Cockerham Parochial C. E. Primary School

MATHEMATICS POLICY

'Where a love of learning grows'

'I can do all things through Christ who strengthens me' Philippians 4.13

February 2022 Updated January 2023

THE NATURE OF MATHEMATICS

Mathematics is a tool for everyday life. It is a whole network of concepts and relationships which provide a way of viewing and making sense of the world through the development of the ability to calculate, to reason and to solve problems. It enables children to understand and appreciate the relationships and pattern in both number and space in their everyday lives. Through their growing knowledge and understanding, children learn to appreciate the contribution made by many cultures to the development and application of Mathematics.

This policy outlines what we are aiming to achieve in respect of pupils' mathematical education. It also describes our agreed approach to the planning, delivery and assessment of the Mathematics curriculum.

The National Curriculum for Mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of Mathematics through varied practice, developing 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 in a variety of contexts breaking down problems into simpler steps and persevering in seeking solutions.

Using the Programmes of Study from the National Curriculum 2014 it is our aim to develop:

- a positive attitude and love of learning towards Mathematics and an awareness of the fascination of Mathematics
- competence and confidence in mathematical knowledge, concepts and skills, with quick recall of basic facts
- an ability to solve problems, to reason, to think clearly and logically and to work systematically and accurately, with independence of thought and flexibility of mind
- initiative and an ability to work both independently and in cooperation with others
- an ability to communicate Mathematics, talking about the subject with assurance, using correct mathematical language and vocabulary
- an ability to use and apply Mathematics across the curriculum and in real life contexts
- an appreciation of creative aspects of Mathematics and awareness of its aesthetic appeal
- an understanding of Mathematics through a process of enquiry and experiment

The National Curriculum outlines the programmes of study for children in Key Stage 1 and Key Stage 2 so that Mathematics is taught progressively, building upon skills from the prior year group. The curriculum is designed so that the majority of children will move through the programme of study at broadly the same pace. At Cockerham we aim that most children will have mastered understanding in the concepts taught in their specific year groups, with some children demonstrating a greater depth of understanding to provide extra challenge and progress the learning further.

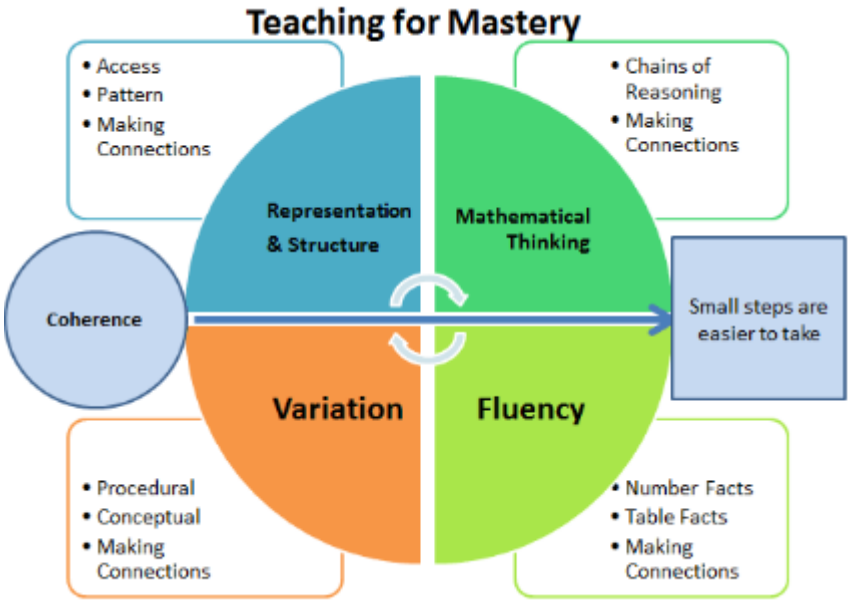
At Cockerham we aim to teach Mathematics using this mastery approach and interlinking the different parts of mastery. Lessons are broken down into small-connected steps that gradually unfold the concept, providing access for all children and leading to a generalisation of the concept and the ability to apply the concept to a range of contexts.

