated to parents through written reports and verbally at parents meetings depending on the year group.

Teacher assessments of children's progress are supported by the use of BRW assessment descriptors linked to the National Curriculum and any formal test results are analysed and used to identify strengths, weaknesses and trends. This enables us to set challenging targets across the school and informs teacher assessment.

The attainment of children is projected to the end of the year using progress charts from end-of-term teacher assessments. Children in years 1, 2, 3 4 5 and 6 are then supported and extended through a range of differentiation (such as deepening through further problems, supporting through immediate intervention) when planning and track progress through KS2.

Samples of children's work are moderated as a school and as an academy and kept. These demonstrate what the expected level of achievement is in Mathematics in each year of the school and quality assure accurate assessments.

In addition, children are involved in self-assessment, metacognitive strategies and are aware of their targets through appropriate assessment descriptors personal to the pupil. They also participate in peer-assessment when marking tests, quizzes, classwork and homework.

→ Monitoring and Review

The monitoring of the standards of children's work and of the quality of teaching is the responsibility of the School Leadership Team, supported by the curriculum team and the several maths experts across OLOL academy. The role of the team involves supporting colleagues, being informed about current developments in the subject, and providing a strategic lead and direction for the subject in the school. The team informs the Management Team of their evaluation of the strengths and weaknesses in the subject and indicates areas for further improvement.

A member of the curriculum team has specially-allocated, regular management time every half term in order to review, report and act upon evidence from children's work and pupil and staff voice; update development plans; plan necessary CPD in response to findings; and work alongside teachers to support and evaluate learning and teaching across the school in the form of coaching. The monitoring cycle is broken down in the school's 'Subject Leader Key Actions' document.

Lesson observations and learning walks of maths teaching across the school are made by the HT/ DHT / Ofsted Consultants / Maths Coordinator. Feedback from these monitoring activities is discussed with class teachers within a week, and actions and development points are established.

Measuring and monitoring the impacts in the above way is an ongoing cycle.

This policy will be reviewed in September 2023