'Let your light shine' – Matthew 5:16

Mathematics Policy

Introduction

This policy should be read in conjunction with the following school policies:

- Calculation policy
- Assessment policy
- Marking and feedback policy
- SEND policy
- Equality policy
- EYFS policy

Intent

At Whitley Memorial CofE Primary School, we offer the children a balanced mathematics curriculum based on the National Curriculum aims to ensure that all children become **fluent**, **reason mathematically** and can **solve problems**. The Whitley aims to allow children to **believe** in themselves and **achieve** as mathematicians and to develop the power of resilience and perseverance when faced with mathematical challenges. We believe that an appreciation of the beauty and power of mathematics and a sense of enjoyment, creativity and curiosity leads the pathway to success. We aim to **'go slow to go fast',** with a clear, progressive curriculum based on developing a secure and deep conceptual understanding allowing children time to identify patterns and make valuable mathematical connections and generalisations. At the Whitley we foster and promote the fact that**, 'We can <u>all</u> do Maths!'** regardless of race, gender or those from disadvantaged backgrounds. We promote an environment that children feel comfortable to try out their ideas and use mistakes and misconceptions as an essential part of learning and provide challenge through rich and sophisticated problems.

Implementation

Our whole curriculum is shaped by our school vision which aims to enable all children, regardless of background, ability, additional needs, to flourish to become the very best version of themselves and to hold the belief that they can achieve.

We teach the National Curriculum, supported by a clear skills and knowledge progression. This spiral curriculum ensures that skills and knowledge are built on year by year and sequenced appropriately to maximise learning for all children.

Across the whole school we use a Teaching for Mastery approach. EYFS plan learning using 'Big Ideas in Early Mathematics' which provides an excellent foundation of early mathematics concepts. To ensure whole school consistency and progression, the Whitley uses a range of

planning resources such as, White Rose, MNP and NCETM PD materials. This is fully aligned with the National Curriculum and ensures that staff at all levels understand the pedagogy of the approach. All staff integrate the Ready to Progress Criteria.

New concepts are shared within the context of an initial related problem, which children discuss in partners or small groups. This initial problem-solving activity prompts discussion and reasoning, as well as promoting an awareness of maths in relatable real-life contexts that link to other areas of learning. Real objects and/or manipulatives are used to allow children to experience the mathematical concept. Teachers use careful questions to draw out children's discussions and their reasoning. Modelled stem sentences are carefully introduced so children can use these to explain and reason effectively and concisely. The class teacher then leads children through strategies for solving the problem, making careful links to previous lessons and concepts. 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. Challenge for all is visible throughout a lesson, where children are asked to reason and prove their understanding at a deeper level. Rich and sophisticated problems (low threshold, high ceiling), as well as exploratory, investigative tasks allows all children to access the same content and reach their full potential.

In addition to a daily maths lesson, teachers plan for a 'Maths Meeting' time 2-3 times per week to further develop fluency and instil a sense of awe and wonder about Maths.

Fluent recall of key facts has been a key focus at the Whitley so children can free up working memory when calculating with confidence. Once concepts are taught children are formally assessed to ensure any gaps or difficulties are addressed and interventions are put in place. The Maths Lead monitors fluency throughout the year and each class has a fluency assessment folder.

Expectations at the Whitley include:

- Teachers reinforce an expectation that **all** children are capable of achieving high standards in Mathematics.
- Adopt a Teaching for Mastery approach that develops the 5 big ideas of **fluency, representation and structure, variation, mathematical thinking and coherence.**
- Staff promote children's curiosity and enable them to safely take risks and learn from first hand experience.
- A diagnostic approach is adopted to seek out any barriers to learning and an effective and targeted intervention in addition to the maths lessons devised to close any gaps when necessary.
- Children progress through the curriculum year group content at the same pace unless a specific learning difficultly has been diagnosed and forms part of their EHP/IEP.

- Differentiation is achieved through targeted questioning to deepen understanding and through individual support, intervention and use of manipulatives.
- Teaching is underpinned by methodical curriculum design and supported by carefully crafted lessons and resources to foster deep conceptual and procedural knowledge.
- Carefully designed procedural and conceptual variation within lesson design to develop fluency and understanding of underlying mathematical concepts.
- Use of precise questioning to test conceptual and procedural knowledge and assess children regularly to identify those requiring intervention, so any misconceptions are addressed within the lesson.
- Modelling of stem sentences and encouraging children to answer concisely in full sentences using mathematical language when reasoning.
- Staff to follow the agreed school Calculation Policy.

