



## Mathematics Policy

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### The importance of Mathematics

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.

### Intent: what is our curriculum aspiring to achieve?

We aim to develop lively, enquiring minds encouraging pupils to become self-motivated, confident and capable in order to solve problems that will become an integral part of their future.

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 have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
- can **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.

At Walkley Primary, we teach Maths for Mastery with high expectations for all children. This means that we are teaching children to have a deep conceptual understanding rather than teaching so that children can get a correct answer. Being able to explain how an answer is calculated, why that answer is correct, and what might happen if a particular variable was changed are the hallmarks of a good mathematician.

We believe that all children are able to succeed mathematically, and that one of our primary tasks as maths teachers is to find ways of presenting, scaffolding, and teaching concepts in such a way that everyone will achieve.

## Implementation: what do we do to deliver our intent?

### Our vision for Mathematics

- To promote a positive attitude towards mathematics in all pupils
- To ensure all pupils are engaged in and are enjoying exploring Mathematics
- To enable all pupils to find links between mathematics and other areas of the curriculum
- To ensure all pupils progress in mathematics and are challenged appropriately through an in depth understanding
- To use a wide range of concrete, pictorial and abstract representations to develop all pupils' relational understanding of mathematics
- To ensure all pupils are confident using mathematical vocabulary when reasoning about mathematics
- To promote a, systematic and reasoned approach to maths, particularly when Problem Solving

### Structure of Maths Lessons

All maths lessons at Walkley Primary consist of:

- Responding to marking and completing a 'do me first' activity
- A CLIC Big Maths session to develop fluency of key skills in Key Stage Two
- A mastering numbers session in EYFS and Key Stage One
- Teacher input following White Rose
- Independent tasks to develop fluency, reasoning and problem solving
- Plenary to consolidate the learning

#### **Do me first**

This is a question presented to the children out of the context of the current learning to recap on prior learning. These questions may be presented in a pictorial or abstract manner and are marked in an assessment style approach. During this time, children also respond to any marking comments or next step tasks set by the teacher from previous sessions and complete an activity such as s Flashback 4 once completed.

#### **Mastering Number**

Across Reception and KS1, we have implemented the Mastering Number maths project. This project aims to secure firm foundations in the development of good number sense for all children from Reception through to Year 1 and Year 2. The aim over time is that children will leave KS1 with fluency in calculation and a confidence and flexibility with number. Attention is given to the key knowledge and understanding needed in Reception classes, and progression through KS1 to support success in the future. The project is delivered as a daily session of 10 to 15 minutes in addition to their daily maths lesson. We use the provided resources such as: lesson plans, visual resources and practical equipment to ensure consistency with the training our staff have received. Central to the programme is a small piece of equipment similar to an abacus called a rekenrek.

### CLIC session

The Big Maths strategy is a systematic approach to teaching key numerical skills. Number based lessons are broken into 4 sections using the CLIC approach.

CLIC stands for: • Counting • Learn Its • It's Nothing New • Calculations

*Counting* is a key skill for all children from Nursery (counting objects) to Year Six (counting in fractions). This is a short section of the main lesson.

*Learn Its* are key facts which all children need to know including addition alongside related subtraction facts and tables facts. These are broken into termly chunks. Children are encouraged to achieve total recall of these facts through repetition in different ways.

The *It's Nothing New* part of the lesson links the skills that the children already have to the learning in the next part of the lesson. The above form the basis for the CLIC starter session with teachers selecting an aspect from each area in line with the progress drives.

The final section is the *Calculations* part. In this part of the lesson children develop strong calculation skills in all four operations.

