

FAIRFIELD
FIRST SCHOOL



Mathematics Policy

April 2020

Date adopted by Governing Body _____

Signed _____ (Chair of Governors)

Review date -

Mastery in Mathematics at Fairfield First School

At Fairfield First School we are currently adopting a mastery approach to the teaching and learning of Mathematics in our school. We believe that ability within Mathematics is not fixed and foster positive 'can do' attitudes, believing all children can achieve in mathematics encouraging children to develop a 'growth mindset'.

Underlying the mastery approach is the belief that more time is spent teaching key mathematical ideas and concepts to allow for the development of depth and sufficient practice to embed learning. All children should work together on a sequence of carefully planned 'small steps' to become fluent mathematicians who are able to reason and solve a variety of problems by applying what they have learned in a range of contexts.

Children are supported through the use of mistakes and misconceptions as part of the teaching process, immediate teacher intervention during Mathematics lessons and through specific planned interventions. Children are challenged through rich and sophisticated problems on the same key learning point, achieving differentiation through depth rather than content.

Conceptual understanding is developed through concrete and visual representations and children are given opportunity to explain their reasoning as part of our daily Mathematics lessons.

In Years 1 to 4 we provide 'recap' activities at the start of each lesson, which enable the children to practice, embed and therefore become fluent in working with all areas of mathematics.

Purpose of study

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.

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.

Key Stage 1 - Year 1 and 2

The principal 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 - Year 3 and 4

The principal 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.

Equal Opportunities

All pupils in our school have the right to be considered of equal value and be given equal opportunities to access the school curriculum. At Fairfield we strive to ensure that the culture and ethos of the school are such that, whatever the heritage and origins, abilities and needs of members of the school community, everyone is equally valued and treat one another with respect. All pupils have the right to be given opportunities and access to the full curriculum regardless of ethnicity, gender, social circumstances, ability, disability, age, nationality or citizenship. Pupils should be provided with the opportunity to experience, understand and celebrate diversity.

Mathematics Curriculum Planning, Teaching and Learning

Mathematics is a core subject in the National Curriculum, and we use the National Curriculum as the basis for implementing the statutory requirements of the programme of study for mathematics. Alongside the National Curriculum, we use White Rose Maths scheme of learning, which follows the concrete, pictorial, abstract approach set out in our Calculation Policy.

Each year group has a Medium Term Plan of sequenced objectives, which build children's understanding over the year in a progressive manner. These plans take the National Curriculum Objectives and break them down into 'small steps,' taken from the White Rose Maths scheme. Teachers plan from their year groups MTPs, following the order of 'small steps' to ensure work is progressive and age appropriate.

Teachers use the WRM unit plans, which follow the 'small steps' to create their teaching sequence, along with other resources which follow the same structure.

Lessons include the following elements for Y1-Y4:

- Lessons begin with a 'Recap' or 'Power Up' activity, building on prior learning
- Input - Fluency, Reasoning and Problem solving questions which are worked through together as a class and are sequenced carefully to build on conceptual understanding. During input, teachers are encouraged to use a range of manipulatives to support learning as well as individual whiteboards where appropriate. High quality questioning and modelling is also used during this time to assess understanding and swiftly address misconceptions.
- Independent learning/application - children work independently (which can sometimes mean working in pairs/groups) on a set of questions/tasks which closely match the input. These questions are carefully sequenced to build on conceptual understanding, fluency, problem solving and reasoning skills.
- Times tables rock stars is delivered daily in Years 3 and 4 and regularly in Year 2.

Our principal aim is to develop children's knowledge, skills and understanding in mathematics. During lessons we encourage children to ask as well as answer mathematical questions and to explain strategies they have used. Questions such as 'How do you know?', 'Convince me...', 'What is it not?', 'Prove it...', 'Show me...' and 'Can you explain why?' are used in every lesson to encourage reasoning and explanation skills with all children, of all ages and abilities.

Misconceptions are promptly identified through accurate questioning and addressed, to ensure children's understanding is sound. Live marking is used within independent tasks, to again address any common misconceptions and enable all children to make progress within every lesson. Children respond to marking with their purple polishing pen.

Children have the opportunity to use a wide range of resources such as base 10, Numicon, number lines, number squares, part-whole models, digit cards, counters and small apparatus to support their work.

In all classes there are children of differing mathematical ability. We recognise this fact and provide suitable learning support and challenge for all children. We achieve this through a range of strategies such as questioning, use of manipulatives, partner work and teacher/TA support.

Class teachers complete their own weekly plans, using their own planning formats, which are shared with TAs to ensure all children's needs are met.

