

MATHEMATICS – NURSERY



*"Without mathematics, there's nothing you can do.
Everything around you is mathematics. Everything
around you is numbers."* Shakuntala Devi.

*"There should be no such thing as boring
mathematics."* Edsger W. Dijkstra.

Miss Finnegan
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Daily Mathematical Skills

Maths should not only be taught during specific maths sessions but wherever possible throughout the day. The following should be utilised to support maths teaching:

- Days of the week song and talking about the day
- General counting e.g. counting how many bananas there are in the fruit box.
- Do we have more bananas or more apples? Do we have fewer apples or bananas? (children can use their subitising skills)
- Subitising and using fingers to represent
- Counting songs and rhymes, using fingers to represent
- Use of ordinal numbers e.g. "Iyla line up first, Gurnoor line up second..."
- Maths games such as track counting games
- Noticing maths in the environment e.g. asking children what they notice about a tree. They may say it is tall, has circles on, notice the pattern in the bark etc.
- Incorporating maths in areas of continuous provision.
- Incorporating maths in daily routines e.g. during registration time. If there are 3 children absent the children clap 3 times. Having labels on pencil pots with a representation of a number to show how many pencils go in that pot during tidy up time. Different representations of number on the 'how many children can play here' posters.

The five counting principles

<p>The one-one principle. This involves children assigning one number name to each object that is being counted. Children need to ensure that they count each object only once ensuring they have counted every object.</p>	<p>The stable-order principle. Children understand when counting, the numbers have to be said in a certain order.</p>	<p>The cardinal principles. Children understand that the number name assigned to the final object in a group is the total number of objects in that group.</p>	<p>The abstraction principle. This involves children understanding that anything can be counted including things that cannot be touched including sounds and movements e.g. jumps.</p>	<p>The order-irrelevance principle. This involves children understanding that the order we count a group of objects is irrelevant. There will still be the same number.</p>
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Key Language for Teachers

<p>Cardinal – The number that indicates how many there are in a set.</p>	<p>Classification – The identification of an object by specific attributes, such as colour, texture, shape or size.</p>
<p>Conservation (of number) – The recognition that the number stays the same if none have been added or taken away.</p>	<p>Numeral – The written symbol for a number; e.g. 3, 2, 1</p>
<p>Ordinal – a number denoting the position in a sequence e.g. 1st, 2nd, 3rd, etc or page 1, page 2, page 3...</p>	<p>Partition – separate a set into two or more subsets e.g. partition a set of socks into plain and patterned.</p>
<p>Subitise – Instantly recognise a small quantity, without having to count how many there are.</p>	<p>Number – Number can be:</p> <ul style="list-style-type: none"> • a count of a collection of items e.g. three boxes, • a measure e.g. of length or weight, or • a label e.g. the number 17 bus
<p>More and less; more than and less than Used when talking about the number e.g. 2 is less than 4.</p>	<p>More and fewer; more than and fewer than Used when talking about an amount of objects</p>
<p>Quantity – The amount you have of something e.g. a cup of four, three boxes, half an hour</p>	

Key representations

Five Frames	
Numicon	
Fingers	
Dice	
Cubes	
Numerals	
Real life objects	
Number Blocks	
Drawing	

Autumn Overview

Geometry	Recognising, naming and matching colours
	Sorting by various attributes
	Continuing AB patterns
Measurement	Using the language of size
Number & Place Value	Sorting and Subitising
	Comparing amounts of objects

Autumn Guidance

Colours (2 weeks)	Recognising, naming and matching colours
Sorting (2 weeks)	Sorting by various attributes
Pattern (2 weeks)	Continuing AB patterns
Size (1 week)	Using the language of size
Subitising and counting (2 weeks)	Subitising up to two objects and recite numbers to 5 and beyond
Comparing (2 weeks)	Comparing amount of objects

Autumn Goals

Number	Numerical Patterns
<ul style="list-style-type: none">I can recite numbers to 5 and beyond	<ul style="list-style-type: none">I can spot patterns and talk about them e.g. stripes on a scarf
<ul style="list-style-type: none">I am starting to subitise up to two	<ul style="list-style-type: none">I can start to use vocabulary to describe the time of day that things happen e.g. day, afternoon, evening, etc.
<ul style="list-style-type: none">I can make comparisons between objects- size, length, weight and capacity	<ul style="list-style-type: none">I can use shapes for building thinking about their properties e.g. flat sides for stacking

Colours – 2 weeks

Recognising and naming colours

Children should be taught to recognise and name colours in a variety of contexts e.g. toys within the classroom, colours in nature, colours in the environment, matching colours, colours on themselves such as hair, skin, clothes. Children should be able to say when objects are and are not the same colour. Link to expressive art and design through painting.

