

Danson Primary School



Mathematics Policy

Danson Primary School Maths Policy

Rationale:

At Danson Primary School, we believe that mathematical success is achievable for all children. We inspire children's mathematical curiosity by developing their procedural fluency, guiding their exploration of problems and through scaffolding the application of reasoning skills. A love of maths is nurtured across school by making clear connections between abstract mathematical concepts and real life situations. As maths is so important to our understanding of the world, children are encouraged to think logically, work systematically and to investigate alternative possibilities so that they can go on to leave primary school with a solid foundation of mathematical principles.

Aims:

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.

Danson children are inspired to be passionate about maths and to think critically when working in a mathematical manner. They are taught to deepen their thinking through their approach to tackling challenging problems and investigating possible outcomes. Children are posed with a series of questions to increase their knowledge and understanding of specific objectives and then they are encouraged to create their own questions to make connections between different mathematical concepts and topics. We provide children with a broad and balanced range of opportunities for maths learning to take place, including but not limited to:

- Daily counting
- Quick recall of known facts
- Low stakes retrieval quizzes
- Investigations
- Arithmetic fluency practise
- Mental maths quizzes
- Number games
- Data collection and statistical analysis
- Scientific graph drawing
- Storytelling in maths
- Problem solving
- Reasoning and vocabulary application

Maths is embedded throughout the curriculum and connections are made explicitly between science and STEM activities. Low-stakes retrieval quizzes enhance children's knowledge and understanding and regular recall of key mathematical concepts are taught frequently.

The Concrete, Pictorial and Abstract Approach:

At Danson, we follow a sequence of learning activities that enable pupils to fully master the maths curriculum. We use the concrete, pictorial and abstract (CPA) approach which is designed to provide opportunities for exploration of a single mathematical concept in all its stages. CPA is a highly effective approach to teaching that develops a deep and sustainable understanding of maths in pupils. This approach involves the use of concrete materials and pictorial representations before moving on to abstract symbols and problems. When teaching for mastery, the CPA approach helps learners to be more secure in their understanding, as they have to prove that they have fully grasped an idea. Ultimately, it gives pupils at Danson Primary School a firm foundation for future learning.

At the concrete stage, it is vital that children use manipulatives to learn through discovery. Every classroom in school has a range of age-appropriate manipulatives to support CPA learning.

In the pictorial stage, children are provided with a range of visual representations of key mathematical concepts. (For example, showing a shape in different sizes and orientations). At Danson, we focus on the Bar Model to present children with abstract number concepts in a visual way.

The visual representations of bar models become embedded in pupils' long term memory and are helpful in making connections between other areas of the maths curriculum. Bar modelling is an effective tool in a mathematicians' repertoire. Bar modelling begins in EYFS with pupils making towers to explore pre-counting principles, more or less, higher and lower and sizing of greater or smaller.

Bar models are then used in all areas of maths throughout Key Stage One, including the use of part-whole models for exploring addition and subtraction. In Lower Key Stage Two, part-whole bar models are used to explore multiplication and repeated addition. Comparison bar models are used to discuss difference problems and division. In Upper Key Stage Two, bar models are used to explore complex multi-step problems around fractions, algebra, ratio and measure.

