

Garswold Primary School



A Curriculum Policy statement for: Mathematics 2024



NCETM
NATIONAL CENTRE FOR EXCELLENCE
IN THE TEACHING OF MATHEMATICS



Philosophy and purpose:

Mathematics is a creative and highly interconnected 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.

Children's knowledge, skills and understanding in mathematics will develop as they use them in practical activities to solve relevant and meaningful problems, and to explore patterns and relationships on which mathematical concepts depend. Mathematics is a way of thinking, and this is reflected in school when the use of mathematical knowledge, skills and understanding are required in other areas of the curriculum. Indeed, throughout the whole curriculum opportunities exist to extend and promote mathematics. Teachers seek to take advantage of all opportunities.



Aims 2014 Curriculum:

The National Curriculum for Mathematics 2014 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 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
- 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

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. It is imperative children understand the concept being taught before moving on, therefore the pace can be increased or decreased as necessary to the task. 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 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.

White Rose Maths Hub:

The White Rose Maths Hub are one of 35 national Government funded hubs who work with hundreds of early years, primary and secondary schools across their assigned areas of Bradford, Calderdale, Kirklees and Leeds to raise standards and inspire children and their teachers about the power of maths. As a hub they have produced a series of learning schemes, assessments and teaching resources to support teaching for mastery. The schemes have proved extremely useful so far for hundreds of schools around the country in helping teachers understand what teaching for mastery might look like. The fluency, reasoning and problem-solving ideas exemplify what depth could look like for each area of mathematics. There is a particularly strong emphasis on developing fluency, reasoning and problem-solving skills.

Garswood have invested in White Rose Premium to gain high quality resources and a sequence of learning that merges well with our school and teaching approaches. **White Rose lessons are ideal for home learning when necessary and when in school are taught in connection with by a wide variety of other resources such as NCETM, Twinkl, Atom Learning and Ready to Progress**

Maths Mastery: Lesson approach

When teaching maths for mastery, the whole class moves through topics at broadly the same pace. Each topic is studied in depth and the teacher does not move to the next stage until all children demonstrate that they have a secure understanding of mathematical concepts.

○ **Time To Think Deeply About The Maths**

Students are given time to think deeply about the maths and really understand concepts at a relational level rather than as a set of rules or procedures. This slower pace leads to greater progress because it ensures that students are secure in their understanding and teachers don't need to revisit topics once they've been covered in depth.







○ **Builds Self-Confidence In Learners**

In a traditional primary school maths lesson, children are put in different groups and given different content based on their anticipated ability. This means that from an early age children are classed as those who can and can't "do maths". Teaching maths for mastery is different because it offers all pupils access to the full maths curriculum. This inclusive approach, and its emphasis on promoting multiple methods of solving a problem, builds self-confidence and resilience in pupils.

What is Maths Mastery?:

Teaching maths for mastery is a transformational approach to maths teaching which stems from high performing Asian nations such as Singapore. When taught to master maths, children develop their mathematical fluency without resorting to rote learning and are able to solve non-routine maths problems without having to memorise procedures.

Need To Know

-  Evidence-based approach to teaching maths
-  Helps pupils develop a deep, long-term and adaptable understanding of maths
-  Inclusive approach where all children achieve
-  Slower pace which results in greater progress
-  Reflected in the 2014 English national curriculum for mathematics
-  Endorsed by the Department for Education, NCETM and OFSTED



School curriculum for Key Stages 1 and 2:

The programmes of study for mathematics are set out year-by-year for key stages 1 and 2. Schools are, however, only required to teach the relevant programme of study by the end of the key stage. Within each key stage, schools therefore have the flexibility to introduce content earlier or later than set out in the programme of study. In addition, schools can introduce key stage content during an earlier key stage, if appropriate. All schools are also required to set out their school curriculum for mathematics on a year-by-year basis and make this information available online.

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

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 4 operations, including with practical resources [for example, 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.



Teaching approaches:

- **Multiplication tables:**
 Y2: 2, 5 & 10 times tables
 Y3: 3, 4 & 8 times tables
 Y4: all tables up to 12x12
- **Standard written methods:**
 Y3: Column addition & subtraction
 Y4: Standard column multiplication
 Y5: Short division
 Y6: Long division
- **Fractions**
 Y1: Introduce $\frac{1}{4}$ and $\frac{1}{2}$
 Y2: $\frac{3}{4}$ and $\frac{1}{3}$. Find $\frac{1}{2}$ of a number
 Y4: Add + Subtract
 Y6: Add & Multiply fractions
- **Algebra**
 Y6: Simple formulae, finding missing numbers, etc.

