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Maths Policy

"It is vital that when educating our children's brains, we do not neglect to educate their hearts."

-Dalai Lama

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1. Curriculum Statement

Intent

The 2014 National Curriculum for Maths aims to ensure that all children:

- Become fluent in the fundamentals of Mathematics
- Are able to reason mathematically
- Can solve problems by applying their Mathematics

The NCETM, Power Maths and White Rose Maths, which ethos our school policy is based on, follows the idea of Maths Mastery.

Mastering maths means pupils of all ages acquiring a deep, long-term, secure and adaptable understanding of the subject. Achieving mastery means acquiring a solid enough understanding of the maths that's been taught to enable pupils to move on to more advanced material.

At Water Primary School, these skills are embedded within Maths lessons and developed consistently over time. We are committed to ensuring that children are able to recognise the importance of Maths in the wider world and that they are also able to use their mathematical skills and knowledge confidently in their lives in a range of different contexts. We are committed to developing children's curiosity about the subject, as well as an appreciation of the beauty and power of Mathematics.

Implementation

5 Big Ideas

The content of the Water Primary Mathematics curriculum is underpinned by the 5 Big Ideas. These ideas are draw from research evidence, underpinning teaching for mastery-

Coherence
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.

Representation and Structure
Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation

Mathematical Thinking
If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned with and discussed with others

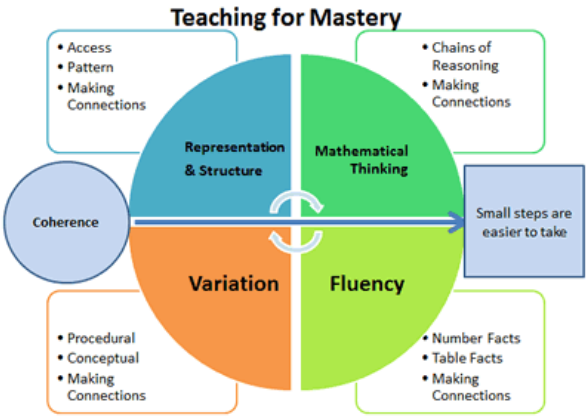
Fluency

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics

Variation

Variation is twofold. It is firstly about how the teacher represents the concept being taught, often in more than one way, to draw attention to critical aspects, and to develop deep and holistic understanding. It is also about the sequencing of the episodes, activities and exercises used within a lesson and follow up practice, paying attention to what is kept the same and what changes, to connect the mathematics and draw attention to mathematical relationships and structure.

A model of the 5 Big Ideas can be found below-



Teaching for Mastery Principles

It is achievable for all – we have high expectations and encourage a positive 'can do' mindset towards mathematics in all pupils, creating learning experiences which develop children's resilience in the face of a challenge and carefully scaffolding learning so everyone can make progress.

Deep and sustainable learning – lessons are designed with careful small steps, questions and tasks in place to ensure the learning is not superficial.

The ability to build on something that has already been sufficiently mastered – pupils' learning of concepts is seen a continuum across the school.

The ability to reason about a concept and make connections – pupils are encouraged to make connections and spot patterns between different concepts (E.g. the link between ratio, division and fractions) and use precise mathematical language, which frees up working memory and deepens conceptual understanding.

Conceptual and procedural fluency – teachers move mathematics from one context to another (using objects, pictorial representations, equations and word problems). There are

high expectations for pupils to learn times tables, key number facts (so they are automatic) and have a true sense of number. Pupils are also encouraged to think whether their method for tackling a given calculation or problem is Appropriate, Reliable and Efficient (A.R.E).

Problem solving is central – this develops pupils' understanding of why something works so that they truly have an appreciation of what they are doing rather than just learning to repeat routines without grasping what is happening.

Challenge through greater depth - rather than accelerated content, (moving onto next year's concepts) teachers set tasks to deepen knowledge and improve reasoning skills within the objectives of their year group.

Power Maths

To ensure whole consistency and progression, the school uses the DfE approved 'Power Maths' scheme. This is fully aligned with the White Rose Maths Hub scheme. New concepts are shared within the context of an initial related problem, which children are able to discuss in partners. This initial problem-solving activity prompts discussion and reasoning.

In KS1, these problems are almost always presented with objects (concrete manipulatives) for children to use. Children may also use manipulatives in KS2. Teachers use careful questions to draw out children's discussions and their reasoning. The class teacher then leads children through strategies for solving the problem, including those already discussed.

Independent work provides the means for all children to develop their fluency further, before progressing to more complex related problems. Mathematical topics are taught in blocks, to enable the achievement of 'mastery' over time. Each lesson phase provides the means to achieve greater depth, with more able children being offered rich and sophisticated problems, as well as exploratory, investigative tasks, within the lesson as appropriate.

