

Gainford Church of England Primary School

Mathematics Policy



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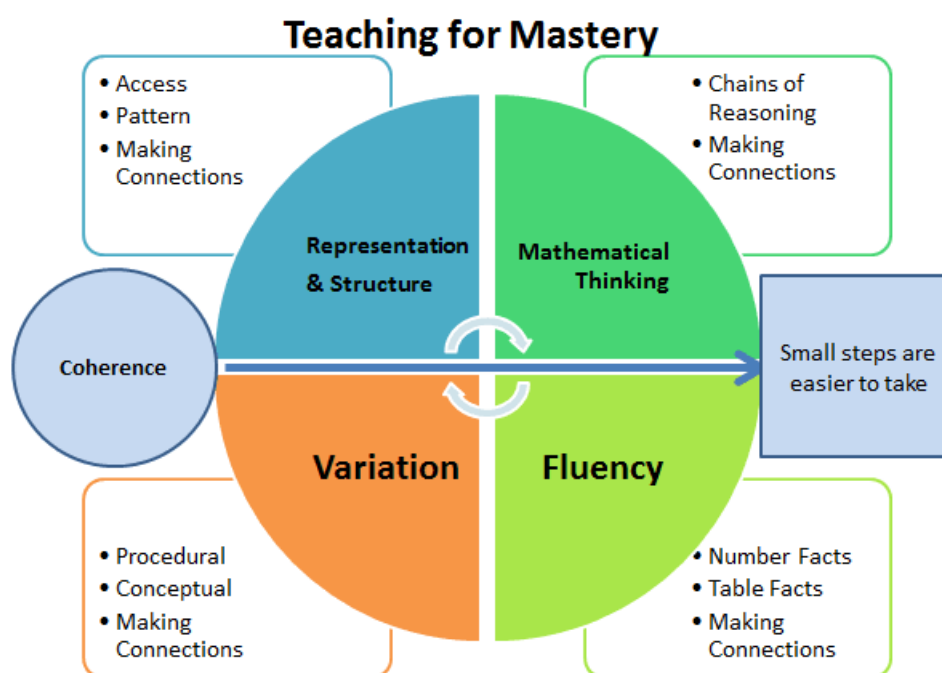
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Introduction and Rationale

Mathematics is essential for everyday life, for understanding and engaging with our world. Gainford C of E Primary School endeavours to equip all pupils with the skills and confidence to solve a range of problems through fluency with numbers and mathematical reasoning, to ensure that children are given opportunities to promote greater understanding and a healthy and enthusiastic attitude towards Maths. The National Curriculum provides a framework for mathematics but the school is aware of the need for flexibility and creativity in teaching.

The school is currently working with White Rose Maths Archimedes Hub as part of a Teacher Research Group (TRG) which helps to implement teaching for mastery within Mathematics and to evaluate its effectiveness.

The mastery approach is defined by five key principles, which are illustrated in the diagram below:



Fluency involves the quick recall of facts and procedures and having the flexibility and fluidity to move between different contexts and representations of mathematics. There is also the ability to recognise relationships and make connections in mathematics.

Representation and Structure is all about the mathematical structures and the key patterns that underpin sets of numbers – the laws and relationships that we want children to spot. Using different representations can often help children to ‘see’ these laws and relationships.

Procedural Variation is a deliberate change in the type of examples used and questions set to draw attention to certain features. **Conceptual Variation** is when a concept is presented in different ways, to show what a concept is in all its different forms.

Mathematical Thinking involves looking for patterns and relationships, logical reasoning and making connections.

Coherence refers to teachers, who should develop a detailed knowledge of the curriculum in order to break the mathematics down into small steps to develop mastery and address all aspects in a logical progression. This will ensure deep and sustainable learning for all pupils.

Aims and Objectives

At Gainford School, through the effective teaching and learning of Mathematics, we aim for all the children to:

- Enjoy maths at Gainford C of E Primary School and that all children can be successful mathematicians.
- Our Mathematics Curriculum is rich and meaningful, based on a ‘Mastery’ approach which is accessible to all and will maximise the development of every child’s ability and academic achievement.
- 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.
- Promote the children’s ability to reason through opportunities to discuss their thinking and understanding. This emphasis may result in less written work but much deeper understanding.
- Promote problem solving and solution finding not only in mathematical learning but in almost all aspects of school life.

The Curriculum

Early Years Provision

Activities and experiences for pupils will be based on the seven areas of learning and development, as outlined in the DfE's 'Statutory framework for the early years foundation stage'.

