



CLIFTON COMMUNITY PRIMARY SCHOOL

MATHS POLICY

'Enjoy and Achieve Together'

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Change History

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1	February 2020	Created to incorporate the Intent/Implementation and Impact of the Maths Curriculum	Co-ords/staff shared
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Maths

Intent

This policy (in conjunction with the Teaching and Learning policy) contributes to the school's philosophy of teaching and learning as expressed through our mission statement

The new National Curriculum states that:

“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.”

It is our belief that all children, regardless of ability, race or gender, should be encouraged and helped to realise their full potential in Maths. We want the children to see Mathematics as being relevant to their world and applicable to everyday life as well as being something that they will need as they move on through their school life and ultimately to the world of employment. To that end, a high-quality, inter-related and creative Maths experience should be one that develops the children's ability to think mathematically and one which allows them to apply the tools to which they have been exposed in a variety of ways. We place a strong emphasis on teaching Mathematical skills and concepts in concrete and practical contexts. Teachers should use models and practical activities which enable the children to use and apply skills, knowledge and understanding. Teachers have access to the 'Maths – No Problem!' scheme and a number of resources including White Rose Maths.

Following the introduction of the new National Curriculum in 2014 the emphasis has been to ensure that all children:

- Become **fluent**
- **Reason** and **explain** mathematically
- Can **solve problems**

This means that children need to be regularly exposed to opportunities involving increasingly complex problem solving which allows them to apply their Maths knowledge. In doing so they should be encouraged to develop an argument and line of enquiry which they can prove and justify using mathematical vocabulary. This includes the ability to break down problems, both routine and non-routine, into a series of steps.

To be a mathematician at Clifton means that you will have:

- An understanding of the important concepts and an ability to make connections within mathematics.
- A broad range of skills in using and applying mathematics.
- Fluent knowledge and recall of number facts and the number system.
- The ability to show initiative in solving problems in a wide range of contexts, including the new or unusual.

- The ability to think independently and to persevere when faced with challenges, showing a confidence of success.
- The ability to embrace the value of learning from mistakes and false starts.
- The ability to reason, generalise and make sense of solutions.
- Fluency in performing written and mental calculations and mathematical techniques.
- A wide range of mathematical vocabulary.
- A commitment to and passion for the subject.

Implementation

At Clifton we follow the 2016 National Curriculum, enriching and structuring it to meet the needs of our students.

It is important that children are allowed to explore Maths and present their findings not only in a written form but also visually; to that end the school adopt the CPA approach: concrete, pictorial, abstract. This allows the children to experience the physical aspects of Maths before finding a way to present their findings and understandings in a visual form before relying on the abstract numbers.

Foundation

In the Nursery and Reception much of the mathematics teaching takes place through structured play and practical activities and is often integrated with other areas of learning. Children are working towards the Early Learning Goals set out in the area of learning for Mathematical Development in the Foundation Curriculum document. In EYFS, children access practical activities which enable them to sort, use and identify different shapes and experiences space and measure. This is undertaken physically, pictorially and with numbers. Language development is a key concern. Children will be taught and encouraged to use appropriate mathematical language, as well as to ask and respond to questions such as “What would happen if?” Practical work and discussion may lead to some children beginning to record their mathematics.

Planning pays due regard to the Early Learning Goals and record keeping is an ongoing process based on the Foundation Stage Profile. Focus Mathematics provides a core of ideas through which to deliver the curriculum. By Reception children follow the objectives set out in the Numeracy Strategy and appropriate activities are chosen by staff to deliver the curriculum.

Key Stage 1 and Key Stage 2

The National Curriculum 2014 outlines what should be taught in each year group throughout KS1 and KS2. In this way the National Curriculum Programmes of Study are delivered in a balanced way. It is expected that most children within a particular year group will follow the objectives for that year group. Some children will be working from the previous year’s objectives while those who have ‘mastered’ their age related expectations will be working at a greater depth. Challenge is thus differentiated appropriately according to the ability of the child.

Year 1 – 6: Maths is taught daily through 4 x 1 hour lessons using the ‘Maths - No Problem!’ Scheme or through the use of maths resources available to teachers, such as White Rose Maths.

