



Success in Maths



Intent – What do we want to achieve?

At Hardy Mill we value a maths curriculum that is creative and engaging. We believe that maths is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. We intend that Hardy Mill children will make rich connections across the areas of maths and apply their skills and knowledge in other subjects.

At Hardy Mill, all children, from Nursery to Year 6 will be the best mathematicians they can be and make progress in all lessons. They will develop skills to become fluent in the fundamentals of mathematics and quickly transfer and apply knowledge in different contexts. They will achieve this by developing their independence and resilience and being proud of their mathematical ability.

We recognise the importance of taking a consistent whole school approach to the teaching of mathematics in order to close any gaps and to ensure the highest possible number of children attain the expected standard. Maths is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas.

Pupils will develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems and knowledge will be embedded into long term memory.

Implementation – How do we organise learning?

At Hardy Mill we follow the White Rose overview from Reception to Year 6 to ensure that our children have full coverage of Maths in the EYFS and the Maths National Curriculum, although teachers are encouraged to use a variety of resources from a wide range of sources in order to deliver their lessons. Alongside this overview, all children are given the opportunity to revisit topics and previous learning through weekly Basic Skills and Arithmetic sessions – this allows further knowledge to be embedded. All children are able to access every lesson with the relevant support or challenge through our adaptive teaching – this provides the opportunity for each child to make progress in every lesson. We ensure that maths is taught in a variety of creative and engaging ways, using a wide array of maths manipulatives to aid and support our children in their learning. Our aim at Hardy Mill is to develop the deepest of learning for our children, so that their knowledge can be transferred and applied in many contexts, including other subjects and their everyday lives.

Each classroom offers a Maths Working Wall that the children utilise to support their current learning. Our aim is to ensure that the three core areas of the National Curriculum are covered in all of our lessons: fluency, reasoning and problem solving. We offer the children the opportunity to have varied and frequent practise of their maths skills with the focus on their ability to recall and apply their knowledge rapidly and accurately. Mathematical vocabulary is an essential part of each lesson and the children need to understand this within the area they are studying and be able to make rich connections across other areas within this subject. Each lesson provides children with the opportunity to become fluent and master a concept before moving on to reasoning and problem solving.

We hope to build problem solvers of the future and build resilience in our children; essential skills they can use in all aspects of their learning. Here at Hardy Mill we offer a range of enrichment activities to promote maths within our children's lives including extra-curricular maths clubs and dedicated maths weeks within school.

Impact

To evaluate how well our children are learning and check that they are remembering more and applying more, we use a combination of formative and summative assessments, pupil interviews, work book scrutinies and lesson observations.

The outcomes of national assessments and observations of our pupils demonstrate that they are very well prepared for the next stage in their education when they leave Hardy Mill and make good progress from their starting points.

National Curriculum - Maths

Purpose of study

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.

Aims

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 nonroutine 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. 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.

National Curriculum – Maths (progression of skills)

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number and Place Value						
<ul style="list-style-type: none"> ❖ Numerical patterns ❖ Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity. ❖ Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally. ❖ Verbally count beyond 20, recognising the pattern of the counting system. 	<ul style="list-style-type: none"> ♣ count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number ♣ count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens ♣ given a number, identify one more and one less ♣ identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least ♣ read and write numbers from 1 to 20 in numerals and words. 	<ul style="list-style-type: none"> ♣ count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward ♣ recognise the place value of each digit in a two-digit number (tens, ones) ♣ identify, represent and estimate numbers using different representations, including the number line ♣ compare and order numbers from 0 up to 100; use and = signs ♣ read and write numbers to at least 100 in numerals and in words ♣ use place value and number facts to solve problems. 	<ul style="list-style-type: none"> ♣ count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number ♣ recognise the place value of each digit in a three-digit number (hundreds, tens, ones) ♣ compare and order numbers up to 1000 ♣ identify, represent and estimate numbers using different representations ♣ read and write numbers up to 1000 in numerals and in words ♣ solve number problems and practical problems involving these ideas. 	<ul style="list-style-type: none"> ♣ count in multiples of 6, 7, 9, 25 and 1000 ♣ find 1000 more or less than a given number ♣ count backwards through zero to include negative numbers ♣ recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) ♣ order and compare numbers beyond 1000 ♣ identify, represent and estimate numbers using different representations ♣ round any number to the nearest 10, 100 or 1000 ♣ solve number and practical problems that involve all of the above and with increasingly large positive numbers ♣ read Roman numerals to 100 (I to C) and know that over time, the 	<ul style="list-style-type: none"> ♣ read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit ♣ count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 ♣ interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero ♣ round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 ♣ solve number problems and practical problems that involve all of the above ♣ read Roman numerals to 1000 (M) and recognise years written in Roman numerals. 	<ul style="list-style-type: none"> ♣ read, write, order and compare numbers up to 10 000 000 and determine the value of each digit ♣ round any whole number to a required degree of accuracy ♣ use negative numbers in context, and calculate intervals across zero ♣ solve number and practical problems that involve all of the above.