Each class teacher is responsible for the mathematics in their class in consultation with and with guidance from the mathematics co-ordinator and the White Rose schemes.

The approach to the teaching of mathematics within the school is based on these key principles:

A mathematics lesson every day with a clear focus on direct, instructional teaching and interactive oral work with the whole class, groups and individuals catering for a range of abilities, differentiated throughout the lesson with an emphasis on the development of key skills, facts and mental calculation. Every mathematics lesson should include....

- Consolidation
- Discussion
- Reasoning
- Explanation
- Open questioning
- Games

Every lesson and set of questions should contain key words in questions such as 'Why?' Every answer should contain the word 'because'







During each lesson, we aim to spend as much time as possible directing independent learning and questioning (mostly open ended) of the whole class, a group of pupils, or individuals. The high-quality teaching which we aim to provide is **oral, interactive** and **lively**.

Where appropriate during the lesson, opportunities will be taken to use, apply and develop mathematics through activities in other areas of the curriculum. Indeed, the development of the Curriculum maps offer extensive opportunities for this.

A practical approach to mathematics is taken wherever possible and jotters (maths notebooks) are used extensively. However, 'working in books' is still essential in our teaching of mathematics.

The teaching of Mathematics is now facilitated extensively through the use of computing and manipulatives. In lessons where this is the case, exactly how computing and manipulatives are being used should be clearly indicated in planning, and specific software are also clearly identified on plans.

Through careful planning and preparation, we therefore aim to ensure that throughout the school children are given opportunities for:

-  practical activities and mathematical games
-  problem solving
-  individual, group and whole class discussions and activities
-  open and closed tasks
-  a range of methods of calculating e.g. mental, pencil and paper and using a calculator
-  working with computers as a mathematical tool



Planning:

The Mathematics Curriculum 2014 in association with White Rose maths Hub provides objectives for planning and teaching mathematics for all pupils across the Foundation stage and Years 1 to 6. However, it is essential that planning also reflects the use of **Assessment for both Learning and Teaching** in order to address the needs of our children and to personalise their learning.

We have an agreed planning format in place and this provides the minimum requirement for mathematics planning. The format which has been developed is intended to provide greater flexibility in responding to the needs of the children. Guidelines and requirements for planning have been issued to staff.



Teachers' planning and organisation:

Since September 2017 Garswood have been following the structure of The White Rose Mathematics Mastery programmes of study, which ensures continuity and progression in the teaching of mathematics. Within a unit of work, the time spent on teaching a specific learning objective or set of learning objectives depends on the needs of the children.



Lessons will follow a six part structure over a week, to allow for AfL:

These aspects of maths will take place over a week of learning, not necessarily once a day, this will be based on the objective and needs of the children when they occur. Some aspects like sharing the learning objective and independent work will be in each lesson while others will be in each maths lesson and some like paired talk task and developing learning might take place twice a week.

- 1) Do Now (A short task or question on the board for the children to be thinking about)
- 2) Sharing of the learning objective and modelling of the new learning

- 3) Paired Talk Task
- 4) Develop Learning
- 5) Independent Work
- 6) Plenary

All teachers plan daily mathematics lessons following this structure using an agreed planning format. Planning is done on a regular basis and adapted after each lesson based on the children's learning and understanding. Where possible teachers pre-empt 'big' misconceptions that many children will have – eg a rectangle/oblong has four lines of symmetry (diagonals). Teachers also plan which vocabulary they will use and which models, images and concrete resources they will use to aid learning. Effective plenaries are only part-planned as misconceptions only arise during the teaching of the lesson. However, all plenaries refer to the learning outcome and the success criteria in a meaningful way, allowing the children some time for self-assessment.

We ensure that across each term children are given a range of experiences in mathematics lessons e.g. practical activities and mathematical games, group problem solving activities, individual, group and whole class discussion activities, open and closed tasks. We ensure that children can use a range of methods to calculate and have the ability to check whether their chosen methods are appropriate, reliable and efficient.

A separate 'Calculation Policy' has been written by the White Rose Maths Hub and has also been adopted by Garswood to ensure complete continuity and gradual development of number skills.

Ready to Progress:

This publication identifies the most important conceptual knowledge and understanding that pupils need as they progress from year 1 to year 6. These important concepts are referred to as ready-to-progress criteria and provide a coherent, linked framework to support pupils' mastery of the primary mathematics curriculum. The ready-to-progress criteria for all year groups are provided at the end of the introduction (Ready-to-progress criteria), and each criterion is explained within the corresponding year-group chapter.

