Dunstall Hill Primary School

Mathematics Policy

At Dunstall Hill Primary School, we promote an inclusive curriculum where every child has the right to achieve their full potential. Children remain at the centre of the curriculum. We aim to inspire them, offer them a wide range of relevant curricular experiences and in doing so, develop the whole child as well enrich their language, which is vital for the children at our school. We continue to interweave our school motto "Together Everyone Achieves More" and core values into everything we do.

INTENT

At Dunstall Hill Primary School, we believe Mathematics is an important part of children's development throughout school, right from an early age. Our aim is for all children to think mathematically, enabling them to reason and solve problems effectively- experiencing a sense of awe and wonder as they solve a problem for the first time, discover different solutions and make connections between different areas of mathematics.

We intend on delivering a curriculum which:

- Allows children to be a part of creative and engaging lessons that will give them a range of opportunities to explore mathematics.

- Gives each pupil a chance to believe in themselves as mathematicians and develop the power of resilience and perseverance when faced with mathematical challenges.

- Recognises that mathematics underpins much of our daily lives and therefore is of paramount importance in order that children aspire and become successful in the next stages of their learning.

- Engages all children and entitles them to the same quality of teaching and learning opportunities, striving to achieve their potential, as they belong to our school community.

- Makes rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.

- Allows children to use and understand a wide range of appropriate mathematical language to discuss, explain and justify their mathematical thinking and reasoning.

- Provides opportunities for children to apply their mathematical knowledge to other subjects (cross-curricular links).

- Is in line with the expectations in the National Curriculum 2014.

Early Years Foundation Stage

Within the Early Years Foundation Stage, there are 7 areas of learning:

- 3 prime areas- Personal Social and Emotional Development, Communication & Language and Physical Development
- 4 specific areas- Literacy, *Mathematics,* Knowledge and Understanding of the World and Expressive Arts and Design

In mathematics, children are assessed at the end of the EYFS (Reception year in school) on two mathematical Early Learning Goals: Number and Numerical Patterns. Children at the expected level of development will reach the following levels within each category:

Early learning goal – Number

Children at the expected level of development will:

- have a deep understanding of number to 10, including the composition of each number;
- subitise (recognise quantities without counting) up to 5;
- automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

Early learning goal – Numerical Patterns

Children at the expected level of development will:

- verbally count beyond 20, recognising the pattern of the counting system;
- compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;
- explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Shape, Space and Measure principles are crucial and are also taught in EYFS. Children have opportunities to explore shape and links are made to Early Learning Goals. Shapes are discussed and are linked to numbers (e.g. 3 linking to triangles) during discussions and interactions. Shape and object sorting is available through continuous provision. Children are taught to use directional and positional language. Opportunities are provided for children to explore concepts of capacity, weight, length and height through provision and interactions.

Year 1-6

The National Curriculum for mathematics 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 develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- 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.

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. 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.

Key Stage 1 – Years 1 and 2

The principle focus of mathematics teaching in key stage 1 is to ensure that pupils 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, pupils 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, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.

Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Lower Key Stage 2 - Years 3 and 4

The principle 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. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure 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. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

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

Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word-reading knowledge and their knowledge of spelling.

Upper Key Stage 2 - Years 5 and 6

The principle 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. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils 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, pupils 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 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.

Pupils should read, spell and pronounce mathematical vocabulary correctly.

IMPLEMENTATION

At Dunstall Hill, to help children become competent with and to gain a deep understanding of new mathematical concepts, we follow a concrete-pictorial-abstract approach:

Concrete- Children have opportunities to use concrete (practical) objects and manipulatives to help them understand what they are doing.

Pictorial- Alongside the concrete, children use pictorial representations (where they are exposed to a range of representations to help draw out mathematical structures). These representations then help children to reason and problem solve.

Abstract- Both concrete and pictorial representations support children's understanding of abstract methods.

This approach contributes to children's conceptual understanding and conceptual understanding supports retention, which is our ultimate goal.

Nursery

Within our nursery provision, planned mathematical opportunities take place through rhymes, puzzles and stories. Other mathematical opportunities are provided through the enhancement of the continuous provision with maths resources. Within the nursery setting, there is also a dedicated maths area, where children are provided access to a range of maths manipulatives of their choice throughout the session. This is also an area where planned maths activities can be completed, if the adults feel it is appropriate. Most of the learning takes place through sensitive adult interactions throughout all of the learning areas in the setting, so that mathematical learning can happen anywhere and is practical wherever possible (e.g. counting conkers outside, finger painting numbers in the creative area, weighing babies in the home corner, etc.). This ensures that children are provided lots of opportunities and time to explore and repeat in play, along with sensitive interaction from adults who help children articulate their thinking through talk and demonstration. Adults share a playful approach to mathematics with the children, which supports them to learn that mathematical discovery is fun and engaging.

