



# **MATHEMATICS POLICY**

**Last Reviewed: November 2022**

**Next Review Date: November 2023**



## Rationale:

At Washingborough Academy, we believe that Mathematics is a key skill that enables children to understand and appreciate relationships and pattern in both number and space in their everyday lives. Through their growing knowledge and understanding, children learn to understand and apply their knowledge to solve real life problems.

We also believe that Mathematics equips children with a uniquely powerful set of tools to understand and change the world. These tools include logical reasoning, problem-solving skills, and the ability to think in abstract ways.

Mathematics is important in everyday life, many forms of employment, science and technology, medicine, the economy, the environment, and development and in public decision-making. Different cultures have contributed to the development and application of mathematics. Today, the subject transcends cultural boundaries, and its importance is universally recognised.

*'Mathematics is of central importance to modern society. It provides the vital underpinning of the knowledge economy. It is essential in the physical sciences, technology, business, financial services, and many areas of ICT. It is also of growing importance in biology, medicine, and many of the social sciences. Mathematics forms the basis of most scientific and industrial research and development.*

Smith A, 2004 - Making Mathematics Count

This policy defines the purpose of Mathematics within our school and has been regularly reviewed in line with the implementation of the new Mathematics Curriculum (2014).

## Aims:

We encourage pupils to become self-motivated, confident, and capable in order to solve problems that will become an integral part of their future. This is achieved by ensuring all our pupils:

- Understand number and where it fits into the number system
- Know number facts, such as number bonds and multiplication tables
- Use known number facts to calculate out answers mentally
- Calculate accurately and efficiently, both mentally and using written methods, drawing on a range of calculation strategies
- Recognise when it is appropriate to use a calculator, and be able to do so effectively
- Solve reasoning problems and recognise the appropriate operations involved
- Explain their methods and reasoning, using correct mathematical terminology
- Judge whether their answers are reasonable, and have strategies for checking them where necessary
- Suggest suitable units for measuring, and make sensible estimates of measurements
- Explain and make predictions from the numbers in graphs, diagrams, charts, and tables.

## Implementation of Policy

At Washingborough Academy, we use a variety of teaching and learning strategies in mathematics lessons. Our primary aim is to develop children's knowledge, skills and understanding in mathematics.



## Washingtonborough Academy – Mathematics Policy

We do this through daily lessons which incorporate whole-class and peer discussions. During these lessons, we encourage children to use a wide range of concrete apparatus such as number lines and Base Ten to support their understanding. Wherever possible, we encourage the children to use and apply their learning in everyday situations and apply them to real-life contexts.

In all classes, there are children of differing mathematical ability. We recognise this fact and provide suitable learning opportunities for all children. We achieve this through a range of strategies – in some lessons, through differentiated group work, and in other lessons by organising the children to work in mixed ability on open-ended problems.

We do this through careful planning and preparation, ensuring that throughout the school, our pupils can:

- Develop mental and oral strategies with an emphasis on quick recall of number bonds and multiplication tables
- Develop their use of mathematical vocabulary
- Engage in problem solving
- Engage in group and peer discussions
- Develop a range of methods of calculating
- Understand mathematics through a process of enquiry and experiment

The National Curriculum for Mathematics underpins teaching throughout the Key Stages. The structure and delivery of all lessons is based on the White Rose Maths schemes of work which focuses on fluency, problem solving and reasoning. Modifications made to the content and structure of this planning can be made at the discretion of the teacher following a discussion with the subject leader.

Links to other subjects within the curriculum should be made where appropriate, allowing our children the opportunity to consolidate and build on their learning in a broader context.

Methods of calculation will be supported throughout our school with clear progression, in line with the agreed calculation policy. Our pupils will be introduced to methods of calculation using practical, oral and mental strategies that are appropriate to the age-related expectations.

Within Mathematics, the reasoning strand has been identified as an area for development and focus relating to teaching and learning. The method of providing greater opportunities for reasoning and problem solving is delivered using the White Rose Maths scheme of learning. NCETM mastery materials are also used where appropriate to supplement this.