Key Vocabulary: notice, match, same, colour

Pattern – 2 weeks

Developing an awareness of pattern helps children to notice and understand mathematical relationships. Children should initially be taught to continue an AB pattern. Children need the opportunity to see environmental patterns initially, AB patterns and talk about what they can see and to continue a pattern. At first they may do this one object 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.

Key Vocabulary: pattern, continue, notice, next, see

Size – 1 weeks

At this stage only focus on large/big and small/little. Use real life examples of objects that are large and small in relation to each other. Begin with objects that are vastly larger/smaller than each other and move onto objects with a smaller difference in size. Include reasoning e.g. 'do you think this large tree would fit into my small box?'

Key Vocabulary: notice, big, large, small, little. The _____ is smaller/larger than the _____.

Sorting – 2 weeks

Sorting doesn't require any counting skills, just same and different. The schema of sorting and classifying lends itself beautifully to subsisting development. There should be a focus on reasoning within sorting i.e. how have you sorted the animals/button etc? Children should be given the opportunity to sort the objects by their own rules and should be taught how to communicate that rule (e.g. I have sorted the buttons by colour). This should be explored in many different contexts such as shapes, different coloured and size objects, different animals, objects found in the environment, appearance of various objects and people. Children should be taught to verbalise what is the same and what is different between sets of objects (e.g. these buttons are pink and these buttons are blue/ they are boys and they are girls). Links can be made to Understanding of the World. Children are not required to count sorted objects.

Key Vocabulary: sort, notice, groups, sets, same, different, group, subitise

Counting and Subitising – 2 weeks

Children need lots more opportunities to see and label whole amounts without counting (perceptual Subitising 2/3), using a variety of objects with low cognitive load (same/similar colour/shape).

Key vocabulary: subitise, what can you see? one,

Comparing – 2 weeks

Children need progressive experiences where they can compare collections and begin to talk about which group has more things. When talking about amounts of objects use the language of more and fewer. Children should initially be taught perceptual comparing (comparing without counting). Initially the groups need to be very obviously different (e.g 2 objects and 7 objects). Move on to collection of small numbers of objects that are similar (e.g 1 and 3 objects) and then move onto different items but same quantity (using language of same or equal).

Key vocabulary: compare, more, fewer, same, equal

There are more _____ than _____ / there are fewer _____ than _____, subitise

Spring Overview

Place Value	Understanding Number 1
	Understanding Number 2
	Understanding Number 3
	Understanding Number 4
	Understanding Number 5
	Understanding Number 6
Measurement	Ordering Events
Geometry	Patterns
	Combining Shapes

Spring Guidance

Place Value (2 week)	Exploring and understanding number 1
Place Value (2 week)	Exploring and understanding number 2
Place Value (2 week)	Exploring and understanding number 3
Place Value (2 week)	Exploring and understanding number 4
Place Value (2 week)	Exploring and understanding number 5
Place Value (2 week)	Exploring and understanding number 6

Through continuous provision and day to day discussions, we will focus on patterns, events and shapes.

Spring Goals

Number	Numerical Patterns
I can say one number name for each item	I can extend a pattern that has been made
I can show 'finger' numbers to 5	I can create my own simple patterns (ABAB)
I can see 3 in different ways (through different manipulatives e.g. 3 sticks as a row/ triangle/ on top of each other) and recognise it without counting	I can start to talk about upcoming events e.g. Birthdays and then talk about what happened after the event
I can make comparisons between quantities	I can combine shapes to make new ones e.g. a bridge/ arch, bigger square, etc.

Number 1 – 2 weeks

Throughout the 2 weeks the following should be explored:

- Number blocks episode 1
- Counting to 1
- Finding 1 object
- 1 being the first number, its position on a number line, ordinal numbers
- Numicon 1
- Dice 1
- Subitising 1
- Representing 1 on a 5 frame
- A circle – 1 sided shape (including in the environment)
- 1 action e.g. 1 hop, 1 jump, 1 clap
- The numeral and formation of 1
- Number 1 in the environment
- Representing 1 using marks, pictures and finger
- Matching numeral to quantity

Number 2 – 2 weeks

As above but also focus on what 2 is made of (1 is a part of me, 1 is a part of me and the whole of me is 2). Note: do not introduce children to addition or number sentences until Reception. Also look at separating the group of objects but knowing that the total is the same.

Number 3 – 2 weeks

As above (2 is a part of me, 1 is a part of me and the whole of me is 3). Exploring different varieties and orientations of triangles.

