

Mathematics Policy

What is Maths?

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. (From The National Curriculum 2014.)

Our Aims

At Highworth School, in Mathematics we aim to enable pupils to:

- learn the facts and techniques they will need in order to study the subject further and for everyday life;
- think logically, to prove ideas and hypotheses;
- solve problems using the most appropriate method;
- be creative and imaginative, to appreciate the power of mathematics;
- 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;
- 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.

Organisation

In Key Stages 1 and 2, sessions last for 1 hour every day, and five Maths lessons are taught per week. Whereas children from Years 2 - 6 were previously grouped according to prior attainment, this is now being phased out, with a view to teaching all children in mixed ability groups. This is to ensure appropriate challenge and high expectations for all. In Years 1 - 5, children are taught in two groups, with three groups in Year 6.

Teaching

Mathematics Mastery

Mathematics Mastery is a Mathematics teaching and learning programme which the school has begun to implement during the year 2018-2019. At the start of 2018-19, children in years Reception and 1 will be using this programme, and this will roll out further up the school, one year at a time. This means that by 2023, all of the children in the school will be taught using the Mathematics Mastery approach.

The Mathematics Mastery curriculum has been developed to ensure every child can achieve excellence in mathematics. It provides pupils with a deep understanding of the subject through a concrete, pictorial and abstract approach. This ensures pupils fully understand what they are learning and are therefore able to apply this to different contexts.

Key Features of the Mathematics Mastery Curriculum:

- High expectations for every child
- Fewer topics, greater depth
- Number sense and place value come first
- Research -based curriculum
- Objects and pictures always before numbers and letters
- Problem solving is central
- Calculate with confidence

Mathematics Mastery places emphasis on the cumulative mastery of essential knowledge and skills. It embeds a deeper understanding of mathematical vocabulary and children's ability to reason confidently.

Years 2 - 6

Teachers use the National Curriculum objectives for their year group to create their medium term plan and to teach their daily lessons. Where necessary, they will track back to objectives from previous year groups to ensure full understanding. In line with the 2014 National Curriculum, all teaching now focuses on three key aims; reasoning, fluency and problem-solving. As Maths Mastery progresses through the school, we are also focusing on implementing the five main principles of Mastery teaching in Year 2 through to Year 6, which encompass the three aims of the National Curriculum already stated.

Fluency

Fluency aims to ensure that children are confident with their numerical skills in order to calculate quickly and effectively with all four operations. All staff are encouraged to include some element of fluency work daily, for example, through times table practice or written arithmetic questions. Fluency objectives have been given to all staff for each year group and are the focus of Maths Meetings and transition points within different parts of the day.

Mathematical Language

We want all children to leave Primary School with a good understanding of Mathematical language. Discrete teaching of mathematical language is becoming embedded into weekly planning and is part of the teaching cycle on a weekly basis. Children are expected to speak in full sentences within Maths lessons and be able to prove, explain and justify their thinking about different Mathematical concepts.

Variation

This principle ensures that different mathematical concepts are varied and children are encouraged to explore these through mathematical thinking, avoiding repetition and instead focus on embedding and deepening understanding.

Representation and Structure

Teachers are encouraged to use a range of different representations of mathematical concepts which expose the structures. These representations (concrete, pictorial and abstract) will enable children to experience and understand the structures being taught.

Coherence

We aim to ensure that the planning and delivery of Mathematics is in a logical and coherent step to provide children with the stepping stones to understand new concepts. Coherence is evident within medium term plans but also within an individual lesson. Lessons will eventually follow a five-part structure when Mathematics Mastery is taught in every group.

Do now – This is the part of the lesson where the children complete an instant task that can recap prior learning or be linked to new learning. It is an opportunity for the children to regularly practice new skills and show what they can do.

New learning – New concepts are introduced. These are introduced with manipulatives which will later lead onto pictorial and abstract representations.

Talk task – This is an opportunity for the children to reason with a partner. These partners are mixed ability pairings. The children will work with manipulatives to explore the new mathematical concept being taught.