SCHOOL APPROACH TO MATHEMATICS

Mathematics is a core subject in the National Curriculum, and we use the Mathematics Programmes of Study: Key Stages 1 and 2 National Curriculum in England as the basis for implementing the statutory requirements of the programme of study for Mathematics.

Approach

At Cockerham we have adopted a Mastery approach which enables pupils to acquire a deep, long-term, secure and adaptable understanding of the subject. The phrase 'teaching for mastery' describes the elements of classroom practice and school organisation that combine to give pupils the best chances of mastering maths. Achieving mastery means acquiring an understanding of the Mathematics that's been taught to enable pupils to move on to their next steps in learning.

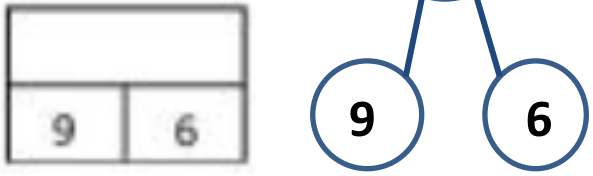


(NCETM https://www.ncetm.org.uk/resources/49450)

Teaching for Mastery is under pinned by four areas, these include:

- Representation and Structure
- Mathematical Thinking
- Variation
- Fluency

Representation and Structure focuses on how concepts in Mathematics are presented in different ways and forms for example when adding 2 numbers together it could be presented in many different ways:



9 + 6 = nine ones add 6 ones is equal to____

Teachers carefully select representations of mathematics to expose mathematical structure. The intention is to support pupils in 'seeing' the mathematics, rather than using the representation as a tool to 'do' the mathematics. These representations become mental images that students can use to think about mathematics, supporting them to achieve a deep understanding of mathematical structures and connections. At Cockerham we believe that it is important to expose children to many different representations and structures. This will enable children to demonstrate mastery in a particular area of Mathematics

Mathematical Thinking
Through mathematical thinking children to be able to work through problems systematically. Children should be able to look for patterns and relationships making connections, conjecturing, reasoning, and generalising. Children are able to actively engage in mathematical thinking by explaining their methods using precise mathematical language when solving a mathematical problem.

Variation
Variation is split into two areas:

- Procedural variation
- Conceptual variation

Conceptual variation involves varying how a concept is represented to draw attention to critical features. Often more than one representation is required to look at the concept from different perspectives and gain comprehensive knowledge.

Procedural variation considers how the student will 'proceed' through a learning sequence. Purposeful changes are made in order that pupils' attention is drawn to key features of the mathematics, scaffolding students' thinking to enable them to reason logically and make connections.

Fluency
At Cockerham we believe it is essential that children have efficient, accurate recall of key number facts and procedures, allowing children to be able to think deeply about concepts and problems. Fluency allows children the flexibility to move between different contexts and representations of mathematics, to recognise relationships and make connections, and to choose appropriate methods and strategies to solve problems.

NCETM (https://www.ncetm.org.uk/resources/50042)

Breadth of Study

- Through careful planning and preparation, we aim to ensure that throughout the school children are given opportunities for:
- practical activities and mathematical games
- problem solving
- individual, group and whole class discussions and activities
- open and closed tasks
- a range of methods of calculating e.g. mental, pencil and paper and using a calculator
- working with computers as a mathematical tool

At Cockerham we also acknowledge our own teachers' creativity, where resources and activities may be created solely by the teacher.

In all lessons, learning objectives are displayed and discussed. The emphasis in lessons is to make teaching interactive and lively, to engage all children, encouraging them to talk about Mathematics. Difficult points and potential misconceptions are identified in advance and strategies to address them planned. Key questions are planned, to challenge thinking and develop learning for all pupils. Within the session children will be exposed to problems to solve, resulting in mathematical discussions about key ideas. Throughout, there should be a balance of teacher talk and pupil-led discussion. Children will have the opportunity to use concrete resources to support their understanding of mathematical concepts as well as using pictorial methods.