The focus of our maths curriculum is on teaching to mastery by ensuring a child thoroughly comprehends a topic before moving on. Ideas are revisited in a spiral as children progress through the school, each time at a higher level. We empathise problem-solving and children using their core

competencies to develop a relational understanding of mathematical concepts. To assist in this, we use the Maths – No problem! scheme of work across years 1- 5. This is a Singapore method of teaching mathematics that develops children's mathematical ability and confidence. The features of our maths teaching therefore include:

- Emphasis on problem solving and comprehension, allowing children to relate what they learn and to connect knowledge
- Careful scaffolding of core competencies of:
- visualisation, as a platform for comprehension
- mental strategies, to develop decision making abilities
- pattern recognition, to support the ability to make connections and generalise
- Emphasis on the foundations for learning and not on the content itself so children learn to think mathematically as opposed to merely reciting formulas or procedures

It is based upon nine units which the children continually re-visit within a spiral curriculum. They are: Number and Place Value; Addition and Subtraction; Multiplication and Division; Fractions; Decimals and Percentages; Statistics; Time and Money; Other Measures; Shape; and Position and Direction. Through these units we develop the following key mathematical threshold concepts:

- To know and use numbers
- To add and subtract
- To multiply and divide
- To use fractions
- To understand the properties of shapes
- To describe position, direction and movement
- To use measures
- To use statistics
- To use algebra

The children are assessed by the teacher during each unit against the age related expectations for these key threshold concepts. A termly assessment (made up of formal and informal assessments) is added to the school's tracking system to show pupil progression.

Year 6: Year 6 teachers use Maths – No Problem for particular topics in order to best suit the children in preparation for their SATs. Year 6 Maths lessons are built using the assessment of weekly arithmetic tests in order to provide the children with follow up lessons tailored to their needs whilst ensuring all objectives taken from the National Curriculum are being met.

Years 1 and 2 (Key Stage 1)

The principal focus of mathematics teaching in key stage 1 is to ensure that children develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources (for example, concrete objects and measuring tools). At this stage, children should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

By the end of year 2, children should:

- know the number bonds to 20 (using known facts to solve problems up to 100.
- know their 2, 5 and 10 multiplication tables and be precise in using and understanding place value. (An emphasis on practice at this early stage will aid fluency.)
- should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Years 3 and 4 (Lower Key Stage 2)

The principal focus of mathematics teaching in lower key stage 2 is to ensure that children become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that children develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. At this stage, children should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that children draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of year 4, children should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

At the end of year 4, children will take part in a Multiplication Table Check (MTC) which became statutory in 2020. The MTC is focused on the fluent recall of multiplication facts. The MTC will be delivered as an online, on-screen digital assessment. The check will take each pupil less than 5 minutes to complete. The check will be available over a 3 week window in June each year. Each assessment consists of 25 questions and children will have 6 seconds to enter a response to the question. There is an emphasis on the 6, 7, 8, 9 and 12 multiplication tables because these have been determined to be the most difficult multiplication tables. There will be no expected standard threshold for the MTC.

‘The purpose of the MTC is to determine whether year 4 children can fluently recall their multiplication tables. Although the check will help schools to identify children who require additional support, it is not intended as a diagnostic tool.’

In addition to this, children should be able to read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

Year 5 and 6 (Upper Key Stage 2)

The principal focus of mathematics teaching in upper key stage 2 is to ensure that children extend their understanding of the number system and place value to include larger integers. This should develop the connections that children make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, children should develop their ability 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, children are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that children classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of

year 6, children should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages. Children should read, spell and pronounce mathematical vocabulary correctly.

How do we teach maths?

We use the 'Maths – No problem!' Scheme which uses the ideas from Singapore maths as a support for our maths teaching across the school.

The teaching focuses on three modes of representation of mathematical ideas: the enactive, iconic and symbolic modes. Children are introduced to an idea through concrete apparatus (things they can touch and hold) and visual representations (things they can see) to help children to conceptualise and solve problems, allowing them to approach complicated problems, investigate and reason through them. Through this approach, children gain confidence as independent learners who are able to use resources and show resilience in solving problems.

Daily maths lessons at Clifton have certain key features:

1. Times tables/Counting

- Learning facts by heart is key to making sustained progress in mathematics: children can use the solution to one problem to help solve others.

- At Clifton, we use Times Tables Rockstars as a resource to support the children with their Times table knowledge. Times Table Rockstars is something which is used during the school weekly timetable and is also set for homework.

2. Mental maths

- Being able to solve problems in your head helps to develop mathematical confidence, flexibility with numbers, and understanding of place value.

- Children need opportunities to rehearse, revise, and refresh mental maths.

- Each week, 1 hour is specifically designated to mental arithmetic.

- Different objectives and areas of focus are met in line with the National Curriculum, each week. This is tailored to the needs of the class at that time or can often be used as time to address misconceptions.

3. Modelling and practice

- The teacher demonstrates (models) how to solve the problem.

- This is modelled clearly and consistently with regular opportunities for student participation.

- The children all rehearse this core skill. Over the course of a week students will do this in groups, pairs and independently.

4. Problem Solving

- The teacher returns to the maths problem and asks students how to solve it using their new skills.
- Students link their new skills to a problem which either requires them to solve a problem, prove something, test a statement or give an explanation.

