WORTHINGTON PRIMARY SCHOOL

Mathematics Policy

REVISION HISTORY

Document version	Date of release	Changes made
Version 2	January 2014	Complete rewrite for the 2104 National Curriculum
V2.1	January 2017	Reviewed – no changes made

Introduction – Our Vision

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

- To become **fluent** in the fundamentals of mathematics, 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

- To **reason** mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

- To **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.

Objectives

- To enjoy maths by making it relevant and meaningful through **connections** to other areas of the curriculum and everyday life.
- To develop a 'can do' attitude and show resilience when solving problems.
- To enable our pupils to use and understand mathematical language and recognise its importance as a language for communication and thinking
- To ensure that all children follow a broad and balanced mathematics programme based on the requirements of the Primary Maths Curriculum.
- To ensure that all children are provided with interesting and challenging tasks that enables them to achieve the highest possible standard and develop a positive attitude to the subject.
- To allow children to develop as independent learners, able to make decisions about their own work.
- To enable children to relate mathematics to the world around them and use it in a wide range of situations

Organisation and Planning

Mathematics is a core subject in the National Curriculum and we use the National Curriculum programmes of study for mathematics which are set out year-by-year for Key stages 1 and 2.

Mathematics is a core subject and we use the Primary Maths Curriculum and White Rose resources as the basis for implementing the statutory requirements of the programme of study for mathematics.

The Primary Maths Curriculum provides us with a detailed outline of what to teach in the long-term. White Rose provides us with small steps, weekly, to include problem-solving and reasoning tasks in our planning. Teachers

ensure an appropriate balance of work across each term.

Weekly plans are completed by the class teacher. These plans list the specific learning objectives and the success criteria for each lesson and give details of how the lessons are to be taught, including differentiation and scaffolding. The class teacher keeps these individual plans and the class teacher and subject leader can discuss these on an informal basis.

Early Years planning is based on "Development Matters" as well at the White Rose Scheme of leaning and Mastering Numbe programme, ensuring both numbers and shape, space and measure is covered each term. The development statements enable the class teacher to identify areas in which to develop, challenge and extend children's current learning. In Early Years, all children have mathematical experiences everyday but initially not in the context of a formal lesson. They are provided with learning experiences to help them achieve the Early Learning Goals pertaining to Number and to Shape, Space and Measure.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through deepening their understanding. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

From EYFS, all children have a dedicated maths lesson every day. These are an hour long in Year 1/2 and Key Stage 2. In EYFS the length of the lesson varies according to the age of the children and the type of activity involved. Some mathematical activities will regularly take place outside of the formal lesson such as times tables practice or testing. There will be opportunities for paired work/ group work/ individual work as well as whole class teaching.

Long term and medium-term planning is based on the National Curriculum for Mathematics 2014 and the White Rose mathematics framework. Teachers adapt their plans to take account of assessment information for particular groups of children. Short term planning is derived from the White Rose medium term plans. Planning is for the benefit of the teacher, to ensure adequate coverage of all aspects of the curriculum and to ensure teacher readiness for the maths lesson. We recognise the importance of establishing a secure foundation in mental calculation and recall of number facts before standard written methods are introduced. Our calculation policy shows the methods to be taught in each year group for each of the 4 number operations

Teaching styles and strategies

We aim to provide all children with high quality direct teaching, which is interactive and lively. Our teaching style and lesson structure provide the opportunity for children to consolidate previous work, use and apply their learning, ask questions, reflect on their own learning and make links with other work.

We operate controlled differentiation with all pupils engaged in mathematics relating to a common theme but at different levels according to prior attainment. In class, use should be made of the interactive whiteboard and pupil-held whiteboards and the visualiser on a regular basis, to enhance the interactive elements of the lesson for the children.

All units of work should be planned to incorporate a CPA (concrete, pictorial and abstract) approach to teaching and learning. Worthington School is heavily committed to the use of manipulatives in all year groups, to aid with the development of concepts. In Early Years children become familiar with Numicon, which continues as one of the core resources in Key Stage 1. All children should have access to manipulatives to develop their concepts; we encourage the more able children to continue to use manipulatives rather than moving straight

onto abstract representations of number.