### Safe Session

Big Maths also contains resources to revisit wider maths areas. The key elements are broken in to 4 sections using the SAFE approach:

SAFE stands for: • Safe • Amounts • Fractions • Explaining Data

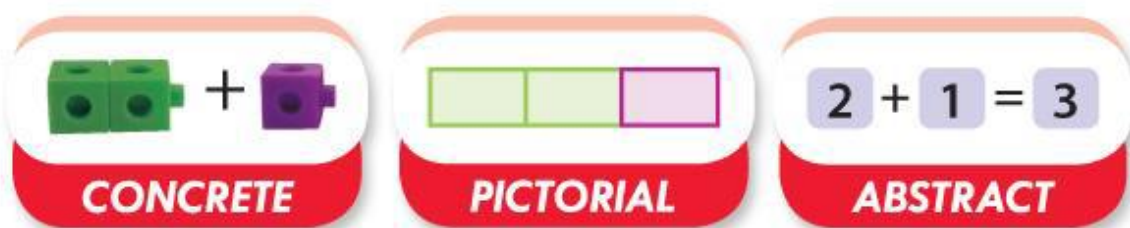
The above form part of the SAFE starter session implemented in upper key stage two alongside CLIC to revisit wider maths learning.

### Planning of Big Maths

Mathematical learning using Big Maths is organised into Progress Drives. These provide teachers with a clear, short step structure to follow, each building on the skills learned in the previous stage. During the week, teachers deliver daily learn its sessions and ensure other aspects of the CLIC session are delivered equally with maths lessons usually consisting of a 3 part CLIC session.

### Main Teaching and Learning – The White Rose Approach

The teaching and learning of mathematics at Walkley Primary should include aspects of the following Mastery approach strategies over a series of lessons following White Rose:



#### CONCRETE

Concrete is the “doing” stage, using concrete objects to model problems. The CPA approach brings concepts to life by allowing pupils to experience and handle physical objects themselves. Every new abstract concept is learned first with a “concrete” or physical experience.

#### PICTORIAL

Pictorial is the “seeing” stage, using representations of the objects to model problems. This stage encourages pupils to make a mental connection between the physical object and abstract levels of understanding by drawing or looking at pictures, circles, diagrams or models which represent the objects in the problem.

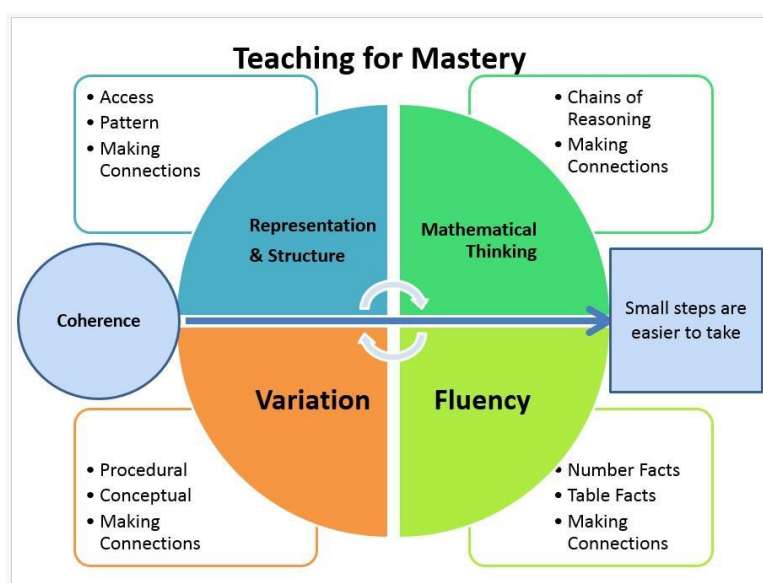
Building or drawing a model makes it easier for pupils to grasp concepts they traditionally find more difficult, such as fractions, as it helps them visualise the problem and make it more accessible.

#### ABSTRACT

Abstract is the “symbolic” stage, where pupils are able to use abstract symbols to model problems.

Only once a child has demonstrated that they have a solid understanding of the “concrete” and “pictorial” representations of the problem, can the teacher introduce the more “abstract” concept, such as mathematical symbols. Pupils are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols.

White Rose uses the Teaching for Mastery model as illustrated below. This has been developed by the NCETM



#### FLUENCY

Fluency comes from deep knowledge and practice. This is the first stage of pupils' understanding. Fluency includes: conceptual understanding, accuracy, rapid recall, retention and practice.