Develop learning – In this section of the lesson, the new learning is developed. This can be in a variety of ways. For example, an additional method, application to a word problem or introducing the pictorial representation. The reasoning is to be practiced throughout the week. This aspect is the ability to discuss, explain and justify mathematical concepts; this can be in either written or verbal form. This allows children to have a deeper and more enriched understanding of what they are doing and why. Problem-solving involves children applying what they know to out-of-context situations, following a logical method in order to break down and solve a range of problems.

Plenary – In the final stage of the lesson, the children are to have a challenge. This could be an application question but it may also be a pre-teaching concept for the following day. This can be modelled by the teacher or more of a ‘have a go’ approach and reason with your partner.

Each part of the lesson is designed so that children are able to demonstrate a sound understanding of their age-appropriate mathematical content and are ready to move on to the next stage.

Planning

Medium Term Plans:

The National Curriculum is now divided up into different sections for each year group. These areas are:

Year 1:

Medium term plans are taken from the Mathematics Mastery scheme.

Year 2:

- Number – number and place value
- Number – addition and subtraction
- Number – multiplication and division
- Number – fractions
- Measurement
- Geometry – properties of shape
- Geometry – position and direction
- Statistics

Year 3:

- Number – number and place value
- Number – addition and subtraction
- Number – multiplication and division
- Number – fractions and decimals
- Measurement
- Geometry – properties of shape
- Statistics

Year 4:

- Number – number, place value and rounding
- Number – addition and subtraction
- Number – multiplication and division
- Number – fractions, decimals and percentages
- Measurement
- Geometry – properties of shape
- Geometry – position and direction
- Statistics

Year 5:

- Number – number, place value and approximation
- Number – addition and subtraction
- Number – multiplication and division
- Number – fractions, decimals and percentages
- Measurement
- Geometry – properties of shape
- Geometry – position and direction
- Statistics

Year 6:

- Number – number, place value and approximation
- Number – addition and subtraction
- Number – multiplication and division
- Number – fractions, decimals and percentages
- Measurement
- Geometry – properties of shape
- Geometry – position and direction

- Statistics
- Ratio and proportion
- Algebra

Within these areas, there are statutory requirements which need to be covered and non-statutory requirements, which allow teachers some elements of flexibility.

Weekly Plans:

The compulsory weekly planning format for Maths has been removed, offering instead a more succinct and concise way of planning as an optional alternative. Teachers are advised to use the statements from the National Curriculum as a basis for their planning, and to focus their 'WALTS' ('We Are Learning To') around these statements. Teachers can access these on our assessment database; Target Tracker. In Years 2 to 6, teachers use the White Rose resources to support the implementation of Maths Mastery principles. In order to provide staff support with short-term planning, many subscriptions have been made to various websites, which provide resources and ideas for every statement in the curriculum. In addition to specifying what the children are learning, planning should also show the expected outcomes for children and how these are differentiated. Smart notebooks are used as evidence of teachers' planning, in addition to their written plans.

Resources

Most resources are kept in the classroom for the period of a unit of work and are accessible to all pupils. Other resources not being used are stored in the Maths resource area. Within this area, resources are clearly labeled and organised for ease. Resources are audited, organised and refreshed each year in line with the needs of staff and changes in the curriculum.

We teach children how to use resources, to recognise appropriate times to use them and to be able to choose the correct piece of equipment to suit their task. Staff are encouraged to use practical resources with children at all levels of attainment and all stages of learning, to scaffold their understanding and to provide support for all learning styles.

Mental Arithmetic

We want pupils to use a wide range of mental strategies wherever possible. We also teach children when to move onto either informal, and then formal, pencil and paper methods if appropriate. This is now particularly important in order to prepare children for the new end of KS2 assessments. A pupil should ask the following four questions of himself or herself when tackling a problem, moving onto the next stage only if the answer is no:

1. Can I do this in my head?
2. Can I do this with just some informal jottings?
3. Can I do this by using a standard written method?
4. Which will be the most efficient method in order to solve it?