Impact

The school has a supportive ethos and our approaches support the children in developing their collaborative and independent skills, as well as empathy and the need to recognise the achievement of others. Students can underperform in Mathematics because they think they can't do it or are not naturally good at it.

The Power Maths programme addresses these preconceptions by ensuring that all children experience challenge and success in Mathematics by developing a growth mindset. Regular and ongoing assessment informs teaching, as well as same-day intervention, to support and enable the success of each child. This ensures that we are able to maintain high standards.

2. Teaching and Learning

Power Maths

A typical lesson using Power Maths lasts approximately 1 hour. Maths is taught daily, each morning, in single year groups.

Children begin with a short 'Power Up' activity which supports fluency in and recall of number facts.

Following this, the main lesson begins with a 'Discover and Share' task in which a contextual problem is shared for the children to discuss in partners. This helps promote discussion and ensures that mathematical ideas are introduced in a logical way to support conceptual understanding. In KS1, these problems are almost always presented with objects (concrete manipulatives) for children to use. Children also use manipulatives in KS2. Teachers use careful questions to draw out children's discussions and their reasoning and the children learn from misconceptions through whole class reasoning.

Following this, the children are presented with varied similar problems which they might discuss with a partner or within a small group. At this point, scaffolding is carefully reduced to prepare children for independent practice. This is the 'Think together' part of the lesson and the children might record some of their working out in their Maths books or on a mini whiteboard. The teacher uses this part of the lesson to address any initial errors and confirm the different methods and strategies that can be used. The children are then shown a 'challenge' which promotes a greater depth of thinking.

The class then progress to the 'Practice' part of the lesson, which is designed to be completed independently. This practice uses conceptual and procedural variation to build fluency and develop greater understanding of underlying mathematical concepts. A challenge question and links to other areas of Maths encourages children to take their understanding to a greater level of depth.

The final part of the sequence is a 'reflect' task. This is an opportunity for children to review, reason and reflect on learning and enables the teacher to gauge their depth of understanding.

Strengthen and Deepen Activities

Running alongside this, 'strengthen' and 'deepen' activities are also provided by the teacher, taking work from other sources to help children progress in their learning. These are completed in separate Maths journals.

Strengthen- This is used as a tool to support children who may need extra support and consolidation in grasping key concepts of the lesson. This could include prior learning, simplified tasks or the use of practical resources which further embed the skills before moving into the book.

Deepen- These are used to support children working at a greater depth level. After completing up to the challenge in their book, children are encouraged to complete a further challenge in their journals which will test their problem-solving skills and reasoning skills to a higher level.

3. Assessment

Assessment for Learning

The structure of Power Maths is designed to support this process and the reflect task at the end of the each lesson also allows for misconceptions to be addressed. At the end of each blocked unit of work, the children complete a short end of unit check. This consists of five varied questions and an opportunity to demonstrate greater depth. There is a subsequent related task which allows for more open-ended outcomes to give further indication of the depth of each child's understanding. The outcome of this mini assessment is in the children's Maths books. Marking and verbal feedback ensure that gaps in understanding can be addressed before the next unit is taught.

Formative Assessment

Formative assessment is completed daily, with live marking taking place in each lesson and during assembly time, addressing any misconceptions. The children then return to class and are re-grouped if needed and same day interventions take place.

Summative Assessment

Teachers administer a termly arithmetic paper and reasoning and problem-solving paper, which specifically links to the coverage for that term. These are taken from the New Puma Primary Maths Assessments from Hachette Learning. The results of these papers are used to identify children's ongoing target areas, which are communicated to the children, as well as to parents and carers at Parents Evening. They are also used to inform the whole school tracking of attainment and progress for each child.

Once termly assessments are completed and data is recorded, this informs future planning and can be used to support children as they move from class to class. This information is than collated and saved each year to monitor children's progress.

4. Planning and Resources

The use of Mathematics resources is integral to the concrete – pictorial – abstract approach and thus planned into teaching and learning. The school has a wide variety of good quality equipment and resources to support our learning and teaching. These resources are used by our teachers and children in a number of ways including demonstrating or modelling an idea, an operation or method of calculation.

Resources for this purpose would include: base 10; 10/5 frames; a number line; place value cards; dienes; money or coins; measuring equipment for capacity, mass and length; bead strings; the interactive whiteboards and related software; 3D shapes and/or nets; Numicon and related resources and software; multilink cubes; clocks; protractors; calculators; dice; number and fractions' fans; individual whiteboards and pens; and 2D shapes and pattern blocks, amongst other things. This then enables children to use a calculation strategy or method that they couldn't do without help, by using any of the above or other resources as required.

Standard resources, such as number lines, multi-link cubes, dienes, hundred squares and counters are located within individual classrooms. Resources within individual classes are accessible to all children who should be encouraged to be responsible for their use.

