Fairfield Nursery School

Maths Curriculum

Early Years Statutory Framework (2021)

Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

Intent and Principles of our maths curriculum

Through our maths curriculum we aim for our children to be:

- Competent and confident
- Be able to investigate and test ideas
- Be able to explore maths through their own lens, ideas and daily routines.

Children will learn and develop their understanding of:

- Cardinality and counting
- Shape and space

- Measures
- Pattern

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 (NCTEM website).

"It is vital to lay a secure foundation in early mathematics." (The national strategies)

At Fairfield we have been inspired by Mary Everest Boole (1832-1916). Boole was a mathematician concerned with supporting the teaching and learning of young children through a practical and engaging way. She promoted the use of natural materials and how children become competent mathematicians through their own play and explorations. One child said, "I thought we were being amused not taught. But after I left I found you had given us power". Boole also invented 'curve stitching' which today we refer to as string geometry. This links with our creative curriculum. The work of Barbara Hepworth and her exploration of strings connecting her sculptures feeds into our Arts Award work and children making links in their understanding of art, artists and their own creativity.

Cardinality, counting and comparison

"We want young children to engage with numbers and to see how to use them in their everyday environment for labelling, quantifying and calculating: in other words, giving children the tools to develop a better understanding of the world in which they live" (The National Strategies, Numbers and patterns: laying foundations in mathematics)

Cardinality is the number that refers to the quantity of things it represents. When children understand cardinality of numbers, they know what the numbers mean in terms of knowing how many things they refer to. Children begin by learning about this through their play and everyday activities such as lining up objects, asking for one/ two items. Children learn through seeing numbers in their environment and also by beginning to learn numbers through reciting

them. Numbers are on display around nursery so these can become familiar to children from a young age, and become part of everyday life.

Shape and space

"Here, the focus is on actively 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)" (NCTEM website). Children begin learning about this area through their play, young children often display schemas, these help children to begin to understand some concepts and can include filling and emptying containers.
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 (NCTEM website). Block play is a big focus within school; this helps children to develop their own structures, whilst figuring out what block should go next or which brick will fit in a space.

Measures

Measuring is based on the idea of beginning to use units to compare attributes, such as length, height, size, capacity and weight. This includes the beginnings of measure such as empty, full, half-full. Children need to begin to understand what is being measured, for example height or size. Measures includes learning about time and beginning to following daily routines such as beginning to understand what comes next. Children also Learn about money and begin to include this in their play using it for a purpose.

Pattern

Developing an awareness of pattern helps young children to notice and understand mathematical relationships (Clements and Sarama 2007). This area includes noticing patterns around them such as spots and stripes, and talking about these. The focus in this area is about beginning to recognise repeating patterns, and then to use this knowledge to create their own patterns. These begin with simple patterns such as two objects, an AB pattern, these can be with

different objects and include different aspects such as colour, size and a variation of object, for example, car, train. This will then lead on to more complex patterns such as ABC and ABBC.

The Early Learning Goals (2021) are what most children should achieve at the end of the reception year and the end of the Early Years Foundation Stage. In mathematics the goals are now split into two areas, Number and Numerical Patterns. At Fairfield we expect our competent mathematicians to be starting to work within the Early Learning Goals.

Number

Children at the expected level of development will:

- Have a deep understanding of number to 10, including the composition of each number;

- Subitise (recognise quantities without counting) up to 5;

- Automatically recall (without reference to rhymes, counting or other aides) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

Numerical Patterns

Children at the expected level of development will:

- Count confidently beyond 20, recognising the pattern of the counting system;

- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;

- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

	I am showing awareness of numbers in my environment and beginning to use language around number and compare quantities.	I am able to identify number names and beginning to match numbers to the correct quantities.		I am able to identify and order numbers, I am able to compare sets and use and represent zero.	I know what numbers mean and how many things they refer to.
Cardinality, counting and comparison	Show an awareness of numbers in their environment Offer comments or as questions about numbers, demonstrating their curiosity Aware of number names through action rhymes and songs Organises and categorises objects	Say some number names in sequence Use some number names and number language accurately Count forwards and backwards within the number sequence 1 to 5 Recognise, say and identify numerals 1 to 5 Recognise and continue repeating patterns in number Recognise some numbers	Knowing the last number counted gives the total so far Use zero and the numeral to represent it Recognise, say and identify numerals 0-9 Count forwards and backwards within the number sequence 0-10 Order numbers in the range 1-5 Conservation: knowing that the number does not change if things are rearranged (as long as none have been added or taken away)		Recognise, say and identify numerals 0- 9 and beyond Count forwards and backwards within the number sequence 0-20 Recognise and continue patterns linked to number Recognise, say and identify numbers up to 30 Order numbers in the range 0-9 Say the number that comes after a given number within the number