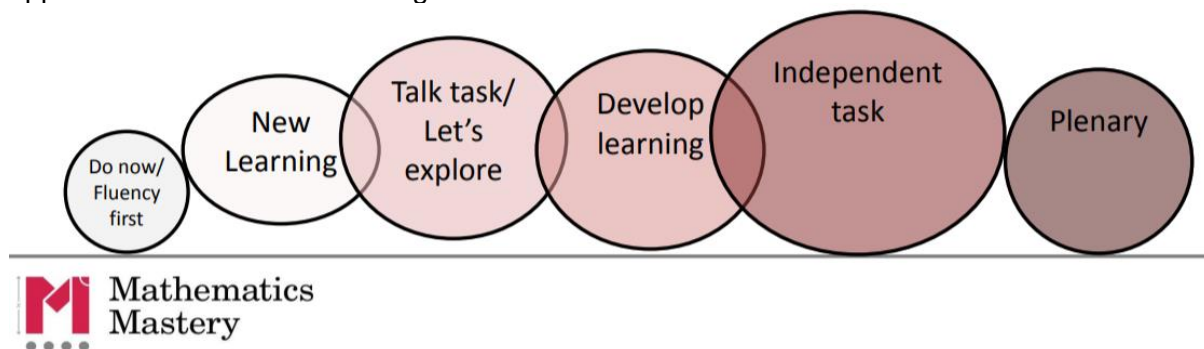
In the abstract stage, children use numerals, shapes, patterns and letters to represent key mathematical concepts. This stage is critical in enabling pupils to be able to apply their knowledge to a variety of problems and real-life situations. Using numbers predominantly, children are taught efficient methods to solve problems and explore investigations. The ability to understand abstract concepts and think back to prior learning of visual and concrete representations is a core skill that prepares pupils for further study at secondary school and beyond.

Mathematics Mastery

Children at Danson begin their mathematical journey at primary school by following the Mathematics Mastery scheme of work. This is a teaching and learning toolkit that connects the CPA approach to lesson sequences.

Mathematics Mastery (MM) focuses on the three dimensions of depth: language and communication, conceptual understanding and mathematical thinking.

Within MM, children are taught to focus on 'star words' which are the significant vocabulary associated with the current concept. (Please see the 'Vocabulary' section within this policy). Lessons follow a unique, six-part approach as outlined in this diagram.



MM lessons allow for cumulative, scaffolded learning where assessment is crucially feeding into subsequent segments. Pupils are 'doing' straight away. No time is wasted as transitions take place between each part of the six-part lesson.

Maths Meetings are a vital part of the MM programme and are used to consolidate key learning outside of the maths lesson. Maths Meetings provide an opportunity to teach and revise 'general knowledge maths' which may not explicitly be covered during the maths lesson. This enables pupils to practise applying concepts and skills on a regular basis, meaning they are continually building on their mastery of these concepts. MM provides guidance on what should be covered in Maths Meetings on a half-term basis. These suggestions complement the work covered to date from the Programme of Study, as well as preparing pupils for upcoming topics. A Maths Meeting board is recommended to be displayed in the classroom around which to centre the meeting.

White Rose

While children in Reception, Year 1, Year 2, Year 3 and Year 4 (2023-2024) will be using the MM lesson sequence, children in 5 and 6 will be following the White Rose Hub scheme of work. Pupils following the White Rose planning have elements of MM embedded too to make the roll out of the MM programme smooth and equip pupils with skills and strategies that they need.

The White Rose Hub (WRH) scheme follows the same mastery-style approach as MM does for EYFS and KS1 children. It places importance on vocabulary, varied fluency, reasoning and problem solving. There are low-stakes quizzes provided for each unit of maths work which are used at Danson as entry and exit tasks to assess attainment and progress of learners.

EYFS Main Maths Learning

The maths Early Learning Goals (ELGs) are as follows:

Number:

- 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

Numerical patterns:

- 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.

Nursery Maths Learning

In Nursery, children are developing mathematical skills to work towards meeting the expected standard for mathematics in the ELGs. Medium term plans are created to cover maths ELGs each week. Then, weekly maths tasks are planned, relating to a specific ELG and connected to other areas of the foundation curriculum and current topic. There are many opportunities for creativity, collaboration, play, exploration, discussion, questioning and problem solving. This provides children with a solid basis of key mathematical principles to be mastered in Reception.

Reception Maths Learning

Children in Reception follow Mathematics Mastery (MM), as outlined above, to build on and deepen their knowledge and understanding of mathematics. MM includes teachers using the six-part lesson plan and pupils meeting the requirements of the National Curriculum through the coverage of units in the MM scheme of work. Long term plans are devised by MM with time provided each half term so that teachers can revisit or pre-teach challenging concepts.

