

EYFS Progression in Maths

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Introduction

The first few years of a child's life are especially important for mathematics development. Research shows that early mathematical knowledge predicts later reading ability and general education and social progress. Therefore, it is our aim at Lane End Primary School that all children develop firm mathematical foundations in a way that is engaging, and appropriate for their age.

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 to be afraid to make mistakes.

EYFS Development Matters







Development Matters offers a top-level view of how children develop and learn for all early years practitioners. Its guidance can help meet the requirements of the EYFS statutory framework.

This document uses the Development Matters guidance for maths at its core but offers more detailed progression within the statements and more ideas of how to teach this in both Nursery and Reception. The progression information has been taken from a combination of the NCETM Progression in EYFS Maths and the Learning Trajectories.

The aim of this document is to equip Lane End Primary early years practitioners with a strong understanding of progression through early maths and all the essential building blocks of mathematical learning needed for the children to become confident, resilient and knowledgeable mathematicians who are ready for the Year 1 National Curriculum content at the end of Reception.

We ensure that the children are taught the following counting principles (how and when these are taught are detailed within this document and in our long-term maps):

The one-to-one principle

This involves children assigning one number name to each object that is being counted. Children need to ensure that each object is only being counted once, ensuring that they have counted every object. Children will sometimes count an object more than once, or will miss an object when counting. Encourage children to line up objects (in the first place) and touch each one, as they count, saying one number name for each object – one touch, one count. This will also avoid counting more quickly that they touch objects which again shows that they have not yet grasped 1:1 correspondence.

The stable order principle

Children understand when counting that the numbers have to be said in a certain order. Children need to know all the number names for the amount in the group they are counting. Encourage children to count aloud to larger amounts without expecting them to count that number of objects. The order of numbers should be reinforced through number songs and daily counting activities.

The cardinal principle

This involves children understanding that the number name assigned to the final object in the group is the total amount of objects in that group. In order to grasp this principle, children need to understand the 1:1 and stable order principle. From a larger group, children select a given number and count them. When asked, 'how many?' children should be able to recall the final number they said. Children should also be able to stop at the final number when asked, "give me…" Children who have not grasped this principle may recount the whole group again.

The abstraction principle

Children will understand that anything can be counted including things like sounds and movements. When starting to count many children rely on touching objects to count accurately. Abstraction should be encouraged on a daily basis by counting things such as claps, clicks and jumps.

The order irrelevance principle

This involves children understanding that the order we count a group of objects is irrelevant. The total will still be the same number. Encourage children to count objects left to right, right to left, top to bottom etc. Move the objects wider and ask children how many there are. Squeeze the objects small and ask how many there are. If children count them all again, they have not fully grasped this principle.

How is each section to be used?

Development Matters	**The statement from Development Matters will be written in here. Statements are split into 3-4 year olds (nursery) and Reception. The statements follow the order set out in Development Matters.**

NCETM Progression in EYFS	Learning Trajectories
Related and relevant statements are written here.	Related and relevant statements are written here.

How we teach this?
This section will contain the suggestions from Development Matters to go alongside the statement. It also contains the progression and teaching, activity & opportunity ideas from either the NCETM Progression documents, the Learning Trajectories or both if appropriate. Some statements have a very clear progression through them which is made clear and highlighted. Practitioners can use this section to gain a deeper understanding of the mathematical sequential learning so that their maths inputs, the language they use and provision and opportunities they provide are appropriate, purposeful and have clear learning intentions.

NURSERY (Typically 3-4)

Development Matters	Develop fast recognition of up to 3 objects, without having to count them individually (subitising)
NCETM Progression in EYFS	Learning Trajectories
(Cardinality and Counting): Subitising: recognising small quantities without needing to count them all (to 3 only)	Learning Trajectories – Subitising Age 2/3 – Subitising: Maker of Small Collections Age 2/3 – Subitising: Small Collection Namer
How we teach this?	
- Point to small groups of objects: "Look, there are two!" - In play, ask children how many there are in a small set of two or three. - Ask children to make a small collection of 3 - Subitize using dot cards, dominoes and dice as part of a game, including irregularly arranged dots (e.g. stuck on) - Playing hidden object games where objects are revealed for a few seconds; for example, small toys hidden under a bowl-shuffle them, lift the bowl briefly and ask how many there were - 'All at once fingers' – show me three fingers	

Development Matters	Recite numbers past 5
NCETM Progression in EYFS	Learning Trajectories
(Cardinality and Counting): Counting: saying number words in sequence	Learning Trajectories – Counting Age 3 – Counting: Reciter (10)
How we teach this?	
- Regularly say the counting sequence, in a variety of playful contexts, inside and outdoors, forwards and backwards, sometimes going to high numbers. For example: hide and seek, rocket-launch countdowns. - Sing simple songs e.g. 5 little ducks or 1,2,3,4,5 once I caught a fish alive - Count using different voices –have different ways to count written or drawn on paper – pull one out and count in that style, e.g. happy, loud, quiet etc - Use a dice with different characters drawn on – roll the dice and count as the character it lands on e.g. as daddy bear, as an alien etc - Count along with a puppet - Count to music or count while everyone marches - Practise starting from different numbers	

Development Matters	Say one number for each item in order: 1, 2, 3, 4, 5
NCETM Progression in EYFS	Learning Trajectories
(Cardinality and Counting): Counting: tagging each object with one number word	Learning Trajectories – Counting Age 3 – Counting: Corresponder
How we teach this?	
- Give children lots of opportunities to count things in irregular arrangements. For example, how many play people are in the sandpit? How many cars have we got in the garage? - Count things of different sizes – this helps children to focus on the numerosity of the count. - Count things that can't be seen, e.g. actions, words, sounds (claps, bangs on a drum etc) - Count things that cannot be moved such as pictures on a screen, birds at the bird table, faces on a shape	

