Strand: Mathematics

Educational Programme:
Mathematics involves providing children with opportunities to develop and improve their skills in counting, understanding and using numbers, calculating simple addition and subtraction problems; and to describe shapes, spaces, and measure.

(The development of each skill or concept is not discrete, instead there is considerable overlap in development so children may develop several skills in parallel. Children may also move in different orders.)

<table>
<tr><th>Nursery</th><th colspan="2">Reception</th><th>End of EYFS</th><th>Year 1 Expectation</th></tr>
<tr><td colspan="5">Cardinality and counting:– Knowledge and Skills
The cardinal value of a number refers to the quantity of things it represents, e.g. the numerosity, ‘how manyness’, or ‘threeness’ of three. When children understand the cardinality of numbers, they know what the numbers mean in terms of knowing how many things they refer to.</td></tr>
<tr><td colspan="2">• To say number words in sequence. (up to 10)
• To tag each object with one number word (up to 6).
• To begin to subitise (up to 3).
• To recognise numbers of personal significance.
• To begin to estimate a small group of objects. (within 5)</td><td colspan="2">• To count to 20 and beyond.
• To count forwards and backwards starting from any number. (to 20)
• To know that the last number counted gives the total. (up to 10)
• To estimate and check how many they have. (within 10)
• To match a number symbol with a number of objects up to 10.
• To write numbers in numerals up to 10.</td><td rowspan="2">• Count to 20 and beyond.
• Count forwards and backwards starting from any number up to 20.
• Matching numbers to quantity up to 10.
• Recognise numbers to 20.
• Write numbers to 10 in numerals.</td><td rowspan="2">• Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number.
• Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens
• Read and write numbers from 1 to 20 in numerals and words.</td></tr>
<tr><td>Vocabulary
Count, number names,
start, forward, backward, last, up, down, finish</td><td>Pedagogical Considerations:
• Counting backwards, for example number rhymes.
• Starting from different numbers.
• Counting things of different sizes – this helps children to</td><td>Vocabulary
Number names to 20, forward, backward, next, in between, middle, up, down,
next to</td><td>Pedagogical Considerations:
• Playing dice games to collect a number of things.
• Playing track games and counting along the track.</td></tr>
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	focus on the numerosity of the count. • Counting things that can't be seen, such as sounds, actions, words. • Counting things that cannot be moved, such as pictures on a screen, birds at the bird table, faces on a shape.		• Using 'tidy-up labels' on containers and checking that nothing is missing. • Reading number books. • Putting the right number of snacks on a tray for the number of children shown on a card.		
Subitise- Knowledge and Skills Subitising is another way of recognising how many there are, without counting.					
• To subitise numbers on my fingers (show me 2) • To subitise some number patterns, di, Numicon patterns, recognising two/three fingers instantly etc.		• To recognise small amounts in 'regular' and when they are not in the 'regular' arrangement, (up to five) e.g. small handfuls of objects. • To subitise number patterns, di, Numicon patterns, recognising numbers on fingers intently five and one more finger is six etc.		• To be able to subitise small regular arrangements up to 6. • To be able to subitise smaller numbers in large numbers.	
Vocabulary dice	**Pedagogical Considerations** • Play 'all at once fingers' -- show me four fingers. • Play simple dice patterns to three. • Using dot cards, dominoes and di as part of a game. • Audio subitising; drop two/three pennies in a pot. Children can recognise the audio patterns.	**Vocabulary** dice, pattern, subitise	**Pedagogical Considerations** • Play 'all at once fingers' – show me six fingers. • Recognising patterns within a large pattern. • What other patterns can you see in a six di pattern? • Using dot cards, dominoes and di as part of a game, including irregularly arranged dots (e.g. stuck on).		