Provision for early years pupils focusses on the following:

- Literacy
- Maths
- Understanding the world
- Expressive arts and design

Activities will provide pupils with the opportunity to develop and improve their skills in counting, understanding and using numbers, calculating simple addition and subtraction problems, and describing shapes, spaces and measurements.

All activities will adhere to the objectives set out in the framework.

Children will learn how to:

- Count confidently.
- Develop a deep understanding of the numbers to 10.
- Understand the relationship between numbers and the patterns within those numbers.
- Develop a secure base knowledge of vocabulary from which mastery of mathematics is built.
- Develop their spatial reasoning skills across all areas of mathematics including, shape, space and measures.
- Develop positive attitudes and interests in mathematics.
- Look for patterns and relationships.
- Spot connections.
- Talk to adults and peers about what they notice and not be afraid to make mistakes.

The National Curriculum

The below demonstrates the 'ready-to-progress' criteria across all year groups and is not exhaustive of everything children will learn through the curriculum.

In Year 1, pupils will be taught to:

Number and place value

- Count within 100, forwards and backwards, beginning with any number.
- Reason about the location of numbers to 20 within the linear number system, including comparing using $<$ $>$ and $=$.

Number facts

- Develop fluency in addition and subtraction facts within 10.
- Count forwards and backwards in multiples of 2, 5 and 10, up to 10 multiples, beginning with any multiple and count forwards and backwards through the odd numbers.

Addition and subtraction

- Read, write and interpret equations containing addition, subtraction and equals symbols, and relate additive expressions and equations to real-life contexts.
- Compose numbers to 10 from two parts and partition numbers to 10 into parts, including recognising odd and even numbers.

Geometry

- Recognise and name common 2D and 3D shapes presented in different orientations and know that rectangles, triangles, cuboids and pyramids are not always similar to one another
- Compose 2D and 3D shapes from smaller shapes to match an example, including manipulating shapes to place them in particular orientations.

In Year 2, pupils will be taught to:

Number and place value

- Recognise the place value of each digit in two-digit numbers, and compose and decompose two-digit numbers using standard and non-standard partitioning.
- Reason about the location of any two-digit number in the linear number system, including identifying the previous and next multiple of 10.

Number facts

- Secure fluency in addition and subtraction facts within 10 through continued practice.

Addition and subtraction

- Add and subtract across 10.
- Recognise the subtraction structure of 'difference' and answer questions of the form "How many more?"

- Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract only 1s or only 10s to or from a two-digit number.
- Add and subtract within 100 by applying related one-digit addition and subtraction facts.
- Add and subtract any two-digit numbers.

Multiplication and division

- Recognise repeated addition contexts, representing them with multiplication equations and calculating the product, within the 2, 5 and 10 multiplication tables.
- Relate grouping problems where the number of groups is unknown to multiplication equations within a missing factor, and to division equations.

Geometry

- Use precise language to describe the properties of 2D and 3D shapes, and compare shapes by reasoning about similarities and differences in properties.

In Year 3, pupils will be taught to:

Number and place value

- Divide 100 into 2, 3, 5 and 10 equal parts and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts.

Number facts

- Secure fluency in addition and subtraction facts that bridge 10, through continued practice.
- Recall multiplication facts and corresponding division facts, in the 10, 5, 2, 4 and 8 multiplication tables, and recognise products in these multiplication tables as multiples of the corresponding number.
- Apply place-value knowledge to known additive and multiplicative number facts.

Addition and subtraction

- Calculate complements to 100.
- Add and subtract up to three-digit numbers using columnar methods.
- Manipulate the additive relationship:
 - Understand the inverse relationship between addition and subtraction and how both relate to the part-part-whole structure.
 - Understand and use the commutative property of addition, and understand the related property for subtraction.

Multiplication and division

- Apply known multiplication and division facts to solve contextual problems with different structures, including quotative and partitive division.

Fractions

- Interpret and write proper fractions to represent one or several parts of a whole that is divided into equal parts.
- Find unit fractions of quantities using known division facts.
- Reason about the location of any fraction within one in the linear number system.
- Add and subtract fractions with the same denominator, within one.

Geometry

- Recognise right angles as a property of shape or a description of a turn, and identify right angles in 2D shapes presented in different orientations.
- Draw polygons by joining marked points and identify parallel and perpendicular sides.