Reception

In reception, children learn through a carefully balanced plan of child initiated and adult led activities as well as learning through play. This is to ensure that children are provided sufficient direct teaching time every day, along with frequent opportunities for children to then practise and consolidate their growing knowledge through their play. As the children become more confident, they are taught to record their mathematics activities during an adult led activity, so that children develop the skills to equip them to meet the challenges of Year 1 and beyond.

Years 1-6

Our mathematics curriculum design is based on the White Rose blocked approach. The long- and medium-term overviews provided by White Rose have been adapted and rearranged to suit the needs of the children in our school, encompassing a cyclical approach that allows learning to be revisited and embedded. Although the whole year is mapped out, teachers are encouraged to use their professional discretion, based on formative and summative assessment findings, when deciding upon how long is needed to be spent on a particular curriculum area whilst ensuring all objectives are covered by the end of the academic year.

Our medium-term plans then provide a series of carefully sequenced, progressive small learning steps for each block of knowledge. Teachers use their professional judgement to design these medium-term plans, catering for the needs of all learners to ensure that they have the opportunity to progress at a similar rate.

Each week, children have four mathematics lessons and one arithmetic lesson. Our lesson structure has been designed to meet the needs of our learners and lessons are designed to provide children with frequent opportunities to discuss and explain their learning, reinforce and develop skills, challenge pupils' reasoning and develop their problem-solving expertise. Discussion in maths is of utmost importance and we believe that providing children with these opportunities helps to embed their understanding of mathematical concepts. Teachers access resources taken from a variety of sources or, if more appropriate, produced internally.

The school's calculation policy and fractions and decimals policy ensure that there is a clear progression of skills when children learn how to add, subtract, multiply and divide. Whilst skills are allocated to a year group, teachers are encouraged to use a range of methods from other year groups if necessary, so that all children can meet the objective being taught, whether by concrete, pictorial or abstract means.

Mathematical learning environments are planned and designed to support all learners in achieving within mathematics.

Dunstall Hill adopts a flexible seating approach: children are mostly taught in mixed ability groups however decisions on groupings are made based on the needs of the cohort. Most children access a range of age-related tasks in accordance with the National Curriculum coverage and where necessary, adaptive teaching is utilised – verbally, visually or written – to scaffold and support the needs of individuals.

In Mathematics, SEND pupils can:

- work on the same content at different rates and levels through tasks matched to individual group's needs.
- be taught concepts through discussion, concrete examples, and practical activities.
- make use of stem sentences.
- be exposed to the pre teaching of vocabulary with the support of dual coding.
- be exposed to modelled examples.
- when planning, use the identified broad area of need to support pupil independence and progress from their different starting points.

In Mathematics, challenge is offered to pupils through:

- exposure to open ended tasks which enable them to tackle and solve more complex problems.
- opportunities to be able to reason at a higher level.
- engaging in opportunities to deepen and broaden their knowledge and understanding of mathematical concepts they are studying.
- the provision of tasks that require them to choose the most efficient and effective methods– where they are required to justify their choices.
- the provision of the opportunity to apply their knowledge and understanding whilst collaborating with other able mathematicians and fostering their love for the subject (i.e. Inter MAT maths challenge days).

Mathematics across the Curriculum

Wherever possible, links are made to Maths across the curriculum, providing children with opportunities to consolidate and enhance their maths skills. Applying and developing skills across the curriculum allow children to become more confident at tackling maths in any context, particularly real-life situations.

STEM

All children are curious about the world around them and how things work. At *** Primary School, we aim to nurture inquiring minds, logical reasoning, and collaboration to prepare them for a world where skills in science, technology, engineering and maths are increasingly important. We provide opportunities for pupils to engage in practical investigation making links between science, maths, technology and developing engineering skills. This helps to encourage critical and creative thinking and makes the acquisition of knowledge and skills relevant and interesting. As a school, we offer opportunities to integrate the STEM subjects, encouraging children to think independently and find solutions to problems.

CPD

Where appropriate members of staff, and/or the co-ordinator, are sent on relevant courses. This is determined by SLT, based on the needs of individual year groups and whole school priorities, and the suitability of courses offered.

