St Meriadoc CE Infant Academy: Non-Negotiables

Mathematics skills should be taught when linked to topics where possible to ensure real world application.

Key Skills

To become fluent in the fundamentals of mathematics.
To be able to solve problems using a range of strategies.
To reason mathematically, following a line of enquiry.
Use mathematical language.

Mathematics – EYFS Development Matters (DM), Birth to 5 Matters (B25), NCETM Early Years Typical Progression and NC objectives for KS1.

	Ladybirds Nursery: Birth to 3 years	Dragonflies Nursery: 3-4 Years	Reception	Year 1: NC - POS	Year 2: NC - POS
Number (Number and Place value)	**DM** Take part in finger rhymes with numbers. Develop counting-like behaviour, such as making sounds, pointing or saying some numbers in sequence. Count in everyday contexts, sometimes skipping numbers – '1-2-3-5'. **B25 – Range 3** Comparison • Responds to words like lots or more Counting • Says some counting words. • May engage in counting-like behaviour, making sounds and pointing or saying some numbers in sequence. Cardinality • Uses number words, like one or two and sometimes responds accurately when asked to give one or two things. **B25 - Range 4** Counting • Begins to say numbers in order, some of which are in the right order (ordinality). Cardinality (How many?) • In everyday situations, takes or gives two or three objects from a group.	**DM** Develop fast recognition of up to 3 objects, without having to count them individually ('subitising'). Recite numbers past 5. 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: for example, showing the right number of objects to match the numeral, up to 5. Experiment with their own symbols and marks as well as numerals. **B25 – Range 5** Comparison • Compares two small groups of up to five objects, saying when there are the same number of objects in each group, e.g. You've got two, I've got two. Same! Counting	**DM** Count objects, actions and sounds. Subitise. Link the number symbol (numeral) with its cardinal number value. Count beyond ten. Compare numbers. **B25 – Range 6** Comparison • Uses number names and symbols when comparing numbers, showing interest in large numbers. • Estimates of numbers of things, showing understanding of relative size. Counting • Enjoys reciting numbers from 0 to 10 (and beyond) and back from 10 to 0. • Increasingly confident at putting numerals in order 0 to 10 (ordinality). Cardinality • Engages in subitising numbers to four and maybe five. • Counts out up to 10 objects from a larger	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 2s, 5s and 10s. 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.	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.

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	• Beginning to notice numerals (number symbols). • Beginning to count on their fingers.	• May enjoy counting verbally as far as they can go. • Points or touches (tags) each item, saying one number for each item, using the stable order of 1,2,3,4,5. • Uses some number names and number language within play, and may show fascination with large numbers. • Begin to recognise numerals 0 to 10. Cardinality • Subitises one, two and three objects (without counting). • Counts up to five items, recognising that the last number said represents the total counted so far (cardinal principle). • Links numerals with amounts up to 5 and maybe beyond. • Explores using a range of their own marks and signs to which they ascribe mathematical meanings. **NCETM: Early Years Typical Progression** Counting Saying number names in sequence. Tagging each object with one number word. Subitising. Knowing the last number counted gives the total so far.	group. • Matches the numeral with a group of items to show how many there are (up to 10). **NCETM: Early Years Typical Progression** Counting Subitising. Numeral meanings. Comparison More than/less than. Identifying groups with the same number of things. Comparing numbers and reasoning.		
Number (Addition and subtraction)	**DM** React to changes of amount in a group of up to three items. Compare amounts, saying 'lots', 'more' or 'same'.	**DM** Solve real world mathematical problems with numbers up to 5. Compare quantities using language: 'more than', 'fewer than'.	**DM** Understand the 'one more than/one less than' relationship between consecutive numbers. Explore the composition of numbers to 10.	Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs. Represent and use number bonds and related subtraction facts within 20.	Solve problems with addition and subtraction: Using concrete objects and pictorial representations, including those involving numbers, quantities and measures.

