Mathematics Curriculum Policy

July 2023

Agreed: July 2023 Review Term: Summer 2025

Introduction:

All pupils should become fluent in the fundamentals of mathematics, including through varied and frequent practice, so that pupils develop conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems. (National Curriculum, 2014)

At Fielding, pupils receive a high-quality mathematical education which equips children with a powerful set of tools that they can use in everyday life in order to understand the world. Our pupils are involved in a wide range of teaching for mastery activities which develops a sense of excitement and curiosity about the subject and overall, helps them to be fluent, confident mathematicians. Through meticulous curriculum mapping and lesson design, we ensure that the statutory requirements of the National Curriculum 2014 are met alongside its aims:

- 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 nonroutine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Aims:

Our pupils learn to:

- develop a positive attitude to maths as an interesting and attractive subject in which all children are able to gain confidence, success and pleasure;
- develop a strong, mathematical understanding through an appropriate and progressive learning journey;
- use maths in practical and real-life problems in order to effectively problem solve within school and, subsequently, adult life;
- use correct mathematical language and vocabulary so they can express themselves fluently;
- develop mathematical fluency, skills, knowledge and rapid recall of basic number facts;
- develop a range of efficient and appropriate calculation strategies for all four operations;
- be assertive when using written calculation methods for all four operations;

- take ownership of their learning by following our Visible Learning approach.

How we teach mathematics at Fielding

Pupils are taught mathematics in two lessons a day. A daily maths lesson of 1 hour and 20 minutes which follows two of the following programmes, depending on the year group:

- Number talks
- TT Rockstars
- NCETM Mastering Number Programme

Planning Resources

Our progression map informs teachers of their planning sequence and supports mastery lesson design by aligning all teaching resources with National Curriculum objectives. The following resources are used to map units and plan a sequence of small-step lessons:

- National Curriculum objectives;
- Power Mathematics units;
- White Rose Education;
- Third Space Learning
- NCETM Ready-to-Progress criteria;
- NCETM teaching spines;

Teaching for mastery

Through teaching for mastery, pupils deepen their understanding of mathematics, rather than memorising key procedures or resorting to rote learning. The three key principles of mastery are:

- conceptual understanding is key;
- children must be able to speak in full sentences applying correct mathematical vocabulary;
- children can learn to think like mathematicians.

Our curriculum moves at a pace that provides pupils opportunities to ‘master’ skills and understanding before applying them in other contexts.

Concrete – Pictorial – Abstract (CPA)

One aspect of ‘Maths Mastery’ is the Concrete – Pictorial – Abstract (CPA) approach. This is implemented from Reception to Year 6. We use concrete and pictorial representations of numbers before moving on to the abstract. Building these steps across a lesson helps pupils better understand the value of digits and the relationship between numbers and the real word. The three stages of the CPA approach help secure pupils’ understanding of the mathematical concept they are learning to effectively develop strong, confident mental strategies.

NCETM Mastering Number Programme

This programme aims to secure firm foundations in the development of good number sense for all children from Reception through to Year 1 and Year 2. Mastering Number sessions are short (10-15 minutes) daily exercises to provide pupils daily opportunities to learn and develop their fluency in calculation and number.

Number Talks

Number Talks are short (10-20 minutes) exercises which are implemented from Year 3 to Year 6 two times a week (depending on age group) as a mental maths activity to build fluency. Each session provides pupils with opportunities to:

- Learn and develop number sense and mental maths skills
- Engage in creative, open mathematics
- Share different perspectives
- Create a learning environment where ***all*** pupils feel safe sharing their mathematical ideas
- Develop social and mathematical independence
- Build conceptual understanding and the ability to explain this
- Build and use mathematical vocabulary with clear understanding and confidence

Number bonds

Pupils in Years 1 and 2 complete all number bond challenges up to 20 before moving on to Times Tables practise.

NumBots:

Pupils in Years 1 and 2 will use NumBots to learn:

- Subitising;
- Number bonds;
- Addition and subtraction.

At school (Online):

- teachers will use weekly computing slots to allow children 5 minutes practice at the beginning of each computing lesson.

- practice opportunities during same day intervention and to support pupils that require individual practise of core maths skills with HLTA / TAs where possible.