When planning, teachers need to consider the following points:

- Develop knowledge, understanding and skills (facts), competency, confidence, application and making connections
- Ensure that at the end of this sequence children will have learned new things but also deepened understanding of other relevant aspects of mathematics.
- Start with the NC expectations on MTP - the mathematics that needs to be learned
- Identify the key knowledge and skills through use of the small steps - what else will you need to add in? Will each step be 1 lesson or more?
- Identify misconceptions that may arise and how you can address these
- Consider how you will teach this (not just the activity you will use) what will the teacher/TA do? Which images and resources will be used? What strategies will be taught? (Refer to calculation policy) what quality questions will be asked? What opportunities for thinking, reasoning and explanation skills will there be?
- Now consider which activities to use and why - don't think a different activity each day, rather consider how you will use the same activity to deepen learning each day. Ensure conceptual variation and procedural variation is used
- Make links to previous learning, for example when teaching fractions, make links to division knowledge
- Consider how you will know the children have been successful

Carefully crafted lesson design provides a step by step, conceptual journey through the mathematics, engaging pupils in reasoning and the development of mathematical thinking. Problems are designed using conceptual and procedural variation.

Conceptual Variation: presenting one concept in a variety of contexts - What is it? What isn't it?

Procedural Variation: ordering questions/tasks to enable connections, and so they build on each other - same key point, apply to different contexts. Same problem, different solutions. Step by step problems, key point driven.

The Foundation Stage

We teach problem solving, reasoning and numeracy in our reception class through a combination of child initiated and adult led play, class sessions and group work using the Early Learning Foundation Stage and White Rose Maths. We give all the children ample opportunity to develop their understanding of number, measurement, pattern, shape and space through varied activities that allow them to enjoy, explore, practice and talk confidently about mathematics.

Assessment and recording

Assessment of children's work in mathematics is ongoing. We use questioning and live marking within a lesson to help us address individual and group misconceptions, adjusting the structure of the lesson as needed to address these swiftly. We use these assessments to alter our lesson plans and ensure we are meeting the needs of all children in the class.

We are currently using Scholar Pack to track children's progress twice a year in mathematics and this information, along with our daily assessment of learning, is used to reach an overall judgment about the children's progress towards the end of their year group expectations. Children having difficulties are identified and the appropriate support put in place daily, to ensure gaps do not appear.

All assessment information is passed on to the next teacher at the end of the year, so that she/he can plan for the new school year. At the end of KS1 (in Year 2) children sit national tests in Mathematics: an arithmetic test (focusing on children's fluency in written calculations across the four areas of addition, subtraction, multiplication and division) and two reasoning papers (focusing on the children's ability to use and apply what they have learnt). At the end of Year 4 there will be an online times tables test (testing children's table knowledge up to 12×12)

Resources

Each class has a 'Maths Toolkit' which contains key resources for their year group, such as; place value grids, counters, cards and base 10 equipment; fractions boards; dice; number lines and hundred squares.

All other maths resources are kept in a central location in the small hall, where teachers are able to access what they need and return them once the unit is completed. Resources include clocks, weighing scales, tape measures, money and games.

The White Rose Maths unit planning, IWB resources, questions and problem solving task and other electronic resources can be located on staff shared in the maths file.

We follow a calculation policy, which has been designed to support our scheme of learning, and includes the use of manipulatives to support each calculation in a progressive manner.

Numbots

The creators of Times Tables Rock Stars have produced a platform for boosting addition and subtraction skills, called NumBots, which is primarily aimed at KS1 children, but can be used in KS2 to support and boost confidence with number skills.

There are two game types:

Story Mode - the emphasis is on learning the ideas and concepts behind addition and subtraction so it features more diagrams, shapes and question styles.

Challenge Mode - the emphasis is more on speed of recall of key facts, like number bonds to 10, doubling small numbers or adding & taking away in your head.

Times table Rock Stars

When it comes to times tables, speed and accuracy are important - the more facts children remembers, the easier it is for them to do harder calculations.

Times Table Rock Stars is a fun and challenging programme designed to help students master the times tables. Children in years 2, 3 & 4 all have an individual login for TTRS, which they can use to access it at school and at home. Paper worksheets are completed by Year 3 and Year 4 in every lesson. Year 2 use the paper work sheets regularly throughout the year.

To be a Times Table Rock Star you need to be able to answer any multiplication fact up to 12×12 in less than 3 seconds!

Monitoring and review

Monitoring of the standards of children's work and of the quality of teaching in mathematics is the responsibility of the mathematics subject leader. The work of the mathematics subject leader also involves supporting colleagues in the teaching of mathematics, being informed about current developments in the subject and providing a strategic lead and direction for the subject in the school.

The mathematics subject leader gives the head teacher an annual summary in which they evaluate strengths and weaknesses in the subject and indicate areas for further improvement. The head teacher allocates regular management time to the mathematics subject leader so that they can review samples of children's work, monitor planning and undertake lesson observations of mathematics teaching across the school. Regular analysis of data is carried out, discussed with staff and appropriate action taken. A named member of the school's governing body is briefed to oversee the teaching of Mathematics. This governor meets regularly with the subject leaders to review progress.

Maths Subject Leader: Mrs Alison Paisley

Governor: Mr Paul Reed

Policy Agreed: