Walton-on-Trent C of E Primary and Nursery School

Mathematics Procedure

Living, Learning, Laughing in God's Love

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INTRODUCTION

This document outlines the teaching, organisation and management of mathematics taught and learnt at Walton-on-Trent C of E Primary and Nursery School.

Its implementation is the responsibility of all teaching staff. The responsibility for monitoring and review rests with the mathematics subject leader.

The main purposes of this document are:
- To establish an entitlement for all pupils.
- To establish expectations for teachers of this subject.
- To promote continuity and coherence across the school.

Vision statement

To be a vibrant learning community aspiring to celebrate God's love and the uniqueness of each individual. This means offering kindness, honesty and respect to our global community and demonstrating courage, perseverance and ambition in order to flourish in the joy and hope of 'life in all it's fullness' (John 10.10)

INTENT

At Walton, our Maths curriculum follows the National Curriculum. We have chosen to use the White Rose Maths scheme to support our delivery of Maths. We selected this schemes because of their mastery principles of concrete, pictorial, abstract (CPA), the way the lessons are scaffolded and the small steps in which units and lessons progress. Additionally, this now brings the school in line with the rest of the JTMAT and allows for more detailed collaboration between colleagues.

At Walton, we aim to create resilient, enthusiastic and confident learners with growth mindsets who are fluent in the fundamentals of mathematics. We aim to ensure children have a balance of procedural fluency and conceptual understanding.

IMPLEMENTATION

KS1 and 2

At Walton, our classes are mixed age. However, Maths is taught in individual year groups.

For more information on how we structure our lessons in KS1 and 2, please see the document 'Walton's Approach to Maths in KS1 and 2'.

EYFS

In EYFS we follow the EYFS framework and use Mastering Number (NCETM) to support learning. Challenge is included through questioning. In Nursery, learning focuses on the children exploring number through a range of continuous provision and teacher-led activities, always using concrete and/or pictorial representations.

In addition to five daily maths lessons per week, children in Y3-6 access Rock Star Times Tables daily. Children in Reception-Y2 access Numbots to practise subtilising, number bonds and their mental maths.

Formative assessments: Teachers use formative assessment in all lessons to check children's understanding. We use a range of methods including: questioning, misconception moments, observations, analysing errors and regular marking of work.

Summative assessment: Termly assessments are carried out across the school from Year 1 to Year 6, using Test Base assessments which are in line with our schemes of learning. These materials, along with teacher judgements entered on Sonar inform our overall judgements.

Visits and enrichment - We place great importance on visits and enrichment experiences to support children's love of mathematics. To enrich our curriculum, we have a subject day (Numbers Day) in which children take part in engaging mathematic enrichment opportunities. These moments are hands-on explorative enrichment activities which raise the profile of mathematics in the school. In Years 5 and 6, children have the opportunity to be part of a maths masterclass at John Taylor High School.

IMPACT

Pupil Voice

Through discussion and feedback, children talk enthusiastically about their maths lessons and speak about how they love learning about maths. Children show confidence and believe they can learn about a new maths area and apply the knowledge and skills they already have.

Evidence in knowledge

Mathematical concepts or skills are mastered when a child can show it in multiple ways, using the mathematical language to explain their ideas, and can independently apply the concept to new problems in unfamiliar situations. Children demonstrate a quick recall of facts and procedures. This includes the recollection of the times table.

Evidence in skills

Pupils use acquired vocabulary in maths lessons. They have the skills to use methods independently and show resilience when tackling problems.
The flexibility and fluidity to move between different contexts and representations of maths.

The chance to develop the ability to recognise relationships and make connections in maths lessons.

Outcomes
At the end of each year we expect the children to have achieved Age Related Expectations (ARE) for their year group. Some children will have progressed further and achieved greater depth (GD). Children who have gaps in their knowledge receive appropriate support and intervention.

EFFECTIVE TEACHING AND LEARNING IN MATHEMATICS

Effective teaching ensures that pupils retain knowledge they have learned in their long term memory. This is supported by opportunities to revisit and practise their prior knowledge as well as building upon these foundations. Pupils are more likely to retain knowledge when they have engaged with the content they study. Teachers can support learning through clear exposition, which takes into account what pupils already know and understand. However, wider educational research offers a strong basis for a range of effective teaching approaches in mathematics. These are often reflected in our lessons and will include:

- Mastery – evidence suggests that in order to have a successful curriculum progression it must be planned from the beginning of a pupil's education by focusing on core content, to develop pupils' motivation and to allow more breadth and depth later.
- Sequence of learning – evidence suggests that teachers can support pupils' long term learning by drawing attention to core facts, formulas, concepts and vocabulary that are useful now and in the next stage of education.
- Prior knowledge – teachers' exposition is likely to be most effective when it is clear and carefully designed to account for pupils' existing knowledge.
- Recall – The evidence points to the need for teachers to provide enough opportunities to practise taught facts, methods and strategies, as well as additional opportunities for overlearning.
- Misconception moments – evidence suggests that teachers and pupils should be aware of infrequent mistakes that can be learned from. Therefore, teachers should ensure that pupils are put on a casual pathway that leads from success to motivation rather than learning from making mistakes. As a result, pupils should be taught about consistent mistakes so that they can experience more understanding, accuracy and success.
- Differentiation – research suggests that the large majority of pupils' progress through the curriculum content at the same pace. Differentiation emphasises deep knowledge and individual support/intervention.
- Mixed ability groupings – there is a lot of evidence to support that mixed ability groupings in mathematics appears to strongly benefit the majority of pupils as they are able to observe how others approach problem- solving and calculating in mathematics.
- Questioning – evidence suggests that teachers use precise questioning to check conceptual and procedural knowledge. They assess in lessons to identify who requires intervention so that all pupils keep up.

• Working walls – provide an additional and practical resource within the teaching and learning environment and develop not only the knowledge and understanding of the children but also the practical skills that are vital in the learning process. Modelled examples from the previous lesson or earlier in the lesson can be used as a point of reference to support children's working memory so that they don't have to hold everything in their heads at once.
• Concrete resources – are objects or physical resources that pupils can handle and manipulate to aid their understanding of different maths concepts and is a powerful tool for supporting our pupils to engage with mathematical ideas. Teachers and pupils must understand the links between the manipulative and the mathematical ideas that they represent as well as their being a clear rationale for using that particular resource.
• Calculations and presentation – research suggests that accurate calculations and careful presentation give pupils the ability to spot important and interesting patterns of number, as well as errors that need to be corrected. Calculation methods and presentation rules are procedural knowledge that need to be taught and rehearsed to automaticity.
• Live marking – evidence suggests that pupils are more likely to develop a positive attitude towards mathematics towards mathematics if they are successful in it, especially if they are aware of their success. As a result, incorporating live marking into the lesson ensures that our pupils are aware of their successes and provide immediate feedback.

SUPPORTING PUPILS IN MATHEMATICS, INCLUDING PUPILS WITH SPECIAL EDUCATIONAL NEEDS AND/OR DISABILITIES (SEND)

We recognise that in all classes children have a wide range of ability in mathematics, and we seek to provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. Research suggests the pupils with SEND benefit hugely from explicit, systematic rehearsal of declarative and procedural knowledge. Teachers use of systematic instruction and rehearsal to help pupils learn planned content over time. All pupils are entitled to a broad mathematics curriculum. Any adaptations made to support pupils' learning in mathematics usually should not be to the overall curriculum content but rather to how the content is taught. In the case of pupils with the most complex learning needs, there may be occasions when it is appropriate to modify the curriculum. However, this will be the exception.

EARLY YEARS FOUNDATION STAGE

Early years explore mathematical themes and content through the 'Mathematics' strand of the EYFS curriculum. This will include developing a strong grounding in number so that all of our pupils develop the necessary building blocks to excel mathematically as well as a greater detail on the importance of shapes, spatial reasoning and measure, and how our pupils can foster a love of maths. They are assessed against Walton's EYFS Curriculum in accordance with the Statutory Framework for the Early Years Foundation Stage.

KEY STAGE 1

The National Curriculum (2014) states that:

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 practical resources (e.g. 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

The National Curriculum (2014) states that:

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.

UPPER KEY STAGE 2

The National Curriculum (2014) states that:

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for

solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages. Pupils should read, spell and pronounce mathematical vocabulary correctly.

PLANNING AND RESOURCES

Long term planning

White Rose Maths Hub, Mastering Number (NCETM) and the Ready-to- progress schemes of learning provide the long-term planning for mathematics taught in our school. In Nursery, the children follow a bespoke long-term plan as outline by the statutory and non-statutory guidance outlined by the educational programmes for EYFS.

Medium and short-term planning

In Year 1 to Year 6, teachers use White Rose Mathematics as a framework based upon the CPA approach (concrete, pictorial and abstract). They support a mastery approach to teaching and learning and have number at their heart as well as ensuring teachers stay in the required key stage and support the ideal of depth before breadth. Within a lesson there are periods of independent practice using practice books and mathematics books. Children are encouraged to:

- "Discover" – show how they are able to solve a mathematical concept;
- "Share" listen to the range of representations that may be used and
- "Think Together" by applying their developing understanding through scaffolded questions until they have grasped the concept.

Teachers are also encouraged to stretch and challenge the children within their class by using a variety of resources and best practice, such as those materials published The White Rose Maths Hub and Number Sense and Ready To Progress Documents.

Short term planning

Teachers in Year 1 to year 6 use the White Rose Maths Hub slides with relevant, teacher informed adaptations. Teachers of the EYFS ensure the children learn through a mixture of adult led activities and child-initiated activities both inside and outside of the classroom. Mathematics is taught through an integrated approach.

Resources

Each class has a stock of core resources that are age appropriate stored in trays or on the table in each classroom. This ensures that maths equipment and resources

are easily accessible to the children during lessons. Additional mathematical equipment and resources are stored centrally in the maths cupboard. The maths subject leader is responsible for the management and maintenance of maths resources, as well as for liaising with SLT in order to purchase further resources.