Development Matters	Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle')
NCETM Progression in EYFS	Learning Trajectories
(Cardinality and Counting): Counting: knowing the last number counted gives the total so far	Learning Trajectories – Counting Age 4 – Counting: Counter (Small Numbers) Age 4 – Counting: Counter (10) Age 4 – Counting: Producer (Small Numbers)
How we teach this?	
- Count things and repeat the last number. For example: "1, 2, 3- **3 cars**" - Point out the number of things whenever possible, so, rather than just 'chairs', 'apples' or 'children', say 'two chairs', 'three apples', 'four children'. - Ask children, 'how many?' question after counting objects in a line for example - Play dice games to collect a number of things - Play track games and count along the track	

Development Matters	Show 'finger numbers' up to 5
NCETM Progression in EYFS	Learning Trajectories
(Cardinality and Counting): Subitising: recognising small quantities without needing to count them all (to 5 only)	Learning Trajectories – Subitising Age 3/4 – Subitising: Perceptual Subitiser to 5
How we teach this?	
- Provide opportunities for subitizing up to 5 using dot patterns, items on a tray or plate etc - Use dot cards, dominoes and dice as part of a game, including irregularly arranged dots (e.g. stuck on) - 'all at once fingers' – show me 5 fingers	

Development Matters	Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5
NCETM Progression in EYFS	Learning Trajectories
(Cardinality and Counting): Numeral meanings Conservation: knowing that the number does not change if things are rearranged (as long as none have been added or taken away)	
How we teach this?	
- Use small numbers to manage the learning environment. Suggestions: have a pot labelled '5 pencils' or a crate for '3 trucks'. Draw children's attention to these throughout the session and especially at tidy up time. 'How many pencils should be in this pot?' or 'How many have we got?' etc. - Use numeral dice in games; matching numerals with varied groups of things - Read number books - Put the right number of snacks on a tray for the number of children shown on a card - Reinforce the principle of cardinality alongside these activities	

Development Matters	Experiment with their own symbols and marks as well as numerals
Mathematical mark making supports children to develop effective learning habits or dispositions in mathematics. In creating mathematical graphics, children develop characteristics of effective learning (DFE, 2020). In mathematical graphics the number of marks can be significant as well as their shape, position and orientation. The marks act as a record for children to 'hold their thoughts'. This mode of mathematical communication is owned and made sense of by the child.	
How we teach this?	
- Provide lots of practical experiences for the children to record. Story contexts e.g., Three Bears, can be a good starting point. Talk to children about their mathematical graphics and what they have drawn and/or represented. - Encourage children in their own ways of recording (for example) how many balls they managed to throw through the hoop? Provide numerals nearby for reference e.g. wooden numerals in a basket or a number track on the fence.	

Development Matters	Solve real world mathematical problems with numbers up to 5
NCETM Progression in EYFS	Learning Trajectories
How we teach this?	
- Discuss mathematical problems throughout the day, inside and outdoors. Suggestions: - "we should have 4 children in the water area, there are 3 children – can we ask ….. to join?" - "lets fill the watering can and water all the plants" Through playing games. - While playing a game – "how many more cards does …… need to fill her board". Games like Orchard Games (shopping list game, flower pot game etc) are good for this.	

<table>
<tr><td>Development Matters</td><td colspan="2">Compare quantities using language: 'more than', 'fewer than'.</td></tr>
<tr><td colspan="2">NCETM Progression in EYFS</td><td>Learning Trajectories</td></tr>
<tr><td colspan="2">(Comparison):
More than/less than</td><td><u>Learning Trajectories – Comparing Number</u>
Age 2/3 – Comparing Number: Perceptual Comparer
Age 3 – Comparing Number: First-Second Ordinal Counter
Age 3 – Comparing Number: Early Comparer of Similar Items
Age 3/4 – Comparing Number: Early Comparer of Dissimilar Items</td></tr>
<tr><td colspan="3">How we teach this?</td></tr>
<tr><td colspan="3">- Compare collections of items in play e.g. loose parts. Use number names when comparing. Use this opportunity to reinforce language of 'first' and 'second' objects in sequence within a collection.
- Match amounts – sometimes seeing equal collections consisting of different items, showing they are the same number.
- Discuss mathematical ideas throughout the day, inside and outdoors.
Suggestions:
- "I think Jasmin has got more crackers…"
- Support children to solve problems using fingers, objects and marks: "There are four of you, but there isn't enough chairs…"
Draw children's attention to differences and changes in amounts, such as those in stories like 'The Enormous Turnip'</td></tr>
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Development Matters	Understand position through words alone – for example, "The bag is under the table," – with no pointing
NCETM Progression in EYFS	Learning Trajectories
How we teach this?	
- Discuss position through words alone – for example, "The bag is under the table," – with no pointing - Use spatial words in play, including 'in', 'on', 'under', 'up', 'down', 'besides' and between e.g. "Let's put a troll under the bridge and the billy goat beside the stream" - Use spatial words when reading a story and looking at the pictures, "the porridge is in the bowl", "Goldilocks is on the chair" etc - Use spatial words in the learning environment both inside and outdoors, e.g. "Put the dolls besides the dolls' house" or "Let's put the fruit bowl between ……. and ……."	