				numeral system changed to include the concept of zero and place value.		
	Number – addition and subtraction					Addition, subtraction, multiplication and division
<p>Number Automatically recalls (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. .Has a deep understanding of number to 10, including the composition of each number. .Is able to subitise up to 5.</p>	<ul style="list-style-type: none"> ♣ read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs ♣ represent and use number bonds and related subtraction facts within 20 ♣ add and subtract one-digit and two-digit numbers to 20, including zero ♣ solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = - 9$. 	<ul style="list-style-type: none"> ♣ solve problems with addition and subtraction: <ul style="list-style-type: none"> ♣ using concrete objects and pictorial representations, including those involving numbers, quantities and measures ♣ applying their increasing knowledge of mental and written methods ♣ recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 ♣ add and subtract numbers using concrete objects, pictorial representations, and mentally, including: <ul style="list-style-type: none"> ♣ a two-digit number and ones ♣ a two-digit number and tens ♣ two two-digit numbers 	<ul style="list-style-type: none"> ♣ add and subtract numbers mentally, including: <ul style="list-style-type: none"> ♣ a three-digit number and ones ♣ a three-digit number and tens ♣ a three-digit number and hundreds ♣ add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction ♣ estimate the answer to a calculation and use inverse operations to check answers ♣ solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction. 	<ul style="list-style-type: none"> ♣ add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate ♣ estimate and use inverse operations to check answers to a calculation ♣ solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why. 	<ul style="list-style-type: none"> ♣ add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) ♣ add and subtract numbers mentally with increasingly large numbers ♣ use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy ♣ solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. 	<ul style="list-style-type: none"> ♣ multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication ♣ divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context ♣ divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context ♣ perform mental calculations, including with mixed operations and large numbers ♣ identify common factors, common multiples and prime

		<ul style="list-style-type: none"> ♣ adding three one-digit numbers ♣ show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot ♣ recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. 				<p>numbers</p> <ul style="list-style-type: none"> ♣ use their knowledge of the order of operations to carry out calculations involving the four operations ♣ solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why ♣ solve problems involving addition, subtraction, multiplication and division
Number – multiplication and division						
	<ul style="list-style-type: none"> ♣ solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. 	<ul style="list-style-type: none"> ♣ recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers ♣ calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals ($=$) signs ♣ show that multiplication of two numbers can be done in any order (commutative) and 	<ul style="list-style-type: none"> ♣ recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables ♣ write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods ♣ solve problems, including missing number problems, 	<ul style="list-style-type: none"> ♣ recall multiplication and division facts for multiplication tables up to 12×12 ♣ use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers ♣ recognise and use factor pairs and commutativity in mental calculations ♣ multiply two-digit and three-digit numbers by a one-digit number using 	<ul style="list-style-type: none"> ♣ identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers ♣ know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers ♣ establish whether a number up to 100 is prime and recall prime numbers up to 19 ♣ multiply numbers up to 4 digits by a one- or two-digit number using a formal written 	<ul style="list-style-type: none"> ♣ use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

		<p>division of one number by another cannot</p> <ul style="list-style-type: none"> ♣ solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. 	<p>involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.</p>	<p>formal written layout</p> <ul style="list-style-type: none"> ♣ solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects. 	<p>method, including long multiplication for two-digit numbers</p> <ul style="list-style-type: none"> ♣ multiply and divide numbers mentally drawing upon known facts ♣ divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context ♣ multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 ♣ recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) ♣ solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes ♣ solve problems involving addition, subtraction, multiplication and 	
--	--	--	--	--	---	--

					<p>division and a combination of these, including understanding the meaning of the equals sign</p> <p>♣ solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.</p>	
Fractions (inc. decimals from Year 4 inc. percentages from Year 5)						
	<p>♣ recognise, find and name a half as one of two equal parts of an object, shape or quantity</p> <p>♣ recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.</p>	<p>♣ recognise, find, name and write fractions $\frac{3}{2}$, $\frac{4}{3}$, $\frac{4}{2}$ and $\frac{4}{3}$ of a length, shape, set of objects or quantity</p> <p>♣ write simple fractions for example, $\frac{2}{6} = \frac{1}{3}$ and recognise the equivalence of $\frac{4}{2}$ and $\frac{2}{1}$.</p>	<p>♣ count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10</p> <p>♣ recognise, find and write fractions of a discrete set of objects: unit fractions and nonunit fractions with small denominators</p> <p>♣ recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators</p> <p>♣ recognise and show, using diagrams, equivalent fractions</p>	<p>♣ recognise and show, using diagrams, families of common equivalent fractions</p> <p>♣ count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.</p> <p>♣ solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number</p> <p>♣ add and subtract fractions with the same denominator</p>	<p>♣ compare and order fractions whose denominators are all multiples of the same number</p> <p>♣ identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths</p> <p>♣ recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $5\frac{2}{5} + 5\frac{4}{6} = 5\frac{6}{6} = 1\frac{5}{1}$]</p> <p>♣ add and subtract fractions with the</p>	<p>♣ use common factors to simplify fractions; use common multiples to express fractions in the same denomination</p> <p>♣ compare and order fractions, including fractions > 1</p> <p>♣ add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions</p> <p>♣ multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $4\frac{1}{2} \times 2\frac{1}{8} = 8\frac{1}{4}$]</p> <p>♣ divide proper fractions by whole numbers [for example, $3\frac{1}{2} \div 2 = 6\frac{1}{4}$]</p> <p>♣ associate a fraction with division and</p>

			<p>with small denominators ♣ add and subtract fractions with the same denominator within one whole [for example, $7\frac{5}{6} + 7\frac{1}{6} = 7\frac{6}{6}$]</p> <p>♣ compare and order unit fractions, and fractions with the same denominators</p> <p>♣ solve problems that involve all of the above.</p>	<p>♣ recognise and write decimal equivalents of any number of tenths or hundredths</p> <p>♣ recognise and write decimal equivalents to $4\frac{1}{2}$, $4\frac{3}{4}$</p> <p>♣ find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths</p> <p>♣ round decimals with one decimal place to the nearest whole number</p> <p>♣ compare numbers with the same number of decimal places up to two decimal places</p> <p>♣ solve simple measure and money problems involving fractions and decimals to two decimal places.</p>	<p>same denominator and denominators that are multiples of the same number</p> <p>♣ multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams</p> <p>♣ read and write decimal numbers as fractions [for example, $0.71 = \frac{71}{100}$]</p> <p>♣ recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents</p> <p>♣ round decimals with two decimal places to the nearest whole number and to one decimal place</p> <p>♣ read, write, order and compare numbers with up to three decimal places</p> <p>♣ solve problems involving number up to three decimal places</p> <p>♣ recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write</p>	<p>calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$]</p> <p>♣ identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places</p> <p>multiply one-digit numbers with up to two decimal places by whole numbers</p> <p>♣ use written division methods in cases where the answer has up to two decimal places</p> <p>♣ solve problems which require answers to be rounded to specified degrees of accuracy</p> <p>♣ recall and use equivalences between simple fractions, decimals and percentages, including in different contexts</p>
--	--	--	--	--	--	---

					<p>percentages as a fraction with denominator 100, and as a decimal</p> <ul style="list-style-type: none"> ♣ solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25. 	
Measurement						
	<ul style="list-style-type: none"> ♣ compare, describe and solve practical problems for: <ul style="list-style-type: none"> ♣ lengths and heights [for example, long/short, longer/shorter, tall/short, double/half] ♣ mass/weight [for example, heavy/light, heavier than, lighter than] ♣ capacity and volume [for example, full/empty, more than, less than, half, half full, quarter] ♣ time [for example, quicker, slower, earlier, later] ♣ measure and 	<ul style="list-style-type: none"> ♣ choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature ($^{\circ}$C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels ♣ compare and order lengths, mass, volume/capacity and record the results using $>$, $<$ and $=$ ♣ recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value ♣ find different combinations of coins 	<ul style="list-style-type: none"> ♣ measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) ♣ measure the perimeter of simple 2-D shapes ♣ add and subtract amounts of money to give change, using both £ and p in practical contexts ♣ tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks ♣ estimate and read time with increasing accuracy to the nearest minute; 	<ul style="list-style-type: none"> ♣ Convert between different units of measure [for example, kilometre to metre; hour to minute] ♣ measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres ♣ find the area of rectilinear shapes by counting squares ♣ estimate, compare and calculate different measures, including money in pounds and pence ♣ read, write and convert time between analogue and digital 12- and 	<ul style="list-style-type: none"> ♣ convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) ♣ understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints ♣ measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres ♣ calculate and compare the area of 	<ul style="list-style-type: none"> ♣ solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate ♣ use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places ♣ convert between miles and kilometres ♣ recognise that shapes with the same areas can have different perimeters and vice versa

	<p>begin to record the following:</p> <ul style="list-style-type: none"> ♣ lengths and heights ♣ mass/weight ♣ capacity and volume ♣ time (hours, minutes, seconds) ♣ recognise and know the value of different denominations of coins and notes ♣ sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening] ♣ recognise and use language relating to dates, including days of the week, weeks, months and years ♣ tell the time to the hour and half past the hour and draw the hands on a clock face to show these times. 	<p>that equal the same amounts of money</p> <ul style="list-style-type: none"> ♣ solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change ♣ compare and sequence intervals of time ♣ tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times ♣ know the number of minutes in an hour and the number of hours in a day. 	<p>record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight</p> <ul style="list-style-type: none"> ♣ know the number of seconds in a minute and the number of days in each month, year and leap year ♣ compare durations of events [for example to calculate the time taken by particular events or tasks]. 	<p>24-hour clocks</p> <ul style="list-style-type: none"> ♣ solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days. 	<p>rectangles (including squares), and including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes</p> <ul style="list-style-type: none"> ♣ estimate volume [for example, using 1 cm³ blocks to build cuboids (including cubes)] and capacity [for example, using water] ♣ solve problems involving converting between units of time ♣ use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling. 	<ul style="list-style-type: none"> ♣ recognise when it is possible to use formulae for area and volume of shapes ♣ calculate the area of parallelograms and triangles ♣ calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³), and extending to other units [for example, mm³ and km³].
Geometry – Properties of shape						

	<ul style="list-style-type: none"> ♣ recognise and name common 2-D and 3-D shapes, including: <ul style="list-style-type: none"> ♣ 2-D shapes [for example, rectangles (including squares), circles and triangles] ♣ 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]. 	<ul style="list-style-type: none"> ♣ identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line ♣ identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces ♣ identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] ♣ compare and sort common 2-D and 3-D shapes and everyday objects 	<ul style="list-style-type: none"> ♣ draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them ♣ recognise angles as a property of shape or a description of a turn ♣ identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle ♣ identify horizontal and vertical lines and pairs of perpendicular and parallel lines. 	<ul style="list-style-type: none"> ♣ compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes ♣ identify acute and obtuse angles and compare and order angles up to two right angles by size ♣ identify lines of symmetry in 2-D shapes presented in different orientations ♣ complete a simple symmetric figure with respect to a specific line of symmetry. 	<ul style="list-style-type: none"> ♣ identify 3-D shapes, including cubes and other cuboids, from 2-D representations ♣ know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles ♣ draw given angles, and measure them in degrees (o) ♣ identify: <ul style="list-style-type: none"> ♣ angles at a point and one whole turn (total 360o) ♣ angles at a point on a straight line and 2 1 a turn (total 180o) ♣ other multiples of 90o ♣ use the properties of rectangles to deduce related facts and find missing lengths and angles ♣ distinguish between regular and irregular polygons based on reasoning about equal sides and angles. 	<ul style="list-style-type: none"> ♣ draw 2-D shapes using given dimensions and angles ♣ recognise, describe and build simple 3-D shapes, including making nets ♣ compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons ♣ illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius ♣ recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.
Geometry – Position and direction						
	<ul style="list-style-type: none"> ♣ describe position, 	<ul style="list-style-type: none"> ♣ order and arrange combinations of 		<ul style="list-style-type: none"> ♣ describe positions on a 2-D grid as 	<ul style="list-style-type: none"> ♣ identify, describe and represent the 	<ul style="list-style-type: none"> ♣ describe positions on the full coordinate

	direction and movement, including whole, half, quarter and three quarter turns.	mathematical objects in patterns and sequences ♣ use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise).		coordinates in the first quadrant ♣ describe movements between positions as translations of a given unit to the left/right and up/down ♣ plot specified points and draw sides to complete a given polygon.	position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.	grid (all four quadrants) ♣ draw and translate simple shapes on the coordinate plane, and reflect them in the axes.
		Statistics				
		♣ interpret and construct simple pictograms, tally charts, block diagrams and simple tables ♣ ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity ♣ ask and answer questions about totalling and comparing categorical data.	♣ interpret and present data using bar charts, pictograms and tables ♣ solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.	♣ interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. ♣ solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs	♣ solve comparison, sum and difference problems using information presented in a line graph ♣ complete, read and interpret information in tables, including timetables.	♣ interpret and construct pie charts and line graphs and use these to solve problems ♣ calculate and interpret the mean as an average.
						Ratio and proportion
						♣ solve problems involving the relative sizes of two quantities where missing values

						<p>can be found by using integer multiplication and division facts</p> <ul style="list-style-type: none"> ♣ solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison ♣ solve problems involving similar shapes where the scale factor is known or can be found ♣ solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.
						Algebra
						<ul style="list-style-type: none"> ♣ use simple formulae ♣ generate and describe linear number sequences ♣ express missing number problems algebraically ♣ find pairs of numbers that satisfy an equation with two unknowns ♣ enumerate possibilities of combinations of two variables.

Hardy Mill Long Term Plan – Maths

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS							
KS1	Year 1	Place Value (within 10)	Addition and Subtraction (within 10) Shape	Place Value (within 20) Addition and Subtraction (within 20)	Place value (within 50) Length and height Weight and volume	Multiplication and division Fractions Position and direction	Place value (within 100) Time
	Year 2	Place Value Addition and Subtraction	Addition and Subtraction cont. Shape	Money Multiplication and Division	Length and Height Mass, capacity and temperature	Fractions Time	Statistics Position and Direction
LKS2	Year 3	Place Value Addition and Subtraction	Addition and Subtraction cont. Multiplication and Division	Multiplication and Division Length and Perimeter	Fractions Mass, Capacity and Temperature	Fractions Money Time	Shape Statistics
	Year 4	Place Value Addition and Subtraction	Area Multiplication and Division	Multiplication and Division Length and Perimeter	Fractions Decimals	Decimals Money Time	Shape Statistics Position and Direction
UKS2	Year 5	Place Value Addition and Subtraction	Multiplication and Division Fractions	Multiplication and Division Fractions	Decimals and percentages Perimeter and Area Statistics	Shape Position and Direction Decimals	Negative Numbers Converting Units Volume
	Year 6	Place Value Four operations	Fractions A Fractions B Converting units	Ratio Algebra Decimals	Fractions, Decimals and Percentages Area, Perimeter and Volume Statistics	Shape Position and Direction	Consolidation and Problem solving

Hardy Mill Number Facts Overview

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
		<u>Cardinality and Counting</u>	<u>Cardinality and Counting</u>	<u>Subitising</u>	<u>Addition facts</u> Number Bonds to 5	<u>Subtraction facts</u> Number Bonds to 5	'Some' Number Bonds to 10
EYFS		Saying number names and counting to 20 in correct order and number understanding 0-5.	Saying number names and counting beyond 20 in correct order and number understanding 0-10.	Subitise to 5 (recognise quantities without counting)	0+5 5+0 1+4 4+1 2+3 3+2 3+2 2+3 4+1 1+4 5+0 0+5	5-0 5-1 5-2 5-3 5-4 5-5 5-0	0+10 1+9 2+8 3+7 4+6 5+5 6+4 7+3 8+2 9+1 10+0
KS1	Year 1	Addition facts <i>Adding 0/1</i>	Addition facts <i>Number bonds to 10</i>	Subtraction facts <i>Number bonds to 10</i>	Addition and linked subtraction facts <i>Adding 10</i>	Addition and linked subtraction facts <i>Adding 2/3</i>	Addition and linked subtraction facts <i>Using doubles</i>
		0+0 0+0 1+0 0+1 2+0 0+2 3+0 0+3 4+0 0+4 5+0 0+5 6+0 0+6 7+0 0+7 8+0 0+8 9+0 0+9 10+0 0+10 (Ensure you revisit when basic concept of subtraction has been taught)	0+10 1+9 2+8 3+7 4+6 5+5 6+4 7+3 8+2 9+1 10+0	10-0 10-1 10-2 10-3 10-4 10-5 10-6 10-7 10-8 10-9 10-10	10+0 0+10 10+1 1+10 10+2 2+10 10+3 3+10 10+4 4+10 10+5 5+10 10+6 6+10 10+7 7+10 10+8 8+10 10+9 9+10 10+10 10+10	2+2 2+2 2+3 3+2 2+4 4+2 2+5 5+2 2+6 6+2 2+7 7+2 2+8 8+2 2+9 9+2 2+10 10+2 3+3 3+3 3+4 4+3 3+5 5+3 3+6 6+3 3+7 7+3 3+8 8+3 3+9 9+3 3+10 10+3	0+0 1+1 2+2 3+3 4+4 5+5 6+6 7+7 8+8 9+9 10+10