Teachers have the flexibility to adapt the scheme of work to suit the needs of all learners. Through the use of MM, children in Reception should meet the expected standard for the ELGs for mathematics and be prepared for moving on to the Key Stage 1, Year 1 National Curriculum content. If teachers choose to deviate from the MM suggested timetable of coverage (based on assessment for learning and meeting the needs of the cohort), they must discuss their reasoning with the Maths Coordinator.

Year 1 Main Maths Learning

Children in Year 1 follow Mathematics Mastery (MM), as outlined above to master the mathematical objectives laid out in the National Curriculum. However, in the MM scheme of work, the first few units cover ELG objectives in order to ensure seamless progression to the National Curriculum. Teachers and learners in Year 1, use the six-part MM lesson plans, long term MM plans and maths meetings to cover the objectives in the National Curriculum. If teachers choose to deviate from the MM suggested timetable of coverage (based on assessment for learning and meeting the needs of the cohort), they must discuss their reasoning with the Maths Coordinator.

Year 2, 3 and 4 Main Maths Learning

Children in Year 2 follow Mathematics Mastery (MM), as outlined below to master the mathematical objectives laid out in the National Curriculum. Teachers and learners use the six-part MM lesson plans, long term MM plans and maths meetings to cover the objectives in the National Curriculum. If teachers choose to deviate from the MM suggested timetable of coverage (based on assessment for learning and meeting the needs of the cohort), they must discuss their reasoning with the Maths Coordinator.

Year 5 & Year 6 Main Maths Learning

Children in Year 5 and Year 6 follow the White Rose Hub (WRH) yearly overview and lesson by lesson small step objectives which cover the National Curriculum content. If teachers choose to deviate from the WRH suggested timetable of coverage (based on assessment for learning and meeting the needs of the cohort), they must discuss their reasoning with the Maths Coordinator.

Arithmetic

Children are taught the fundamental mathematical skills that underpin reasoning and problem-solving tasks through arithmetic sessions and 'do now' moments at the start of lessons. This provides children with opportunities to develop written methods that can facilitate their understanding of abstract concepts.

Arithmetic lessons follow the CPA approach, as does all maths learning at Danson. Danson's Calculation Policy explains the detailed steps of arithmetic learning. This document provides a clear, step by step, breakdown of the sequence of written methods for all four operations that learners need to explore and feel confident with in order to have a well-rounded bank of arithmetic tools.

Arithmetic in EYFS

Within the Early Learning Goals for children in EYFS, mathematics is an umbrella heading for various maths skills and the curriculum does not have a separate heading for arithmetic. However, the goals do relate to arithmetic principles.

Mental Maths

The quick recall of certain strategies, facts and formulae is very important in order to be a successful mathematician. At Danson, we feel that all children should have a plethora of mental methods to support their use and application of mathematics. During lessons, we create a culture of possibilities where alternative strategies are explored and children are asked to reason and justify why they chose a particular route to solve a problem. Mental maths is vitally linked with critical thinking as children are aware of their thought processes and can evaluate their choices, or synthesise a new one.

Across the school, children take part in lots of activities to stimulate and strengthen their mental maths capacity. Some games include:

- Maths countdown
- Hit the button
- Fizz buzz
- Number of the day
- Problem of the day
- Maths 24

Mental Maths in EYFS

Based on the Early Learning Goals (ELGs), pupils in EYFS are expected to count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing. These objectives can be applied mentally or using written strategies but teaching and learning will facilitate both means throughout the academic year.

Vocabulary

Children at Danson focus on vocabulary in every maths lesson and in relation to all maths tasks. Teachers and support staff model the correct terminology and it is discussed in context and related to real life situations.