Development Matters	Describe a familiar route
NCETM Progression in EYFS	Learning Trajectories
How we teach this?	
- Take the children out to the postbox or the park; recall the route and the order of things seen on the way. - Use stories and recall route of character through picture ordering, small world play etc. e.g. 'We're Going on a Bear Hunt' and 'What the Ladybird Heard'	

Development Matters	Discuss routes and locations, using words like "in front of" and "behind"
NCETM Progression in EYFS	Learning Trajectories
How we teach this?	
- Set up obstacle courses, interesting pathways and hiding places for children to play freely. When appropriate, ask children to describe their route and give directions to each other. - Provide complex train tracks, with loops and bridges, or water flowing challenges with guttering that direct the flow to a water tray, for children to play freely with. - Read stories about journeys, such as 'Rosie's Walk'	

Development Matters	Make comparisons between objects relating to size, length, weight and capacity
NCETM Progression in EYFS	Learning Trajectories
(Measures): Recognising attributes Comparing amounts of continuous quantities	
How we teach this?	
- Ensure adults model language which highlights the specific attribute that is the focus of attention e.g. length – "long", "short", "longer" & "shorter" THIS MUST COME BEFORE COMPARISON - Once adults have modelled language then we can ask children to begin to find something that is longer/short or heavier/lighter than a referenced item. They will utilise strategies such as direct comparison, e.g. placing objects side by side to determine which is larger. In the learning environment and through play, adults to ask children	

questions using specific terms such as, "Which is longer?", "Does this hold more?", "I wonder if this is heavier than…?" etc. Use more general comparative terms too such as, 'not enough', 'too much' and 'a lot more'.

- Show children how to compare lengths directly by ensuring they align starting points and compare like-for-like, e.g. straightening skipping ropes before comparing length.
- Encourage children to compare different attributes in everyday situations: "I wonder who has the longest snake?", "I wonder which pot will hold the most water?" and "I wonder which ball is the heaviest?"
- Cut a piece of ribbon as long as a child's arm and encourage them to find things in the environment that are 'longer', 'shorter' or 'the same length'.
- Focus on asking for specific things according to their attributes, e.g. "Please can you pass me a …….. that is …….. than ……"
- When comparing directly, find the odd one out, by providing a varied range of container shapes all containing the same amount of liquid except for one – "Which do you think is the odd one out?", "Why?", "How will we check?", "Were we right?"
- Set up a 'balancing station' with interesting things to weigh and to balance, indoors and outdoors
- Compare different parcels to see which are heavier and which are lighter
- Provide experiences of size changes. Suggestions: "Can you make a puddle larger?", "When you squeeze a sponge, does it stay small?", "What happens when you stretch dough, or elastic?"
- Talk with children about their everyday ways of comparing size, length, weight and capacity. Model more specific techniques, such as lining up ends of lengths and straightening ribbons, discussing accuracy: "Is it **exactly**…?"

<table>
<tr><td>Development Matters</td><td colspan="2">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</td></tr>
<tr><td colspan="2">NCETM Progression in EYFS</td><td>Learning Trajectories</td></tr>
<tr><td colspan="2">(Shape and Space):
- Developing spatial awareness: experiencing different viewpoints
- Developing spatial vocabulary
- Shape awareness: developing shape awareness through construction</td><td><u>Learning Trajectories – Spatial visualisation</u>
Can move shapes to a location by physical trial and error.
Slides and turns objects accurately in easy tasks.</td></tr>
<tr><td colspan="3">How we teach this?</td></tr>
<tr><td colspan="3"><u>To develop spatial awareness:</u>
- Riding trikes around interesting routes
- Construction activities
- Printing and making pictures and patterns with shapes
- Posting boxes
- Jigsaws
- Directing a simple robot or remote-controlled toy vehicle along a route
- Tangrams – "Can you make a person with the shapes?"
- Toys in a line: "Can you say what the teddy on the other side is seeing?"
<u>Activities to teach and provide opportunity to develop spatial vocabulary:</u>
- Hunting for hidden objects, with some prompts, e.g. "Look behind the bicycle store, take three steps from the front of the art cupboard…"
- Developing and talking about small-world scenarios, e.g. doll's house, miniature village, play park</td></tr>
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- Acting out their own versions of well-known stories where characters negotiate routes and obstacles, for example 'We're Going on a Bear Hunt'
- Directing each other as robots

<u>Developing shape awareness through construction:</u>

- Provide a variety of construction materials like blocks and interlocking bricks. Provide den materials – allow children to play freely with these materials, outdoors and inside. When appropriate, talk about the shapes and how their properties suit the purpose.
- Provide shapes that combine to make other shapes, such as pattern blocks and interlocking shapes, for children to play freely with. When appropriate, discuss the different designs that children make.
- Occasionally suggest challenges, so that children build increasingly more complex constructions.
- Use tidy-up time to match blocks to silhouettes or fit things in containers, describing and naming shapes. Suggestion: "Where does this triangular one/cylinder/cuboid go?".

Development Matters	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.
NCETM Progression in EYFS	Learning Trajectories
	<u>Learning Trajectories – Patterning</u> Age 2/3 Recognises a simple pattern, usually ABABABA, even if they can't yet name or describe it
How we teach this?	
- Provide patterns from different cultures, such as fabrics - Provide a range of natural and everyday objects and materials, as well as blocks and shapes, for children to play with freely and to make patterns with. When appropriate, encourage children to continue patterns and spot mistakes.	

Development Matters	Extend and create ABAB patterns – stick, leaf, stick, leaf Notice and correct an error in a repeating pattern
NCETM Progression in EYFS	Learning Trajectories
(Pattern): Continuing an AB pattern Copying an AB pattern Make their own AB pattern	Learning Trajectories – Patterning Age 3/4 Patterner AB

How we teach this?

Children first need the opportunity to see a pattern, to talk about what they can see, and to continue a pattern. At first, they will do this one item at a time, e.g. red cube, blue cube, red cube… verbalising the pattern helps. Children may then be asked to say what they would add next to continue it.

- 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 co-ordination skills.