At home (Online)

- teachers who have classes and pupils set up for TT Rockstars can use the same login details to access NumBots;
- children can play in Story Mode, where emphasis is on mathematical concepts and is underpinned by a mastery approach to teaching. This mode features visual representations, procedural variation, exposure to different calculation strategies and interleaved material in a carefully sequenced order;
- it is recommended pupils play in Story Mode for three minutes four to five times a week;

Times Table Rockstars:

All pupils at Fielding will know table facts up to 12 x 12 by the end of Year 4, in line with National Curriculum expectations. Pupils will use Times Tables Rockstars to learn table facts at school and at home.

At school (Paper):

- pupils will start with a baseline;
- pupils will then work through sheets to practise their tables;
- pupils will then complete a check sheet.

At school (Online):

- teachers will use weekly computing slots to allow children 5 minutes practice at the beginning of each computing lesson.
- practice opportunities during same day intervention and to support pupils that require individual practise of specific times tables with HLTA / TAs where possible.

At home (Online)

- teachers will need to provide each child with their own log in and password to access the site from computers, tablets and phones;
- children will need to first play a Gig game within the 5-minute limit for the best starting point to be set when practising;
- half-termly battles set by the subject leader where pupils can compete against each other, the team with the highest average number of correct answers will be the half-term winners;

- **NOTE**: for some children, manual tables can be set to support individual practise of specific times tables.

Daily mathematics lessons

Daily mathematics lessons are planned and taught through our Fielding Teaching and Learning Framework and can vary in structure depending on the topic being covered and the needs of the pupils. Small-step teaching takes place to ensure that all pupils understand key concepts before they are exposed to new ones. All key prior knowledge is revisited where appropriate and it is expected that all pupils have the opportunity to apply their understanding of a topic as a result of their exposure to rich and deep mathematical problems.

Key Features of Fielding's approach to Mastery include:

- **Curriculum design** - A detailed, structured curriculum is mapped out across all phases, ensuring continuity and supporting transition.
- **Lesson design** - Lessons are crafted with similar care and are often perfected over time with input from other teachers, drawing on evidence from observations of pupils in class. Practical lessons should follow whole class approach provided by Power Mathematics and White Rose guidance whilst written lessons should follow the Teaching and Learning Blueprint with a challenge by choice approach to differentiated activities.
- **Teaching for Mastery-** A balance between teacher-directed instruction and pupil inquiry should be made where an approximate 80:20 split between the combined 'TEACH, DO and PRACTISE phases and the BEHAVE phase.[1] Teachers introduce and build new mathematical concepts whilst pupils become fluent in its practice, then a period of reflection in which pupils apply prior learning and new connected ideas for serious mathematical thinking.
- **Teaching resources** - A coherent programme of high-quality curriculum materials from the NCETM, Power Mathematics, Third Space and White Rose Mathematics Hub is used to support classroom teaching and intervention.
- **Teaching methods** - Pupils work on the same tasks and engage in common discussions. Concepts are often explored together to make mathematical relationships explicit and strengthen pupils' understanding of mathematical connectivity.
- **Vocabulary** – In-depth teaching of vocabulary throughout a learning journey by creating actions, associating symbols and relevant images, teaching word morphology and etymology and recording key definitions.
- **Stem Sentencing** - Used to tackle misconceptions and improve reasoning through talk for learning whilst exposing generalisations within mathematical structures
- **Questioning** - Precise questioning during lessons are explored to ensure that pupils develop fluent technical proficiency and think deeply about the underpinning mathematical concepts.
- **Teaching misconceptions** Pupils' difficulties and misconceptions should be identified through immediate formative assessment so they can be unpicked and addressed with either same-day intervention or whole-class teaching the following lesson.
- **Low Threshold High Ceiling** – Tasks are made accessible for every child in the class where everyone needs to have the prior mathematical knowledge required to start working. The Low Threshold mitigates against the development of mathematical anxiety and the High Ceiling offers everyone the opportunity to access the task and develop their resilience when problem solving.

[1] McCourt, Mark, *Teaching for Mastery.* Woodbridge: John Catt Educational Ltd, 2019.

- **Pupil support -** Through the support and intervention provided to different pupils, not in the topics taught, particularly at earlier stages. There is no differentiation in content taught, but the questioning and scaffolding individual pupils receive in class as they work through problems will differ, with rapid graspers challenged through more demanding problems which deepen their knowledge of the same content.