After completing a calculation, children should ask themselves, "Does my answer look sensible/realistic?" In KS2, children are encouraged to make an estimate to accompany their working out, thereby gaining a rough idea of whether their actual answer is close or not.

Maths Meetings

Maths Meetings are taught throughout the school for an additional fifteen minutes to the Maths lesson. These meetings are taught mixed ability and aim to cover a range of mathematical concepts within one session. Every classroom has a Maths Meeting board that is used to model and demonstrate the skill being practiced. Within the meeting, children will respond in a variety of ways for example:

- Whole class chanting
- Table challenges
- Call and response
- Partner work
- Written response
- Explanation responses
- Written calculations or jottings

Within these responses, speaking in full sentences and correct use of vocabulary is expected of all children. Daily practice of mathematical concepts will embed and deepen understanding ready for Maths lessons and ensure regular assessment and feedback on methods is being given to children.

Please see attached guidance directly taken from Mathematics Mastery regarding purpose, content and expectations for these meetings.

Transition Points throughout the day

During transition points throughout the day, for example, moving between lessons, getting home time things ready, teachers organise transition point chants. At these points, the children will practice a mental fluency skill and recall as a class for example, chanting the times tables, counting in 10s, counting backwards across boundaries etc...

Marking

Where appropriate, the 'We are learning to' ('WALT') of the lesson is used as the title for the piece of written work. This allows teachers to mark the work according to whether or not this has been achieved. All work is clearly marked and assessed in line with the school's marking policy, with a particular focus on the combination of self and peer marking and verbal feedback.

Assessment

Formative assessment takes place regularly, whereby staff use Target Tracker to assess the children's ability to meet the statements for the particular age group they are working on. They do this by highlighting the statements that the children have both covered and achieved. At the end of each half term, this will generate a 'step' for each child, which will give an indication as to whether or not that child is working at their age-related expectation.

We continue to prepare pupils for the statutory Key Stage 1 and Key Stage 2 SATS which take place in May each year. Teachers in Years 2 and 6 use the assessment frameworks to prepare for, and complete, these national assessments. At the end of Key Stage 1, children must sit two papers; Paper 1: Arithmetic and Paper 2: Reasoning. At the end of Key Stage 2, children must now complete three statutory papers; Paper 1: Arithmetic, Paper 2: Reasoning and Paper 3: Reasoning. These assess all of the skills taught at that stage.

Each half term, the children complete a half-termly assessment in Maths. This has been provided by PiXL (Partners in Excellence), with activities which test the children on all that they have learned during that half term. These half-termly tests will provide teachers with an excellent gap analysis tool, thereby equipping them with the information they need to plan for the coming half term in order to fill the necessary gaps that children have. This is another way of ensuring that more children are able to achieve the age-related expectation for their year group band. When PiXL has been successfully implemented across the school, it will give us a clear calendar of – and tools for – regular formative and summative assessment.

Homework

Home learning has been implemented as of September 2018. Children are sent home a Maths pack that they are then tested on in class after a 2-4-week period. If the children get the number of marks required for that assessment, then they will receive the next home learning pack. These packs are based on the National Curriculum objectives for that year group.

Equal Opportunities

Work is differentiated (where appropriate) in terms of ability and catered to the requirements of both pupils with 'Special Educational Needs' and EAL pupils, so that all pupils have access to a full and broad curriculum. This policy has been written in accordance with, and meets the requirements of the Equality Act 2010.

Monitoring

The approaches detailed in this policy will be monitored by the class teacher, Mathematics co-ordinator and Headteacher in line with school policy.

See also:

DfES Primary Mathematics Framework
School Assessment Policy
School Equal Opportunities Policy
School Monitoring Policy
School Marking Policy
School Homework Policy
National Curriculum 2014
Mathematics Mastery Schemes of work

Updated by Rebecca Harris
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