In Year 4, pupils will be taught to:

Number and place value

- Know that 10 hundreds are equivalent to 1 thousand and that 1,000 is 10 times the size of 100 and apply this to identify and work out how many 100s there are in other four-digit multiples of 100.
- Recognise the place value of each digit in four-digit numbers using standard and non-standard partitioning.
- Reason about the location of any four-digit number in the linear number system including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each.
- Divide 1,000 into 2, 4, 5 and 10 equal parts and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts.

Number facts

- Recall multiplication and division facts up to 12×12 and recognise products in multiplication tables as multiples of the corresponding number.
- Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders and interpret remainders appropriately according to the context.
- Apply place-value knowledge to known additive and multiplicative number facts.

Multiplication and division

- Multiply and divide whole numbers by 10 and 100 and understand this as equivalent to making a number 10 or 100 times the size.
- Manipulate multiplication and division equations and understand and apply the commutative property of multiplication.
- Understand and apply the distributive property of multiplication.

Fractions

- Reason about the location of mixed numbers in the linear number system.
- Convert mixed numbers to improper fractions and vice versa.

- Add and subtract improper and mixed fractions with the same denominator, including bridging whole numbers.

Geometry

- Draw polygons, specified by coordinates in the first quadrant and translate within the first quadrant.
- Identify regular polygons, including equilateral triangles and squares, as those in which the side-lengths are equal and the angles are equal.
- Find the perimeter of regular and irregular polygons.
- Identify line symmetry in 2D shapes presented in different orientations.
- Reflect shapes in a line of symmetry and complete a symmetric figure or pattern with respect to a specified line of symmetry.

In Year 5, pupils will be taught to:

Number and place value

- Know that 10 tenths are equivalent to 1 one and that 1 is 10 times the size of 0.1.
- Know that 100 hundredths are equivalent to 1 one and that 1 is 100 times the size of 0.01.
- Know that 10 hundredths are equivalent to 1 tenth and that 0.1 is 10 times the size of 0.01.
- Recognise the place value of each digit in numbers with up to 2 decimal places and compose and decompose numbers with up to 2 decimal places using standard and non-standard partitioning.
- Reason about the location of any number with up to 2 decimal places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each.
- Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts.
- Convert between units of measures including using common decimals and fractions.

Number facts

- Secure fluency in multiplication table facts and corresponding division facts, through continues practice.
- Apply place-value knowledge to known additive and multiplicative number facts.

Multiplication and division

- Multiply and divide numbers by 10 and 100 and understand this as equivalent to making a number 10 or 100 times the size or 1 tenth or 1 hundredth times the size.
- Find factors and multiples of positive whole numbers, including common factors and common multiples and express a given number as a product of 2 or 3 factors.
- Multiply any whole number with up to four digits by any one-digit number using a formal written method.

- Divide a number with up to 4 digits by a one-digit number using a formal written method and interpret remainders appropriately for the context.

Fractions

- Find non-unit fractions of quantities.
- Find equivalent fractions and understand that they have the same value and the same position in the linear number system.
- Recall decimal fraction equivalents for $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$ and $\frac{1}{10}$, and for multiples of these proper fractions.

Geometry

- Compare angles, estimate and measure angles in degrees and draw angles of a given size.
- Compare areas and calculate the area of rectangles using standard units.

In Year 6, pupils will be taught to:

Number and place value

- Understand the relationship between powers of 10 from 1 hundredth to 10 million and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size.
- Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and non-standard partitioning.
- Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system and round numbers, as appropriate, including in contexts.
- Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.

Addition, subtraction, multiplication and division

- Understand that 2 numbers can be related additively or multiplicatively and quantify additive and multiplicative relationships.
- Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships and place-value understanding.
- Solve problems involving ratio relationships.
- Solve problems with 2 unknowns.

Fractions

- Recognise when fractions can be simplified and use common factors to simplify fractions.

- Express fractions in a common denomination and use this to compare fractions that are similar in value.
- Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.

Geometry

- Draw, compose and decompose shapes according to given properties, including dimensions, angles and area and solve related problems.

Cross-curricular links

Wherever possible, the maths curriculum will provide opportunities to establish links with other curriculum areas.

English

Mathematical terminology is used, where appropriate.

Science

Pupils' data collection and analysis skills are further developed through the conduction of physical experiments, using units of measurement, calculating averages and interpreting results.

Pupils record their finding using charts, tables and graphs.

Humanities

Data analysis, pattern seeking and problem-solving skills are developed through the teaching of geography.