		Addition and linked subtraction facts	Multiplication Facts	Division Facts	Addition and linked subtraction facts	Addition and linked subtraction facts	Addition and linked subtraction facts
		<i>Using near doubles</i>	<i>x2 x5 x10</i>	<i>x2 x5 x10</i>	<i>Bridging / compensating</i>	<i>Number bonds to 20</i>	<i>Number bonds to 100</i>
	Year 2	Revise Y1 number facts and	With x2 also refer to doubles	With ÷2 also refer to halves	7+4 4+7 7+5 5+7 8+3 3+8 8+4 4+8 8+5 5+8 8+6 6+8 9+3 3+9 9+4 4+9 9+5 5+9 9+6 6+9 9+7 7+9	0+20 20+0 1+19 19+1 2+18 18+2 3+17 17+3 4+16 16+4 5+15 15+5 6+14 14+6 7+13 13+7 8+12 12+8 9+11 11+9 10+10 10+10	Pairs of multiples of 10 and pairs of multiples of 5 0+100 5+95 10+90 15+85 20+80 25+75 30+70 35+65 40+60 45+55 50+50 55+45 60+40 65+35 70+30 75+35 80+20 85+15 90+10 95+5 100+0
		3+4 4+3 4+5 5+4 5+6 6+5 6+7 7+6 7+8 8+7 8+9 9+8					

LKS2	Year 3	Addition and linked subtraction facts	Multiplication Facts	Division Facts	Addition and linked subtraction facts	Doubling / halving	Doubling / halving
		<i>Number bonds to 100</i>	<i>x3 x4 x8</i>	<i>x3 x4 x8</i>	<i>Number bonds to 1000</i>	<i>Also refer to as addition facts (a number plus itself)</i>	<i>Also refer to as addition facts (a number plus itself)</i>
		Pairs of numbers that total 100 (There are many so focus on understanding and use of bonds learnt in Y2) Egs. 100 - 6 = 94 100 - 14 = 86 100 - 23 = 77 100 - 33 = 67 100 - 42 = 58 100 - 55 = 45 100 - 61 = 39 100 - 78 = 22 100 - 89 = 11 100 - 67 = 3	Also learn commutative fact 1x3 2x3 3x3 4x3 5x3 6x3 7x3 8x3 9x3 10x3 11x3 12x3 1x4 1x8 2x4 2x8 3x4 3x8 4x4 4x8 5x4 5x8 6x4 6x8 7x4 7x8 8x4 8x8 9x4 9x8 10x4 10x8 11x4 11x8 12x4 12x8	All linked division facts for x3 x4 x8 Will have been being developed alongside learning of multiplication facts but spend time embedding.	Pairs of multiples of 50 that total 1000 50+950 150+850 250+750 350+650 450+550 550+450 650+350 750+250 850+150 950+50	Doubles to 20 and corresponding halves 11x2 12x2 13x2 14x2 15x2 16x2 17x2 18x2 19x2 20x2	Doubles of multiples of 5 up to 100 15x2 25x2 35x2 45x2 55x2 65x2 75x2 85x2 95x2