The publication does not address the whole of the primary curriculum, but only the areas that have been identified as a priority. It is still a statutory requirement that the whole of the curriculum is taught. However, by meeting the ready-to-progress criteria, pupils will be able to more easily access many of the elements of the curriculum that are not covered by this guidance.

Aims of Ready to Progress?

- bring greater coherence to the national curriculum by exposing core concepts in the national curriculum and demonstrating progression from year 1 to year 6
- summarise the most important knowledge and understanding within each year group and important connections between these mathematical topics

Ready to Progress at Garswood










- At Garswood we have combined our resources of White Rose Maths Hub Schemes with the DfE/NCETM Ready to Progress documents. Post Lockdown, school leaders were being inundated with ideas, advice and theories about what is required for school return on March 8th 2021. We have looked at and discussed a variety of options, reading widely before adopting this plan for Garswood.
- The Ready to Progress guidance aimed to bring greater coherence to the curriculum by exposing core concepts and demonstrating progression from Y1 to 6, while summarising the most important knowledge and understanding needed in each year to make important connections between mathematical topics. It was never intended to replace the curriculum and we believe it should not now. It is now fully incorporated of Version 3 of White Rose Maths which ensures it is taught within maths lessons.

How will Ready to Progress be used?

White Rose Maths Version 3 has all the aspects of Ready to Progress woven into. Therefore, children experience a recap at the beginning of each unit which has been directly taken from the Ready to Progress documentation to recap key areas that are significant and present in many areas of maths. When these skills are secure then the next White Rose 'step' can be taken.

Guidance on Mathematics Planning:

The planning structure for each year is organised into the following sections containing both statutory and non-statutory guidance. Some objectives have been created for the 2014 curriculum; others have stayed the same while others have moved from upper year groups to lower to accommodate greater challenge. Each section has incorporated into it objectives from 'Using and Applying mathematics'.

-  Number and place value (approximation, estimation and rounding added in KS2)
-  Addition and subtraction
-  Multiplication and division
-  Fractions (percentages and decimals added in KS2)
-  Measures
-  Geometry and property of shapes (position, direction and motion added in KS2)
-  Data – KS2 only
-  Ratio and proportion – Year 6 only
-  Algebra – Year 6 only

Resources:

A wide variety of both practical and teacher resources are available in school. Each classroom has been equipped with specific resources which are used on a regular basis. All other resources are currently stored mainly within classrooms who are fully stocked with daily maths resources which children can access when needed through modelled practise.

However, resources used at various points throughout the year such as weights and balances are stored in the cabinets at the end of the 'junior corridor' and are easily accessible to all.

Each classroom is equipped with a Plasma TV which is used as a teaching resource. All interactive whiteboards have Internet access and are networked to a huge variety of software all of which can be used for teaching, reinforcement and practice. In addition, we now have access to a set of five laptops per class, each with access to the Internet and resources from the school network as well as 15 iPads that are timetabled throughout the school for access to such things as Atom Learning and timestables.co.uk. they also have various mathematical apps, appropriate to the various year groups

Year 1 and Reception use a combination of desktop computers and tablets within their classroom for mathematical interventions. The computer suite also has timetabled sessions (one of which is for maths interventions such as or timestables.co.uk, Atom etc...)

Assessment and Monitoring:

Level descriptors have now been removed from the National Curriculum 2014. It has been stated that levels have become too abstract, do not give parents meaningful information about how their child is performing, nor give pupils information about how to improve. Therefore, a range of strategies will be

used which help teachers to recognise and record pupil's progress, levels of understanding, identify misconceptions and plan further work. Planning and recording of assessments is regularly monitored by the Mathematics and Assessment co-ordinators.

The Curriculum 2014 objectives in association with White Rose Maths Hub objectives tracks pupil's progress every half term. It has been agreed that all class teachers will use the objectives to indicate at least termly with colours **green** (confident in an objective), **yellow** (working towards an objective) **red** (not understood) and **purple** (mastered an objective) based on 2014 National Curriculum new objectives in association

Formal assessments in Mathematics include completion of the Foundation Stage profile in Reception which acts as a baseline; end of KS1 SATs; end of KS2 SAT and Multiplication times table check in Year 4. With the new additional of White Rose reasoning and arithmetic termly assessment tests for each year group and White Rose topic assessments at the end of each unit e.g. addition and subtraction to give a clear understanding of children's misconceptions and were to go next.