Number 4 – 2 weeks

Throughout the 2 weeks the following should be explored:

- Number blocks episode 4
- Counting to 4
- Finding 4 objects
- its position on a number line, ordinal numbers
- Numicon 4
- Dice 4
- Subitising 4
- Representing 4 on a 5 frame
- Squares and rectangles, including in the environment
- 4 actions e.g. 4 hops, 4 jumps, 4 claps

- The numeral and formation of 4
- Number 4 in the environment
- Representing 4 using marks, pictures and finger
- Matching numeral to quantity
- Composition of 4 (2 is a part of me, 2 is a part of me and the whole of me is 4; 3 is a part of me, 1 is a part of me and the whole of me is 4)

Number 5 – 2 weeks

As above (3 is a part of me, 2 is a part of me; 4 is a part of me, 1 is a part of me)

Number 6 – 2 weeks

As above (3 is a part of me, 3 is a part of me; 4 is a part of me 2, 2 is a part of me, 5 is a part of me 1 is a part of me). Explain 6 as being 5 and 1 more.

Key Vocabulary: number, numeral, subitise, represent, how many, count, cardinal, first/second/third etc

Summer Overview

Geometry	Shapes
Measurement	Ordering the events of our day
	Length and Height
	Weight
	Capacity
Number & Place Value	Number Recognition
	Subitise
	Comparison

Summer Guidance

Geometry (2 weeks)	Focus on properties of shapes
Measurement (1 weeks)	Ordering events of the day
Measurement (1 weeks)	Long, short, tall and comparing lengths
Measurement (1 week)	Light and heavy and comparison
Measurement (1 weeks)	Full, half full, empty and comparison

Summer Goals

Number	Numerical Patterns
I can count, order, recognise and use numbers to 5	I can talk about patterns and spot errors
I can subitise up to 3 objects (recognise up to 3 objects quickly without counting)	I can continue and create patterns
I can compare quantities using the vocabulary of greater, less, more, fewer and the same	I can sequence a pattern of events using time language e.g. first, next, then.
	I can talk about 2D and 3D shapes (using informal vocab e.g. sides, straight, round, flat)

Shape

The primary focus in relation shapes should be on the properties of shapes. For example, children should be encouraged to notice and describe shapes in the environment and talk about the properties using words such as 'straight/flat/round/curved'. When teaching the names of shapes, wherever possible, real life shapes in the environment should be used. Note that only flat surfaces should be referred to as faces. Include sorting of natural shapes; the children may sort stones, for example, into sets that have straight edges, sets that have curved edges etc.

Key Vocabulary: edge, curve, straight, round, flat, sides, face, corner, smooth Note: This is for staff to model.

My day (This is not done as discrete lessons— covered daily)

Children should explore talking about and ordering the events of their day such as waking up, coming to school, dinner, bed time. Encourage the vocabulary of first, next, then and possibly last.

Key Vocabulary: first, next, then, last

Length and Height

In the first stage children should be able to apply the attribute of long, short, tall etc to various examples (e.g. a bus is long; an adult is tall; grass is short). Adults should be continuously modelling this language. The children should then move on to finding objects that are longer/shorter than a given item. They should be encouraged to utilise strategies such as direct comparison (e.g. placing objects side by side to determine which is longer). When comparing length and height verbally children should be encouraged to use language such as 'taller than/longer than/shorter than'. When comparing lengths directly children need to ensure

that they align the starting points and compare like-for-like (e.g. straightening skipping ropes before comparing lengths).

Key Vocabulary: long, short, tall, longer than, shorter than, taller than
The _____ is longer/shorter/taller than the _____.

Weight (Mass)

Initially begin with identifying objects the children think may be heavy – use lots of adult modelled language. Move on to comparing weights. One way to identify this is to identify that a heavier object creates a greater downwards pull. Ask children to hold a carrier bag; encourage them to notice if it feels as though their hand is being pulled down when something heavy is put in it. Place a carrier bag in each hand and identify which one is heavier by discussing which arm feels more pulled down. Explore the link to the balance scales to show that the heavier side goes down. Exemplify this with a see-saw 'What can we do to make this side of the see-saw go down?'. Ensure that children are presented with large but light objects and small but heavy objects to prevent the generalisation that big means heavy and small means light.

Key Vocabulary: Heavy, heavier than, light, lighter than, balanced
The _____ is heavier than/lighter than the _____.

Capacity

Children should be given daily opportunity for sand and water play which can provide lots of opportunities to explore capacity. Children should be able to identify when a container is empty and full, and extend to half full. Initially children should be exposed to the comparison of full, half full, empty using the same container. However this can be moved on by talking about different size containers (e.g. I wonder whose pot will hold the most water?' When comparing capacities directly children can pour from one container to another to find which holds more or less water.

Key Vocabulary: full, half full, empty, most, least
The container is full/half full/empty. The _____ holds the most/least water.