Copying a pattern can be difficult for children if they have to keep comparing item by item. AB patterns are easiest – when presented to children, these should contain several repeats, to ensure that the pattern unit is evident. Discuss the nature of the pattern: how has the pattern been made? Patterns can have a range of features such as varying objects, size or orientation.

- Accessing a range of patterns to copy, For example, using the plastic bears: big, small, big, small, big …, footwear: shoe, welly, shoe, welly, shoe ….., actions and sounds: jump, twirl, jump, twirl, jump… or clap, stamp, clap, stamp, clap
- Collecting things in the outdoors environment: leaf, stick, leaf, stick…

As children progress from continuing to copying patterns, they can be challenged to change the sample pattern or create their own.

- Challenge the child to change one element of the pattern they have created, e.g. "Can you change the red bear to a blue bear? What is the pattern now?"
- Ensuring that there are numerous opportunities to create patterns – e.g. in the outdoors, using natural materials such as sticks, leaves, stones, pine cones; in craft activities, using stamping , sticking, printing; with musical instruments, using sounds such as drum, shakers, triangles etc.
- Working collaboratively with a friend to take turns to create a pattern; e.g. one claps, one stamps
- Challenging a friend to continue or copy their pattern

Development Matters	Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then…'
NCETM Progression in EYFS	Learning Trajectories

How we teach this?

- Talk about patterns of events, in cooking, gardening, sewing or getting dressed. Suggestions: 'first', 'then', 'after', 'before', 'Every day we', 'Every evening we'
- Talk about the sequence of events in stories
- Use vocabulary like 'morning', 'afternoon', 'evening' and 'night-time'. 'earlier', 'later', 'too late', 'too soon', 'in a minute'
- Count down to forthcoming events on the calendar in terms of number of days or sleeps. Refer to the days of the week, and the day before or day after, 'yesterday' and 'tomorrow'

RECEPTION

Development Matters	Count objects, actions and sounds
NCETM Progression in EYFS	Learning Trajectories
(Cardinality and Counting): Counting: saying number words in sequence Counting: tagging each object with one number word Counting: knowing the last number counted gives the total so far Conservation: knowing that the number does not change if things are rearranged (as long as none have been added or taken away)	Learning Trajectories – Counting Age 4 – Counting: Producer (Small Numbers) Age 5 – Counting: Counter and Producer (10+)

How we teach this?

- Build counting into everyday routines such as register time, tidying up, lining up or counting out pieces of fruit at snack time.
- To work on saying number names in sequence - Practise starting from different numbers and practise counting backwards which is a useful skill BUT be aware that young children find this harder because of the demand it places on the working memory.
- Develop the key skills of counting objects including saying the numbers in order and matching one number name to each item. Also count things of different sizes – this helps children to focus on the numerosity of the count
- Say how many there are after counting – for example, "…6, 7, 8. There are 8 balls" – to help children appreciate that the last number indicates the total number of the group. This is the cardinal counting principle.
- Say how many there might be before you count to give a purpose to counting: "I think there are about 8. Shall we count to see?"
- Count out a smaller number from a larger group. "Give me seven…" Knowing when to stop shows that children understand the cardinal principle.
- Sing counting songs and number rhymes and read stories that involve counting (see White Rose Maths suggested story books)
- Play games which involve counting

- Children also need the opportunity to recognise amounts that have been rearranged and to generalise that, if nothing has been added or taken away, then the amount is the same. This can be done: by 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.

Development Matters	Subitise
NCETM Progression in EYFS	Learning Trajectories
(Cardinality and Counting): Subitising: recognising small quantities without needing to count them all	Learning Trajectories – Subitising Age 4 – Subitising: Conceptual Subitiser to 5 Age 4/6 – Subitising: Conceptual Subitiser to 7 Age 5/6 – Subitising: Conceptual Subitiser to 10

How we teach this?

- Once children can instantly recognise collections up to 5, e.g. "I see 4" they then move on to verbally label all arrangements to 5 then to 7 then to 10 e.g. "I see 4 and I see 3 – I see 7". Conceptual subitising refers to the ability of children to identify a whole quantity as a result of composing smaller quantities that make up a whole. Children may use structures such as tens frames to conceptually subitise/recognise larger quantities.
- Show small quantities in familiar patterns (for example, dice) and random arrangements
- Play games which involve quickly revealing and hiding numbers of objects
- Put objects into five frames and then ten frames to begin to familiarise children with the tens structure of the number system
- Prompt children to subitise first when enumerating groups of up to 4 or 5 objects; "I don't think we need to count those. They are in a square shape so there must be 4." Count to check.
- Encourage children to show a number of fingers 'all at once', without counting

Development Matters	Link the number symbol (numeral) with its cardinal number value
NCETM Progression in EYFS	Learning Trajectories
NCETM (Cardinality and Counting): Numeral meanings	
How we teach this?	

- Display numerals in order alongside dot quantities or tens frame arrangements
- Play card games such as snap or matching pairs with cards where some have numerals, and some have dot arrangements
- Discuss the different ways children might record quantities (for example, scores in games), such as tallies, dots and using numeral cards
- Look for opportunities to have a range of number symbols available, e.g. wooden numerals, calculators, handwritten (include different examples of a number, e.g. 4, 4, 4
- Use tidy-up labels on containers and checking that nothing is missing
- Read number books (see White Rose Maths for suggested titles)