Teachers should bear in mind the sequence:

Concrete real object-----symbolic object-----image of object----symbolic image---- number sentence

as the sequence that the development of number concepts will follow. It is therefore important to have to hand a wide range of resources such as number lines and counting beads to provide concrete support. Each class should ensure they have a good supply of those resources and that they are used regularly. Resources used less regularly are stored in the maths resources area for communal use.

As a school we encourage spoken language, children will often work together to solve problems. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. They are assisted in making their thinking clear to themselves as well as others and teachers ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

Assessment

Assessment takes place daily. Teachers continually observe and talk to the children about their work, which they then use to help them adjust their daily plans. Children's work is marked daily and this also helps to inform teachers of their daily plans. We recognise that on-going assessment is at the heart of promoting learning and raising standards of attainment. It is a continuous process, allowing the teacher to match the correct level of work to the current concept development of the child. It will involve using information gathered from talking to children, observing and marking their work, watching their approach to practical tasks, noting their answers to questions etc. It will be used to alter the pace/content/level of a lesson as the teacher takes continuous feedback from the class on the appropriateness of the planned work. Children are encouraged to self-assess and peer assess their work. When a teacher finds their planning is at the incorrect level for the class or that more time is needed on a topic than they had previously planned, plans must be changed to accommodate.

All children are tested termly, using the NFER Assessments, based on the same style of the national tests in Year 2 and 6. These tests are marked and create a GAP analysis for teachers to inform of their next steps in the following term.

Children's progress from term to term, year group to year group is tracked using the school's own assessment system and this information is used to identify targeted children. Each child's progress is discussed every term in a pupil progress meeting with the head teacher, class teacher, SENco. These meetings are also used to help formulate intervention programmes.

Early Years assessment is an on-going process through teacher observations during child-initiated play and adult-led activities. The class teacher uses the development statements to identify where each child is in their developmental pathway. This is recorded on a pupil progress form each term and shared with the Head Teacher and Maths Co-Ordinator.

The teaching of Mathematics to children with Special Educational Needs

We enjoy teaching mathematics to all children, whatever their ability. It is part of the school curriculum policy to provide a broad and balanced education to all children. We provide learning opportunities that are matched to the needs of children with learning difficulties. Work in mathematics takes into account the targets set for individual children in their Specific Learning Plans (SLPs).

Adaptations for Supporting SEND Pupils in Mathematics

Differentiated Instruction

- **Tailored Tasks**: Provide tasks that are adjusted in complexity to match the individual needs of SEND pupils, ensuring they can engage with the content at an appropriate level.
- **Flexible Grouping**: Utilise flexible grouping strategies, allowing SEND pupils to work with peers who can support their learning while also providing opportunities for independent work.

Use of Visual Aids and Manipulatives

- **Concrete Resources**: Incorporate physical manipulatives (e.g., counters, base ten blocks) to help pupils visualise mathematical concepts and enhance understanding.
- **Visual Supports**: Use visual aids such as charts, diagrams, and pictorial representations to reinforce learning and provide clear examples of mathematical processes.

Structured Instruction

- **Explicit Teaching**: Implement explicit, systematic instruction that breaks down mathematical concepts into manageable steps, ensuring clarity and focus on key learning objectives.
- **Rehearsal of Skills**: Provide opportunities for systematic rehearsal of both declarative (facts) and procedural (methods) knowledge, allowing pupils to practice and consolidate their understanding.

Assessment and Feedback

- **Ongoing Assessment**: Utilise formative assessments to monitor progress and identify specific areas where pupils may struggle, allowing for timely interventions.
- **Constructive Feedback**: Provide immediate and constructive feedback that highlights strengths and areas for improvement, helping pupils to understand their learning journey.

Scaffolding Techniques

- **Step-by-Step Guidance**: Offer step-by-step instructions and scaffolding to support pupils in completing tasks, gradually reducing support as their confidence and competence grow.
- **Checklists and Templates**: Use checklists or templates to guide pupils through multi-step problems, helping them to organise their thoughts and approach tasks systematically.