EYFS use the 'Statutory framework for the early years foundation stage' and a set of 'Big Ideas' (Erikson Institute) which map the key math concepts young children need to explore between the ages of 3 and 6. 'Big Ideas' are foundational to lifelong mathematical thinking and guide the teaching and learning in the early childhood years. There are 9 'Big ideas' as follows:

- **Sets** are basic to children's thinking and learning. They are also basic to our number system.
- **Number sense** is the ability to understand the quantity of a set and the name associated with that quantity.
- **Counting** is a part of young children's daily life. Counting seems very simple, but it is really quite complex.
- **Operations** When children focus on what happens when we join two sets together or separate a set into parts, they learn about how quantities change. When they have lots of experience comparing amounts, they become familiar with thinking about differences between sets.
- **Pattern** is a defining quality of mathematics. Mathematics "makes sense" because its patterns allow us to generalise our understanding from one situation to another.
- **Measurement** is any process that produces a quantitative description of an attribute, such as length, circumference, weight, temperature, volume, or number. Measurement is an essentially mathematical procedure that we apply in many different contexts.
- **Data analysis** can be very simple, like making a list of items and writing how many you have of each, or creating and talking about a bar graph whose bars are higher.
- **Spatial Relationships** Children develop their skills at expressing directions from different locations and understanding relative positions.
- **Shape** Everything in the material world has shape. In mathematics, the focus is very much on regular shapes, such as the two-dimensional circle, triangle, and rectangle and the three-dimensional solids known as spheres and polyhedrons.

Impact

'Let your light shine' – Matthew 5:16

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 of the Mathematics National Curriculum.

Throughout a lesson, formative assessment takes place and immediate feedback is given. Assessment is used to influence daily planning to ensure that the needs of each child are met and progress is made.

The teaching of maths is monitored on a half-termly basis through book scrutinies, learning walks, pupil interviews and lesson observations. The Maths lead is also able to develop the teaching of mastery approach by providing bespoke training sessions and opportunities to observe teaching in other classes.

The Whitley ensures that the whole of the curriculum is taught. However, by spending longer on the priority areas identified in the Mathematics guidance: key stages 1 and 2 ready-to-progress criteria, will ensure pupils will be able to more easily access many of the elements of the curriculum and enter the next years content with confidence. The following information summarises this documentation and should be used alongside the full documentation and the National Curriculum.

EYFS summary of ready-to-progress criteria

- Begin to develop a sense of the number system by verbally counting forward to and beyond 20, pausing at each multiple of 10.
- Play games that involve moving along a numbered track, and understand that larger numbers are further along the track.
- Begin to experience partitioning and combining numbers within 10.
- Distribute items fairly, for example, put 3 marbles in each bag. Recognise when items are distributed unfairly.
- Understand the cardinal value of number words, for example understanding that 'four' relates to 4 objects.
- Subitise for up to to 5 items.
- Automatically show a given number using fingers.
- Devise and record number stories, using pictures, numbers and symbols (such as arrows).
- See, explore and discuss models of common 2D and 3D shapes with varied dimensions and presented in different orientations (for example, triangles not always presented on their base).
- Select, rotate and manipulate shapes for a particular purpose, for example:
  • rotating a cylinder so it can be used to build a tower
  • rotating a puzzle piece to fit in its place

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Ready-to-progress criteria: year 1 to year 6

The table below is a summary of the ready-to-progress criteria for all year groups.