Test data and class work are both critically analysed to identify 'needs to be addressed' (areas of weakness) on a year group, class, group and individual level. These identified needs are addressed in future plans.

Each teacher is responsible for reporting individual progress to parents and to the next class teacher.

We are all accountable for securing the mathematical entitlement of individuals.






Differentiation

Staff at Garswood have high expectations of all children, irrespective of ability, and encourage them to be successful and achieve their full potential. Our aim is to ensure challenge for all. Children are encouraged to have a growth mindset about their ability to do mathematics. Encouraging children to 'have a go' is seen as paramount.

We aim to develop the mantra that: **'It's okay to be stuck because we all get a little stuck sometimes and it is fantastic when you get unstuck!'**

All children are given accessibility to the same learning objective. It is crucial that children understand this objective before moving onto the next step in the topic. Children are challenged through open questioning and further challenges around the same area of learning, developing a mastery approach and deeper understanding.

Differentiation of tasks is done in various ways:

-  Open ended questioning and activities which allow more able children to offer more sophisticated mathematical responses
-  Stepped Activities which can be accessed at different steps, supporting and challenge all
-  Recording e.g. allowing some children to give verbal responses and photographing their learning
-  Resourcing eg. Use of cubes, 100 squares, number lines, mirrors to support some children
-  Pre learning for those children who are finding certain concepts difficult. Giving them a shorter version of the lesson before the rest of the class. Activities are based on the same theme. Part of independent work often involves some focused, targeted group work from the teacher. However groupings are 'fluid and flexible' based on the needs of individual pupils.

Marking children's work:

The quality of marking is crucial. A simple 'X' is of little assistance to a child unless accompanied by an indication of where the error occurred, together with an explanation of what went wrong. All teachers are required to mark every piece of work in Mathematics books and provide photographic or tweeted evidence of a practical lesson.

Where appropriate, children in Years 5 and 6, are encouraged to check computational exercises and record reasoning skills with an explanation of how they have solved a problem. This can foster independence in the children, who can seek help if they are unable to locate and correct their errors.

Marking should be both diagnostic and summative and school policy believes that it is best done through conversation with the child but acknowledges that constraints of time do not always allow this.

Challenge and Intervention points should also be identified within a piece of work to ensure children are challenged and misconceptions are dealt with immediately during group work in order for children to continue to make progress during the lesson.

(for more detail see the School Marking Policy).



Reporting to Parents:

Reports are completed before the end of the summer term and parents are given opportunity to discuss their child's progress on three separate occasions throughout each academic year. At the Parents' Evenings in both the Autumn and Spring terms, the Parents are given a copy of their child's targets in mathematics. When significant changes have been/are made to the mathematics curriculum parents are invited to attend an information meeting in school outlining such changes. During the First half of the autumn term each new academic year, parents are also invited into school to attend 'curriculum meetings' for each year group.



Early Years:

The curriculum for Mathematics follows the Foundation Stage Profile in Reception and these are now also contained within the *Renewed Framework for Mathematics* for the Foundation Stage – see section on Planning Principles for outline and guidance. Garswood are early adopters of the Foundation Stage Curriculum and the children in Reception also have log ons for the Mathseeds application.



Related Issues:



Special Educational Needs:

Children with SEN are taught within the daily mathematics lesson and are encouraged to take part in all aspects of the lesson. They should make progress at their individual rate of development and children on intervention programmes should make accelerated progress to narrow the gap.

Where applicable children's IEPs incorporate suitable objectives from the 2014 mathematics curriculum for Mathematics and teachers keep these objectives in mind when planning work.

When additional support staff are available to support groups or individual children, they work collaboratively with the class teacher on planning and provision.

Within the daily mathematics lesson teachers not only provide activities to support children who find mathematics difficult but also activities that provide appropriate challenges for children who are high achievers in mathematics.



Equal Opportunities:

We incorporate mathematics into a wide range of cross-curricular subjects through the 'Challenge Curriculum' and seek to take advantage of multi-cultural aspects of mathematics.








In the daily mathematics lesson, we support children with English as an additional language in a variety of ways. eg. repeating instructions, speaking clearly, emphasising key words, using picture cues,

playing mathematical games, encouraging children to join in counting, chanting, finger games, rhymes etc.

See also the relevant sections of policies for SEN, Equal Opportunities, and Health and Safety.

Vocabulary and precision of language

Developing children's language and vocabulary is absolutely essential.