Time and Pace Adjustments

- **Extended Time**: Allow additional time for pupils to complete tasks and assessments, recognising that they may require more time to process information and demonstrate understanding.
- **Pacing Adjustments**: Adjust the pace of lessons to ensure that all pupils, particularly those with SEND, have sufficient time to grasp concepts before moving on to new material.

Collaboration with Support Staff

- **Specialist Support**: Employ teaching assistants with a strong understanding of the mathematics curriculum to provide targeted support to SEND pupils during lessons.
- **Professional Development**: Ensure that teaching assistants receive ongoing training in effective strategies for supporting SEND pupils in mathematics, enhancing their ability to facilitate learning.

Parental Engagement

- **Informative Workshops**: Offer workshops for parents to help them understand how to support their children's learning at home, particularly in mathematics.
- **Resource Sharing**: Provide parents with resources and strategies that they can use to reinforce mathematical concepts outside of school.

Addressing Misconceptions in Maths

Identification of Misconceptions

- **Regular Assessment**: Implement formative assessments (quizzes, end of unit assessments, etc.) to identify common misconceptions among pupils.
- **Diagnostic Tools**: Use diagnostic assessments at the beginning of new topics to uncover prior knowledge and potential misconceptions.

Curriculum Design

- **Sequential Learning**: Ensure that the curriculum is designed to build on prior knowledge incrementally, allowing pupils to connect new concepts with what they already know.
- **Focus on Key Concepts**: Identify key mathematical concepts where misconceptions are likely to arise (e.g., fractions, decimals, geometry) and allocate appropriate time for in-depth exploration.

Explicit Teaching of Misconceptions

- **Direct Instruction**: When introducing new concepts, explicitly address common misconceptions. For example, when teaching fractions, clarify that the numerator represents parts of a whole, which counters the misconception that it represents a whole number.
- **Use of Examples**: Provide clear examples that illustrate both correct applications and common misconceptions, allowing pupils to see the differences.

Metacognitive Strategies

- **Encourage Reflection**: Teach pupils to reflect on their thought processes and question their understanding. This can include prompts such as, "What do you think is wrong with this answer?" or "Why does this method work?"
- **Peer Teaching**: Foster a classroom environment where pupils can discuss and explain their reasoning to peers, helping to clarify misconceptions collaboratively.

Feedback Mechanisms

- **Timely Feedback**: Provide immediate and constructive feedback on assessments and classwork, highlighting misconceptions and guiding pupils towards correct understanding.

- **Correction Opportunities**: Allow pupils to revisit and correct their misconceptions through targeted practice and re-assessment.

Professional Development for Staff

- **Training on Misconceptions**: Provide ongoing professional development for teachers on common misconceptions in mathematics and effective strategies to address them.
- **Collaborative Planning**: Encourage teachers to collaborate in planning lessons that anticipate and address misconceptions, sharing effective practises and resources.

Parental Involvement

- **Informational Workshops**: Offer workshops for parents to help them understand common misconceptions and how they can support their children at home.
- **Resources for Home Learning**: Provide parents with resources and strategies to reinforce correct mathematical understanding at home.

By systematically addressing misconceptions in mathematics, Worthington Primary School aims to enhance the quality of education and ensure that all pupils achieve their full potential. This approach not only supports individual learning but also fosters a positive and resilient learning environment.

Resources

There is a range of resources to support the teaching of mathematics across the school. All classrooms have a wide range of appropriate small apparatus. Mathematical dictionaries are available in school. The library contains a range of books to support children's individual research. A range of software is available to support work with the computers.

Homework

Children are set a weekly homework task in order to strengthen their learning in mathematics. This task directly links with the current unit of learning and is set on Mirodo or using the CPG revision books. Children are also encouraged to learn their times tables with regular practice on TTRock Stars. For further information please refer to the homework guidelines.