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	B25 – Range 4 Comparison • Beginning to compare and recognise changes in numbers of things, using words like more, lots or 'same'.	**B25 – Range 5** Composition • Through play and exploration, beginning to learn that numbers are made up (composed) of smaller numbers. • Beginning to use understanding of number to solve practical problems in play and meaningful activities. • Beginning to recognise that each counting number is one more than the one before. • Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same. **NCETM Early Years Typical Progression** Conservation – knowing that the number does not change if they are rearranged.	Explore the composition of numbers to 10. Automatically recall number bonds for numbers 0–5 and some to 10. **B25 – Range 6** Composition • Shows awareness that numbers are made up (composed) of smaller numbers, exploring partitioning in different ways with a wide range of objects. • Begins to conceptually subitise larger numbers by subitising smaller groups within the number, e.g. sees six raisins on a plate as three and three. • In practical activities, adds one and subtracts one with numbers to 10. • Begins to explore and work out mathematical problems, using signs and strategies of their own choice, including (when appropriate) standard numerals, tallies and "+" or "-". **NCETM Early Years Typical Progression** <u>Comparison</u> Knowing the 'one more/one less than' relationship between counting numbers. <u>Composition</u> Part-whole – identifying smaller numbers within a number (conceptual subitising). Inverse operations. A number can be partitioned into different pairs of numbers. A number can be partitioned into more than two numbers.	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. Recognise that adding is the inverse of subtraction.	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: A two-digit number and ones, A two-digit number and tens, Two two-digit numbers, 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. If ready: Confidently use column addition to add and subtract. Estimate the answers to calculations. Know that adding is the inverse of subtraction.

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			Number bonds – knowing which pairs make a given number.		
Number (Multiplication and division)	N/A	N/A		Confidently count in 2,5 and 10 times tables. 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.	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 (×), division (÷) and equals (=) signs. Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
Number (Fractions and decimals)	N/A	N/A		Recognise, find and name a half as one of two equal parts of an object, shape or quantity. Recognise, find and name a quarter as one of four 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 length, shape, set of objects or quantity. Write simple fractions for example, 1/2 of 6 = 3 and recognise the equivalence of 2/4 and 1/2 .
Measurement/ Geometry	**DM** Combine objects like stacking blocks and cups. Put objects inside others and take them out again. Climb and squeeze themselves into different types of spaces. Build with a range of resources. Complete inset puzzles. Compare sizes, weights etc. using gesture and language - 'bigger/little/smaller',	**DM** Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: 'sides', 'corners'; 'straight', 'flat', 'round'. Understand position through words alone – for example, "The bag is under the table," – with no pointing. Describe a familiar route.	**DM** Select, rotate and manipulate shapes to develop spatial reasoning skills. Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can. Continue, copy and create repeating patterns. Compare length, weight and capacity.	Compare, describe and solve practical problems for: - 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]	Choose and use appropriate standard units to 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. Compare and order lengths, mass, volume/capacity and record the results using G, q and =.

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	'high/low', 'tall', 'heavy'. Notice patterns and arrange things in patterns. **B25 – Range 3** Spatial Awareness • Enjoys filling and emptying containers. • Investigates fitting themselves inside and moving through spaces. Shape • Pushes objects through different shaped holes, and attempts to fit shapes into spaces on inset boards or puzzles. • Beginning to select a shape for a specific space. • Enjoys using blocks to create their own simple structures and arrangements. Pattern • Becoming familiar with patterns in daily routines. • Joins in with and predicts what comes next in a story or rhyme. • Beginning to arrange items in their own patterns, e.g. lining up toys. **B25 - Range 4** Spatial Awareness • Moves their bodies and toys around objects and explores fitting into spaces. • Begins to remember their way around familiar environments. • Responds to some spatial and positional language.	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. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs', etc. Extend and create ABAB patterns – stick, leaf, stick, leaf. 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…' **B25 – Range 5** Spatial Awareness • Responds to and uses language of position and direction. • Predicts, moves and rotates objects to fit the space or create the shape they would like. Shape • Chooses items based on their shape which are appropriate for the child's purpose.	**B25 – Range 6** Spatial Awareness • Uses spatial language, including following and giving directions, using relative terms and describing what they see from different viewpoints. • Investigates turning and flipping objects in order to make shapes fit and create models; predicting and visualising how they will look (spatial reasoning). • May enjoy making simple maps of familiar and imaginative environments, with landmarks. Shape • Uses informal language and analogies, (e.g. heart-shaped and hand-shaped leaves), as well as mathematical terms to describe shapes. • Enjoys composing and decomposing shapes, learning which shapes combine to make other shapes. • Uses own ideas to make models of increasing complexity, selecting blocks needed, solving problems and visualising what they will build. Pattern • Spots patterns in the environment, beginning to identify the pattern "rule". • Chooses familiar objects to create and recreate repeating patterns beyond AB patterns and begins to identify the unit of repeat. Measures	- Time [for example, quicker, slower, earlier, later]. Measure and begin to record the following: - 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. Recognise and name common 2-D and 3-D shapes, including: - 2-D shapes [for example, rectangles (including squares), circles and triangles] - 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]. Describe position, direction and movement, including whole, half, quarter and three quarter turns.	Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value. Find different combinations of coins that equal the same amounts of money. 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 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. order and arrange combinations of mathematical objects in patterns and sequences. Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and