SMSC within Mathematics

Children will have opportunities to:

<u>Spiritual Education</u>

Use their imagination and creativity to explore ideas while learning mathematics by:

- identifying and applying patterns and rules to everyday problem-solving.
- writing own problems and challenges that use those patterns or rules.

<u>Moral Education</u>

- Understand the consequences of actions, e.g. if you perform a particular action to one number, will the same outcome apply to other numbers? Is it always the case? 'Sometimes, always, never' statements.
- Apply the skills required to solve various problems and understand how decisions are made dependent upon the outcomes of the problem.

<u>Social Education</u>

- Develop personal qualities and use social skills.
- Work in pairs or groups to solve problems.
- Persevere when struggling to answer questions.
- Take risks and not being afraid to try – it's ok to be wrong, it's not ok not to try.
- Take turns when playing maths games.
- Question types such as, 'X thinks ___, Y thinks ___, who is right?' Discuss.

<u>Cultural Education</u>

- Understand and appreciate personal influences, considering other people's views and understand how to express own views, e.g. How to explain to someone where they may have gone wrong in a question.
- Understand that mathematics is a universal language of the world.
- Develop a realisation that many topics we learn today have travelled across the world and are used internationally.

British Values within Mathematics

At Dunstall Hill, we ensure that through our school vision, values, rules, curriculum and teaching we promote tolerance and respect for all cultures, faiths and lifestyles. We have a duty to prepare our children for life in modern Britain and to keep them safe. We value, uphold and teach pupils about the British Values as directed under Ofsted guidance:

'ensure that they and the school promote tolerance of and respect for people of all faiths (or those of no faith), cultures and lifestyles; and support and help, through their words, actions and influence within the school and more widely in the community, to prepare children and young people positively for life in modern Britain'

Through mathematics, we advocate and actively promote the fundamental British values:

Democracy

- Developing a love for the beauty of mathematics through the enjoyment of following rules to reach an answer.
- Taking into account the views of others in shared activities.
- Voting when collecting data.

The rule of law

- Following class rules during tasks and activities for the benefit of all.
- Understanding the consequences if rules are not followed.

Individual liberty

- Challenging ourselves to work independently to achieve personal success.

Mutual respect

- Take turns and share equipment.
- Review each other's work respectfully.
- Working with peers who appreciate maths and working collaboratively to solve problems.

Tolerance of those with different faiths and beliefs

- Trying to find mathematics everywhere regardless of the context.
- Use maths to learn about different faiths and cultures around the world, e.g. looking at patterns/shapes within Islam/Hindu religions.

Home/School Link

The link between home and school within Mathematics takes place in many forms:

- Termly curriculum newsletters are sent out informing parents of topic areas that are to be covered.
- In Key Stage 1 and 2, weekly maths homework is provided for pupils to tackle- supporting the learning that has taken place within the classroom during the week.
- To provide a detailed outline of the child's progress and attainment, termly reports are sent out to parents/carers ahead of the parent consultations.
- Parent consultations take place each term, providing parents/carers with information on their child's progress and attainment. Children's targets are highlighted to parents/carers.
- Informal meetings are encouraged when needed.
- A variety of parent/carer workshops are held throughout the year, ranging from subject knowledge specific sessions to information sharing about statutory testing.
- Parents/carers are encouraged to join their children within the classroom on specific days throughout the year, helping to raise the profile of mathematics, e.g. Maths Week England, NSPCC Number Day, Rockstar Day (TTRS).

IMPACT

Each year group has a curriculum coverage and assessment grid for Mathematics. This document lists the objectives to be covered. Each term teachers are given the opportunity to collate and discuss evidence through either year group, key stage, or inter-school moderation.

The mathematics leader alongside SLT is responsible for monitoring curriculum coverage and will support teachers to review medium term plans on a termly basis. Monitoring of classroom practice and children's work is carried out by the subject leader and SLT. The subject leader will carry out a review each term and identify targets for future action within the subject. The subject leader will also produce a report for Governors to inform where the subject is now and the intentions for moving forward.

Supporting Teacher Assessment

- Formative, ongoing assessment for learning is carried out by staff daily and used to inform subsequent sessions/interventions.
- Summative testing is carried at the end of each term- question level analysis activities are then carried out so that assessment outcomes directly inform future planning.

Outcomes of formative and summative assessments are consistently used to inform subsequent teaching and learning.

Statutory Testing

- Reception Baseline Assessment
- Y4 Multiplication Tables Check
- Y6 End of KS2 SATs Test