Working walls will be utilised and updated regularly, in accordance with the area of maths being taught at the time as well as including maths vocabulary and reasoning and problem solving sentence starters as well as worked examples.

Arithmetical proficiency

At Walton, an increased focus on arithmetic proficiency (an appreciation of number and number operations, which enables mental calculations and written procedures to be performed efficiently, fluently and accurately) is paramount to ensure that our children have a broad range of mathematical skills to ensure they are fluent in the fundamental of Mathematics.
Reception use Mastering Number to support fluency and key stage 1 and 2 classes complete daily 15-minute Mastering Number sessions. Key stage 2 children complete daily flashback 4 on whiteboards before their lesson starts.

Mixed ability

Children have a wide range of mathematical abilities. At Walton, we deliver maths sessions in mixed ability classes. Where possible, children work in mixed ability pairs - this benefits all learners. Confident mathematicians are challenged through further questioning. Teachers and TAs provide support and to ensure that work is matched to the needs of individual.

Marking

Work is marked according to our Marking and Feedback Procedure and indicates whether or not the Learning Objective have been achieved. Some maths work may be marked during the lessons by pupils or teachers to identify the amount of progress being made. Where a child has self-marked, made corrections after the lesson or received intervention after the lesson, the child will use a purple pen.

CROSS-CURRICULAR OPPORTUNITIES

Staff are encouraged to develop cross-curricular links with mathematics and other subjects to provide a relevant and meaningful curriculum for pupils.

English
Mathematics contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. Children develop oracy through discussing mathematical questions, or presenting their reasoning's to the rest of the class and/or partner.

History

The teaching of mathematics contributes to children's historical understanding in a variety of ways. Children learn to use numbers when developing a sense of chronology through activities such as creating timelines and through sequencing events in their own lives. Children also learn to interpret information presented in graphical or diagrammatic form. They also study different number systems from past cultures, e.g. Roman numerals.

Geography
Mathematical ideas are present in most geography lessons and pupils can apply their mathematical skills to extend their geographical understanding. Effective maths skills are vital in many aspects of the subject. For example, numbers for measurement, e.g. temperatures, percentages, distances, river flow, numbers as coordinates e.g. grid references and latitude/longitude, comparative data e.g. ratios such as population density or GNP.

Science
The teaching of science contributes to the children's mathematical understanding in a variety of ways to interpret information presented in graphical or diagrammatic form as well as being able to deepen their mathematical reasoning when selecting the correct method or formulas to solve a problem.

Art
The teaching of art allows for the understanding of fractions, proportion and shape to be used within a real-life context that is enjoyable and thought provoking for our pupils.

Design and technology (DT)
The teaching of DT contributes to the children's mathematical understanding in a variety of ways to interpret information presented in numerous way. This allows our pupils to systematically rehearse content taught as well as developing an ability to solve all manner of problems. DT allows for children to rehearse their understanding of shape, space and measure as well as number.

Computing
Wherever appropriate we use computing to enhance our teaching of mathematics. The children use ICT in a variety of ways, such as creating spreadsheets and coding.

ASSESSMENT

Assessment is an integral part of teaching and learning and is a continuous process. Teachers make assessments of children daily through:
- regular marking of work
- analysing errors and picking up on misconceptions
- asking questions and listening to answers
- facilitating and listening to discussions

• making observations

These ongoing assessments inform future planning and teaching. Lessons are adapted readily where necessary. Pupils' attainment and progress in mathematics is recorded by teachers using Sonar Tracker to inform future teaching and learning activities.

Pupil Progress meetings are timetabled each term for all classes. Progress of pupils is discussed and appropriate intervention considered and put in place where appropriate.

Termly assessments are carried out across the school using the assessment materials for each year group provided by Test Base and is in line with the schemes of learning. These materials used alongside judgements made from class work support teachers in making a steps assessment for each child which in line with the assessment document. Year 2 and Year 6 complete the national tests (SATs) in May as well as Year 4 completing the multiplication check in June.

HEALTH AND SAFETY

We enable all pupils to have access to the full range of activities involved in learning mathematics. Where children are to participate in activities outside the classroom, teachers should be aware of health and safety issues. Risk assessments are undertaken prior to activities, to ensure that they are safe and appropriate for all pupils. Before undertaking a field trip, teachers are encouraged to visit the proposed area of study and fill in a risk assessment form. Further information can be found in the Health and Safety and Wellbeing Document and Educational Visits Document.

MONITORING AND REVIEW

It is the responsibility of the mathematics subject leader to:
• support colleagues in their teaching, by keeping informed about current developments in mathematics and by providing a strategic lead and direction for this subject;
• develop, implement and review an action plan for mathematics;
• monitor mathematics throughout the school;
• encourage staff to provide effective learning opportunities for all pupils;
• develop valid activities, appropriate for children at different stages of development, which enable pupils to progress in the subject.

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 subject leader also involves supporting colleagues in their teaching, being informed about current developments in the subject, and providing a strategic lead and direction for the subject in the school.

This document will be reviewed at least every three years.