#### REASONING

Verbal reasoning demonstrates that pupils understand the mathematics. Talk is an integral part of mastery as it encourages students to reason, justify and explain their thinking. To encourage talk in mathematics, teachers may introduce concepts by including sentence structures. Pupils should be able to say not just what the answer is, but how they know it's right. This is key to building mathematical language and reasoning skills. This gives pupils the confidence to communicate their ideas clearly, before writing them down.

#### PROBLEM SOLVING

Mathematical problem solving is at the heart of the Mastery Approach. Pupils are encouraged to identify, understand and apply relevant mathematical principles and make connections between different ideas. This builds the skills needed to tackle new problems, rather than simply repeating routines without a secure understanding.

Mathematical concepts are explored in a variety of representations and problem-solving contexts to give pupils a richer and deeper learning experience. Pupils combine different concepts to solve complex problems, and apply knowledge to real-life situations. Through problem solving, pupils are required to select their mathematical knowledge and apply this to a new concept.

## **Planning – White Rose**

At Walkley Primary, teachers in FS2 – 6 follow the White Rose Planning. This provides the yearly overview and Medium Term planning for each year group.

- The yearly overview provides a Long Term Plan and is arranged into 'Blocks' such as 'Place Value' and 'Fractions'.
- Each term, the Learning Objectives are listed and are time related to ensure coverage and pace. The medium term plan breaks this down in to 'small steps' These are smaller building blocks to achieve the key objectives.
- The school subscribes the White Rose Premium. This provides planning for each small step and resources for both the teaching input and children's independent work.
- There will be an opportunity for fluency, reasoning and problem solving for all pupils in every lesson or sequence of lessons.
- Teachers follow the school's Calculation Policy and consider which pupils would benefit from a Concrete, Pictorial, or Abstract approach in each lesson, either through instruction for all pupils, or as a scaffold or support for some.
- Adaptations will be made to the tasks and input where necessary to meet the needs of all pupils.
- Teachers plan for the introduction of specific mathematical vocabulary which is guided through the 'Mathematical talk' section of the White Rose planning.

## **TT Rockstars and Times Tables**

Times Tables must be taught and then practised. TT Rockstars is available for the practice of times tables and these facts also form part of the 'learn its' programme within Big Maths.

We teach times tables using the following progression:

Year 1 – Be able to count in multiples of twos, fives and tens

Year 2 - Be able to recall 2, 5 and 10 multiplication and division facts

Year 3 - Be able to recall 3, 4 and 8 multiplication and division facts

Year 4 - Be able to recall up to 12x12 multiplication and division facts

Year 5/6 – consolidation of times tables and application of multiplication and division facts to problem solving

TT Rockstars is an initiative for Year 2 – 6. It is a fun way to practise times tables.

Pupils are expected to log onto TT Rockstars at home for each week.

In school, pupils complete the TT Rockstar Paper worksheets 3 times per week (5 times in Year 4). Each worksheet is timed and takes 3 minutes and the results are recorded onto the website once a week.

A leader board is displayed in each classroom and updated each week reflecting each pupils highest 'rock speed'.

## **Calculation Policy**

The policy has been developed to demonstrate our Mastery Approach and shows progression through each operation for each stage of learning. The policy is written to reflect the CPA (concrete, pictorial, abstract) approach to each stage of progression of the calculations.

## **Displays**

Each classroom should have:

- A MADS wall (multiplication, addition, division and subtraction) which reflects the appropriate level of the calculation policy delivered in the year group. This should be

accessible to children and demonstrate the CPA (concrete, pictorial, abstract) approach for each calculation.

- A CLIC working wall should also be displayed in each classroom. This should reflect the CLIC being delivered showing all four areas of the session and should be updated when new CLIC is introduced.

### **Homework**

Maths homework is provided weekly and consists of:

The week's Learn Its to embed through rehearsal.

An element of consolidation from the teaching that has been delivered. Maths homework takes the form of a google quiz which is accessed through Google Classrooms.

### **Maths in Foundation Stage 2**

EYFS follow Mastering Number to secure the firm foundations in the development of good number sense. Our aim is to provide our children with the automaticity, rapid recollection and confidence with basic number facts e.g. subitising.