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
NPV	1NPV–1 Count within 100, forwards and backwards, starting with any number.		3NPV–1 Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three-digit multiples of 10. →	4NPV–1 Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100. →	5NPV–1 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. →	6NPV–1 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 (multiply and divide by 10, 100 and 1,000).
		2NPV–1 Recognise the place value of each digit in two-digit numbers, and compose and decompose two-digit numbers using standard and non-standard partitioning. →	3NPV–2 Recognise the place value of each digit in *three*-digit numbers, and compose and decompose *three*-digit numbers using standard and non-standard partitioning. →	4NPV–2 Recognise the place value of each digit in *four*-digit numbers, and compose and decompose *four*-digit numbers using standard and non-standard partitioning. →	5NPV–2 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. →	6NPV–2 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.
	1NPV–2 Reason about the location of numbers to 20 within the linear number system, including comparing using < > and = →	2NPV–2 Reason about the location of any two-digit number in the linear number system, including identifying the previous and next multiple of 10. →	3NPV–3 Reason about the location of any *three*-digit number in the linear number system, including identifying the previous and next multiple of 100 and 10. →	4NPV–3 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. →	5NPV–3 Reason about the location of any number with up to 2 decimals 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. →	6NPV–3 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. →

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
NPV			3NPV–4 Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts. →	4NPV–4 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. →	5NPV–4 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. →	6NPV–4 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.
					5NPV–5 Convert between units of measure, including using common decimals and fractions.	
NF	1NF–1 Develop fluency in addition and subtraction facts within 10. →	2NF–1 Secure fluency in addition and subtraction facts within 10, through continued practice. →	3NF–1 Secure fluency in addition and subtraction facts that bridge 10, through continued practice.			
	1NF–2 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. →		3NF–2 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. →	4NF–1 Recall multiplication and division facts up to 12 × 12, and recognise products in multiplication tables as multiples of the corresponding number. →	5NF–1 Secure fluency in multiplication table facts, and corresponding division facts, through continued practice.	
				4NF–2 Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders, and interpret remainders appropriately according to the context.		
			3NF–3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10). →	4NF–3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100) →	5NF–2 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth).	

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
AS	1AS–1 Compose numbers to 10 from 2 parts, and partition numbers to 10 into parts, including recognising odd and even numbers.	2AS–1 Add and subtract across 10.	3AS–1 Calculate complements to 100.			6AS/MD–1 Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number).
	1AS–2 Read, write and interpret equations containing addition (+), subtraction (−) and equals (=) symbols, and relate additive expressions and equations to real-life contexts.	2AS–2 Recognise the subtraction structure of 'difference' and answer questions of the form, "How many more…?".	3AS–2 Add and subtract up to three-digit numbers using columnar methods.			6AS/MD–2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.
		2AS–3 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract only ones or only tens to/from a two-digit number.	3AS–3 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.			6AS/MD–3 Solve problems involving ratio relationships.
		2AS–4 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract any 2 two-digit numbers.				6AS/MD–4 Solve problems with 2 unknowns.

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
MD		2MD–1 Recognise repeated addition contexts, representing them with multiplication equations and calculating the product, within the 2, 5 and 10 multiplication tables.	3MD–1 Apply known multiplication and division facts to solve contextual problems with different structures, including quotitive and partitive division.	4MD–1 Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size. →	5MD–1 Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size.	For year 6, MD ready-to-progress criteria are combined with AS ready-to-progress criteria (please see above).
		2MD–2 Relate grouping problems where the number of groups is unknown to multiplication equations with a missing factor, and to division equations (quotitive division).		4MD–2 Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication.	5MD–2 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.	
				4MD–3 Understand and apply the distributive property of multiplication. →	5MD–3 Multiply any whole number with up to 4 digits by any one-digit number using a formal written method.	
					5MD–4 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.	

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
F			3F–1 Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts.			6F–1 Recognise when fractions can be simplified, and use common factors to simplify fractions.
			3F–2 Find unit fractions of quantities using known division facts (multiplication tables fluency). →		5F–1 Find non-unit fractions of quantities.	6F–2 Express fractions in a common denomination and use this to compare fractions that are similar in value.
			3F–3 Reason about the location of any fraction within 1 in the linear number system. →	4F–1 Reason about the location of mixed numbers in the linear number system.		6F–3 Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.
				4F–2 Convert mixed numbers to improper fractions and vice versa.	5F–2 Find equivalent fractions and understand that they have the same value and the same position in the linear number system.	
			3F–4 Add and subtract fractions with the same denominator, within 1.	4F–3 Add and subtract improper and mixed fractions with the same denominator, including bridging whole numbers. →	5F–3 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.	
G	1G–1 Recognise common 2D and 3D shapes presented in different orientations, and know that rectangles, triangles, cuboids and pyramids are not always similar to one another. →	2G–1 Use precise language to describe the properties of 2D and 3D shapes, and compare shapes by reasoning about similarities and differences in properties. →	3G–1 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.		5G–1 Compare angles, estimate and measure angles in degrees (°) and draw angles of a given size.	

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Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
G					5G–2 Compare areas and calculate the area of rectangles (including squares) using standard units.	
	1G–2 Compose 2D and 3D shapes from smaller shapes to match an example, including manipulating shapes to place them in particular orientations. →		3G–2 Draw polygons by joining marked points, and identify parallel and perpendicular sides. →	4G–1 Draw polygons, specified by coordinates in the first quadrant, and translate within the first quadrant. →		6G–1 Draw, compose, and decompose shapes according to given properties, including dimensions, angles and area, and solve related problems.
				4G–2 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.		
				4G–3 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.		

Inclusion and Equal Opportunities

At Whitley Memorial each child is valued as an individual. No one is discriminated against on the grounds of gender, race or religion. Copies of the school's policies on Equal Opportunities and Racial Equality are available in school.

Teachers will aim to include all pupils fully in their daily mathematics lessons. All children benefit from the emphasis on oral and mental work and watching and listening to other children demonstrating and explaining their methods. However, a pupil whose difficulties are severe, complex or whose mathematical understanding well below expected for their year group, will need to be supported with an individualised programme in the main part of the lesson.

Health and Safety

A risk assessment must be completed if it is thought that an activity may pose a threat to a pupil's health or safety during a particular lesson.

Resources/Display

Resources for the delivery of the maths curriculum are stored both centrally and in classrooms. Everyday basic equipment is kept in classrooms while topic related equipment is stored in shared resource cupboards. A regular audit of resources ensures there are adequate good quality resources available.

Mathematical vocabulary and stem sentences should be displayed so that children use this in the communication of their understanding.

There should be maths work on display in classrooms and in other areas of the school in order to encourage a positive attitude and enthusiasm towards mathematics for all groups of children

Cross-curricular Links

Mathematics is an interconnected subject and links with other subjects are built into planning when appropriate.

Assessment, Recording and Reporting

Assessment for learning should occur throughout the entire maths lesson, enabling teachers/teaching assistants to adapt their teaching/input to meet the children's needs. This feedback should be incisive and regular. Pupil's work should be marked in line with the Marking Policy and should model how corrections should be made, giving children a chance to learn from their misconceptions or incorrect methods.

Summative assessments are made at least once per half term in order to provide further understanding of the level a child is working at and to inform a more rounded judgement of their abilities.

Tracking is used in order that children who are not making good progress over time can be targeted for support in one form or another. What that support will and how intensive, depends upon the child's needs and it may be a simple strategy within whole class teaching that is needed. Where further support is deemed necessary, children can access interventions.

It is the responsibility of the class teacher to assess all pupils in their class. Class teachers report to parents each term during Parent/Teacher Consultations and a formal end of year report. Children who require extra support, a discussion with parents and child takes place and targets are set every 6 weeks.

Monitoring

The Head teacher and mathematics leader are responsible for monitoring progress in mathematics. There is a named governor responsible for Mathematics who is updated regularly.

Evaluation

This policy will be reviewed annually by the Mathematics subject leader, in consultation with the staff, and as and when elements of Mathematics are identified or prioritised within the School Development Plan.

Role of the Subject Leader

• Ensure teachers are familiar with the Mathematics curriculum they teach to and help them to plan lessons

• Lead by example in the way they teach in their own classroom

• Prepare, organise and lead CPD, with the support of the Head teacher

• Work with the SENCO and Intervention Co-ordinator

• Observe colleagues with a view to improve provision

• Attend CPD provided by LA mathematics consultants and Maths Hub

• Discuss developments and the provision of Mathematics with the Head teacher and the mathematics governor

• Monitor and evaluate mathematics provision in the school

- Conduct an audit of resources

<u>Consultation has taken place</u>

Staff Date:

Governors Date:

Date Formally Approved by Governors

Date Policy became effective 1st September 2020

Review Date:

Debbie Rucroft

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