Mathematics Mastery (MM) and White Rose Hub (WRH) both value vocabulary as highly important to overcoming barriers to children's learning in maths. 'Star words' are used at the start of, and within, all lessons for children to practise using crucial vocabulary. Pupils are verbally praised for the correct use of vocabulary and words are built upon each year. Staff use the MM Vocabulary List, whether following the scheme of work or not, as it provides a comprehensive, cumulative list of vocabulary to discuss with children. In addition to this document, staff refer to Bar Modelling terminology as to take a consistent approach when delivering pictorial lessons and representations.

Children will have many opportunities to discuss maths language with their peers and 'talk as thought' dialogue is promoted in all lessons. Children are supported with sentence stems, word banks, visual displays and additional resources when appropriate.

Counting/ Times Tables

Counting principles and the quick recall of multiplication and division facts are fundamental parts of being an effective and efficient mathematician. Children build on this knowledge from EYFS to Year 6 and beyond. At Danson, we foster a love of times tables learning through a thorough teaching sequence and engage children through use of additional provision and digital resources.

In Year 3 and 4, there is a particular emphasis on times tables facts as this will help create a solid foundation to build upon in Upper Key Stage 2. Also, there is a statutory Multiplication Times Tables Check assessment that is completed each summer which will assess children on multiplication facts up to 12 x 12 and the ability of children to answer these questions in under 6 seconds.

Children in Lower Key Stage 2 have an additional 15 minutes per day of times tables learning in their weekly timetable in order to facilitate the extra practise. It is important to note that times tables knowledge will be tracked and analysed carefully in Lower Key Stage 2 using the tracking system on Times Tables Rock Stars.

Online Resources to Support the Teaching of Mathematics

At Danson, we believe that technology plays an important part in our society and it should be reflected in our practice of teaching and learning. We use a variety of technology software and hardware to inspire children and enhance the teaching of mathematics.

One online platform that we promote the use of is NumBots. This software is aimed at pupils in Key Stage One who are practising crucial place value and arithmetic skills. NumBots supports every child in achieving the understanding, recall and fluency in mental addition and subtraction, so that they move from counting to calculating.

Another online platform that teachers and children can access is Times Tables Rock Stars (TTRS). In either paper form or online, Times Tables Rock Stars is a carefully sequenced programme of recurring times tables practice. Teachers can set children specific times tables to learn or they can be automatically generated by the computer program. At Danson, teachers use a mixture of both strategies to support classes, groups and individuals.

Danson as a 'Centre of Excellence' in Financial Education

Danson Primary School is proud to be recognised as a 'Centre of Excellence in Financial Education' by Young Money. Across the school, the teaching and learning of financial education is incorporated into many different areas of the curriculum, notably in Maths, PSHE and Citizenship lessons. In line with Young Money's planning frameworks, pupils' learning is covered across four different strands: how to manage money, becoming a critical consumer, managing risks and emotions associated with money and understanding the important role money plays in our lives.

At Danson, we believe that developing pupils' financial literacy from a young age will set them up for whatever future path they endeavour to follow. We incorporate financial literacy with storytelling in mathematics and teachers read a class text once per year that has an element of financial education that can be explored and discussed with pupils. Children are supported through the use of manipulatives, including pretend coins and notes that look realistic.

Assessment

Understanding children's attainment and progress in mathematics is critical to developing a secure foundation of maths learning at the primary level. Assessment is conducted formatively and summatively to analyse children's knowledge and application of the subject matter.

Formative assessment includes, but is not limited to:

- Teacher questioning in lessons
- Guided group work verbal assessments
- Feedback and marking against written work in maths books
- Times table paper quizzes

- TTRS online quizzes
- Quick recall quizzes
- How O'Track maths objective statements are being met (fortnightly)
- Whiteboard work in lessons
- Arithmetic quizzes

Summative assessment includes, but is not limited to:

- O'track judgements
- Entry and exit quizzes for White Rose Hub year groups
- End of term summative papers for Year 1 - 6 (MM or WRH depending on year group)
- Tracking against Early Learning Goals for EYFS

Moderation includes, but is not limited to:

- Year group moderation twice a half term (one with a particular focus on a key group of pupils)
- Termly moderation with year groups above/ below
- Termly moderation with a member of the Maths Team

All forms of assessment feed into the creation of long-term, medium-term and weekly planning documents. Gaps in children's knowledge and understanding is made clear through the assessment process and is addressed through high-quality teaching and learning.