Arithmetic work that involves the use of mental strategies should be incorporated within lessons to provide opportunities to consolidate prior learning alongside recently introduced methods and techniques. The coverage of this may be within starter activities or as part of the main lesson's activity and peer discussions. These activities should also regularly revisit multiplication facts. Fluency and knowledge in these areas ensure our pupils can accurately and confidently use mathematical terminology and show their understanding with recall, critical thinking, and reasoning.



## Washingborough Academy – Mathematics Policy

The inclusion of arithmetic-based questioning and prompting aims to support discussion and ‘stretch and challenge’ pupils of all abilities. Learning inputs should also promote mathematical explanations, reasoning, stimulate critical thinking, and evaluate alternate methods.

Teaching and learning should follow the objectives as defined in the National Curriculum, through the delivery of the White Rose Maths small steps guidance. Additional resources that enhance pupils’ understanding of objectives and are suitably matched to expectations may also be utilised.

Pupils should record work in their White Rose Maths workbooks. Additional journals should also be used to demonstrate written methods and calculations. As our children progress through each Key Stage, they are encouraged to record methods in order to promote high standards of presentation. Each ‘step’ should be dated and have reference to a specific objective.

### Entitlement

Mathematics is a subject which requires pupils to identify and form rich connections between abstract, visual, and concrete representations relating to a range of mathematical ideas. Our programmes of study are arranged into distinctive domains and enable all pupils the opportunity to develop fluency, reasoning and competency when tackling increasingly complex problems.

The National Curriculum order for Mathematics describes what must be taught in each key stage. We follow the primary mathematics framework, which provides detailed guidance for the implementation of the orders and ensures continuity and progression in the teaching of Mathematics.

*“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.”*

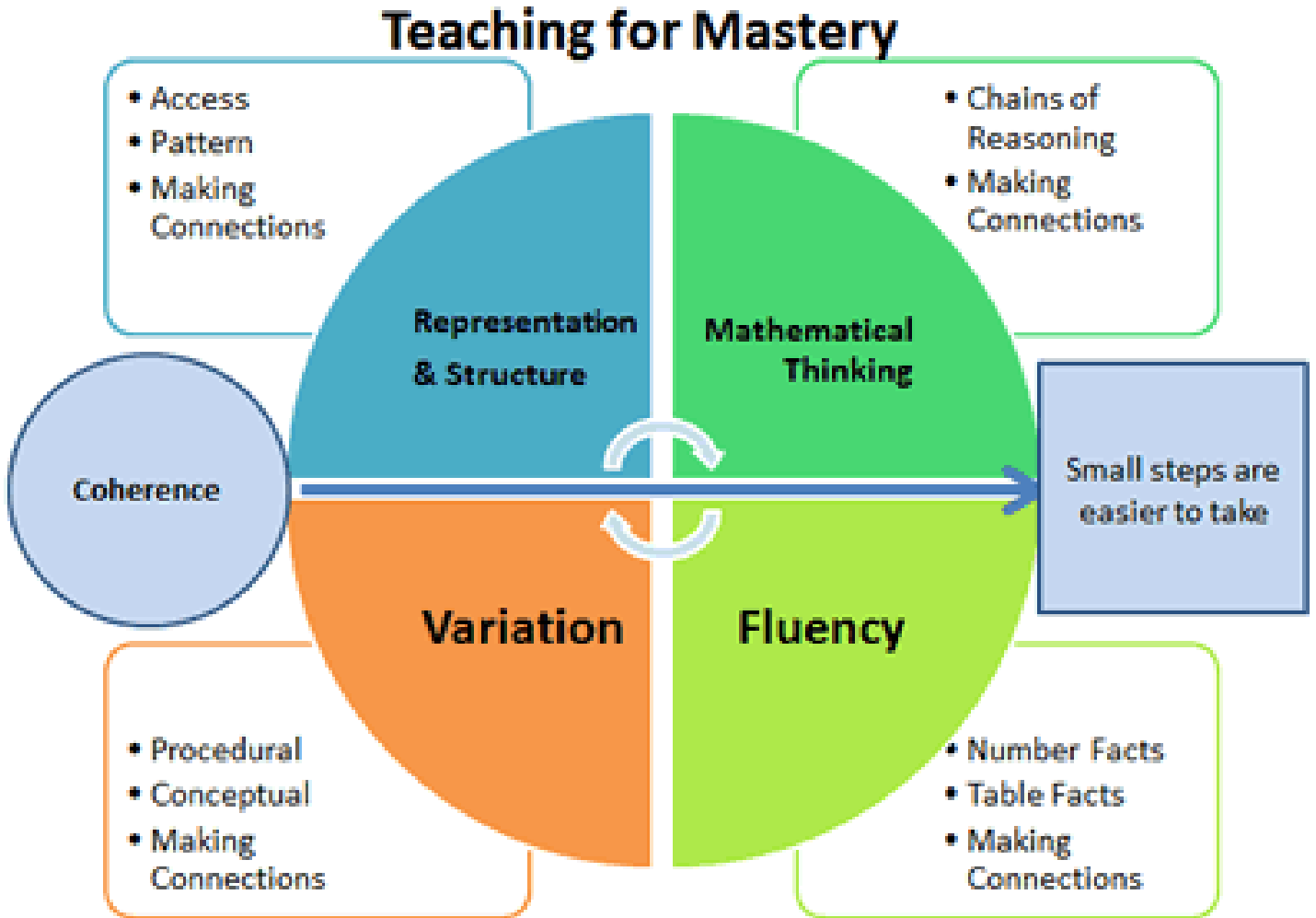
The New National Curriculum in England - framework document, July 2013