Development Matters	Count beyond 10
NCETM Progression in EYFS	Learning Trajectories
NCETM (Cardinality and Counting): Counting: saying number words in sequence Counting: tagging each object with one number word Counting: knowing the last number counted gives the total so far Conservation: knowing that the number does not change if things are rearranged (as long as none have been added or taken away)	Learning Trajectories – Counting Age 4 – Counting: Counter (Small Numbers) Age 4 – Counting: Counter (10) Age 4 – Counting: Producer (Small Numbers) Age 5 – Counting: Counter and Producer (10+) Age 5 – Counting: Counter Backward from 10
How we teach this?	
- Count verbally beyond 20, pausing at each multiple of 10 to draw out the structure, for instance when playing hide and see, or to time children getting ready - Provide images such as number tracks, calendars and indoors and out, including painted on the ground, so children become familiar with two-digit numbers and can start to spot patterns within them - Recognises errors in other people's counting	

Development Matters	Compare numbers
NCETM Progression in EYFS	Learning Trajectories
NCETM (Comparison): Identifying different groups with the same number of things Comparing numbers and reasoning	Learning Trajectories – Comparing Number Age 4 – Comparing Number: Matching Comparer Age 4 – Comparing Number: Counting Comparer (Same Size) Age 5 – Comparing Number: Spatial Extent Estimator – Small/Big Age 5 – Comparing Number: Counting Comparer (5)

	Age 4/5 – Comparing Number: Mental Number Line to 5 Age 4/5 – Comparing Number: Serial Orderer to 5 Age 5 – Comparing Number: Ordinal Counter Age 5 – Comparing Number: Counting Comparer (10) Age 5 – Comparing Number: Mental Number Line to 10
How we teach this?	
- Use vocabulary: 'more than', 'less than', 'fewer', 'the same as', 'equal to'. Encourage children to use these words as well. - First, compare groups of 1-6 by matching. Provide collections to compare, starting with a very different number of things. Include more small things and fewer large things, spread them out and bunch them up, to draw attention to the number not the size of things or the space they take up. Include groups where the number of items is the same. - Next, estimates which set is more or less if the differences are clear. - Distribute items evenly, for example: "Put 3 in each bag," or give the same number of pieces of fruit to each child. Make deliberate mistakes to provoke discussion. - After this, compares with counting – You may tell a story about a character distributing snacks unfairly and invite children to make sure everyone has the same. - Orders quantities (dots) or numerals up to 5. - Identifies and uses ordinal numbers from 'first' to 'tenth'	

Development Matters	Understand the 'one more than/one less than' relationship between consecutive numbers
NCETM Progression in EYFS	Learning Trajectories
NCETM (Comparison): Knowing the 'one more than/one less than' relationship between counting numbers	
How we teach this?	
- Make predictions about what the outcome will be in stories, rhymes and songs if one is added, or if one is taken away - Provide 'staircase' patterns which show that the next counting number includes the previous number plus one	

Development Matters	Explore the composition of numbers to 10
NCETM Progression in EYFS	Learning Trajectories
NCETM (Composition): Composition – Part-whole: identifying smaller numbers within a number (conceptual subitising – seeing groups and combining to a total) Composition – Inverse Operations Composition – A number can be partitioned into different pairs of numbers Composition – A number can be partitioned into more than two numbers Composition – Number bonds: knowing which pairs make a given number	

How we teach this?
Part-whole: identifying smaller numbers within a number (conceptual subitising – seeing groups and combining to a total) - Children need opportunities to see small numbers within a larger collection first. 'Number talks' allow children to discuss what they see. For instance, with giant ladybirds: 'There are 5 spots altogether. I can see 4 and 1, I can see 3 and 2, and I can see 1 and 1 and 1 and 1 and 1'. Encourage exploration of all the ways that 'five' can be and look. Children are encouraged to look closely at numbers to see what else they can see. This reinforces the concept of conversation. Focus on the composition of 2, 3, 4 and 5 before moving onto larger numbers. Model conceptual subitising: "Well, there are three here and three here so there must be six". Emphasise the parts within a whole: "There were 8 eggs in the incubator. Two have hatched and six have not yet hatched." A number can be partitioned into different pairs of numbers - Next, children need opportunities to partition a number of things into two groups, and to recognise that those groups can be recombined to make the same total. Encourage children to say the whole number that the 'parts' make altogether. Explore songs; for example, 'Five Currant Buns' – show that the whole is still five but there are some in the shop and some that have been taken away; check throughout that there are still five currant buns. Playing skittles and looking at how many are standing. "How many have fallen over?" How many are there altogether?" Play other games which involve partitioning and recombining sets. - After this, children need opportunities to explore a range of ways to partition a whole number. The emphasis here is on identifying the pairs of numbers that make a total. Children can do this in two ways – physically separating a group, or constructing a group from two kinds of things. Activities to partition into different pairs of numbers: • Numicon towers: layering up Numicon pieces of the same total • Putting things into two containers in different ways • Making a number with two different kinds of things. For example, make a fruit skewer with five different pieces of fruit, using bowls of bananas/strawberries to choose from; then ask the children to describe how they have made theirs. They should compare it with a partner's: What is the same about your skewers? What is different?

- Bunny Ears: using your fingers like bunny ears. 'With two hands, show me five fingers. Can you do it a different way?' Or, 'Show five fingers altogether with a friend.'
- Spill the Beans: using double-sided counters or beans, where one side is coloured, throw the collection and note how many of each type can be seen and how many altogether.
- Using six bean bags with different fabric on each side, throw the collection and note how many of each type can be seen.

A number can be partitioned into more than two numbers

- Following this, children move on to look at the fact that a number can be partitioned into more than two numbers. Children need opportunities to explore the different ways that numbers can be partitioned, i.e. into more than two groups. Situations to promote this include increasing the number of pots to put a given amount into, e.g. planting ten seeds into three or more pots.

