Mathematics

Intent

At Butler's Hill Infant School, we view mathematics as essential to everyday life, critical to science, technology and creating the building blocks for later life. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, and a sense of enjoyment and curiosity about the subject. Our intent is to provide children with a mathematics curriculum that will allow them to become confident individuals through developing their mathematical skills to their full potential. We also aim to present maths as a challenging, exciting, creative and relevant subject in order to promote a positive and confident attitude.

In line with the National Curriculum (2014), our aim is to:

- 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.
- solve problems by applying their mathematics to a variety of routine and non routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

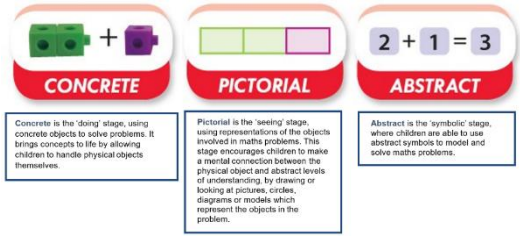
Implement

At Butler's Hill we are committed to providing a motivating, challenging and comprehensive Maths curriculum that is accessible to all and links the use of mathematics across a range of subjects, adding meaning to the learning of Maths. Our whole school approach to the teaching and learning of Maths involves the following;

Our Maths planning is based on Schemes of Learning from White Rose Maths. This is also enhanced by a wide range of resources. This ensures a progressive

and thorough curriculum in every year group. Teachers know which objectives must be taught and assessed in each year group and can follow progressive small steps to ensure pupils have a comprehensive understanding of Maths.

- Teachers are encouraged to plan in, Activ Inspire creating slides for each 'small step' with teaching points and activities to be completed. This format ensures evaluation of each lesson and subsequent lessons are adapted accordingly.
- WRM (White Rose Maths) promotes kinesthetic learning to ensure children acquire fluency of skills by introducing concepts in a practical/concrete way to progress to pictorial then abstract (C-P-A). We use this approach mixed with our own teacher led ideas.



Impact

Our successful approach to the teaching and learning of maths, results in a fun and engaging curriculum that embeds understanding and knowledge through hands on, practical activities. Introductions to concepts using concrete materials and practical activities supports learning through memorable activities, 'songs' and 'games' which children can recall at a later date, relating the learning to new situations. Our policy of 'marking with the children' within lessons supports children in recognising their strengths and areas for development. Children are encouraged to share their misconceptions and misunderstandings and become adept in using appropriate vocabulary in doing so. The inclusion of open dialogue to discuss and explain mathematical thinking also strengthens the use and understanding of mathematical language along with ensuring children can explain, justify and evidence their thinking. Connecting maths across the curriculum highlights how maths relates to life. We use and highlight our use of maths in science investigations, collecting, recording and presenting data, such as in Year 2 ICT and science curriculum using data handling and geography field trips collecting and categorising resources from the world around us and taking measurements, e.g. orienteering in year Computing also highlights the real use of maths with statistics and data collection and analysis while measuring and position and direction are essential skills to programme toys such as Beebots and coding

Aims and Values Caring, creative & Confident Values • Fairness • Respect • Perseverance • Acceptance • Co-operation • Responsibility	Enrichment opportunities • TTRockstars day with Juniors • Whole school maths day • Magical Maths after school maths club	Assessment/sticky knowledge • EYFS baseline • Termly EYFS statements • Pre and post WR assessments for each unit • Termly WF assessments • Previous SAT's papers • Independent fluency booklets termly in Year 2
Concepts Fluency Reasoning Problem Solving	Local community links	Cross Curricular Links • ICT purple mash coding, beebots • Science-data handling

	Core Knowledge
	Place Value
EYFS	Nursery • Know number names to 10 and sometimes count accurately. Know how to represent numbers using marks, fingers or digits. Know when two small groups have the same number of objects. know how to identify numerals in the environment. Reception • Number • Have a deep understanding of number to 10, including the composition of each number; • Know how to subitise (recognise quantities without counting) up to 5; • Numerical Patterns • Know how to verbally count beyond 20, recognising the pattern of the counting system; • Know how to ompare 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.
YEAR 1	• Know how to identify one more (numbers to 100) and one less (numbers to 100). • Know the language of equal to, more than, less than (fewer), most least • Know how to identify and represent numbers using different representations. • Know how to read numbers 1-100 in numerals. • Know how to read and write numbers 1-20 and tens numbers in words.
YEAR 2	• Know how to count forwards and backwards in 2's, 3's,5's and 10's from any given number. • Know how to compare and order numbers 0 to 100 using □, □ and =. • Know how to Represent numbers using concrete apparatus including: place value counters and base. • Know how to read and write numbers to 100 and beyond in numerals • Know how to read and write numbers to 100 in words

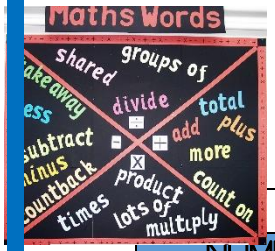
Year 3	• Know how to count in steps of 4, 8, 50 and 100; find 10 or 100 more or less than a given number. • Know how to identify, represent and estimate numbers using different representations • Read write numbers up to 1000 in numerals and in words. • Know to recogniser the place value of each digit in a three digit number • Know how to compare and order numbers up to 1000.
Addition and Subtraction	
EYFS	Automatically recall (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.
YEAR 1	• Know and derive and recall addition facts for totals up to 10 • Know number bonds and related subtraction facts within 20 • Know addition doubles for all numbers to at least 10 • Know how to add one-digit and two-digit numbers to 20, including zero • Know how to subtract one-digit and two-digit-numbers to 20, including zero • Know how to add a multiple of 10 to a one-digit number • Know adding near doubles • Know how to read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
YEAR 2	• Know use addition and subtraction facts within 20 • Know and derive number facts to 100 • Know how to use concrete objects to - Add and subtract two-digit number and ones -Add and subtract two-digit number and tens -Add and subtract two-digit numbers • Know how to use pictorial representations to: - Add and subtract two-digit number and ones - Add and subtract two-digit number and tens - Add and subtract two-digit numbers • Know mental strategies to - Add and subtract two-digit number and ones - Add and subtract two-digit number and tens • Know how to add three one-digit numbers • know that addition can be done in any order (commutative). • know that addition and subtraction are inverses • Know how the inverse operation to find missing numbers.
Year 3	Know how to add and subtract numbers mentally, including: a three-digit number and ones a three-digit number and tens a three-digit number and hundreds know how to add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction know how to estimate the answer to a calculation and use inverse operations to check answers know how to solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction
Multiplication and Subtraction	

EYFS	• Not applicable
YEAR 1	• Know how to solve one-step problems involving multiplication and division using concrete objects, pictorial representations and arrays
YEAR 2	• Know multiplication and division facts for the 2 times tables • Know multiplication and division facts for the 5 times tables • Know multiplication and division facts for the 10 times tables • Know how to recognise if a number is odd or even and explain how I know. • Know and recognise the symbols x, ÷ and = • Know that multiplication is commutative and division is not • Know how to use an array to represent and support me to solve multiplication and division problems Know that multiplication is the same as repeated addition
Year 3	• Know how to recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables • Know how to 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 • know how to solve problems, including missing number problems, involving multiplication and • division, including positive integer scaling problems and correspondence problems in • which n objects are connected to m objects
	Measurement
EYFS	**Nursery** • Know how to talk about the routine of the day and use language like 'before' and 'after'. • Know how to use comparative language like 'taller', 'shorter', 'the same'. • Know how to Identify shapes in the environment. Begin to make more meaningful pictures, patterns and arrangements with shapes. • Begin to find appropriate shapes for certain tasks. • Know how to ask questions about my observations of differences and similarities. • **Talk about and explore 2D and 3D shapes using informal and mathema. language: 'sides', 'corners'; 'straight', 'flat', 'round'.** • **Geometry –position and direction/–properties of shapes** **Reception** • No ELG • To name 2d and 3d shapes • To compare length, height, size and width using appropriate vocabulary • To use positional language
YEAR 1	**Length and Height** • Know how to measure and record lengths and heights

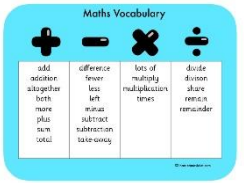
	• Know how to compare, describe and solve practical problems, moving from non-standard to standard units of length and height
YEAR 2	**Length and Height** • Know that meter (m), centimetre (cm) and millimetre(mm) are units for measuring length and height • Know that to measure the length or height in any direction using a ruler, tape measure or meter stick. • Know how to read the scale on the ruler, tape measure or meter stick. • Know how to compare and order length and height using □, □ and = • Know that 10mm= 1cm • Know that 100cm= 1m Weight/mass • Know that gram (g), kilogram(kg) are units for measuring **Weight and Mass** • Know how to measure and begin to record mass / weight • Know how to compare, describe and solve practical problems, moving from non-standard to standard units of mass and weight • Know how to measure the weight or mass using scales. • Know how to read the scale on the scales. • Know how to compare and order weight and mass using □, □ and = **Time** • Know how to recognise and use language relating to dates days of the week, weeks, months and years • Know how to compare, describe and solve practical problems, using standard units of time • Know how to compare events saying which one is longer or shorter • Know how to sequence events that happen over a period of time identifying which came first, second, last • Know the time in 15-minute intervals, o'clock, half past, quarter past and quarter to. • Know how to write the time in words to match a clock that shows o'clock, half past, quarter past and quarter to • Know how to draw the hands on a clock to show o'clock, half past, quarter past and quarter to. • Know how to tell the time to 5 minutes. • Know that there are 60 minutes in 1 hour • • Know that there are 24 hours in 1 day **Money** • Know the value of different denominations of coins and notes: 1p, 2p, 5p, 10p, 20p, 50p, £1, £2, £5, £10, £20, £50 • Know that £ is used for pounds • Know that p is used for pence • Know how to use different coins to make an amount. • Know how to find different combinations of coins to make the same amount • Know to add and subtract money in the same unit to solve problems. • Know how to give change in one unit **Capacity and Volume** • Know how to measure and begin to record capacity and volume.

	• Know how to compare, describe and solve practical problems moving from non-standard to standard units of capacity and volume • Know that millilitres (ml), litres (l) are units for measuring capacity and volume • Know how to measure the capacity or volume using measuring jugs and cylinders. • Know how to read the scale on the measuring jug and cylinder. • Know how to compare and order capacity and volume using □, □ and =
YEAR 3	• 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; 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 • 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] • 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

'Our Maths tuff spot challenge area is my favourite bit of the classroom I get to show off what Miss had taught me!'

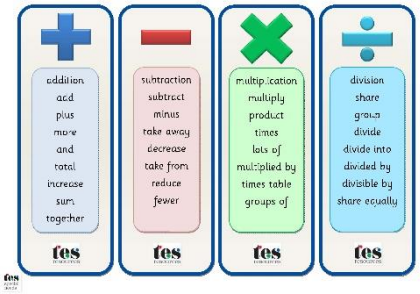


Vocabulary Progression Ladder



	Foundation Stage	Year 1	Year 2	
NUMBER Number and place value	Count Subitise Order 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 10 less hundreds
Estimating				
Addition and subtraction	Add Plus Altogether Total Tak away/minus Number bonds Part Whole digit	Addition/add Subtraction Difference Equals Facts Problems Missing number problems 2 digit number inverse	Sum 3 digit number commutative	Column addition Column subtraction Exchange estimate

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
Fractions		Whole Half Quarter Equal parts	Three quarters Third Equivalent fractions Unit fractions Non unit fractions Numerator Denominator One whole	tenths
Measurement (length)	Measure Wide(er) Narrow(er) Compare Long(er) (est) Short(er) (est) length	compare	Standard units Estimate Order Record results Centimetre cm Metre m	Millimetre mm perimeter
Height, weight & capacity	Long(er)/short(er) Tall(er)/short(er)	volume	Kilogram kg Gram g	



	Weight Capacity Heavy/light Big/bigger/biggest Full/empty More than Less than Half/half full		Quarter full Three quarters full Litres l Millilitres ml Temperature Celsius	
Time	Time Quicker Slower Earlier Later Before After First Next Today Yesterday Tomorrow Morning Afternoon Evening Day Week Hour minutes	Chronological order Days of the week Months of the year Month Year O 'clock Half past second	Intervals of time Quarter past/to duration	Analogue clock Roman numerals 12-hour clock 24-hour clock a.m/p.m noon midnight leap year digital

Money		Money Coins Notes Pounds £ Pence p	Value change	
Geometry	2-d shapes Rectangle Square Circle Triangle Characteristics 3 d shapes Cuboids Cubes Cones Spheres Curved Straight flat	Sides Corners Properties Pyramids faces	Pentagon Hexagon Octagon Lines of symmetry Properties Cylinder Edges Vertices vertex	Right angled triangle Heptagon Polygon Properties prism
Position and direction	Over Under Between Around	Position Direction Movement Whole turn	Clockwise/anti clockwise Straight line Rotation Arrange	

	Through On Into Next to Behind Beneath Order Repeat Patterns On top of	Quarter turn Half turn Three quarter turn	sequences	
statistics			Pictograms Tally chart Block diagram Category Sorting Totalling Comparing Horizontal vertical	Table Bar chart One step problem Two step problems

Butler's Hill Progression of Mathematical Learning

Number and Place Value				
Counting				
Nursery	**Foundation Stage 2**	**Year 1**	**Year 2**	**Year 3**
Use number names to 10 and sometimes count accurately. Identify numerals in the environment.	Count to number 20 and beyond Subitise with numbers to 5 Recoginse quantities to 5 without counting.	count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number	count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number	count from 0 in multiples of 4, 8, 50 and 100
	Verbally count beyond 20, recognising the pattern of the counting system; Have a deep understanding of number to 10, including the composition of each number;	Count numbers to 100 in numerals; count in multiples of twos, fives and tens count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward	Count numbers to 100 in numerals; count in multiples of twos, fives and tens count in steps of 2, 3, and 5 from 0, and in tens from any number.;	find 10 or 100 more or less than a given numbe
Comparing numbers				
Nursery	**Foundation Stage 2**	**Year 1**	**Year 2**	**Year 3**
Say when two small groups have the same number of objects.	Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;	use the language of: equal to, more than, less than (fewer), most, least compare and order numbers from 0 up to 100	use the language of: equal to, more than, less than (fewer), most, least compare and order	compare and order numbers up to 1000

