

Henbury View First School

Maths Progression of Knowledge



Intent

'Love challenges, be intrigued by mistakes, enjoy effort and keep on learning' *Carol Dweck*

At Henbury, Maths is a skill we use on a daily basis and is an essential part of everyday life. Therefore, mathematics forms an important part of our broad and balanced curriculum where we endeavour to ensure that children develop an enjoyment and enthusiasm for maths that will stay with them throughout their lives and empower them in future life. We believe that unlocking mathematical fluency is an essential life skill for all learners and is a pre-requisite to being able to reason and solve problems mathematically. Our aim is to develop a positive culture of deep understanding, confidence and competence in maths that produces strong, secure learning. As a school, we recognise that the key to unlocking the potential in our children is through the development of basic mathematical skills and the understanding of mathematical concepts. We therefore place great emphasis on the use of concrete resources and pictorial representations at all ages, to enable children to fully understand the concepts and principals, when presented with abstract calculations and questions. Our maths curriculum is progressive; at KS1 it is designed to develop competencies to equip pupils for KS2 where they will build on KS1, make connections and solve increasingly sophisticated problems.

Vision

At Henbury View, we strongly believe that confidence and competence in numeracy, and other mathematical skills, is a precondition of success across the National Curriculum. Maths continues to be one of the most important areas of learning for your child, and we are fully committed to providing our children with the highest level of math's provision. In line with the current National Curriculum, our math's provision comprises of four areas:

The Fundamentals: We aim for all children to learn the skills and knowledge set out in the National Curriculum

Mathematical Fluency: We aim for our learners to develop skills in choosing appropriate procedures, carrying out procedures flexibly, accurately, efficiently and appropriately, and recalling factual knowledge and concepts readily. Learners are fluent when they calculate answers efficiently, when they recognise robust ways of answering questions, when they choose appropriate methods and approximations, when they recall definitions and regularly use facts, when they use appropriate mathematical language and when they can manipulate expressions and equations to find solutions.

Mathematical Reasoning: We aim for our learners to develop an increasingly sophisticated capacity for logical thought and actions, such as analysing, proving, evaluating, explaining, inferring, justifying and generalising. Learners are reasoning mathematically when they explain their thinking, when they deduce and justify strategies used and conclusions reached, when they adapt the known to the unknown, when they transfer learning from one context to another, when they prove that something is true or false and when they compare and contrast related ideas and explain their choices.

Mathematical Problem Solving: We aim for our learners to develop the ability to make choices, interpret, formulate, model and investigate problem situations, and communicate solutions effectively. Learners formulate and solve problems when they use mathematics to represent unfamiliar or meaningful situations, when they design investigations and plan their approaches, when they apply their existing strategies to seek solutions, and when they verify that their answers are reasonable.

Implementation

Our Maths curriculum provides breadth and balance, is relevant and engaging and is adapted to match the needs and abilities of all our children to ensure that all pupils are able to excel. As a school, we believe in the importance of following the concrete (hands on thinking)-pictorial (picture my thinking)-approach as a means to developing a solid understanding of mathematical concepts which can be applied in a variety of contexts through reasoning and problem-solving challenges.

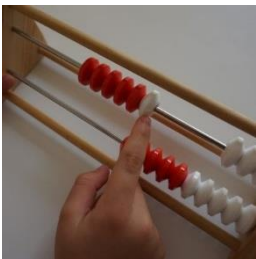
Children receive a minimum of 5 hours maths tuition each week with additional sessions devoted to number proficiency and times tables. From Reception to Year 4, we adhere to our calculation policy which outlines the progression of strategies and methods to be taught and we have an accompanying vocabulary progression document which we also follow.

We use the resources provided by the NCETM but have altered the order in some cases to suit and benefit the needs of our children so that connections between units of learning are easier to recognise. From Reception to Year 4, children follow the NCETM guidance which supports children in learning the fundamentals behind the meanings of numbers and exploring other key mathematical areas. NCETM use small steps to break down the teaching sequence into small achievable steps. Where children require additional support, 'scaffolds' are used to support children further to ensure that they have secured the small step before moving on. These 'scaffolds' may be in the form of returning to concrete resources or pictorial representations. For children who understand a concept quicker, challenges are used to deepen and challenge learners further within the curriculum area. Progression documents such as our calculation policy are carefully used to ensure that children are not being stretched outside their year group but rather deepened within it. In each lesson, children have a fluency activity and then 'Problem of the Day', which asks them to apply their knowledge and then make connections between this and their prior knowledge.



Daily assessment is incorporated throughout the lesson through live and verbal feedback. Termly NTS assessments are used as a diagnostic tool to ensure that teachers are adapting learning to meet the needs of all children and ensure that any necessary interventions are targeted specifically to meet the needs of children.

Mastering Number



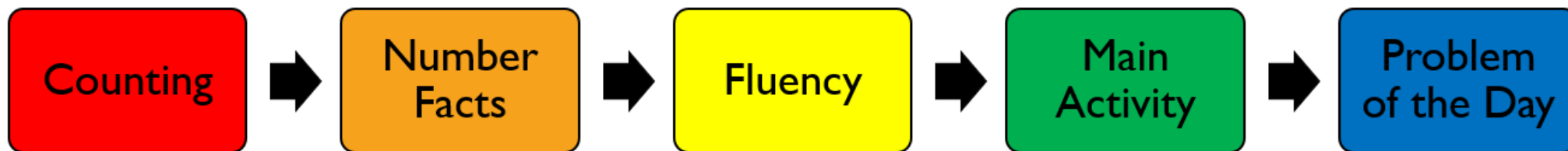
'Mastering Number' aims to secure firm foundations in the development of good number sense for all children from Reception through to Year 1 and Year 2. The aim over time is that children will leave KS1 with subitising, fluency in calculation and a confidence and flexibility with number. Attention is given to key knowledge and understanding needed in Reception classes, and progression through KS1 to support success in the future.

This is a NCETM (National Centre for Excellence in Teaching Mathematics) backed programme that has a daily taught session followed by activities in the continuous provision. It is number focussed and moves slowly so that children develop a sound understanding of each step before moving on. Mastering Number is also used in Year 1 and 2 for their fluency sessions daily. These are extra maths sessions that focus on the children's ability to manipulate numbers and use them in a variety of contexts and problems.

What do our lessons look like?

This is the structure of a typical math's lesson:

- **Counting:** Every day we spend some time practising our counting objectives. In KS1, this could be counting forwards or backwards, or counting in multiples of 2s, 5s or 10s. In KS2, this focuses more on times tables and developing fluency with multiplication and division facts.
- **Number Facts:** Here we focus on developing the children's fluency with number. We use our additive facts progression to ensure coverage and developing a deep understanding.
- **Fluency:** We use the 'Fluent in 5' resources to ensure children have continuous practice of both written and mental methods.
- **Main Activity:** This is the children's opportunity to apply and consolidate new skills. For each new topic area, we use a CPA approach to embed the learning and ensure the children have a deep conceptual understanding.
- **Problem of the Day:** Every day we give the children a problem and discuss how to solve it to help develop their reasoning and problem-solving skills - this is an important part of maths today.



Times Tables and Number Sense

Number sense refers to a child's fluidity and flexibility with numbers. It helps children understand what numbers mean, improving their performance of mental mathematics, and gives them the tools to look at maths in the outside world and make comparisons. Children develop number sense gradually over time and at different rates through exploring numbers, visualising them in a variety of contexts, and relating them in ways that are not limited by formal written methods. At Henbury View, to help our children develop good number sense, we teach fluency every day as part of our math's lessons and cover main areas to help children to spot patterns and manipulate numbers to make calculations easier. This also gives them the confidence to be flexible in their approach to solving problems. We had an additive facts progression (see separate document) that outlines these main number skills which support our children to become strong mentally and make connections and see patterns within number.

We also place a heavy emphasis in our curriculum on times tables. Right from the Summer term of Year 1, children follow our times tables progression. They move up the levels when they have both fluency and accuracy. Our programme matches the national curriculum objectives with the aim for all children to be fluent in all times tables and division facts by the end of Year 4. Children are quizzed each week and times tables is taught every day within our Maths lesson cycle using a variety of different techniques, including songs and rhymes, the counting stick and 'Times Tables Rockstars'.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Developing Core Number Skills, Counting in multiples of 1, 2, 5, 10					
Year 2	Revise multiples of 2, 5 and 10		x5	x10	x2	Revision- focus based on need and gaps
Year 3	x4	x8	x3	x6	x12	Revision- focus based on need and gaps
Year 4	x9	x7	x11	Revision- focus based on need and gaps		

Curriculum Sequencing

EYFS

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p><u>Cardinality</u></p> <ul style="list-style-type: none"> Counting: saying number words in sequence Counting: tagging each object with one number word Counting: Knowing the last number gives the total <p><u>Measures</u></p> <ul style="list-style-type: none"> Recognising attributes Comparing amounts of continuous quantities Showing awareness of comparison in estimating and predicting Comparing indirectly 	<p><u>Cardinality</u></p> <ul style="list-style-type: none"> Subitising: recognising small quantities without the need to count them all Numeral meanings Conservation: knowing that the number of objects does not change if things are rearranged (as long as none have been added or taken away) <p><u>Shape and Space</u></p> <ul style="list-style-type: none"> Developing spatial awareness: experiencing different view points Developing spatial vocabulary Shape awareness: developing shape awareness through construction Representing spatial relationships 	<p><u>Comparison</u></p> <ul style="list-style-type: none"> More than / less than Identifying groups with the same number of things Comparing numbers and reasoning <p><u>Pattern</u></p> <ul style="list-style-type: none"> Continuing an AB pattern Copying an AB pattern Make their own AB pattern Spotting an error in an AB pattern 	<p><u>Comparison</u></p> <ul style="list-style-type: none"> Knowing the 'one more/ one less' relationship between numbers <p><u>Composition</u></p> <ul style="list-style-type: none"> Part-whole: identifying smaller numbers within a number (conceptual subitising – seeing groups and combining to form a total) (0-5) <p><u>Shape and Space</u></p> <ul style="list-style-type: none"> Identifying similarities between shapes Showing an awareness of properties of shapes 	<p><u>Measure</u></p> <ul style="list-style-type: none"> Recognising the relationship between the size and number of units Beginning to use units to compare things <p><u>Composition</u></p> <ul style="list-style-type: none"> Part-whole: identifying smaller numbers within a number (conceptual subitising – seeing groups and combining to form a total) (6-10) Inverse operations <p><u>Pattern</u></p> <ul style="list-style-type: none"> Identifying the unit of repeat Continuing an ABC pattern Continuing a pattern that ends mid-point Make their own ABB/ ABC/ ABBC etc pattern 	<p><u>Measures</u></p> <ul style="list-style-type: none"> Beginning to use time to sequence events Beginning to experience specific time durations <p><u>Shape and Space</u></p> <ul style="list-style-type: none"> Describing properties of shape Developing an awareness of relationships between shapes

N.B. Statements taken from NCETM 'Six Key Areas of Early Mathematics Learning' Progressions

Year 1

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p><u>Number, Addition and Subtraction</u> Working with numbers within 10:</p> <ul style="list-style-type: none"> Count to 10, forwards and backwards, beginning with 0, 1 or any given number Find 1 more or less Count read and write numbers Identify and represent numbers using objects and pictorial representations including the number line Use language of equal to, more than, less than, most, least (fewer) Partitioning of numbers 0-5 and then 6-10 <p>(1.1, 1.2, 1.3, 1.4)</p>	<p><u>Number, Addition and Subtraction</u> Addition and subtraction within 10 including:</p> <ul style="list-style-type: none"> Aggregation and partitioning Augmentation and reduction <p>(1.5, 1.6, 1.7)</p> <p><u>Geometry</u> Recognise and name 2D shapes including rectangles (including squares as a special rectangle), circles, triangles</p>	<p><u>Number, Addition and Subtraction</u> Working with numbers within 100 including:</p> <ul style="list-style-type: none"> Composition of multiples of 10 to 100 Composition of numbers 20-100 Composition of numbers 11-19 <p>(1.8), (1.9), (1.10)</p>	<p><u>Multiplication and division</u> Counting in 2s, 5s, 10s including unitising and coins</p> <p>(2.1)</p> <p><u>Measurement</u> Recognise and know the value of different coins and notes</p> <p><u>Geometry</u> 3D shapes (cuboids, including cubes, pyramids, and spheres)</p>	<p><u>Fractions</u></p> <ul style="list-style-type: none"> Know the names of fractions 'one-half', and 'one quarter' in relation to a fraction of length, shapes or set of objects Find half of numbers (0- 20) <p>(3.1, 3.2)</p> <p><u>Geometry</u> Describe position, direction, and movement, including whole, half, quarter and 3-quarter turns</p> <p><u>Measures</u> Measure and begin to record the following:</p> <ul style="list-style-type: none"> Length and height Mass/weight 	<p><u>Measures</u> Measure and begin to record the following:</p> <ul style="list-style-type: none"> Capacity and volume, time (hours, minutes, seconds) Sequence events in chronological order using language (before, after, first etc.) Recognise and use language relating to dates (days, weeks, months, years) Tell the time to the hour and half hour <p>Compare, describe and solve practical problems for:</p> <ul style="list-style-type: none"> Length and height Mass/ weight Capacity and volume Time

Year 2

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p><u>Number, Addition and Subtraction</u></p> <ul style="list-style-type: none"> Revise: Composition of numbers 20-100 (1.9) Addition and subtraction mentally: Bridging 10 (1.11) Subtraction as difference (1.12) Addition and subtraction: 2-digit and 1-digit numbers (mentally) (1.13) 	<p><u>Number, Addition and Subtraction</u></p> <p>Addition and subtraction:</p> <ul style="list-style-type: none"> 2-digit and multiples of 10 (1.14) <p><u>Multiplication and Division</u></p> <ul style="list-style-type: none"> Structures of multiplication meaning equal groups (2.2) 2 x tables and commutativity (2.3) 10 and 5 x tables (2.4) 	<p><u>Multiplication and Division</u></p> <ul style="list-style-type: none"> Commutativity of multiplication and division, including relationship between doubling and halving (2.5) Division structures of quotitive (grouping) and partitive (sharing) (2.6) <p><u>Addition and Subtraction</u></p> <ul style="list-style-type: none"> Addition of two 2-digit numbers (formal method) (1.15) Subtraction of two 2-digit numbers (1.16) <p><u>Measures</u></p> <p>Money:</p> <ul style="list-style-type: none"> Recognise and use symbols for pounds and pence, combine amounts to make a particular value Find different combinations of coins to make the same amount Solve simple problems in a practical context, including addition, subtraction of money and giving change 	<p><u>Geometry</u></p> <ul style="list-style-type: none"> Identify and describe the properties of 2D shapes, including number of sides and line symmetry in vertical line Identify and describe 3D shapes, including edges, vertices, and faces Identify 2D shapes on 3D shapes Compare and sort 2D and 3D shapes Order and arrange combinations of mathematical objects in patterns and sequences <p><u>Number, Addition and Subtraction</u></p> <p>Counting in 3s</p> <p><u>Fractions</u></p> <ul style="list-style-type: none"> Name and describe the fractions one-half and one-quarter (revisit) and one-third in relation to length, shapes and space Read and write the fraction notation for $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$ (3.1, 3.2) Find $\frac{1}{3}$ and $\frac{1}{4}$ of a number Find $\frac{2}{4}$ and $\frac{3}{4}$ of an object, shapes, set of objects, length or quantity Recognise equivalence of $\frac{2}{4}$ and $\frac{1}{2}$ 	<p><u>Measurement</u></p> <ul style="list-style-type: none"> Compare and sequence intervals of time Tell the time to hour, half hour, 15 minutes, 5 minutes, including using language quarter past and quarter to, including drawing hands on a clock face Know the number of minutes in an hour, hours in a day, days in a week, including names days in order Choose and use appropriate standard units to estimate and measure length/ height (cm, m), mass (kg, gm), capacity (ml, L), to the nearest appropriate unit, using rulers, scales, containers, measuring vessels Compare and order different measurements using , = 	<p><u>Measures</u></p> <p>Choose and use appropriate units of measurement (temperature), including use of thermometers</p> <p><u>Geometry</u></p> <p>Use mathematical vocabulary to describe position, direction, and movement, including understanding relationship between a straight line and right angles and quarter, half, and 3-quarter turns (both clockwise and anti-clockwise)</p> <p><u>Statistics</u></p> <ul style="list-style-type: none"> Interpret and construct simple pictograms, tally charts, block diagrams and simple tables Ask and answer simple questions involving the above Ask and answer questions involving the above