The National Curriculum for Mathematics 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.

Every teacher at Washingborough Academy has access to the framework for teaching mathematics and the curriculum map outlining progression, which has been designed by the subject leader to meet the needs of each pupil in our school.

**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.

NCETM, 2017

**Progression**

**Early Years Foundation Stage:**

At Washingborough Academy, our pupils follow the early years foundation stage curriculum. We give all children the opportunity to talk and communicate in a widening range of situation and to practise and extend their range of vocabulary and numeracy skills. They have the opportunity to explore, enjoy, learn, and use mathematics in a range of situations.

*‘Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space, and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, ‘have a go’, talk to adults and peers about what they notice and not be afraid to make mistakes.’*

Statutory framework - early years foundation stage

**Key Stage 1:**

At Washingborough Academy, daily maths lessons are taught for a duration of one hour. Each year group’s content is supported by progression documents that are made available to all teachers in line with the White Rose Maths scheme.

The primary focus of learning in Key Stage One is to ensure that pupils develop confidence and mental fluency with number. A mastery approach develops pupils’ deeper understanding that will compliment their learning as they progress through each year group. Where possible, concepts will be introduced using concrete, pictorial and abstract representations. This ensures that pupils can visualise focus areas in a multitude of ways, make rich connections, and extend their learning. Alongside number, objectives will focus on identifying fractions using arrays, shapes and quantities relating to sharing and grouping. Pupils will be taught to count using



## Washingtonborough Academy – Mathematics Policy

fractions, recognise equivalent values and apply their understanding of fractions on a number line. Pupils will also develop their ability to recognise, describe, construct, compare and sort a range of shapes. Units of measurement will be introduced to describe and compare quantities such as length, mass, capacity, time and money.

### Key Stage 2:

The primary focus of learning in lower Key Stage 2 is to ensure that pupils develop their fluency and understanding of number and the four operations, including concepts relating to place value. They should also develop written and mental methods and perform calculations accurately with increasingly large values. Pupils will develop their understanding of using measurement instruments with increasing accuracy. Learning will also encompass identifying and describing the properties of shapes. By the end of Year 4, pupils should be fluent in their recall of the multiplication tables and be able to apply this to their mathematical work with precision.