	Year 4	Addition and linked subtraction facts Number bonds to 200	Multiplication facts x6 x7 x9 x11 x12	Division facts x6 x7 x9 x11 x12	Doubling / halving <i>Also refer to as addition facts (a number plus itself)</i>	Multiplication facts x10 x100 x1000	Division facts $\div 10 \div 100 \div 1000$																
		Pairs of numbers that total 200 (There are many so focus on understanding and use of bonds) Egs. 200 - 6 = 194 200 - 14 = 186 200 - 23 = 177 200 - 33 = 167 200 - 42 = 158 200 - 55 = 145 200 - 61 = 139 200 - 78 = 122 200 - 89 = 111 200 - 67 = 133	<p><i>Although you will revise and test all facts in each of these times tables these are the only new facts to learn, if chn are on track and have achieved fluency of multiplication facts in previous years.</i></p> <table border="1"> <tr><td>6x6</td><td>9x9</td></tr> <tr><td>7x6</td><td>11x9</td></tr> <tr><td>9x6</td><td>12x9</td></tr> <tr><td>11x6</td><td>11x11</td></tr> <tr><td>12x6</td><td>12x11</td></tr> <tr><td>7x7</td><td>12x12</td></tr> <tr><td>9x7</td><td></td></tr> <tr><td>11x7</td><td></td></tr> <tr><td>12x7</td><td></td></tr> </table>	6x6	9x9	7x6	11x9	9x6	12x9	11x6	11x11	12x6	12x11	7x7	12x12	9x7		11x7		12x7		All linked division facts for x6 x7 x9 x11 x12 Will have been being developed alongside learning of multiplication facts but spend time embedding.	Doubles and halves of 20-50 21x2 31x2 22x2 32x2 23x2 33x2 24x2 34x2 25x2 35x2 26x2 36x2 27x2 37x2 28x2 38x2 29x2 39x2 30x2 40x2 41x2 42x2 43x2 44x2 45x2 46x2 47x2 48x2 49x2 50x2
6x6	9x9																						
7x6	11x9																						
9x6	12x9																						
11x6	11x11																						
12x6	12x11																						
7x7	12x12																						
9x7																							
11x7																							
12x7																							

UKS2	Year 5	Multiplication and division facts	Multiplication and division facts Squared numbers and square roots	Addition and linked subtraction facts Decimal number bonds to 1/2	Addition and linked subtraction facts Decimal number bonds to 10/20	Doubling / halving <i>Also refer to as addition facts (a number plus itself)</i>	Multiplication and division facts
		Revision of all x tables; mixed up, using related multiples of 10/100/1000 Eg. 20x4 4x600 70x50	Chn should already know facts when shown as 2x2 or 9÷3 etc. Focus on language and symbol for squared and square root Include; 13 ² 14 ² 15 ² Introduce cube numbers.	0.1+0.9 0.2+0.8 0.3+0.7 0.4+0.6 0.5+0.5 And commutative fact 0.1+1.9 0.2+1.8 0.3+1.7 0.4+1.6 0.5+1.5 0.6+1.4 0.7+1.3 0.8+1.2 0.9+1.1 And commutative Fact	There are many, use the strategies and number bonds to practice and embed this objective.	Doubles and halves of 50-100 There are many so relate back to strategies and already known doubles facts.	Revision of all x tables; mixed up, using decimals eg. tenths, hundredths, thousandths Eg. 3x0.7 0.08x2 0.4x0.6
	Multiplication and division facts Cubed numbers and cube roots	Doubling / halving <i>Also refer to as addition facts (a number plus itself)</i>	Revision / drill and skill of all Maths Fluency Objectives				
UKS2	Year 6	1 ³ = 1 2 ³ = 8 3 ³ = 27 4 ³ = 64 5 ³ = 125 6 ³ = 216 7 ³ = 343 8 ³ = 512 9 ³ = 729 10 ³ = 1000 Ensure chn are aware that cubed numbers are a number times itself, times itself.	Doubles and halves of decimal numbers using doubling of whole number facts already learnt 3.5 x 3 4.6 x 7 7.5 ÷ 5 6.4 ÷ 8				

Progression of vocabulary in maths at Hardy Mill

		EYFS	KS1		LKS2		UKS2	
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number and place value		Count Subitise Order/ ordinal Compare Forwards Backwards Numerals Digit One more One less Equal to More than Less than (fewer)	Sort Represent Multiples Partitioning Ones Tens	Count in steps Count in multiples Place value Estimate Compare	Ascending Descending 10 or 100 more 10 or 100 less Hundreds	Negative numbers Roman numerals 1000 more 1000 less Thousands Round	Ten thousands One hundred thousands Powers of integer	Millions Ten Millions
Addition and subtraction		Add Plus Altogether Total Take away/ minus Number bonds Part Whole Digit	Addition Subtraction Difference Equals Facts Problems Missing number problems 2digit number Inverse	Sum 3 digit commutative	Column addition Column subtraction Exchange estimate	4 digit number Operations methods		