			• Recognising arrangements quickly in irregular patterns. • Playing hidden object games where objects are revealed for a few seconds; for example, small toys hidden under bowl – shuffle them, lift the bowl briefly and ask how many there were.		
Common errors in this area may include:		**What to look for, Can a child:**			
• Missing out an object or counting an object twice. • When asked how many cars are in a group of four, simply recounting '1, 2, 3, 4,' without concluding that 'there are four cars in the group' • When asked to 'get five oranges' from a tray, a child just grabs some, or carries on counting past five • When objects in a group are rearranged, the child (unnecessarily) recounts them to find how many there are • Difficulties in counting back • Confusion over the 'teen' numbers – they are hard to learn • Missing a number like 15 (13 or 15 are commonly missed out) or confusing 'thirteen' and 'thirty'.		• Consistently recite the correct sequence of numbers and cross decade boundaries? • Collect nine from a large pile, e.g. nine pencils from a pot? • Subitise (instantly recognise) a group that contains up to four, then five, in a range of ways, e.g. fingers, dice, random arrangement? • Select a numeral to represent a quantity in a range of fonts e.g. 4, ϟ? • Correct a puppet who thinks the amount has changed when their collection has been rearranged?		
Comparison – Knowledge and Skills Comparing numbers involves knowing which numbers are worth more or less than each other. This depends both on understanding cardinal values of numbers and also knowing that the later counting numbers are worth more (because the next number is always one more).					
• To identify more and less/fewer and use the language more, fewer. (within 3)		• To compare quantities up to 10 in different contexts and recognise when			• Given a number, identify

• To find groups of objects with the same amounts. (within 3)		a group is one more, one less or the same amount and add reason. • To place in order numbers to 10 and say one more and one less in practical contexts.		• Identify one more and one less up to 10.	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. • Recognise, find and name a half as one of two equal parts of an object, shape or quantity
Vocabulary More, less, same, big, small	**Pedagogical Considerations** • Collections for children to sort and compare, which include objects which are identical, and which include objects of different kinds or sizes.	**Vocabulary** More, less, more than, less than, same, bigger than, smaller than, fewer, fewer than	**Pedagogical Considerations** • Comparison is linked to numerosity, size, shape, space and measure. • Collections with a large number of things, and collections with a small number of things. • Asking children to convert two unequal groups into two that have the same number, e.g. 'There are 6 apples in one bag and 2 in another bag; can we make the bags equal for the two hungry horses?		
Common errors in this area may include:		**What to look for, Can a child:**			
• Children not comparing the numerosity of the group and considering more in terms of size • Children giving a response that does not match the context when estimating a number; e.g. when adding, giving as an answer a number that is smaller than the numbers given. Example: 'There are 7 cars in a garage and then 2 more go in.' The child guesses there are 4 cars in total inside.		• State which group of objects has more? Can they do this with a large or small visual difference? • Compare two numbers and say which is the larger? • Predict how many there will be if you add or take away one?			
Composition – Knowledge and Skills Knowing numbers are made up of two or more other smaller numbers involves 'part–whole' understanding. Learning to 'see' a whole number and its parts at the same time is a key development in children's number					

understanding. Partitioning numbers into other numbers and putting them back together again underpins understanding of addition and subtraction as inverse operations.			
• To identify smaller numbers within a number up to 3. (**Conceptual subitising**)	• To know if nothing has been added or taken away, then the amount is the same. (Conservation) (up to 10) • To identify smaller numbers within a number up to 5. (Part–whole: **conceptual subitising**) • To combine two amounts and know that they can be recombined to make the same total. (up to 10) • To make different patterns with a given number of objects. • To partition groups of 5 into number pairs. • To automatically recall addition and subtraction facts up to five and extend to 10. • To add and subtract with objects, using count all then count on, or take away strategies. (within 10)	• Adding and subtracting with objects, using count all then count on, or take away, strategies. • Recall number facts to 5 and more. • Use number bonds and related subtraction facts within 5 and more.	• Represent and use number bonds and related subtraction facts within 20. • Add and subtract one-digit and two-digit numbers to 20, including zero.

Vocabulary altogether, sharing, add, more, less, taken away, gone, left, how many,	**Pedagogical Considerations** • Correcting a puppet who may say that there are more or fewer objects now, as they have been moved around, e.g. spread out or pushed together. • Encouraging the children to make different patterns with a given number of things. • Sharing things out (grouping them in different ways) and then the puppet complaining that it is not fair as they have less • Numicon towers: layering up Numicon pieces of the same total • Putting things into two containers in different ways.	**Vocabulary** altogether, part, whole, all, some, sharing, add, less, taken away, gone, left, more,	**Pedagogical Considerations** • Playing skittles and looking at how many are standing. How many have fallen over? How many are there altogether? • Playing hidden object games where objects are revealed for a few seconds; for example, small toys hidden under bowl – shuffle them, lift the bowl briefly and ask how many there were. • Encouraging making arrangements with (e.g.) ten; ensuring the children talk about the different arrangements they can see within the whole. • Making a number with two different kinds of things.		
Common errors in this area may include:		**What to look for, Can a child:**			
• Children suggesting that a larger number than the total are hidden.		• Subitise small groups within a larger number? • Make a reasonable guess at a hidden number? • In context, state two groups that make a larger amount? For example, how might the (six) bean bags land? You could have three with stripes up and three with spots up.			