The contribution of Mathematics to other areas of the curriculum

English

Mathematics contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. For example, we encourage children to read and interpret problems in order to identify the mathematics involved. The children explain and present their work to others during plenary sessions. Younger children enjoy stories and rhyme that rely on counting and sequencing. Older children encounter mathematical vocabulary, graphs and charts when using non-fiction texts.

Science

During science lessons, children are able to use and apply their data handling skills when creating tables and graphs of scientific measurements. Whole class discussion of data also highlights the importance of clear recording of information. Children are also able to use a wide range of measuring devices in a real-life context. Children are required to read the scales on Newton meters, measuring cylinders, weighing scales

and a variety of other instruments.

Computing
Children use and apply mathematics in a variety of ways when solving problems using information Technology. Younger children use information Technology to communicate results with appropriate mathematical symbols. Older children use it to produce graphs and tables when explaining their results or when creating repeating patterns, such as tessellations. Children use standard and non-standard measures for distance and angle. They use simulations to identify patterns and relationships. Maths games and maths programs are used on the computer to enhance the learning.

Personal, social and health education (PSHE)
Mathematics contributes to the teaching of personal, social and health education and citizenship. The work that children do outside their normal lessons encourages independent study and helps them to become increasingly responsible for their own learning. The planned activities that children do within the classroom encourage them to work together and respect each other's views. We present older children with real-life situations in their work on the spending of money.

Spiritual, moral, social and cultural development
The teaching of mathematics supports the social development of our children through the way we expect them to work with each other in lessons. In paired or group work, we give them the chance to discuss their ideas and results. The study of famous mathematicians around the world contributes to the cultural development of our children.

Monitoring and evaluation

The maths leader undertakes a work scrutiny in each class at various points throughout the year, providing detailed feedback to each teacher with both points to celebrate and areas for improvement. Regular CPD and INSET on maths is provided both in-house and with external courses. NFER Assessments, SATs and teacher assessments provides a range of data which are closely monitored to assess progress in different classes and also to evaluate our performance against national standards. Interventions are evaluated with entry and exit data being compared to ensure children are making expected progress and that there is value for money. The governors and staff of Worthington are committed to providing the full range of opportunities for all pupils, regardless of gender, disability, ethnicity, social, cultural or religious background. All pupils have access to the curriculum and the right to a learning environment which dispels ignorance, prejudice or stereotyping.

Roles and Responsibilities

Head teacher and Governing Body

- support the use of appropriate teaching strategies by allocating resources effectively
- ensure that the school buildings and premises are best used to support successful teaching and learning
- monitor teaching strategies in the light of health and safety regulations
- monitor how effective teaching and learning strategies are in terms of raising pupil
- attainment
- ensure that staff development and performance management policies promote good quality teaching.

Subject leader

- To have an impact on raising standards of attainment for Maths across the whole school.

- Ensure the effective implementation of the National Curriculum for Maths so that it meets the needs of our children.
- To monitor the whole school and individual needs to be able to assess individual professional development opportunities and needs.
- To maintain the availability of high-quality resources.
- To maintain an overview of current trends and developments within the subject.
- To ensure, together with the Head Teacher, a rigorous and effective programme of monitoring.
- To effectively manage any funding designated to Maths.

Class teacher and teaching assistants

- Ensure the effective implementation of the National Curriculum for Maths, adapting it to meet the needs of our children
- Make effective use of Assessment for learning within Maths.
- To ensure scaffolding is in place to enable all children to reach their full potential.

Parents and carers

We believe that parents have a fundamental role to play in helping children to learn. We do all we can to inform parents about what and how their children are learning by:

- holding parents' evenings to discuss children's progress
- sending an annual report to parents in which we explain the progress made by each child and indicate how the child can develop their learning
- explaining to parents how they can support their children with homework

Equal opportunities statement

All children have equal access and inclusive rights to the curriculum regardless of their age, gender, race, religion, belief, disability or ability. We plan work that is for the performance of all groups and individuals. Worthington Primary School is committed to creating a positive climate that will enable everyone to work free from racial intimidation and harassment and to achieve their full potential. Policies are available on each of these that expand on this further.

Review

This policy will be reviewed every three years.