The primary focus of learning in upper Key Stage Two is to ensure that all pupils extend their understanding and knowledge of number and place value. Pupils should develop their problem-solving skills, including with simple fractions and place value, with a focus on decimals. Pupils should make rich connections between multiplication and division with fractions, decimals, percentages, and ratio. Pupils should develop their ability to solve a wide range of problems, including working with increasingly complex properties of number and arithmetic, and problems requiring written and mental methods of calculation. The concept of algebra is also introduced to compliment our children's understanding of problem solving. Geometry and measures will also be covered, allowing pupils to consolidate and extend their knowledge and understanding of number. Pupils should develop their ability to classify a range of shapes with complex geometric properties using appropriate mathematical terminology.

We aim to develop resilience and problem-solving skills by providing our pupils with open ended problems using a range of representations that can be applied to the real world.

### Parental Involvement

We recognise that parental involvement is an important factor in helping children achieve their potential and actively encourage parents to become involved with their children's development in Mathematics through:

- Parents' meetings twice a year, along with opportunities to look at children's work (via telephone during COVID-19)
- Providing parents with annual report outlining their child's attainment and achievements
- Maths Week (14.11.2022)
- Weekly homework activities, including Times Tables Rock Stars and Numbots
- Termly newsletters informing parents of curriculum content

### Other Curriculum Areas

English:

Mathematics contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking, and listening.



## Washingtonborough Academy – Mathematics Policy

### Computing:

The effective use of computing can enhance the teaching and learning of mathematics when used appropriately. When considering its use, we consider the following points:

- Computing should enhance good mathematics teaching. It should be used in lessons only if it supports good practice in teaching mathematics
- Any decision about using computing in a particular lesson or sequence of lessons must be directly related to the teaching and learning objectives for those lessons

### Science:

A large proportion of scientific investigations or experiments require the mathematical skills of classifying, counting, measuring, calculating, estimating, and recording in tables and graphs. In Science, children will order numbers, including decimals, calculate simple means and percentages, use negative numbers when taking temperatures, decide whether it is more appropriate to use a line graph or bar chart, and plot, interpret and predict from graphs.

### Art, Design and Technology:

Many patterns and constructions are based on spatial ideas and properties of shapes, including symmetry. Designs may need enlarging or reducing, introducing ideas of multiplication and ratio.

### Food:

As part of our food education, pupils are required to measure quantities of ingredients using scales and calculate costs.

### History, Geography and Religious Education:

In History and Geography, pupils will collect data by counting and measuring, particularly during fieldwork observations. The study of maps includes the use of co-ordinates and ideas of angle, direction, position, scale, and ratio. The pattern of the days of the week, the calendar and recurring annual festivals all have a mathematical basis. Historical ideas require understanding of the passage of time, which can be demonstrated on a timeline.

### Physical Education and Music:

Sporting activities require measurement of height, distance, and time, while ideas of counting, time, symmetry, movement, position, and direction are used extensively in music, dance, gymnastics, and ball-orientated games.

### Spiritual, moral, social, and cultural development:

The teaching of Mathematics supports the social development of our pupils through the way we expect them to interact during lessons. Each lesson provides numerous opportunities for peer discussions and group-based activities. The study of famous mathematicians around the world contributes to the cultural development of our children.





## Assessment

At Washingborough Academy, we regularly assess and monitor our pupils' progress. We see assessment as an integral part of the teaching process and endeavour to make our assessment purposeful, allowing us to match the correct level of work to the needs of the children.

Teachers should assess taught concepts in Mathematics each term using summative and formative assessments:

Summative assessment:

Assessment that summarises the level pupils are working at any given point. This form of assessment provides a snapshot of knowledge and understanding (attainment and achievement).

Formative assessment:

Assessment that interprets evidence of pupils' comprehension, learning needs and academic progress during a unit.