Further resources (often larger items shared by the whole school) are located in the Mathematics section of our school. An interactive teaching tool for the purpose of modelling strategies is available to all teachers as part of the Power Maths scheme. Resources to support teachers' own professional development and understanding of new approaches as part of a mastery approach are available on the Power Maths 'Active Learn' platform. As well as overviews of learning, these include short videos which demonstrate new methods to ensure accuracy. High quality textbooks and practice books, approved by the DfE, as part of the national approach to teaching for mastery are used in each year group and a digital version of the Power Maths textbooks allows these to be shared with the class, during the main teaching. Teachers are encouraged to use the school playgrounds as an outdoor classroom when possible, for example, when teaching length, area or perimeter.

5. Organisation

The school has implemented a blocked curriculum approach to the teaching of Mathematics. This ensures that children are able to focus for longer on each specific area of Maths and develop a more secure understanding over time. This approach is also designed to enable children to progress to a greater depth of understanding. Subsequent blocks continue to consolidate previous learning so that the children continually practise key skills and are able to recognise how different aspects of Maths are linked. For example, when children have completed a block which has enabled them to master the multiplication of two-digit numbers, a subsequent block on area and shape might provide opportunities to use this understanding when calculating the area of shapes with 2-digit length and width dimensions.

Lessons are structured in a two-part way, with a short break in the middle. This allows the teacher to mark on the spot, highlight misconceptions and challenge children further appropriately. When returning for the second half of the lesson, children can complete purple pen activities (to correct simple mistakes), work in a small group with an adult to address misconceptions or break learning down further, or complete extensions and challenges to progress learning on and create deeper understanding.

6. EYFS

Children in Nursery have a short daily Maths teaching session, during which time they begin to develop their understanding of simple mathematical concepts such as counting to 20, maintaining 1 to 1 correspondence, simple addition and subtraction facts, to recognise and describe simple 2D and 3D shapes. Children are taught these concepts using physical resources, pictorial resources, songs, games and role-play. There is no focus activity linked to these sessions.

In Reception, children have a three-part lesson from Autumn 1. This consists of:

1. Whole class oral and mental starter - 5 minutes

2. Whole class main teaching - 10 minutes

3. Focus activity for 8 children, grouped according to current attainment and taught in a ratio of 2 or 3 children to 1 adult

Throughout the week a child will work with an adult - either a teacher or a supporting adult - on a differentiated task. This activity is completed in 10 - 15 minutes. This structure to the lesson enables teachers to secure a good balance between whole class work, group teaching and individual practice. It also enables teachers to establish regular routines thereby maximising teaching time. It supports assessment on a daily basis, as well as individual feedback to children, ensuring that children receive immediate intervention as required during the supported focus activity.

The independent activities at the Maths table link to the focus for the week. For example, if the focus for the week is addition, then activities on the Maths will often link to this. In addition to these planned independent activities, children also have the opportunity to self-select Maths resources to consolidate their learning during child-initiated activities. We recognise the importance of play-based learning and therefore encourage children to develop their understanding during their play. Such opportunities are provided in both the inside and outside environment. Regular observations and assessments help to ensure that children that need additional intervention to consolidate their mathematical understanding are identified and supported by appropriate interventions.

7. KS1 and KS2

As acknowledged by the National Centre for Excellence in the Teaching of Mathematics (NCETM) and the Maths Hub programme – 'The use of well-designed and tested textbooks is critical for the successful implementation of teaching for mastery. A good textbook is both an aid for the teacher in planning lessons and for the children during lessons and working on their own.'

Through Years 1 to 6 we use a coherent programme of high-quality materials and exercises, which are structured with great care to build deep conceptual knowledge alongside developing procedural fluency. Our KS1 and KS2 teachers use textbooks and workbooks from DfE approved Power Maths series. This scheme is based on the principles of how Mathematics is taught in many high performing jurisdictions in East Asia and aligned with the 2014 National Curriculum. The Power Maths textbooks and workbooks are arranged in chapters and, over the course of the academic year, all units of the 2014 National Curriculum are covered. Short term planning is done on a bi-weekly basis, and includes the preparation of success criteria which accompany the learning intentions for each lesson. Teachers also plan activities and additional tasks which offer support and also provide further challenge for children who are able to progress further in their learning.

In both key stages, the initial teaching takes place, with the teacher referring to the online version of the text book (children might go to tables for the 'Think Together' task, or to

practise using concrete resources prior to independent task time so they are not on the carpet for too long).

Children record their work into their own Power Maths Practice book. Teachers mark outcomes of work in the practice books and then use the success criteria to verify children's self-assessment and identify immediate target areas for each child, as outlined in the school's marking and presentation policy. Support tasks and further challenge questions (which are completed in follow up of main independent work to consolidate or extend learning) are recorded in the children's own Maths books. This provides further evidence of differentiated learning.