Maths Working Walls:

Maths working walls are built up overtime as we move though a learning journey. On the wall, the following is displayed:

- the learning journey;
- star vocabulary with definitions;
- examples of modelling using the CPA approach (Concrete, Pictorial and Abstract);
- examples of strategies being applied within a piece of work (WAGOLL – what a good one looks like).

End of Journey Reflection:

Pupil's are given the opportunity to reflect on their learning journey upon completing Post-learning assessments. To support pupil's with their reflections the following can be used:

- review questions;
- stem sentences;
- star vocabulary;
- WAGOLL examples (what a good one looks like).

Catch-up support

Dynamo Dyslexia and Dyscalculia: pupils with specific learning needs are identified by the class teachers and SENDco. Diagnostic screening takes place and if criteria are met pupils are able to participate in the Dynamo programme with the support of HLTAs.

Same day intervention: Teachers ensure they timetable a daily slot to allow a small number of pupils (maximum of 8) to receive additional support following the lesson taught that day. This is to ensure that no pupil falls behind due to lack of conceptual understanding. This can be also integrated into timetabled support from a HLTA / TA where possible. If a greater number of pupils require support, lessons will be retaught the following day, focusing on the areas of misconception through a variation of tasks.

Assessment

Teachers use formative (n the moment) assessment within lessons to assess how much pupils know and remember. Strategies include: observation, questioning and marking in accordance with our school marking and feedback policy.

Twice yearly summative assessments (tests) are used. Information is recorded onto the schools tracking system (NFER Hub/BromCom[2]) and used to inform future planning, and to identify pupils for intervention and support. We judge the impact of our mathematical teaching by:

- end of Key Stage assessments;
- NFER Assessments Mid-year and End of Year;
- termly progress tests;
- book and planning scrutiny;
- lesson evaluations of the teaching of mathematics;
- pupil interviews;
- learning walks.

Marking follows the guidance set out in the marking and feedback policy. It:

- should identify where pupils are practising and applying a skill:
    - highlight (green) where there is a correct answer/working out strategy,
    - highlight (yellow) where there is an error,
    - give an example – where appropriate,
- is purposeful and contributes to children's learning and progress through the inclusion of a developmental point or next step comment,
- can include a response given to Mathematics Minutes to acknowledge pupils' written feedback,
- includes time to reflect on learning and respond to next step comments as promptly as possible after a lesson
- may include self-assessment, peer-assessment, and verbal feedback.

Monitoring and evaluation of mathematics:

Monitoring outcomes of pupil's learning and of quality of teaching in mathematics is the responsibility of the mathematics leader and the senior leadership team.

The subject leader for mathematics monitors the quality of mathematics teaching through:

- work scrutiny
- talking to pupils
- observing classroom practice through learning walks.

Professional development

In addition, the subject leader supports colleagues in the teaching of mathematics and informing teachers about current developments in the subject.

Professional Learning Community (PLC)

[2] BromCom From January 2020

One member teacher from each year group/phase is a member of the mathematics PLC. The PLC fosters collaborative professional development to enhance pupil learning. Our approach to mathematics teaching and learning is developed through our PLC by:

- sharing a clear vision, values and outcomes;
- collective responsibility for pupils' learning;
- collaborative focus on learning;
- individual and group professional learning;
- sharing practice-based professional learning;
- reflective professional enquiry;
- mutual trust, respect and support.

Central and West London Maths Hub

Our partnership with the Central and West London Maths Hub coordinated by the National Centre for Excellence in the Teaching of Mathematics (NCETM) develops and shares excellent practice within mathematics.

Our participation with the maths hub provides colleagues with:

- Continuing professional development from primary maths specialists;
- Participation in collaborative teacher research groups and projects;
- national networking opportunities with mathematics education professionals;
- Opportunities for staff to be agents of professional development at Fielding.

Maths online resources and games

The links below provide access to up-to-date resources and research in-line with the National Curriculum, support with learning which will support pupils' learning at home.

National Strategies

NCETM - www.ncetm.org.uk

NRICH maths - https://nrich.mathematics.org

Maths dictionary - http://www.amathsdictionaryforkids.com/

Power mathematics - https://www.activelearnprimary.co.uk/login (teachers only)

Third Space learning - https://thirdspacelearning.com/

White Rose - https://whiterosemaths.com