MULTIPLICATION TABLES

Recall of multiplication tables, at speed and in random order, is recognised as an essential basis for mathematical fluency. As such, we are committed to supporting children to achieve this, in partnership with parents and carers. Recall should be achieved in specific multiplication tables as listed below:

Year 1-2: 2x, 5x and 10x
Year 3: 3x, 4x and 8x
Year 4: 6x, 7x, 8x, 9x, 11x and 12x

Children should have full speed recall of all multiplication tables up to 12x by the time that they reach Year 5. At the end of Year 4, children will take the multiplication tables check (MTC) which is statutory for all year 4 pupils in England. The purpose of the MTC is to determine whether pupils can recall their times tables fluently, which is essential for future success in mathematics. It will help schools to identify pupils who have not yet mastered their times tables, so that additional support can be provided.

TEACHERS' PLANNING AND ORGANISATION

Planning

Reception (EYFS) and Years 1-6 all follow the White Rose Maths schemes of learning. The schemes of learning are used to breakdown the larger curriculum statements (taken from the long-term planning documents) into smaller progressive steps that build upon one another.

The statements are broken into areas of fluency, problem solving and reasoning. Our weekly plans list the specific learning objectives and give details of how the lessons are to be taught. Within the White Rose Maths scheme, mastery is at the centre of the scheme and it supports teachers in providing pupils with opportunities to deepen their thinking and understanding to ensure they have `mastered` that concept within their year group. Each class teacher is responsible for the mathematics in their class, in consultation with and with guidance from the Mathematics coordinator, and follows the school Calculations Policy in order to ensure progression of skills and understanding throughout the school.

Teachers of the Reception class base their teaching on objectives from Development Matters this ensures that they are working towards the 'Early Learning Goals For Mathematical Development'. We give all of the children ample opportunity to develop their understanding of Mathematics. We aim to do this through varied activities that allow them to use, enjoy, explore, practise and talk confidently about Mathematics.

Key Stage 1 and Key Stage 2

Using the White Rose Maths materials, teachers will plan as necessary for the needs of their classes ensuring concrete, pictorial and abstract learning is embedded using sentence stems to allow the children to communicate mathematically. All classes have a daily Mathematics lesson with the opportunity within the day to complete a 15 minute `Flashback 4` or fluency activity. Flashback 4 works alongside the White Rose Maths scheme to ensure that pupils have the opportunity to revisit previous learning through 4 daily questions, this gives children an opportunity to regularly revisit concepts taught earlier in the year, in essence helping knowledge to `stick`.

The headteacher and Mathematics subject leader are responsible for monitoring the Mathematics planning within our school.

CROSS-CURRICULAR LEARNING

Throughout the whole curriculum, opportunities exist to extend and promote Mathematics. Teachers seek to take advantage of all opportunities. Teachers plan creative learning opportunities and outcomes for Mathematics across other subjects.

DIFFERENTIATION, SPECIAL EDUCATIONAL NEEDS AND EQUAL OPPORTUNITIES

We aim to provide a broad and balanced education to all pupils, regardless of gender, race, class or disability. Quality First Teaching is considered an entitlement for all pupils. Effective pupil tracking enables identification of pupils who may benefit from 'intervention' at an appropriate level, i.e. Wave 2 or Wave 3.

In all classes, there are children of differing mathematical ability. We recognise this fact and

provide suitable learning opportunities for all children. Teachers ensure when planning that learning is scaffolded to meet the needs of all the children, through the use of manipulatives to support understanding and adult support for struggling learners. For advanced learners teachers challenge through deeper questioning and providing deeper learning tasks and opportunities, where children have to use and apply their mathematical understanding in different contexts. When additional support staff are available to support groups or individual children, they work collaboratively with the class teacher to plan and deliver intervention strategies and activities.

We also recognise, and aim to make provision for, pupils who have a particular ability in Mathematics.

We incorporate Mathematics into a wide range of cross-curricular subjects and seek to take advantage of multi-cultural aspects of Mathematics.

In Mathematics lessons, we support children with English as an additional language in a variety of ways, for example: repeating instructions, speaking clearly, emphasising key words, using picture cues, playing mathematical games, encouraging children to join in counting, chanting, finger games and rhymes.