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<tr><td colspan="5">Pattern- Knowledge and Skills
The focus in this section is on repeating patterns, progressing from children copying simple alternating AB patterns to identifying different structures in the ‘unit of repeat’, such as ABB. Patterns can be made with objects like coloured cubes, small toys, buttons and keys, and with outdoor materials like pine cones, leaves or large blocks, as well as with movements and sounds, linking with music, dance, phonics and rhymes. Children can also spot and create patterns in a range of other contexts, such as printed patterns, timetables, numbers and stories.</td></tr>
<tr><td colspan="2">• To copy an AB pattern.
• To continue AB pattern.</td><td colspan="2">• To make their own AB pattern. (two colours, two shapes, two objects)
• To spot patterns in the environment and talk about what I see.
• To continue an ABC pattern. (three colours, three shapes, three objects)
• To spot an error in a pattern.
• To talk about and describe their pattern.
• To duplicate pattern using real objects in a straight line.
• To know patterns within numbers up to ten including evens and odds and double facts to 5.</td><td>• To spot and create patterns in different contexts.</td></tr>
<tr><td>Vocabulary
Pattern, next, same,</td><td>Pedagogical Considerations
• Building towers or trains of different-coloured cubes (continuing patterns horizontally and vertically)
• Extending patterns using a wide range of identical objects in different colours, e.g. beads; small plastic toys such as bears, dinosaurs, vehicles. Try to avoid interlocking cubes or bead-threading so children can focus on the pattern rather than their coordination skills.</td><td>Vocabulary
Pattern, next, same, before, match, repeat, repeated, Under, up, different, odd, even, double,</td><td><u>Pedagogical Considerations</u>
• Accessing a range of patterns to copy. For example, using the plastic bears: big, small, big, small, big… footwear: shoe, welly, shoe, welly..., actions and sounds: jump, twirl, jump, twirl, jump… or clap, stamp, clap, stamp…
• Collecting things in the outdoors environment: leaf, stick, leaf, stick…</td><td></td></tr>
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	• Check children repeat the unit at least three times (big bear, small bear; big bear, small bear; big bear, small bear). This is to ensure the child can sustain the pattern.		• Challenge, using pre-given circles to create a border, such as on or around a paper plate. 		
Common errors in this area may include:		**What to look for, Can a child:**			
• When copying or extending a pattern, changing it before making three repeats • Spotting that there is an error but not being able to describe it • Identifying an error but not being able to correct it		• Continue, copy and create an AB pattern? • Identify the pattern rule (unit of repeat) in an AB pattern? • Identify the pattern rule (unit of repeat) in ABB, ABBC (etc.) patterns? • Spot an error and 'correct' a pattern? • Explain whether a circular pattern is continuous or not			
Shape and Space – Knowledge and Skills Mathematically, the areas of shape and space are about developing visualising skills and understanding relationships, such as the effects of movement and combining shapes together, rather than just knowing vocabulary. The focus is on exploring spatial relations and the properties of shapes, in order to develop mathematical thinking (rather than on shape classification, which requires prior knowledge of properties).					
• • • • • • To move myself safely around the environment,		• To understand and use the language of position and direction 'in' 'on' 'under' 'up' 'down' 'across' 'in front' 'behind' 'forwards' 'backwards' 'next to' in practical contexts. • To understand and use left, and right.	• Use the language of position and direction. • Identify similarities	• Recognise and name common 2-D and 3-D shapes, including: - 2-D shapes [for example,	

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- To find shapes that fit together.
- To understand the language of position and direction 'in' 'on' 'under' 'up' 'down' 'across' 'in front' 'behind' 'forwards' 'backwards'
- To explore different shapes through construction play indoor and outdoor.

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- To draw simple representations of three-dimensional object e.g. drawing a simple map of houses and trees, drawing a plan for a garden or play area using a small tray with twigs and sand.
- To identify similarities between shapes and use simple language to describe the properties. Edges, corners, short, long sides. (2d shapes: circle, square, triangle, rectangles, star) (3D: cuboid, cube, sphere, cylinder, cone)
- In practical contexts, to describe the properties of the shapes using informal language, e.g. ball / house / pointy. 2d shapes: circle, square, triangle, rectangles, star) (3D: cuboid, cube, sphere, cylinder, cone)
- In practical contexts, to understand the relationships between shapes. E.g. Using triangles and rectangles to make a tent.