Summative assessments are provided through Mathematics tests on a termly basis. This is recorded on the school's tracking system.

Formative assessments are provided through the completion of 'end of unit' assessments in line with the White Rose Maths scheme, Flashback Four starter assessments, multiplication checks and other appropriate forms of assessment during a term. This is recorded on tracking documents as well as evidence within working journals. Formative assessment should be utilised daily by teachers to inform teaching and learning.

## Equal Opportunities

We endeavour to maintain an awareness of and provide equal opportunities for all our children in Mathematics. We aim to give all pupils the platform to succeed, irrespective of cultural background, gender, or ability, both in our teaching attitudes and in the published materials we use with our children.

Adopting a teaching for mastery approach gives all pupils access to the full mathematical curriculum. This inclusive approach, which promotes a variety of approaches to problem solving, ensures our children build resilience and develop a growth mindset.

Differentiation should focus on supporting all pupils to access the age-appropriate curriculum objectives. Where the individual needs mean that children can not access the curriculum for their age-related expectations, classroom intervention should be used to deliver suitable learning opportunities and support. Pupils may be given additional support in line with the school's SEND policy. The NCETM Mastering Number programme is utilised to provide pupils with additional support with their knowledge of number facts, recall, fluency, and accessing higher levels of mastery. Differentiation is not present in the content taught within lessons, but instead through scaffolds, ability-based questioning that stretches and challenges pupils of different ability levels, opportunities to 'dig deeper', and open-ended questions that extend their understanding. Children who require further consolidation are provided with additional support before accessing new mathematical content. Pupils' misconceptions are identified using formative assessments and are covered in small intervention groups at the earliest available opportunity to consolidate their learning and understanding.



## **Role and Responsibilities**

The Mathematics Subject Leader is Mr Dan Woolley

They will:

- Review the current Mathematics policy and schemes of work in relation to National Curriculum objectives and the requirements of the school
- Maintain an overview of the Mathematics curriculum throughout the school through discussions with the senior leadership team, staff members, and attending subject relevant training.
- Support the development of the Early Years, Key Stage One, and Key Stage Two curriculum
- Monitor the effective teaching of Mathematics throughout the school
- Ensure all teaching staff have access to a sequenced and progressive curriculum map which contains the key knowledge, skills and vocabulary children need to become procedurally fluent in mathematics
- Keep up to date with new initiatives and update staff on these
- Liaise with the SENDCO on issues relating to special educational needs and Mathematics
- Provide assistance to newly qualified members of staff
- Provide teaching staff with guidance relating to SATS and suitable preparation for pupils
- Feed back to the Headteacher on standards in Mathematics

## **Monitoring and Review**

At Washingborough Academy, the subject leader supports teaching and learning by keeping members of staff informed about current developments in Mathematics, and by providing a strategic lead and direction for this subject.

The quality of teaching and learning in mathematics is monitored and evaluated by the leadership team as part of the school's agreed cycle of lesson observations. A designated member of the school's governing body is briefed to oversee the teaching of mathematics.

Observations of the teaching and delivery of Mathematics should be completed on an annual basis as part of core subject appraisals. More regular observations may also be necessary for the purposes of training and mentoring. The school improvement plan (SIP) should also be reviewed annually by the leadership team and the subject leader. Objectives within the SIP should reflect the requirements of the curriculum, encompassing areas of development identified through observations as appropriate.

This policy will be reviewed each academic year.

## **Change and approval**

The policy has been amended to account for new mathematical schemes (NCETM Mastering Number) and changes to the White Rose Maths schemes of learning (version 3).



## Washingtonborough Academy – Mathematics Policy

Approval:

<b>Approved by:</b>	<b>Signature:</b>	<b>Date:</b>
<b>Mathematics Subject Leader</b> <i>Mr Dan Woolley</i>		
<b>Headteacher</b> <i>Dr Jason O'Rourke</i>		
<b>Chair of Governors</b> <i>Mr Steve Baker</i>		