Marking and Presentation

Mathematics learning can be challenging if formal presentation is not adhered to. Written methods, particularly, focus on the application of neat presentation and alignment of digits. At Danson, pupils are taught how to form numbers correctly from EYFS and continue this journey through handwriting practise until they leave school in Year 6. Squared paper is used from Year 1 - 6 to support children's mathematical note taking. Teachers are expected to adhere to the school's feedback and marking policy when marking books and presentation guidance in curriculum documents when guiding children as to how to present their work.

Maths marking labels are saved in the Maths folder on the Google Drive for teachers to adapt and use in line with a mastery approach to teaching and learning and higher order thinking skills being applied. The marking labels are used to support teacher workload and to provide further opportunities for consolidation of learning or extension and challenge around the mathematical concept being discussed.

Monitoring and Evaluation

The Curriculum Leaders, alongside SLT, are responsible for monitoring and evaluating curriculum progress. This is done through book scrutiny, planning scrutiny, lesson observations, pupil interviews, staff discussions and audit of resources.

Equal Opportunities

We expect all children to enjoy and reach their potential in maths, regardless of ethnicity, gender and ability, as laid out in our Equal Opportunities Policy. Termly assessments and end of Key Stage results are analysed to ensure that all groups throughout the school are making appropriate progress, and the SENCO and Maths Coordinator support teachers and children to accelerate progress where necessary. All maths resources reflect positive and non-stereotypical images of race, class, gender and disability. Maths planning and teaching includes a range of teaching and learning styles to cater for visual, auditory and kinaesthetic learners. Opportunities for modelling the use of Standard English and providing the opportunity for pupils to practise and extend their use of maths vocabulary, are sought and made use of. The SENCO will liaise with the Maths Coordinator and Class Teachers to ensure that the individual needs of pupils are met and appropriate targets are set and regularly reviewed.

Roles and Responsibilities

All stakeholders work together to ensure the implementation of the maths Policy.

The Governing Body will:

- Ensure there is a link governor responsible for maths, who will meet regularly with the subject lead
- Ensure arrangements for teaching and learning of maths are regularly reviewed and agreed, including provision for funds for resources

The Headteacher will:

- Determine the ways maths enriches and extends the wider curriculum at Danson
- Provide a budget for maths resources, including visitors
- Work alongside the maths subject leader to support staff in the teaching and learning of the subject
- Ensure the subject leader is able to monitor maths through lesson observations, work scrutiny and pupil voice
- Report to governors about progress made in maths

The Maths Subject Leader will:

- Support and motivate teachers and colleagues in the teaching and learning of maths
- Provide subject knowledge and expertise in the maths curriculum
- Promote cross-curricular links between maths and the wider curriculum
- Enrich the curriculum with activities associated with maths, such as organising Maths Week, running Maths 24 Club and inviting visitors in to discuss maths
- Develop and monitor assessments of the subject
- Manage the provision of resources
- Keep up to date with any developments in the teaching of maths
- Monitor the quality of education of maths across school
- Contribute to staff professional development in maths
- Create, follow and evaluate an annual action plan in line with any school development priorities
- Liaise with the link governor regularly about maths updates

The Class Teacher will:

- Ensure the maths curriculum is taught in line with the national curriculum
- Record and assess pupils' work and progress in maths
- Seek professional development where necessary
- Update the maths subject leader of any issues with equipment or resources
- Work alongside the subject lead and SLT to report on children's outcomes in the subject.

Health and Safety

Risk assessments will be carried out for trips or visitors and safeguarding procedures will be followed for anyone who comes into Danson Primary School.

Policy Owner	Maths Subject Leader
Approver	Deputy Head Teacher and Head Teacher
Date Approved	April 2024
Next Review	April 2025