-  In all lessons attention is given to whether key vocabulary has been learnt.
-  Key vocabulary is listed on vocabulary cards during lessons and instantly added to as new words arise.
-  Paired talk activities are used to encourage children to talk about their mathematics.
-  Teachers insist that children mirror the language they hear the adults using.
-  Where appropriate, children are encouraged to answer in full sentences.
-  Adults mirror back alternative words for the same meaning to enrich children's range of vocabulary. E.g. Child says '3 times 5 is 15', teacher says, 'yes, the product of 3 and 5 is 15' or '3 multiplied by 5 equals 15'.
-  Children are required to provide justification and reasoning for their answers. For example, 'I know the shape is a square because....'

Home School Links:

Home-school mathematics links are an important part of children's experiences. A home-school link for mathematics is in place from Reception through to Year 6, and it is our school policy to provide parents and carers with opportunities to work with their children at home. The activities offered to parents for this purpose, may only be brief, but are valuable in promoting children's learning in mathematics. Indeed, the activities they engage in at home help children to develop many of the key aspects of learning identified in 'Excellence and Enjoyment: learning and teaching in the primary years'.

Activities are sent home on a regular basis through an assignment or task on Microsoft Teams. These are completed by the children and 'handed in' or uploaded to their individual channel so feedback can be given. Tasks and assignments should complement the activities already provided in class, but should take the form of number games, puzzles, problem solving or investigational tasks. We also suggest that parents keep up regular practise at home, of key number skills i.e. times tables, number bonds, etc... Any focus for these will be highlighted in the home-activity guidance sheets provided by each class teacher. Children also have online access (passwords and usernames) to TT rock Stars and Mathseeds (KS1 and Y3) and Maths Whizz (KS2) which ideally should be completed at home on a regular basis, it is included on all homework requirements.

Teachers must ensure that home-activities **DO NOT** include "finishing off" written work carried out in class or pages of sums to do at home.

Computer applications adopted by Garswood

Atom Learning

Atom Learning – the platform uses adaptive technology which means that questions are displayed at an optimal level of difficulty for our children. This ensures they are stretched and challenged without becoming demotivated. Atom Nucleus is an adaptive learning platform designed to support children studying Key Stage 2 (Years 3–6).

What is Atom Prime?

Atom Prime is a free classroom and homework platform that empowers you to:

- Manage mixed-ability classes with adaptive learning

- Provide in-class support with helpsheets and video tutorials
- Prepare for SATs and boost results
- Support secondary school preparation

One Minute Maths

Designed for use both in class and at home, our 1-minute maths app helps children build greater number confidence and fluency. It's all about targeted practice in engaging, one-minute chunks!

What's the app about?





This first version of the app is aimed at Key Stage 1 pupils (ie, age 5-6 years). Individual one-minute tasks focus on adding and subtracting – and on 'Subitising', the skill of instantly recognising the number of items in a group without counting. Multiplication and division topics are also now available!

How do we use it?

Children can choose any topic they want to try. They then answer a unique series of questions (so it's a different set of questions every time). If they're struggling with a question, a 'Hint' button will give a helpful clue by showing the question in a different but familiar way. When the one minute's up, they'll see a feedback screen telling them how they've done.

Teach your Monster Number Skills

Is a game designed to help children develop their number sense. Designed with experts in early years maths to align with the Reception/Pre-K curriculum, the game is appropriate for children from 3 to 6+ who will all find value in using the game to practice and reinforce key number skills

-  Designed in collaboration with experts in early years mathematics.
-  Fun-filled games offer exciting new ways to practice numbers.
-  Aligned with Pre-K/Reception curriculum and enjoyable for ages 4-6+.
-  80 levels provide structured practice in addition, subtraction, counting, number bonds to 10 and more.

Number sense is the ability to use lots of different skills that we don't always realise are important – such as breaking numbers apart and putting them together or putting numbers in the right order – to judge how many things there are of something. It's the difference between children when they're older being able to add up large numbers in their head instead of still struggling to add them up on their fingers.

Although the game specifically aligns with the Reception/Pre-K, children up to 6 and beyond will find the game offers valuable practice. Even those who may seem confident with their numbers are often stronger in some of the core concepts than others – it's often the case that children start to struggle with mathematics when they get older, as they've missed the opportunity to practice and understand all of these key concepts. This game will find any gaps they may have and give them ample opportunity to practice and fill these gaps.

Lesley Moon (Mathematics Leader)
Policy revised May 2024