Activities can include:

- Role play, e.g. in a toy shop, ten toys need arranging onto the three shelves. How will you organise them?
- Having more than two places to sort things into in any given context, e.g. arranging characters in a small-world play in different locations

Number bonds: knowing which pairs make a given number THIS COVERS THE DEVELOPMENT MATTERS STATEMENT BELOW BUT HAS BEEN PUT IN THIS SECTION TOO TO ENSURE THAT THIS PROGRESSION IS MAPPED OUT IN FULL

- Once the children have worked through the stages of progression within Composition, they will learn which pairs make a given number. Children need opportunities to say how many are hidden in a known number of things. For example: Five toys go into a tent, then two come out. How many are left in the tent?' The child should respond that there are still three toys in the tent.
- Play hiding games with a number of objects in a box, under a cloth, in a tent, in a cave, etc.
- Utilising classroom routines such as tidy up time to identify how many are still missing from a pot with a number label.

Development Matters	Automatically recall number bonds for numbers 0-5 and some to 10
NCETM Progression in EYFS	Learning Trajectories
NCETM (Composition): Composition – Number bonds: knowing which pairs make a given number	

How we teach this?

Number bonds: knowing which pairs make a given number

- Once the children have worked through the stages of progression within Composition, they will learn which pairs make a given number. Children need opportunities to say how many are hidden in a known number of things. For example: Five toys go into a tent, then two come out. How many are left in the tent?' The child should respond that there are still three toys in the tent.
- Play hiding games with a number of objects in a box, under a cloth, in a tent, in a cave, etc.
- Utilising classroom routines such as tidy up time to identify how many are still missing from a pot with a number label.
- Have a sustained focus on each number to and within 5. Make visual and practical displays in the classroom showing the different ways of making numbers to 5 so that children can refer to these.
- Help children to learn number bonds through lots of hands-on experiences of partitioning and combining numbers in different contexts, and seeing subitised patterns (see above)
- Initially give children wrong number of things. For example: ask each child to plant 4 seeds then give them 1, 2 or 3. "I've only got 1 seed, I need 3 more."
- Spot and use opportunities for children to apply number bonds: "There are 5 of us but only 2 clipboards. How many more do we need?"
- Place objects into a five frame and talk about how many spaces are filled and unfilled.

Development Matters	Select, rotate and manipulate shapes to develop spatial reasoning skills

NCETM Progression in EYFS	Learning Trajectories
NCETM (Shape and Space): - Developing spatial awareness: experiencing different viewpoints - Developing spatial vocabulary - Shape awareness: developing shape awareness through construction - Representing spatial relationships - Identifying similarities between shapes - Showing awareness of properties of shape	

How we teach this?

Developing spatial awareness: experiencing different viewpoints

Children need opportunities to move both themselves and objects around, so they see things from different perspectives. This will support them in visualising how things appear when turned around and imagining how things might fit together. They need to make constructions, patterns and pictures, and select shapes which will fit when rotated or flipped in insert boards, shape sorters and jigsaws. These experiences will support them in noticing the results of rotating and reflecting images, and in visualising these.

Activities and opportunities for this include:

- Riding trikes around interesting routes
- Construction activities
- Printing and making pictures and patterns with shapes
- Posting boxes
- Jigsaws
- 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 teddy on the other side is seeing?"

Developing spatial vocabulary

Children need opportunities to be exposed to and use the language of position and direction:
Position – 'in', 'on', 'under'
Direction – 'up', 'down', 'across'

Children also need opportunities to use terms which are relative to the viewpoint:
'In front of', 'behind', 'forwards', 'backwards' ('left' and 'right' to be used later on as ideas develop)

Create as many opportunities as possible to explore this language, taking advantage of play in the outdoors to explore sequences of body movements (following obstacle courses, directing a friend, etc)

Activities and opportunities for these include:

- Hunting for hidden objects, with some prompts, e.g. "Look behind the bike shed, take three steps from the art cupboard…"
- Developing and talking about small-world scenarios, e.g. doll's house, miniature village, play park
- Acting out their own versions of well-known stories where characters negotiate routes and obstacles, for example 'We're Going on a Bear Hunt'
- Directing each other as robots

Shape awareness: developing shape awareness through construction

Through play – particularly in construction – children have lots of opportunities to explore shapes, the attributes of particular shapes, and to select shapes to fulfil a particular need. Support this exploration by discussing items built by children in terms of how towers are built and why certain shapes chosen to make a tower, and the space that has been created within an enclosure. Ask: "How did you make that tower?", "Why were those blocks good ones to use?"

Activities and opportunities for this include:

- Construction with structured and unstructured materials
- Making dens with varied materials outdoors

Representing spatial relationships

Small world play and model building provide lots of opportunities for children to describe things being in 'in front of', 'behind', 'on top of' etc., and to consider objects from different perspectives. Drawing representations of these relationships is a further challenge. These drawings may include a simple representation of a three-dimensional object from a different viewpoint. For example, "Can you draw your construction from above, looking down on it?"

Activities and opportunities for this include:

- Designing a plan for a garden or play area, using a small tray with sand, twigs, building bricks, etc.
- Drawing or making a simple map of a route with 'landmarks', e.g. houses and trees
- Following a simple map of an excursion

Identifying similarities between shapes

Children need opportunities to construct and create things that represent objects in their environment. As they do this, they should notice shape properties of the object they want to represent; encourage them to think about the appropriateness of the shapes they choose. Examples of this may include representing a ball as a circle, building a train from wooden rectangular blocks, or using a curved block for the elephant's trunk.

Showing awareness of properties of shape

At this stage, children show increasing intentionality in their selection of shapes, for example using cylinders to represent wheels because they can roll. Draw children's attention to specific properties by using specific language in everyday situations, while children may use informal language. Properties include:

- Curvedness
- Number of sides and corners (2D) or edges, faces and vertices (3D)
- Equal sides
- Parallel sides
- Angle size, including right angles

- 2D shapes as faces of 3D shapes

In play, children show that they are utilising this knowledge by gathering specific items needed for their construction, e.g. making a bed for a teddy and gathering blocks of equal length to make the rectangle; taking time with constructing corners so that the shapes fit together to make a right angle.