- Students often find making links from one problem to another challenging and so through our questioning and consistency we really focus on this skill. This is particularly underlined in our investigations.

Display and Resources

- In the classrooms there should be, either on display or easily accessible to children, appropriate resources, particularly concrete and pictorial apparatus to support children to grasp concepts.
- Mathematical vocabulary should be displayed so that children use this in the communication of their understanding.
- There should be maths work on display in classrooms and in other areas of the school in order to encourage a positive attitude and enthusiasm towards mathematics for all groups of children.

Mathematical materials, equipment and Basic resources are stored in each classroom. All classrooms have the necessary resources to deliver the curriculum. Additional resources are held centrally. Teachers should also ensure central resources are not kept in classrooms when maths topics are completed. They must be returned to the central stock after a unit of work is finished. They are not classroom resources.

The mathematic Subject Leader should be informed when equipment needs replacing or supplementing. The children are shown how to take care of equipment and resources and progressively encouraged to select materials suitable for the task in which they are engaged.

Roles

The role of the subject leader:

The role of the subject leader is to:

- to provide a strategic lead and direction for the subject
- to support and offer advice to colleagues on issues related to the subject;
- to monitor pupil progress in that subject area;
- to provide efficient resource management for the subject.

It is the role of the Maths subject leader to keep up to date with developments in Maths, at both national and local level. They review the way the subject is taught in the school and plan for improvement. This development planning links to whole-school objectives. Each subject leader reviews the curriculum plans for their subject, ensures that there is full coverage of the National Curriculum and that progression is planned. They must then monitor and review this on a regular basis, by conducting book scrutiny, learning walks and through discussion with both children and staff. This will then inform future.

Parental Support and Homework

We recognise that parents make a significant difference to the children's progress in maths and encourage this essential partnership. Homework follows the school's Policy and is used for the following purposes:

- to practice a skill
- To learn something by rote such as times tables and formulae
- To revise for an assessment
- To explore a mathematical problem or question
- To research a topic

Monitoring and Assessment

Teachers continuously assess the children informally (formative assessment) through their marking and interactions with the children during lessons.

Across a range of lessons children should be allowed to engage in mathematical discussion (talk partner or group work), investigations, problem solving, practical experiences and written methods, as well as allowing for time to demonstrate their understanding through gap tasks.

In EYFS children's attainment and progress is tracked on a daily and weekly basis.

NFER Testing: As part of our formative assessment year's 3, 4 & 5 conduct NFER test in the autumn term, as a baseline assessment, and then again in the summer term to identify progress and inform attainment standards.

Impact:

Intended Outcomes

Our children will learn to:

- Develop the appropriate mathematical language associated with number, shape and position;
- Use and apply mathematics in practical tasks, in real life problems and in acquiring further knowledge, skills and understanding in the subject itself;
- Understand and use the four operations of number in relevant contexts;
- Understand relationships between numbers, learn basic number facts and develop a range of computational methods;
- Understand place value in our counting system and understand how it can be extended into numbers below zero.
- Use their mathematical skills in simple problem solving;
- Collect, interpret and represent data in tabular, graphical and diagrammatic form;
- Develop mental methods of calculation;
- Recognise, describe and represent shapes and patterns in terms of their properties, location and movement;
- Measure quantities including length, area, volume/capacity, angle, temperature, time and mass;

- By the time children reach Year 6 they will be introduced to ratio/ proportion and language of algebra as a means for solving a variety of problems.
- Be at the Age Related Expectations (ARE) at the end of their appropriate school year.

Safeguarding, Inclusion and Equal Opportunities:

At Clifton we have high aspirations and expectations for all children. Children learn and thrive when they are healthy, safe and engaged. In all subjects we are committed to safeguarding children and as such we maintain an ethos where children feel safe, encouraged to talk and are listened to. We ensure that children know they can approach and talk to adults if they are worried or in difficulty. We support children with their emotional wellbeing and health, recognising that subjects may sometimes be sensitive for children. Clifton Primary believes in inclusion and equal opportunities meaning that all children should have access to a broad and balanced curriculum, including Maths, which enables them to make the greatest progress possible according to their individual abilities. We provide learning opportunities that are matched to the needs of the children making reasonable adjustments where needed. Lessons are planned in advance addressing any potential areas of difficulty and barriers to the children achieving are removed. We will ensure that expectations do not limit children's achievements, supporting where there is a need and extending children's learning who need further challenging.

As per the Equality Act 2010, it is the responsibility of all teachers to ensure that all children irrespective of SEN, gender, ethnicity, social circumstance and ability (including gifted and able children), have access to the curriculum and make the greatest progress possible.

Review:

This policy will be reviewed annually by the Maths curriculum leader.

Appendixes

Appendix 1: Calculation Policy