EYFS follow the White Rose schemes of learning – principally securing the representations of numbers up to 10 and recognising number to 20. Children are encouraged to spot patterns and identify differences through variation. EYFS children begin their fluency journey by noticing and recalling numbers up to 20. EYFS practise is predicated on exploration and discovery with songs and repetition to secure foundational knowledge.

### **Impact: how do we ensure that children are learning?**

Through the White Rose learning journey and the clear small steps approach, the teachers, support staff and the pupils assess their learning continuously throughout the lesson. Assessment for Learning is fundamental to raising standards and enabling children to reach their potential. Assessment in Mathematics takes place daily using a range of strategies such as marking and feedback of work and verbal discussions with children.

- Marking feedback – children self-assess each lesson against the 'Remember tos' – the building blocks in the lesson to reach the learning objective. Teachers then mark their agreement with the child's own judgement. Teachers will mark children's accuracy in their independent work. A written comment will look at the child's understanding of the learning objective and provide the next step. In the case of misconceptions, verbal feedback may be given or the teacher may scaffold the learning in their marking.
- At the end of the unit, block assessment tasks are completed, where children have the opportunity to reflect on their knowledge and understanding.
- Teachers will use their judgement from lessons and from end of block assessments to inform their judgement of each key objective on the PiTA grid. Objectives are organised in to White Rose blocks of learning and children are judged using the 6 point PiTA scale for how well they are achieving against each statement.
- Three formal assessments take place in a year using White Rose end of term assessments or past SATs papers (Year 2 and Year 6). These raw scores are captured on PiTA grids and used to judge outcomes of working towards the standard, meeting expected standard and achieving greater depth.
- Pupil progress meetings are held regularly to discuss the progress children are making and to discuss the need for different approaches or interventions in light of assessment data.

## **CLIC**

Weekly CLIC assessments take place each week. Children complete a prepared activity of 10 at their assessed level covering a range of areas of number. These are then marked and the scores inputted in to the Big Maths website. If a child scores 10 out of 10 and is working below expected standard, the child then moves to the next CLIC level the following week. If a child scores 10 out of 10 and is working at or above the expected standard, they need to achieve 10 out of 10 3 times before they progress to the next level. However, children will not move on to CLIC levels beyond the content of the year group teaching and will be involved in designing CLIC challenges when they reach the upper level for the year group. Children are given time to work on the questions they have got incorrect before the following week. CLIC levels are captured on PiTA grids.

## **TT Rockstars**

Results from weekly paper tests are inputted to the TT Rockstars website and are reflected on the class leader board display.

Once a term, a baseline assessment is also administered which assesses the knowledge of the children across all times tables. The rock speed (calculated as number correct in time completed) is then captured on the PiTA grids.

Year 4 also record the soundcheck score as this gives an indication of achievement in line with the Year 4 multiplication check.

## **Responsibilities**

- Teaching staff have a responsibility to ensure maths sessions are planned, delivered and assessed as outlined in the policy.
- Teaching assistants have a responsibility to deliver planned sessions and provide feedback to teaching staff regarding the progress, engagement, misconceptions and achievements of the children (in some cases teaching assistants may also be responsible for planning activities).
- Supply teachers have a responsibility to ensure maths are planned, delivered and assessed as instructed by teachers in line with the maths policy.
- Subject leaders and SLT have a responsibility to monitor whole school application of the maths policy by all staff and ensure observed practice is effective. They will also deliver CPD when necessary.

## **Monitoring and review**

Maths will be monitored through observations and scrutiny of maths assessment data by SLT and subject leaders to ensure:

- The policy is applied by all staff.
- PiTA objectives are addressed.
- Sessions are pitched at the level appropriate for the group.
- Sessions are delivered in line with the agreed lesson sequence.
- Independent tasks are planned and to further develop fluency, reasoning and problem solving.
- Accurate assessments of children's achievements.
- Assessment information is used to inform future planning.

Policy to be reviewed September 2024.