Activities and opportunities for this include:

- Making an insect hotel – selecting tube-like shapes from a collection of varied materials, some not fit for purpose
- Creating an extended channel for water to flow from a high container to a low one, some distance away
- Asking questions, for example; "What shapes can you make with three people inside of a loop of string? What about four people? What is the same and what is different about these?"
- Making shapes with sticks and with their own bodies
- Printing with shapes: "What footprint do you think this cylinder will make?" "What about if you roll it?"

Development Matters	Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can
NCETM Progression in EYFS	Learning Trajectories
How we teach this?	

- Investigate how shapes can be combined to make new shapes: for example, two triangles can be put together to make a square. Encourage children to predict what shapes they will make when paper is folded. Wonder aloud how many ways there are to make a hexagon with pattern blocks.
- Find 2D shapes within 3D shapes, including through printing or shadow play.

Development Matters	Continue, copy and create repeating patterns

NCETM Progression in EYFS	Learning Trajectories
NCETM (Pattern): - Identifying the unit of repeat - Continuing an ABC pattern - Continuing a pattern which ends mid-unit - Make their own ABB, ABBC patterns - 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 - Pattern spotting around us	

How we teach this?

Identifying the unit of repeat

The key aspect of understanding patterns is identifying the smallest part of the pattern, or 'unit of repeat'. You can draw children's attention to this when building patterns by picking up a unit at a time, e.g. a blue block and a red block together, and describing this as a 'red-blue pattern' rather than a red, blue, red, blue, red, blue pattern. Children can also be asked to show the unit pattern which repeats, e.g. show two blocks, a red and a blue.

This is best to do initially with physical objects (counters, blocks, bears) so that the unit of repeat can be moved to show how it repeats. Patterns that are printed, stuck down or stamped, and therefore cannot be corrected, are more appropriate for more confident pattern makers.

Continuing an ABC pattern

Once children are more secure with alternating patterns, they can tackle more complex pattern structures:
ABC has more items in unit of repeat
ABB is more challenging because they have two items within the same unit of repeat, e.g. red, blue, blue, red, blue, blue…
ABBC is more complex because it is longer, with three items, but also includes items which are the same, e.g. red, blue, blue, yellow, red, blue, blue, yellow…
AABB may be simpler as there are just two items, both repeated, e.g. red, red, blue, blue, red, red, blue, blue…

Children who have only experienced alternating ABC patterns may state that patterns such as ABBC are not patterns, as you cannot have two of the same colour next to each other. This highlights that children need lots of experience of a range of pattern types, so early misconceptions do not form about what makes a pattern.
When working on continuing these patterns, children should be encouraged to focus on the unit of repeat, "I see you are making a red, blue, green pattern". Ensure that children repeat the pattern at least three times and are encouraged to describe and say how they would continue.

Children can use counters, beads, building blocks etc but avoid using interlocking cubes or bead threading so children can focus on the pattern rather than on their co-ordination skills.

Continuing a pattern which ends mid-unit

As children work on patterns involving more elements, they can be challenged to continue patterns which do not end after a whole unit of repeat.

Provide a range of patterns for children to continue – on cards and physical.
Ensure patterns offered have different structures and end after a complete or partial unit.

Make their own ABB, ABBC patterns

Ask children to repeat the unit 3 times, e.g. blue, red, yellow, blue, red, yellow, blue, red, yellow…

Give children opportunity to make a specified pattern

Make sure children can then choose their own rule

Make patterns with a range of items in the environment too and through musical instruments, movements and dance sequences

Spotting an error in an ABB pattern

Present patterns with deliberate errors

Once children have 'fixed' the pattern, encourage them to check the 'fix' by tracking the pattern

Then ask the children to make a pattern with a deliberate mistake and challenge a friend to spot it

Symbolising the unit structure

As children become more familiar with extending and creating patterns, encourage them to record the patterns that they make. Initially these might be straightforward representations, but over time these recordings may become more iconic e.g. red dot to represent red dinosaur, a squiggle or the letter R.

Children to invite friends to copy the pattern from their symbols.

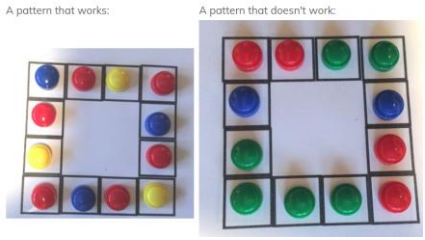
Generalising structures to another context or mode

As children gain experience of symbolising patterns, they develop their experience of pattern structure. As they identify the unit of repeat and express it, they will eb able to use this knowledge to create a pattern in a different medium, which follows the same structure. E.g., the children work with a pattern like this: ABCCABCCABCC (using shapes) – "Can you use items from the nature basket to create a pattern with the same rule – leaf, twig, berry, berry, leaf, twig, berry, berry, leaf, twig, berry, berry….

Making a pattern which repeats around a circle

Making circular patterns such as necklaces, circles of linking elephants etc
Use pre-given circles to create a border such as around a paper plate
Exploring which patterns work, which don't and why
Make patterns with rectangular or other shaped frames

Making a pattern around a border with a fixed number of spaces



When exploring if a pattern works or not, draw attention to the number of spaces and the size of the unit of repeat.
Encourage children to predict if the pattern could 'keep going', voting on this and then discussing their reasons with a partner.