		one more and one less	numbers from 0 up to 100; use and = signs	
Identifying, representing and estimating numbers				
Nursery	**Foundation Stage 2**	**Year 1**	**Year 2**	**Year 3**
Represent numbers using marks, fingers or digits.	Identify and represent numbers to 1-5, then 1-10 Count an irregular arrangement of up to 10 objects Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.	identify and represent numbers using objects and pictorial representations including the number line identify, represent and estimate numbers using different representations, including the number line to 20	identify and represent numbers using objects and pictorial representations including the number line identify, represent and estimate numbers using different representations, including the number line	identify, represent and estimate numbers using different representation
Reading and writing numbers				
Nursery	**Foundation Stage 2**	**Year 1**	**Year 2**	**Year 3**
	Read and write numbers to 10	read and write numbers from 1 to 20 in numerals and words. read and write numbers to at least 100 in numerals and in words	Read and write numbers from 1 to 20 in numerals and words. read and write numbers to at least 100 in numerals and in words	read and write numbers up to 1000 in numerals and in words
Understanding place value				

Nursery	Foundation Stage 2	Year 1	Year 2	Year 3
	Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.to 10, odd and evens to 10	Odds and evens to 20 Recognise the place value of numbers to 20	Odds and evens to 100 recognise the place value of each digit in a two-digit number (tens, ones) recognise place value of each digit in a 2 digit number (tens and ones)	recognise the place value of each digit in a three digit number (hundreds, tens, ones
Problem Solving				
Nursery	Foundation Stage 2	Year 1	Year 2	Year 3
	Use place value and number facts to solve problems to 10	use place value and number facts to solve problems, within 20	use place value and number facts to solve problems, within 100	solve number problems and practical problems involving these ideas.
Addition and Subtraction-Number bonds				
Nursery	Foundation Stage 2	Year 1	Year 2	Year 3

	Automatically recall (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.	represent and use number bonds and related subtraction facts within 20	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100	
		represent and use number bonds and related subtraction facts within 20	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100	
Mental Calculation				
Nursery	Foundation Stage 2	Year 1	Year 2	Year 3

	Add and subtract within 10 Know addition and subtraction facts by recall to 5.	add and subtract one-digit and two-digit numbers to 20, including zero	add and subtract numbers using concrete objects, pictorial representations, and mentally, including: * a two-digit number and ones * a two-digit number and tens * two two-digit numbers * adding three one-digit numbers	* add and subtract * numbers mentally, * including: * * a three-digit number * and ones * * a three-digit number * and tens * * a three-digit number * and hundreds
		read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs (appears also in Written Methods)	show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot	
Written Methods				
Nursery	Foundation Stage 2	Year 1	Year 2	Year 3

		read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs (appears also in Mental Calculation)	recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
Inverse operations, estimating and checking answers				
Nursery	**Foundation Stage 2**	**Year 1**	**Year 2**	**Year 3**
			Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	estimate the answer to a calculation and use inverse operations to check answers

Multiplication and division				
Multiplication and division facts				
Nursery	Foundation Stage 2	Year 1	Year 2	Year 3
		count in multiples of twos, fives and tens (copied from Number and Place Value)	*count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward* (copied from Number and Place Value) recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers	*count from 0 in multiples of 4, 8, 50 and 100 recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables*
Mental Calculation				
			show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot	*write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including*

				for two-digit numbers times onedigit numbers, using mental and progressing to formal written methods (appears also in Written Methods)
Written calculation				
			calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs	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 (appears also in Mental

				Methods)

Fractions				
Counting in Fractional steps				
Nursery	Foundation Stage 2	Year 1	Year 2	Year 3
			Pupils should count in fractions up to 10, starting from any number and using the1/2 and 2/4 equivalence on the number line (Non Statutory Guidance)	count up and down in tenths
Recognising fractions				
Nursery	Foundation Stage 2	Year 1	Year 2	Year 3
		recognise, find and name a half as one of two equal parts of an object, shape or quantity	recognise, find, name and write fractions 1 / 3 , 1 / 4 , 2 / 4 and 3 / 4 of a	recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions

		recognise, find and name a quarter as one of four equal parts of an object, shape or quantity	length, shape, set of objects or quantity	with small denominators recognise that tenths arise from dividing an object into 10 equal parts and in dividing one – digit numbers or quantities by 10. recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
Equivalence				
			write simple fractions e.g. 1 / 2 of 6 = 3 and recognise the equivalence of 2 / 4 and 1 / 2 .	recognise and show, using diagrams, equivalent fractions with small denominators