Multiplication and division		Double Half Twice as many Equal Unequal Share Group Odd even	Multiplication Division Arrays	Multiplication tables Commutative Repeated addition	Exchange Mathematical statements Missing number problems Integer scaling problems Correspondence problems Derived facts	Factor pairs Formal written lay out Distributive Law Remainders	Multiples Factors Prime Numbers Square numbers Cube numbers Short division Product Dividend Divisor Quotient Operations	Multi-digit numbers Long division
	Fractions, Decimals & Percentages			Whole Half Quarter Equal Parts	Three quarters Third Equivalent fractions Unit fractions Non unit fractions Numerator Denominator One whole	Tenths	Decimal equivalence Hundredths Convert Proper Fractions Improper Fractions Decimal Point	Fifth Thousandths Mixed number Percent % Factors Integer Complements

Ratio & Proportion								Relative size Missing values Integer multiplication Percentages Scale factor Unequal sharing & Grouping
Algebra								Formulae Linear number sequences Algebraically Equation Unknowns Combinations variables

Measurement	Length	Measure Wider(er) Narrow(er) Compare Long(er)(est) Short(er)(est) Length	Compare	Standard units Estimate Order Record results Centimeter (cm) Meter (m)	Millimeter (mm) Perimeter	Kilometers (km) Rectilinear figure area	Decimal notation Scaling Metric units Imperial units Inches Compound shape Irregular shapes Square centimeters Square meters	Conversion Miles Formulae Parallelograms Triangles Feet
	Height, weight & capacity	Height Long(er)/ short(er) Tall(er)/ short(er) Weight Capacity Heavy/light Heavier than Lighter than Big/ bigger/biggest Full/ empty More than Less than Half/ half full	Mass Volume	Kilogram (kg) Gram (g) Quarter full Three quarters full Litres (l) Millilitres (ml) Temperature Celcius			Cubic centimeter Pounds pints	Cubic meter Cubic millimeter Cubic kilometer Gallons Stones ounces

	Time	Time Quicker Slower Earlier Later Before After First Next Today Tomorrow Morning Afternoon Evening Day Week Hour minutes	Chronological order <i>Days of the week</i> <i>Months of the year</i> Month Year O'clock Half past Second	Intervals of time Quarter past/ to Duration	Analogue Roman numerals 12 hour clocj 24 hour clocj am. pm. Noon Midnight Leap year Digital	convert		
	Money		Money Coins Notes Pounds £ Pence p	Value change				

Geometry	Properties of shape	2D shapes Rectangle Square Circle Triangle Characteristics 3D shapes Cuboids Cubes Cone Sphere Curved Straight Flat	Slides Corners Properties Pyramids faces	Pentagon Hexagon Line of symmetry Properties Cylinder Edges Vertices vertex	Right angle triangle Heptagon Octagon Polygon Properties Prism Orientations Angles Acute angle Obtuse angle Turn Right angles Half turn Three quarters of a turn Greater than right angle Less than right angle Horizontal lines Vertical lines Perpendicular lines Parallel lines	Isosceles Equilateral Scalene Trapezium Rhombus Parallelogram Kite Geometric shapes Quadrilaterals	Regular polygon Irregular polygon Reflex angles Degrees One whole turn Angles on a straight line Angles around a point Vertically opposite Missing angles	Radius Diameter Circumference Dimensions
-----------------	----------------------------	--	--	---	--	---	---	---

Position and direction		Over Under Between Around Through On Into Next to Behind Beneath Order Repeat Patterns On top of	Position Direction Movement Whole turn Quarter turn Half turn Three quarter turn	Clockwise/ anti clockwise Straight line Rotation Arrange sequences		Co-ordinates First quadrant Grid Translation Plot Polygon axis	Reflection	Four quadrants Co-ordinate plan
STATISTICS				Pictograms Tally chart Block diagram Category Sorting Totaling Comparing Horizontal Vertical	Table Bar chart One step problem Two step problem	Time graph Discrete data Continuous data Line graph Comparison problem Sum problem Difference problem Calculate interpret	Timetable Two way tables	Pie chart mean