Pupils' understanding of time and measurements of time are developed through discussions of historical events.

Computing

Pupils are encouraged to use calculators and other electronical devices, gaining confidence throughout their school experience.

ICT will be used to enhance pupils' maths skills through the use of online resources and the creation of spreadsheets. ICT will also be used to record findings, using text, data and tables.

Teaching and Learning

Pupils will be taught to describe key characteristics and associated processes in common language, as well as understand and use technical terminology and specialist vocabulary.

Pupils will undertake independent work, and have the opportunity to work in groups and discuss work with fellow classmates.

Lessons will allow for a wide range of mathematical, enquiry-based research activities, including the following:

- Questioning, predicting and interpreting
- Pattern seeking
- Collaborative work
- Problem-solving activities
- Classifying and grouping

Lessons will involve the use of a variety of sources, including data, statistics, graphs and charts.

The classroom teacher, in collaboration with the subject leader, will ensure that the needs of all pupils are met by:

- Setting tasks which can have a variety of responses.
- Providing resources of differing complexity, according to the ability of the pupils.
- Setting tasks of varying difficulty, depending on the ability group.
- Utilising teaching assistants to ensure that pupils are effectively supported.

A maths mastery approach is taken to the curriculum, in which fluency comes from deep knowledge and practice. This means that structured questioning is used to ensure that pupils develop fluent technical proficiency and think deeply about the underpinning mathematical concepts.

Lesson structure KS1/KS2

- Flashback
- Worksheet
- Reasoning and Problem-Solving Questions

Focus is put on the development of deep structural knowledge and the ability to make connections, with the aim of ensuring that what is learnt is sustained over time.

Planning

EYFS to Year 6 use the White Rose Maths Hub schemes of learning as their long-term and medium-term planning documents. Each year group is also provided with a calculation policy to ensure that teaching of written methods and representations are done in line with White Rose planning and progress appropriately.

The White Rose schemes provide teachers with exemplification for maths objectives and are broken down into fluency, reasoning and problem solving, key aims of the National Curriculum. They support a mastery approach to teaching and learning and have number at their heart. They ensure teachers stay in the required key stage and support the ideal of depth before breadth. They support pupils working together as a whole group and provide plenty of time to build reasoning and problem solving elements into the curriculum. The schemes of learning also support daily lesson/flipchart planning.

All classes have a mathematics lessons at least four times a week where possible and are between 45-60 minutes long depending on the daily routine.

Daily mathematics lessons are inclusive to pupils with special educational needs and disabilities. Maths focused intervention in school helps children with gaps in their learning and mathematical understanding. These are delivered by trained support staff and overseen by the SENCO and/or the class teacher. Within the daily mathematics lesson, teachers have a responsibility to not only provide differentiated activities to support children with SEND but also activities that provide sufficient challenge for children who are high achievers. It is the teachers' responsibility to ensure that all children are challenged at a level appropriate to their ability.

Resources

The subject leader is responsible for the management and maintenance of maths resources, as well as for liaising with the SBM in order to purchase further resources.

Maths resources will be stored in each classroom and easily accessible to children during lessons.

Displays (working walls) will be utilised and updated regularly, in accordance with the area of maths being taught at the time.

The subject leader will undertake an audit of maths equipment and resources on an annual basis.

Assessment

Children aged between two and three will be assessed in accordance with the 'Statutory framework for the early years foundation stage', in order to identify a pupil's strengths and identify areas where progress is less than expected.

An EYFS Profile will be completed for each pupil in the final term of the year in which they reach age five.

The progress and development of children within the EYFS is assessed against the early learning goals outlined in the 'Statutory framework for the early years foundation stage'.

Assessment will be undertaken in various forms, including the following:

- Pupil Voice
- Discussing children's work with them
- Marking work against the learning objectives
- Children's self-evaluation of their work
- End of unit tests (White Rose)
- NFER end of term tests
- Year 6 complete the national standardised tests (SATs) in May

Parents will be provided with a written report about their child's progress during the Autumn and Summer term every year. These will include information on the pupil's attitude towards maths, understanding of mathematical terminology, investigatory skills and the knowledge levels they have achieved.

The progress of children with SEND will be monitored by the SENCO.

Monitoring

Monitoring may be carried out by the subject leader or Head Teacher in the following ways:

- Informal discussion with staff and pupils
- Work sampling
- Learning walks
- School/Local/County Moderations

Any changes made to this policy will be communicated to all teaching staff.

Review

This policy will be reviewed in September 2025