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<td rowspan="2">between shapes.</td>
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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.

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<tr>
<td>Vocabulary

- In, on, under, up, down, across, in front, behind, forwards, backwards

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<td>Pedagogical Considerations

- Riding trikes around interesting routes
- Construction activities
- Printing and making pictures and patterns with shapes
- Posting boxes
- Jigsaws

</td>
<td>Vocabulary
In, on, under, up, down, across, in front, behind, forwards, backwards, left, right, edges, corners, short, long sides, turn, roll, flat, straight, curve, round, triangles and rectangles, inside, outside</td>
<td>Pedagogical Considerations

- Making a complete circuit with a train track

• Directing a simple robot or remote-controlled toy vehicle along a route
• Tangrams: 'Can you make a person with the shapes?'
• With toys in a line: 'Can you say what the</td>
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		2d shapes: circle, square, triangle, rectangles, star) (3D: cuboid, cube, sphere, cylinder, cone)	teddy on the other side is seeing?		
Common errors in this area may include:		**What child: What to look for, Can a child:**			
• Children thinking that only regular triangles are triangles, only brick-like rectangles are rectangles (i.e. shapes are defined by their image, not by their properties) • Children thinking that squares are only squares when the bottom is horizontal (i.e. shapes are defined by their orientation)		• Select and rotate shapes to fit into a given space? • Use positional vocabulary, including relative terms, to describe where things are in small-world play? • Show intentionality in selecting shapes for a purpose, such as cylinders to roll? • Make a range of constructions, including enclosures, and talk about the decisions they have made? • See shapes in different orientations and recognise that they are still that shape? • Recognise a range of triangles and say how they know what they are			
Measure – Knowledge and Skills					

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To understand and vocabulary for long, short, tall, small, full, empty.
To compare quantiles using gestures
To understand important times of the day. E.g lunch time, home time.

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To understand and use the vocabulary for long, short, tall, small, heavy, light.
To use comparative phrases in practical contexts, ‘longer than, taller than, shorter than,
In practical contexts, to estimate and predict e.g. which box would the object fit in, which sized clothes will fit the doll.
To say the days of the week in sequence with adult support using rhyme.
To understand the language of time yesterday, tomorrow, next, after in practical contexts

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To use simple language to compare weight, length and capacity.

Heavy, light, heavier, lighter, long, short, longer shorter, full empty.

To use simple language of time; yesterday, tomorrow and names of the week days.
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<td rowspan="2">
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]
Time [for example, quicker, slower, earlier, later]
Sequence events in chronological order using language [for

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<tr>
<td>Vocabulary
long, short, tall, small, full, empty.
Today next</td>
<td>Pedagogical Considerations
Ensuring adults model language which highlights the specific attribute that is the focus of attention
Dough modelling, which can provide a good opportunity to discuss the length of snakes, or the weight of different-sized lumps
Water and sand-play, which can provide lots of opportunities to highlight capacity</td>
<td>Vocabulary
long, short, tall, small, heavy, light, longer than, taller than, shorter than yesterday, tomorrow, next, after, days of the week, quick, slow</td>
<td>Pedagogical Considerations
Encouraging children to compare different attributes in everyday situations: ‘I wonder who has the longest snake?’ ‘I wonder whose pot will hold the most water?’ ‘I wonder which ball is the heaviest?’
Cutting a piece of ribbon as long as a child’s arm and encouraging them to find things in the environment that are</td>
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			longer, shorter or the same length		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.
Common errors in this area may include:		**What child: What to look for, Can a child:**			
• Keeping track of events, e.g. 'Have I had my lunch yet?' • Positional language associated with time; muddling the relative terms 'yesterday' and 'tomorrow' • Using 'long' to describe the shape of something (e.g. a block that is much longer than it is wide) rather than to compare lengths • Not taking into account both ends as the starting and stopping point • Not being able to say 'than' in the phrase, 'this is longer than that'.		• Find something that is longer, shorter, heavier, lighter (etc.) than a reference item? • Find an appropriate container for a specific item? • Describe the location of something using positional language? • Accurately use the relative terms 'yesterday' and 'tomorrow'? • Order a short sequence of events.			