Differentiation should always be incorporated into all Mathematics lessons and can be done in various ways:

- Small steps focusing on one mathematical concept which becomes more difficult and demanding but cater for all children to succeed.
- Scaffolded differentiation: concrete resources used alongside pictorial and abstract representations in all lessons.
- Using a variety of resources within lessons e.g. counters, cubes, 100 squares, number lines, mirrors.
- Deeper Learning Tasks which are open ended activities/investigations where children can explain their mathematical thinking using precise mathematical language.
- Deeper questioning used in lessons
- Sentence stems allowing children to explain their mathematical thinking using precise mathematical language.
- Same day intervention to ensure no child is left behind.

PUPILS' RECORDING OF THEIR WORK

There are occasions when it is both quick and convenient to carry out written calculations. It is also important to record aspects of mathematical investigations. Children are taught a variety of methods for recording their work and they are encouraged and helped to use the most appropriate and convenient method of recording.

Children are encouraged to use mental strategies before resorting to a written algorithm.

Exercise Books for Recording

It is school policy that the following pattern is used:

- KS1: 1 cm squares and workbooks
- Year 3: 7 mm squares

- Year 4: 7 mm squares
- Year 5: 7 mm squares
- Year 6: 7 mm squares

All children are encouraged to work tidily and neatly when recording their work. When using squares one square should be used for each digit.

MARKING
Marking should be both diagnostic and summative and we believe that it is best done through conversation with the child but acknowledges that constraints of time do not always allow this (for more detail see the Feedback policy)

We recognise the importance of responding to children's work, whether orally or in writing. We seek to encourage children by acknowledging positive achievements.

ASSESSMENT AND RECORD KEEPING
Assessment has two main purposes:

- assessment of learning (summative assessment)
- assessment for learning (formative assessment)

At Cockerham, assessment of learning is used appropriately to provide a snapshot of what has been learned and to ascertain where children are with respect to age-related expectations.

We recognise that AfL lies at the heart of promoting learning and in raising standards of attainment. We further recognise that effective AfL depends crucially on actually using the information gained.

The school supports teacher assessment using the Lancashire KLIPS documentation. The assessment procedures within our school encompass:

- Making ongoing assessments and responding appropriately to pupils during 'day-to- day' teaching. These 'immediate' responses are mainly verbal and are not normally recorded.
- Using knowledge of pupils drawn from ongoing pupil tracking records.
- Adjusting planning and teaching within units in response to pupils' performance.
- Lancashire KLIPS assessment.
- Use of information gained from statutory and optional tests. Analysis is done at both a quantitative and qualitative level. Information gained is used to set focused curricular targets (what to teach) and also to determine which strategies or methods are particularly effective in respect of specific areas of Mathematics (the how and why).

Teachers are expected to make regular assessment of each child's progress and to record these systematically. These are regularly discussed at Pupil Review Meetings half termly with the HT and reported to the Standards and Effectiveness committee termly.

REPORTING TO PARENTS AND PARENTAL INVOLVEMENT

Annual reports are completed before the end of the Summer term and parents are given opportunity to discuss their child's progress on three separate occasions. Parents evening are offered throughout the year.

When significant changes have been/are made to the Mathematics curriculum, parents are invited to a meeting or sent information via the school newsletter.

MONITORING AND EVALUATION

Monitoring of the standards of children's work and of quality of teaching in Mathematics is the responsibility of the headteacher and link governor, supported by the subject leader.

The work of the 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.

STAFFING AND RESOURCES

There are a range of resources to support the teaching of Mathematics across the school. Staff are encouraged to use practical and visual models to support children's learning in Mathematics.

Resources which are not used or required regularly are stored centrally in the cupboard outside the office or in the main storeroom in the hall.

THE GOVERNING BODY

We have identified a Mathematics governor. They are invited to attend relevant school INSET. The Mathematics governor visits the school termly to talk with teachers and when possible, observes some Mathematics lessons. The Mathematics governor reports back to the curriculum committee on a regular basis.

HOMEWORK

It is our school policy to provide parents and carers with opportunities to work with their children at home. These activities may only be brief, but are valuable in promoting children's learning in Mathematics. Activities are sent home on a regular basis (see the separate school Homework Policy) and take the form of number games and tasks with some formal exercises for older children.

Approved by Governing Body:
Signed by Chair of Governors……. Date……..

Review Date: