Boyne Hill Infant and Nursery School – Knowledge & Skills Progression Overview

MATHEMATICS

Purpose: 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. 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.

Intent: Our focus at Boyne Hill in the teaching of mathematics in Key Stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources, for example, concrete objects and measuring tools. At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. They should also be more confident when reasoning and linking knowledge and be able to describe their thinking to others. They should have been taught to question and make links rather than follow set methods and to see how Maths is used in and can influence the wider world.

Early Years Foundation Stage Links the EYFS Framework	Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.	
3-4 Years **(FS1 Nursery)** Development Matters 2021	**M**	Have fast recognition of up to 3 objects, without having to count them individually ('subitising'). Recite numbers past 5 and say one number for each item in order: 1, 2, 3, 4, 5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle'). Show 'finger numbers' up to 5. Link numerals and amounts, e.g., showing the right number of objects to match the numeral, up to 5. Experiment with symbols and marks as well as numerals. Solve real world mathematical problems with numbers up to 5. Compare quantities using language: 'more than', 'fewer than'. Talk about and explore 2D and 3D shapes, e.g., circles, rectangles, triangles and cuboids using informal and mathematical language: 'sides', 'corners', 'straight', 'flat', 'round'.

		Understand position through words alone, describe a familiar route and discuss routes and locations, using words like 'in front of' and 'behind'. Make comparisons between objects relating to size, length, weight and capacity. Select shapes appropriately: flat surfaces for building, a triangular prism for a roof etc. Combine shapes to make new ones - an arch, a bigger triangle etc. Talk about and identify the patterns around them, extend and create ABAB patterns and notice and correct an error in a repeating pattern. Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then...'
4-5 Years (FS2 Reception) Development Matters 2021	**M**	Count objects, actions and sounds. Subitise. Link the number symbol (numeral) with its cardinal number value. Count beyond ten. Compare numbers. Understand the 'one more than/one less than' relationship between consecutive numbers. Explore the composition of numbers to 10. Automatically recall number bonds for numbers 0–10. Select, rotate and manipulate shapes in order to develop spatial reasoning skills. Compose and decompose shapes so they recognise a shape can have other shapes within it, just as numbers can. Continue, copy and create repeating patterns. Compare length, weight and capacity.
Early Learning Goal (ELG)	**M**	**Number** • Have a deep understanding of number to 10, including the composition of each number. • Subitise (recognise quantities without counting) up to 5. • 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. **Numerical Patterns** • Verbally count beyond 20, recognising the pattern of the counting system. • 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.
Years 1 & 2 (KS1) *Statutory requirements*	The principal focus of mathematics teaching in KS1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources, for example, concrete objects and measuring tools. At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practise at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary at a level consistent with their increasing word reading and spelling knowledge at KS1.	

Number order and counting			
FS1	**FS2**	**Year 1**	**Year 2**
Develop faster recognition of up to 3 objects, without having to count them individually.	Count objects, actions and sounds.	Count to and across 100, beginning with 0 or 1.	Count in multiples of 2, 3, 5 and 10.
Recite numbers past 5.	Match one number name to each item counted within 10.	Count in multiples of 2, 5 and 10.	Recognise and use the place value of each digit within questions.
Say one number for each item in order.	Estimate how many objects there might be before counting within 10.	Given a number, identify one more and one less.	Identify, represent and estimate numbers using different representations, including a number line or number track.
Know that the last number reached when counting a small set of objects tells you how many there are in total.	Count out a smaller number than the amount they actually have, to understand the cardinal principle.	Identify and represent numbers using objects and pictures, including number lines.	Compare and order numbers using the < and > signs and the = sign.
Show 'finger numbers' up to 5.	Count within everyday routines.	Use the language of 'equal to', 'more than', 'less than', 'fewer', 'most' and 'least'.	Read and write numbers from 1-100 in numerals and words.
Compare quantities using language of 'more than', 'less than' or fewer.	Sing counting songs and number rhymes and read stories that involve counting.	Read and write numbers from 1-20 in numerals and words.	
Count an irregular arrangement of up to 10 objects.	Play games that involve counting, revealing and hiding numbers.	Know where numbers belong on a blank number line using their relative value.	
Begin to describe a sequence of events, real or fictional, using words such as 'first' and 'then'.	Show small quantities in familiar patterns and random arrangements.	Practise counting, ordering and using ordinal language in real life contexts (1^{st}, 2^{nd}, 3^{rd}).	
Link numerals and amounts.	Count beyond ten in games like hide and seek.	Recognise odd and even numbers and link this with addition and subtraction.	
Experiment with own symbols and marks as well as numerals.	Compare quantities of objects including those that might be the same.	Say the number that is 2 more, 2 less, 10 more or 10 less than a given number.	
Match numbers with other representations of the same amount.	Distribute items evenly when sharing things out in real life situations.		
	Display numerals in order alongside dot quantities or ten frame arrangements.		
	Play card games where numerals and dots are visible.		
	Discuss the ways that we might record scores in games such as tallies and dots.		
	Know that the amount of objects does not change even if they are moved around.		

Place Value			
FS1	**FS2**	**Year 1**	**Year 2**
		Begin to recognise and use place value to talk about numbers within 100.	Partition numbers into their tens and ones and understand that 0 is a place holder.
		Recognise what the tens part of the number is and what the ones are using Dienes cubes.	Use place value and number facts to solve problems.
			Partition numbers using arrow cards.

Addition			
FS1	**FS2**	**Year 1**	**Year 2**
Solve real world mathematical problems with numbers up to 5.	Make predictions about what the outcome will be if one more is added or one is taken away.	Read, write and interpret mathematical statements involving the addition [+] and the [=] sign.	Solve problems with addition [+] using concrete and pictorial representations, including those involving number, quantities and measures.
	Explore the composition of numbers to ten.	Represent and use number bonds and related addition facts within 20.	Solve problems using addition [+] applying knowledge of mental and written methods.
	Automatically recall number bonds for the numbers 0-10.	Add one-digit and two-digit numbers to 20, including 0.	Recall and use the addition facts to 20 fluently and derive and use related facts to 100.
		Solve one step addition problems that involve addition using concrete objects, visualisations and pictorial representations.	Add numbers using concrete objects, pictorial representations and mentally, including a two-digit number and ones, a two-digit number and tens and adding three one digit numbers.
		Use numbered and blank number lines as well as number tracks within 30 effectively to add 2 numbers.	Show that addition is commutative and can be done in any order but that subtraction is not.
		Practise adding numbers within 20 mentally using real life problems.	See addition [+] and subtraction [-] as inverse operations and use this to check answers.
		Solve missing number problems involving addition.	Extend understanding of the language of addition and subtraction to include ‘sum’ and ‘difference’.
		Recognise odd and even numbers and link this with addition and subtraction.	Record addition in columns to support place value and prepare for more formal written methods with larger numbers.

		See addition [+] and subtraction [-] as inverse operations and use this to check answers.	
		Double and halve numbers within 20.	
		Counting forwards and backwards mentally Using objects and fingers Number Lines Numicon Diagrams Blank Number Lines Inverse and Commutative introduced	Using place value to aid addition Exploring commutative by reversing numbers in additions and subtractions Creating their own pictures and diagrams Checking answers with inverse operations Column Addition Bar method Chunking Concept Cartoons Doubling and Halving and near doubles and halves

Subtraction			
FS1	**FS2**	**Year 1**	**Year 2**
Solve real world mathematical problems with numbers up to 5	Make predictions about what the outcome will be if one more is added or one is taken away.	Read, write and interpret mathematical statements involving the subtraction [-] and the [=] sign.	Solve problems with subtraction [-] using concrete and pictorial representations, including those involving number, quantities and measures.
		Represent and use number bonds and related subtraction facts within 20.	Solve problems using subtraction [-] applying knowledge of mental and written methods.
		Subtract one-digit and two-digit numbers to 20, including 0.	Recall and use the subtraction facts to 20 fluently and derive and use related facts to 100.
		Solve one step problems that involve subtraction using concrete objects, visualisations and pictorial representations.	Subtract numbers using concrete objects, pictorial representations and mentally, including a two-digit number and ones, a two-digit number and tens and adding three one digit numbers.
		Solve missing number problems involving subtraction.	Show that addition is commutative and can be done in any order but subtraction is not.
		Use numbered and blank number lines and number tracks within 30 effectively to subtract numbers.	See addition [+] and subtraction [-] as inverse operations and to use this to check answers.
		Practise subtracting numbers within 20 mentally using real life problems.	Extend understanding of the language of addition and subtraction to include sum and difference.

		Recognise odd and even numbers and link this with addition and subtraction.	Record subtraction in columns to support place value and to prepare for more formal written methods with larger numbers.
		See addition [+] and subtraction [-] as inverse operations and use this to check answers.	
		Counting forwards and backwards mentally Using objects and fingers Number Lines Numicon Diagrams Blank Number Lines Inverse and Commutative introduced	Using place value to aid subtraction Exploring commutative by reversing numbers in additions and subtractions Creating their own pictures and diagrams Checking answers with inverse operations Column Subtraction Bar method Chunking Concept Cartoons Doubling and Halving and near doubles and halves

Multiplication			
FS1	**FS2**	**Year 1**	**Year 2**
	Distribute items evenly when sharing things out in real life situations.	Solve one step problems involving multiplication using concrete objects to help, pictorial representations and arrays with the support of the teacher.	Recall the multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
		See multiplication [x] and division [÷] as inverse operations.	Calculate mathematical statements for multiplication [x] within the multiplication tables and write them using the [x] and [=] signs.
		Count in multiples of 2, 5 and 10.	Show that multiplication is commutative and can be done in any order but division is not.
		Make connections between arrays and counting in 2, 5 and 10.	Use a wide range of methods, such as arrays, diagrams and grouping and materials to explore multiplication and how to solve division problems. These should relate to real life as much as possible.
			Use repeated addition to show multiplication problems.
			Count forwards and backwards in multiples of 2, 3, 5 and 10.

			Repeated addition Arrays Diagrams	Multiplication as repeated addition in equal amounts True/False statements <, > and = less than, greater than and equal to

Division			
FS1	**FS2**	**Year 1**	**Year 2**
	Distribute items evenly when sharing things out in real life situations.	Solve one step problems involving division using concrete objects to help, pictorial representations and arrays with the support of the teacher.	Recall the multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers and use them when solving division [÷] questions.
		See multiplication [x] and division [÷] as inverse operations.	Calculate mathematical statements for division [÷] within the multiplication tables and write them using the [÷] and [=] signs.
		Group and share small quantities.	Show that multiplication is commutative and can be done in any order but division is not.
			Use a wide range of methods, such as arrays, diagrams and grouping and materials to explore division and how to solve division problems. These should relate to real life as much as possible.
			Use repeated subtraction to show division problems.
		Repeated subtraction Arrays Diagrams and Pictures	Division as sharing equally True/False statements Division with remainders <, > and = less than, greater than and equal to

Estimation			
FS1	**FS2**	**Year 1**	**Year 2**
Develop faster recognition of up to 3 objects, without having to count them individually.	Estimate how many objects there might be before counting, within 20.	Estimate how many objects there might be before counting, within 20.	

Money			
FS1	**FS2**	**Year 1**	**Year 2**
		Recognise and know the value of different denominations of coins and notes.	Recognise and use the symbols for pounds [£] and pence [p]; combine amounts to make a particular value.
			Find different combinations of money that equal the same amount.
			Solve simple problems in a practical context involving addition and subtraction of money in the same unit, including giving change.
			Become fluent in counting and recognising coins. Read and say amounts of money confidently and use the symbols £ and p accurately, recording pounds and pence separately.

Fractions			
FS1	**FS2**	**Year 1**	**Year 2**
	Distribute items evenly when sharing things out in real life situations.	Recognise, find and name a half as one of two equal parts of an object, shape or quantity.	Recognise, find, name and write fractions $^{1}/_{3}$, ¼, ½, $^{2}/_{4}$ and ¾ of a length, shape, set of objects or a quantity.
	Equal and unequal groups	Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.	Write simple fractions, for example: ½ of 6 = 3 and recognise the equivalence of $^{2}/_{4}$ and $^{1}/_{2}$.
			Discuss what happens when you add fractions together using halves and quarters.
			Use fractions as 'fractions of' discrete and continuous quantities by solving problems using shape, objects and quantities. Connect unit fractions to equal sharing and grouping, to numbers when they can be calculated and to measures, finding fractions of lengths, quantities, sets of objects, or shapes.
			Count in fractions to 10, starting from any number and using the ½ and $^{2}/_{4}$ equivalence on the number line.

Shape and Space – 2D shape			
FS1	**FS2**	**Year 1**	**Year 2**
Talk about and explore 2D and 3D shapes using informal and mathematical language; 'sides', 'corners', 'straight', 'flat' and 'round' [for example, circles, rectangles, squares, triangles and cuboids].	Select, rotate and manipulate shapes in order to develop spatial reasoning skills.	Recognise and name common 2D shapes, for example rectangles [including squares], oblongs, circles and triangles].	Identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line.
Talk about and identify the patterns around them, for example; stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy' 'spotty' and 'blobs'.	Continue, copy and create repeating patterns.	Recognise 2D and 3D shapes in different orientations and sizes and know that rectangles, triangles, cuboids and pyramids are not always similar to each other.	Compare and sort 2D and 3D shapes and everyday objects.
Extend to create ABAB patterns – [stick, leaf, stick, leaf for example]. Colour patterns		Create repeating patterns with objects, colours and shapes.	Handle and name a wide variety of common 2D and 3D shapes including quadrilaterals and polygons, cuboids, prisms and cones and identify the properties of each shape, for example, number of sides, number of faces.
Notice and correct an error in a repeating pattern.			Identify, compare and sort shapes on the basis of their properties and use vocabulary precisely such as sides, edges, vertices and faces.
Recognising Colours			Read and write names of shapes that are appropriate for their word reading and spelling.