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	• Explores how things look from different viewpoints including things that are near or far away. Shape • Chooses puzzle pieces and tries to fit them in. • Recognises that two objects have the same shape. • Makes simple constructions. Pattern • Joins in and anticipates repeated sound and action patterns. • Is interested in what happens next using the pattern of everyday routines. Measures • Explores differences in size, length, weight and capacity. • Beginning to understand some talk about immediate past and future. • Beginning to anticipate times of the day such as mealtimes or home time.	• Responds to both informal language and common shape names. • Shows awareness of shape similarities and differences between objects. • Enjoys partitioning and combining shapes to make new shapes with 2D and 3D shapes. • Attempts to create arches and enclosures when building, using trial and improvement to select blocks. Pattern • Creates their own spatial patterns showing some organisation or regularity. • Explores and adds to simple linear patterns of two or three repeating items, e.g. stick, leaf (AB) or stick, leaf, stone (ABC). • Joins in with simple patterns in sounds, objects, games and stories dance and movement, predicting what comes next. Measures • In meaningful contexts, finds the longer or shorter, heavier or lighter and more/less full of two items. • Recalls a sequence of events in everyday life and stories. **NCETM Early Years Typical Progression** <u>Measures</u> Recognising attributes.	• Enjoys tackling problems involving prediction and discussion of comparisons of length, weight or capacity, paying attention to fairness and accuracy. • Becomes familiar with measuring tools in everyday experiences and play. • Is increasingly able to order and sequence events using everyday language related to time. • Beginning to experience measuring time with timers and calendars. **NCETM Early Years Typical Progression** <u>Measures</u> Comparing amounts of continuous quantities. Showing awareness of comparison in estimating and predicting. Comparing indirectly. Recognising the relationship between size and the number of units. Beginning to use units to compare things. Beginning to experience specific time durations. <u>Shape and Space</u> Identifying similarities between shapes. Describing properties of shape. Representing spatial relationships.		distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise).

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		Beginning to use time to sequence events. <u>Shape and Space</u> Developing spatial awareness: experiencing different viewpoints. Developing spatial vocabulary. Shape awareness: developing shape awareness through construction. Showing awareness of properties of shape. <u>Pattern</u> Continuing an AB pattern. Copying an AB pattern. Make their own AB pattern. Identifying the unit of repeat. Spotting patterns around us. Spotting an error in an AB pattern.	Developing an awareness of relationships between shapes. <u>Pattern</u> Continuing an ABC pattern. Make their own AAB, ABBA patterns. Making a pattern which repeats around a circle. Making a pattern around a border with a fixed number of spaces. Continuing a pattern which ends mid-unit. Spotting an error in an ABB pattern. Symbolising the unit structure. Generalising structures to another context or mode. Making a pattern which repeats around a circle. Making a pattern around a border with a fixed number of spaces.		
Statistics	N/A	N/A	Link the number symbol (numeral) with its cardinal number value - Discuss the different ways children might record quantities (for example, scores in games), such as tallies. *STMI – compare results.* *STMI: Begin to: compare votes using cubes in two towers using language of more and less, e.g to choose a book to read.*	N/A *STMI* Begin to: Answer simple questions by counting the number of objects in each quantity, e.g of a Tally chart made by the teacher of class votes. Begin to: Ask and answer questions about totaling data collated by the teacher.	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 totaling and comparing categorical data.