Year 3

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p><u>Number, Addition and Subtraction</u></p> <ul style="list-style-type: none"> • Composition of numbers 100 and bridging 100 (1.17) • Composition and calculation of 3-digit numbers (1.18) • Securing mental strategies calculation up to 999 including 3-digit and 1-digit, 3-digit and 2-digit and 3-digit and 3-digit (1.19) <p><u>Geometry</u> Draw 2D shapes and make 3D shapes using modelling materials, recognise 3D shapes in different orientations and describe their properties</p>	<p><u>Multiplication and Division</u> 2, 4 and 8x tables and the relationship between them (2.7)</p> <p><u>Number, Addition and Subtraction</u></p> <ul style="list-style-type: none"> • Formal addition (1.20) • Estimating to check answers <p><u>Geometry</u></p> <ul style="list-style-type: none"> • Recognise angles as a property of shape or a description of a turn • Identify right angles, recognising that 2 right angles make a half turn, and 4 right angles make a full turn, identify whether angles are greater or smaller than a right angle <p><u>Fractions</u> Revise fractions by understanding the part-whole relationship (3.1)</p>	<p><u>Multiplication and Division</u> 3, 6 and 9 times tables and the relationship between them (2.8)</p> <p><u>Addition and Subtraction</u></p> <ul style="list-style-type: none"> • Formal subtraction (1.21) • Estimating to check answers • Use of inverse operations to check <p><u>Multiplication and Division</u></p> <ul style="list-style-type: none"> • Connecting multiplication and division, and the distributive law multiplication of 2d x 1d (2.10) • Integer scaling and correspondence problems 	<p><u>Multiplication and Division</u> Division with remainders (2.12)</p> <p><u>Fractions</u> Identify unit fractions, including representing and comparing them (3.2)</p> <p><u>Geometry</u> Identify sets of lines including parallel and perpendicular, horizontal and vertical</p> <p><u>Fractions</u></p> <ul style="list-style-type: none"> • Identify non-unit fractions, including representing and comparing them (3.3) • Adding and subtracting fractions within a whole (3.4) 	<p><u>Fractions</u> Count up and down in tenths, understanding that tenths arise from dividing something by 10, including dividing 1 digit numbers by 10 (1.23)</p> <p><u>Measurement</u></p> <ul style="list-style-type: none"> • Measure, compare, add and subtract money, including giving change in practical contexts (£ and p) (1.25) • Measure, compare, add and subtract different units of measurement (length, mass, volume/ capacity) including perimeter of 2D shapes 	<p><u>Addition and Subtraction</u> Adding and subtracting tenths (1.23)</p> <p><u>Measures</u> Time:</p> <ul style="list-style-type: none"> • Tell the time from an analogue clock, including those with Roman numerals from I to XII and 12 and 24hour time • Estimate and read time with increasing accuracy in terms of seconds, minutes, hours and use vocabulary such as am, pm, etc. • Know different durations of time and compare these <p><u>Statistics</u></p> <ul style="list-style-type: none"> • Interpret and present data using bar charts, pictograms and tables • Solve one-step and two-step questions relating to the above

Year 4

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p><u>Number, Addition and Subtraction</u></p> <ul style="list-style-type: none"> • Composition of numbers 1000 and four digit numbers (1.22) • Negative numbers, counting, comparing and calculating (1.27) <p><u>Multiplication and Division (Revise)</u></p> <ul style="list-style-type: none"> • Multiplication 7x tables (2.9) • Connecting multiplication and division, and the distributive law multiplication of 2d x 1d (2.10) • Times tables 11 and 12 (2.11) 	<p><u>Multiplication and Division</u></p> <ul style="list-style-type: none"> • Division with remainders (2.12) • Multiplying and dividing by 10 and 100 (2.13) <p><u>Number, Addition and Subtraction</u></p> <p>Composition and calculation: hundredths (1.24)</p>	<p><u>Number, Addition and Subtraction</u></p> <p>Addition and subtraction, money (1.25)</p> <p><u>Multiplication and Division</u></p> <p>Multiplication: partitioning leading to short multiplication (2.14)</p> <p><u>Geometry</u></p> <ul style="list-style-type: none"> • Compare and classify geometric shapes including quadrilaterals and triangles based on their properties • Identify lines of symmetry in 2D shapes presented in different orientations, complete simple symmetrical figures with respect to lines of symmetry <p><u>Number, Addition and Subtraction</u></p> <p><i>Roman Numerals taught through History unit</i></p>	<p><u>Multiplication and Division</u></p> <ul style="list-style-type: none"> • Multiplication in context, area and perimeter (2.16) • Division, partitioning leading to short division (2.15) <p><u>Fractions</u></p> <p>Working across a whole, improper fractions and mixed numbers (3.5)</p>	<p><u>Multiplication and Division</u></p> <p>Comparison and scaling structures (2.17)</p> <p><u>Fractions</u></p> <p>Find equivalent fractions and simplifying (3.7)</p> <p><u>Measures</u></p> <ul style="list-style-type: none"> • Convert between different units of measurement • Estimate, compare and calculate different measures, including money 	<p><u>Measures</u></p> <p>Measure and calculate perimeter of rectilinear figures in cm and m (revision of 2.16)</p> <p><u>Geometry</u></p> <ul style="list-style-type: none"> • Identify acute and obtuse angles and compare and order these up to two right angles • Describe position on a 2D grid as coordinates in the first quadrant • Describe movements between positions as transitions of a given unit (vertical and horizontal) and plot specific points to complete a given polygon <p><u>Statistics</u></p> <ul style="list-style-type: none"> • Interpret and present discrete and continuous data using bar, line and time graphs • Solve problems using information represented in the above