Shape and Space – 3D shape			
FS1	**FS2**	**Year 1**	**Year 2**
Select shapes appropriately: flat surfaces for building, a triangular prism for a roof etc.	Compose and decompose shapes so that children recognise a shape can have other shapes *within* it, just as numbers can.	Recognise and name common 3D shapes, for example cuboids [including cubes], spheres, prisms, pyramids and cones.	Identify and describe the properties of 3D shapes, including the number of edges, vertices and faces.
Combine shapes to make new ones – an arch, a bigger triangle.		Recognise 2D and 3D shapes in different orientations and sizes and know that rectangles, triangles, cuboids and pyramids are not always similar to each other.	Identify 2D shapes on the surface of 3D shapes, for example, a circle on a cylinder and a triangle on a pyramid.
		Create repeating patterns with objects, colours and shapes.	Compare and sort 2D and 3D shapes and everyday objects.
			Handle and name a wide variety of common 2D and 3D shapes including quadrilaterals and polygons, cuboids, prisms and cones and

			identify the properties of each shape, for example, number of sides, number of faces.
			Identify, compare and sort shapes on the basis of their properties and use vocabulary precisely such as sides, edges, vertices and faces.
			Read and write names of shapes that are appropriate for their word reading and spelling.
			Draw lines and shapes using straight edges.

Measure			
FS1	**FS2**	**Year 1**	**Year 2**
Make comparisons between objects relating to size, length, weight and capacity. Tall, long and short	Compare length, weight and capacity. Longer and Shorter	Compare, describe and solve practical problems for lengths and heights, for example 'long/short', 'longer/shorter', 'tall/short' and 'double/half'.	Choose and use appropriate standard units and estimate and measure length/height in any direction [m/cm]; mass [kg/g]; temperature [˚c]; capacity [litres/ml] to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels.
Continue to use everyday language related to money.		Compare, describe and solve practical problems for mass/weight, for example, heavy/light, heavier than/lighter than.	Compare and order lengths, mass, volume/capacity and record the results using <, > and =.
		Compare, describe and solve practical problems for capacity and volume, for example, full/empty, more than/less than, half full, quarter full.	Compare and sequence intervals of time.
		Compare, describe and solve practical problems for time, for example, quicker, slower, earlier, later.	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.
		Measure and begin to record lengths and heights, mass/weight, capacity and volume, time/hours, minutes and seconds.	Know the number of minutes in an hour and the number or hours in a day.
		Sequence events in chronological order using language, for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening.	Use standard units of measurement with increasing accuracy and use knowledge of the number system. Use the appropriate language and record using standard abbreviations.

		Recognise and use language relating to dates including days of the week and months and years.	Compare measures including simple multiples such as 'half as high'; 'twice as high'.
		Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.	Read scales in divisions of ones, twos, fives and tens.
		Move from using and comparing different types of quantities and measures using non-standard units to using manageable common standard units.	Read scales where not all numbers on the scale have been given and estimate points in between.
		Begin to use measuring tools such as rulers, weighing scales and containers.	Become fluent in telling the time on analogue clocks and record it.
		Use the language of time, including telling the time throughout the day, first using o'clock and half past times.	

Position and Direction			
FS1	**FS2**	**Year 1**	**Year 2**
Understand position through words alone – for example 'The bag is under the table'.	Patterns with numbers, objects and shapes	Describe position, direction and movement, including whole, half, quarter and three-quarter turns.	Order and arrange combinations of mathematical objects in patterns and sequences.
Describe a familiar route.	Using left, right, forwards and backwards to retrieve an object or guide another	Use the language of position, direction and motion, including left and right, top, middle and bottom, on top of, in front of, above, between, around, near, close and far, up and down, forwards and backwards, inside and outside.	Use mathematical vocabulary to describe position, direction and movement in a straight line and distinguish between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns [clockwise and anti-clockwise].
Discuss routes and locations using words like 'in front of' and 'behind'.		Make whole, half, quarter and three-quarter turns in both directions and connect turning clockwise with movement on a clock face.	Work with patterns of shapes, including those of different orientations.
Ordering events within their day What happens during the day/night?			Use the concept and language of angles to describe 'turn' by applying rotations, including in practical contexts, for example, pupils themselves moving in turns, giving instructions to other pupils to do so and programming robots using instructions given at right angles.

Statistics			
FS1	**FS2**	**Year 1**	**Year 2**
			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 sort the categories by quantity.
			Ask and answer questions about totalling and comparing categorical data.
			Record, interpret, collate, organise and compare information, for example, using many-to-one correspondence in pictograms with simple ratios 2, 5 and 10.