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EYFS end of Reception ELGs (Statutory from September 2021):

Statutory ELG: Number

Children at the expected level of development will:

- 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.

Statutory ELG: Numerical Patterns

Children at the expected level of development will:

- 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.

Statutory Educational Programme: Mathematics

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.

End of KS1: Teacher Assessment

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Working towards the expected standard
The pupil can: • read and write numbers in numerals up to 100 • partition a two-digit number into tens and ones to demonstrate an understanding of place value, though they may use structured resources[1] to support them • add and subtract two-digit numbers and ones, and two-digit numbers and tens, where no regrouping is required, explaining their method verbally, in pictures or using apparatus (e.g. 23 + 5; 46 + 20; 16 – 5; 88 – 30) • recall at least four of the six[2] number bonds for 10 and reason about associated facts (e.g. 6 + 4 = 10, therefore 4 + 6 = 10 and 10 – 6 = 4) • count in twos, fives and tens from 0 and use this to solve problems • know the value of different coins • name some common 2-D and 3-D shapes from a group of shapes or from pictures of the shapes and describe some of their properties (e.g. triangles, rectangles, squares, circles, cuboids, cubes, pyramids and spheres). [1] For example, base 10 apparatus. [2] Key number bonds to 10 are: 0+10, 1 + 9, 2 + 8, 3 + 7, 4 + 6, 5 + 5.

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Working at the expected standard

The pupil can:

- read scales* in divisions of ones, twos, fives and tens
- partition any two-digit number into different combinations of tens and ones, explaining their thinking verbally, in pictures or using apparatus
- add and subtract any 2 two-digit numbers using an efficient strategy, explaining their method verbally, in pictures or using apparatus (e.g. 48 + 35; 72 – 17)
- recall all number bonds to and within 10 and use these to reason with and calculate bonds to and within 20, recognising other associated additive relationships (e.g. If 7 + 3 = 10 then 17 + 3 = 20; if 7 – 3 = 4 then 17 – 3 = 14; leading to if 14 + 3 = 17, then 3 + 14 = 17, 17 – 14 = 3 and 17 – 3 = 14)
- recall multiplication and division facts for 2, 5 and 10 and use them to solve simple problems, demonstrating an understanding of commutativity as necessary
- identify $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, of a number or shape, and know that all parts must be equal parts of the whole
- use different coins to make the same amount
- read the time on a clock to the nearest 15 minutes
- name and describe properties of 2-D and 3-D shapes, including number of sides, vertices, edges, faces and lines of symmetry.

* The scale can be in the form of a number line or a practical measuring situation.

Working at greater depth

The pupil can:

- read scales* where not all numbers on the scale are given and estimate points in between
- recall and use multiplication and division facts for 2, 5 and 10 and make deductions outside known multiplication facts
- use reasoning about numbers and relationships to solve more complex problems and explain their thinking (e.g. 29 + 17 = 15 + 4 + ☐ ; 'together Jack and Sam have £14. Jack has £2 more than Sam. How much money does Sam have?' etc)
- solve unfamiliar word problems that involve more than one step (e.g. 'which has the most biscuits, 4 packets of biscuits with 5 in each packet or 3 packets of biscuits with 10 in each packet?')
- read the time on a clock to the nearest 5 minutes
- describe similarities and differences of 2-D and 3-D shapes, using their properties (e.g. that two different 2-D shapes both have only one line of symmetry; that a cube and a cuboid have the same number of edges, faces and vertices, but different dimensions).

* The scale can be in the form of a number line or a practical measuring situation.