8. Equal Opportunities and Protected Characteristics

Our school is committed to ensuring the active participation and progress of all children in their learning:

- All children will be given equal opportunities to achieve their best possible standard, whatever their current attainment and irrespective of gender, ethnic, social or cultural background, home language or any other aspect that could affect their participation or the progress of which they are capable.
- Children are given the opportunity to explore and use mathematical concepts and concrete apparatus, allowing them to develop a curiosity about problem solving and reasoning.
- The opportunity of accessing a further challenge within Maths lessons is a way to demonstrate the importance of equality and mutual respect, this shows that all children are given the same equal opportunities to progress within each lesson.
- Understanding and highlighting diversity within our Power Maths/White Rose Maths scheme, where a lot of the characters used within problem solving questions are of different races.
- The use of readily available concrete apparatus during Maths lessons ensures that all children, no matter what age, have the opportunity to progress as mathematicians.
- Discussions about mathematic enquiry and how we can approach problem solving questions ensure that children are working together in pairs or as a team to reach an answer, no matter what race, religion or gender they are.

9. Inclusion

Taking a mastery approach, variation occurs in the support and intervention provided to different children, not in the topics taught, particularly at earlier stages.

The National Curriculum states: 'Children who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.'

There is little differentiation in the content taught but the questioning and scaffolding individual children receive in class as they work through problems will differ, with higher

attainers challenged through more demanding problems, which deepen their knowledge of the same content before acceleration onto new content.

Through the number of questions completed for each lesson (which progressively get more difficult), to the strengthen activities and support given in class and again to the challenges achieved independently, work is varied; not by the questions they are given which can sometimes act as a ceiling on learning, but through their own capabilities and depth of understanding.

Children's difficulties and misconceptions are identified through immediate formative assessment and addressed with rapid intervention – commonly through individual or small group work within the lesson or if needed, later in the day. A range of inclusion strategies are embedded in practice and teachers are aware of the special educational needs of the children in their Maths class, as well as those who have English as an additional language.

Although the expectation is that the majority of children will move through the programmes of study at broadly the same pace, the 2014 National Curriculum states: 'Decisions about when to progress should always be based on the security of children's understanding and their readiness to progress to the next stage.' If a child's needs are best met by following an alternative plan, including coverage of the content from a previous year, this will be overseen by the SENDCo, in collaboration with the class teacher. Specific arrangements for the provision of children with SEND will be communicated to parents and carers during SEND reviews.

10. Role of the Subject Leader

The subject leader will raise the profile of Maths through best practice. They will model lessons, as appropriate to new staff, ECTs and peers to support continued professional development. They will ensure the high quality of Maths displays around the school, present certificates of achievement during assemblies and involve the school in 'celebrations' of Maths.

The subject leader will support staff in providing opportunities for CPD in Maths and will identify and organise opportunities which enable this, as appropriate. This may be in-house or provided externally.

The subject leader will monitor progression and continuity of Maths throughout the school through lesson observations and regular monitoring of outcomes of work in Maths exercise books.

The subject leader will ensure that all staff have access to year group plans and the relevant resources which accompany them.

The subject leader will monitor children's progress through the analysis of whole school data. They will use this data to inform the subject development plan which will detail how standards in the subject are to be maintained and developed further.

The subject leader will, on a regular basis, organise, audit and purchase central and class-based Maths resources.

The subject leader will keep up to date on current developments in Maths education and disseminate information to colleagues.

The subject leader will extend relationships and make contacts beyond the school.

The subject leader will develop opportunities for parents/carers to become more involved in Maths education.

The subject leader will ensure that all staff have access to professional development including observations of outstanding practice in the subject.

11. Parents

We recognise that parents and carers have a valuable role to play in supporting their child's mathematical learning. An overview of the Maths curriculum is available on the school's website, as well as guidance in the progression in calculation methods used by the school. Paper copies of these documents are also available on request.

Activities which link to each Maths topic are suggested for parents and carers to try at home with their child.

Apps such as TT Rockstars and Numbots (EYFS) are encouraged to promote fluency whilst personalised activities are advised dependant on a child's needs.

Parents are informed of their child's progress at Parents' Evenings and in the annual end of year report.

Parents and carers are encouraged to speak to their child's Maths teacher at any point during the year, either informally or by making a specific appointment; information about their child's standards, achievements and future targets in Maths is shared during parent/carer meetings, as well as ways that parents/carers may be able to assist with their child's learning.

School also provides a number of opportunities for parents/carers to learn about what their child is learning and the way their child is being taught through parent workshops and online videos especially designed for parents.