Pattern spotting around us

As children become pattern experts, look for opportunities to spot and study patterns in the environment.
Explore patterns in stories, songs and rhymes.
Where possible, represent these diagrammatically to support pattern spotting, and predicting what will happen next and why.
Invite children to spot patterns in the home environment, or bring examples from home
Look at fabric patterns from different cultural traditions: discuss the patterns in terms of what stays the same and what is different
Design wrapping paper for a specific event that involves creating a pattern which the children can describe

Development Matters	Compare length, weight and capacity
NCETM Progression in EYFS	Learning Trajectories
NCETM (Measures): - Recognising attributes - Comparing amounts of continuous quantities - Showing awareness of comparison in estimating and predicting - Comparing indirectly - Recognising the relationship between the size and number of units - Beginning to use units to compare things - Beginning to use time to sequence events - Beginning to experience specific time durations	

How we teach this?

Recognising attributes (recap of Nursery)

In this first stage, children are able to recognise the specific attributes of length, height, capacity etc.
Ensure adults model language which highlights the specific attribute which is the focus of attention.
Dough modelling, can provide a good opportunity to discuss the length of snakes, or the weight of different sized lumps.
Water and sand play can provide lots of opportunities to highlight capacity.

Comparing amounts of continuous quantities (recap of Nursery)

- Encourage children to compare 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"
- Cut a piece of ribbon as long as a child's arm and encourage them to find things in the environment which are shorter, longer or the same length

- Focus on asking for specific things according to their attributes, e.g. "Please can you pass me a …….. that is ……. than ……."
- When comparing directly, find the odd one out, by providing a varied range of container shapes all containing the same amount of liquid except for one – "Which do you think is the odd one out?", "Why?", "How will we check?", "Were we right?"
- Set up a 'balancing station' with interesting things to weigh and to balance, indoors and outdoors
- Compare different parcels to see which are heavier and which are lighter
- Provide experiences of size changes. Suggestions: "Can you make a puddle larger?", "When you squeeze a sponge, does it stay small?", "What happens when you stretch dough, or elastic?"
- Talk with children about their everyday ways of comparing size, length, weight and capacity. Model more specific techniques, such as lining up ends of lengths and straightening ribbons, discussing accuracy: "Is it **exactly**…?"

Showing awareness of comparison in estimating and predicting

After comparing attributes, children can begin to estimate and predict. Opportunities and situations that can be used:

- Making a bed for a teddy using blocks
- Selecting a box or container to store a specific item
- Dressing dolls, and selecting different sized-clothes
- Finding things that will fit inside a matchbox

Comparing indirectly

Children can then move on to comparing one thing with two others. Opportunities and activities may be:

- Making Russian doll type sets of nesting boxes from a collection
- Finding ways of seeing if the cupboard or carpet will fit in the role play area without moving it
- Finding which of three pairs of shoes is heaviest for packing in a rucksack
- Packing in a shopping bag, making sure the lightest items do not get squashed by heavier things

Recognising the relationship between the size and number of units

Before children use standard units of measure, they begin to compare units of different sizes in practical contexts, e.g. in the water tray, does it take longer to fill a bucket using bottles or teaspoons of water?

- Set up an estimation station and guess how many things are in the jar each day
- Make biscuits from a given amount of dough – choose cutters to see who makes the most biscuits
- Choose from a selection of spoons, ladles, etc, to see who can fill their pot the quickest with rice. How do you know who will be the quickest?

Beginning to use units to compare things

Experiences can be provided where children use units to 'measure' and compare. It is better to provide identical bricks, centimetre cubes or metre sticks so they can count physical units, rather than repeating the use of one item as with hands or feet. In order to measure accurately, they need to ensure there are no gaps between units of measure. Using standard units helps children make connections with measuring in 'real life'. Young children also enjoy using height charts, measuring charts, measuring tapes, rulers, digital scales and timers, although they will not yet fully understand how they work.

- Setting up a 'filling station' with lots of different-sized containers to fill with beads, then comparing capacities
- Using large bricks to measure the height of individuals
- Using metre sticks to see if an elephant or dinosaur would fit in the room
- Measuring the growth of a beanstalk or sunflower with interlocking centimetre cubes
- Comparing the capacity of different bottles by filling lots of glasses

Beginning to use time sequence events

Time is an abstract aspect to measure, and tricky in a range of ways. Although their age may be the most familiar number they know, children may have little sense of the unit of a 'year', and few may know the date of their birthday.

In order to tell the time, children need a sense of number, space and time, the ability to count, and some notion of fractions. In the Early Years we begin by drawing children's attention to sequencing of activities, important times in their days, and some sequences of time that are significant to them.

Vocabulary that supports the understanding of this concept includes the positional language of 'before', 'after', 'next' and the relative terms 'yesterday' and 'tomorrow'. Knowing days of the week also helps children to keep track of time. Direct children's attention to the short hand, pointing to a number on a clockface, and identify what we are doing at that time.

- Un-muddling visual timetables

- Making picture sequences for cooking instructions
- Describing sequences by re-telling stories
- Discussing 'o'clock' times at registration, lunchtime, snack time, tidy-up time, etc
- Making their own timetable for the day – selecting activities and ordering them

Beginning to experience different time durations

Children need to experience specific time spans in order to start to develop an overall sense of time. Initially this may be based on the number of 'sleeps' before an event. A class calendar may support this by highlighting certain events – 'how many sleeps until the chicks hatch?', 'how many sleeps until we go to the park?' etc Discuss the number of sleeps getting smaller and what this means.

By using timers in play, children can start to explore what they can do in a certain time period. For example, 'I wonder how long it takes you to run around the track?' and 'How could we know if you were getting quicker?'

Children can also have the opportunity to see how many things they can do in a minute.

- Events on a class calendar to count down to
- Timers provided for children to set and respond to challenges
- Time durations with songs or music