	With support able to pick 1 apple, 1 milk (1-to-1 correspondence) at snack time Use some language such as more and a lot in their play e.g. I've got lots Make comparisons between quantities Distinguish between quantities – recognise when a group is more than one	of personal significance such as their age (e.g. 3 when they are 3) Show awareness of 1-to-1 correspondence through practical everyday experience Count up to 5 objects touching each object and saying one number for each item Represent numbers up to 5 using fingers Recognise groups with 1, 2, 3 objects Match groups with the same number of object (1-3 realise that 3 apples is the same value as 3 peas	Count reliably up to 10 objects, including those that cannot be moved Count out a smaller number of objects (up to 6) from a large group Instantly recognise without counting, familiar patterns of up to 6 objects Begin to estimate and check by counting (up to 10) Compare sets of up to 10 objects using language such as more and fewer Find one more or one less from a number 1-10 Remove objects from a small group and count how many are left	sequence 0-10 Order numbers across the 10 boundary (e.g. 8 to 11) Say the numbers that come before and after a given number within the number sequence 0-20 Use the ordinal language of 1st, 2nd, 3rd Count reliably more than 10 objects Count large groups of objects by using efficient strategies Estimate a number of objects Find the total number of objects in 2 groups by counting them all

Pattern	I am able to organise and categories objects.	I am exploring making patterns with different objects, colours and sizes and can create an AB pattern.	I am able to follow and create my own versions of ABC patterns.	I am able to create a pattern of my own and use symbols / shapes to create structures.
	Organising and categorising objects – e.g. put all the shells together With support recognise and identify patterns from their own experiences e.g. clothes	Continuing a pattern basic (AB) pattern, e.g. red, blue, red, blue Copying a basic pattern (AB) e.g. circle, square, circle, square Make their own basic pattern using a variety of objects, colours, sizes. Spotting an error in a basic (AB) pattern Identifying the unit of repeat NB: An AB pattern is a simple pattern using 2 features, for example colour, (red/green/red/green) size (big, small, big, small), or objects (car/dinosaur/car/dinosaur)	Continuing an ABC pattern Continuing a pattern which ends mid unit Making their own ABBC patterns Spotting an error in an ABB pattern NB: An ABC pattern is a pattern using 3 features for example (red/green/blue/red/ green/blue…) An ABBC pattern is a pattern using 3 features for example (dinosaur/car/car/train….)	Symbolising the unit of 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

Shape, space	I am able to create simple block structures and arrangements.	I can identify shapes by properties and use shapes appropriately in play.	I am developing spatial vocabulary and use knowledge of spatial awareness to create structures.	I know the mathematical names for 2D and 3D shapes and confidently use positional language.
	Use blocks to create own simple structures and arrangements Using own spatial awareness – negotiate a simple pathway through a variety of objects	Notice simple shapes and patterns in pictures Categorise objects according to shape Match simple shapes, circle, square, triangle, rectangle Use shapes appropriately in play for tasks Develop shape awareness through construction Identify similarities between shapes Show awareness of some properties of shape	Developing spatial vocabulary Beginning to use positional language in play and solving problems Use knowledge of spatial awareness to complete a train track circuit, give directions along a route and describe Identify properties of a shape – number of sides and corners	Competently use positional language – in, on, under, up, down, in front, behind, forwards, backwards, left, right in play Use mathematical names for solid 3D and flat 2D shapes

Measure	Beginning to recognise language of measure – long, big, small, heavy Able to anticipate time based events e.g. snack, bedtime Explores filling and emptying containers Able to use the language of today and tomorrow To take part in the daily routine and begin to anticipate what may be next in the daily routine e.g. snack time, hometime	Matching objects by size Find something that is longer/shorter, heavier/lighter Able to say what they are going to do next Begin to use some language such as full and empty when filling and emptying containers	Orders 2 or 3 items by length or height Use specific language terms such as taller than, heavier than, lighter than, holds more than and not enough, too much and a lot more Using knowledge of space, shape and measures – identify the right size box to fit an object Measure items using objects such as blocks and compare these e.g. one item is 4 cubes and another one is 7 cubes Begin to talk about what day of the week it is Use money in play and begin to understand what it is used for	Orders groups of items by length or height Orders groups of items by weight or capacity Recognises the relationship between size and number of units e.g. to fill a bucket with 3 jugs or 10 cups Begin to measure items using a tape measure and ruler with adult support Show and interest in a clock and know that we use it to tell the time Use language related to time, e.g. my birthday is 5 sleeps away Begin to use timers for a purpose, e.g. how many times can you run around the garden in a minute

				Use money for a purpose and understand what it is used for

Implementation

Our continuous provision supports the learning of mathematics through play. Our core books support by introducing mathematical vocabulary. Children are able to practice their skills using our open-ended resources. This

"Will help to provide children with the skills they need to support further learning and enquiry, giving them the confidence to 'have a go' and to develop their understanding and skills. It provides the important start in life that will help overcome the fears and reluctance to engage in mathematics that adults will often admit to. It will help turn an 'I can't' attitude towards mathematics into the more positive 'I can and do'. (The national strategies)

Number songs and nursery rhymes are used to introduce number names to children and to further develop their understanding of numbers.

"Nursery rhymes use patterns in language and speech, and by recognising patterns in language, children are also able to recognise patterns in numbers, which helps with mathematical problem solving. Many nursery rhymes also use numbers in the content of the rhymes, such as "One, two, three, four, five" and "Hot cross buns," so children practice counting, addition and subtraction." (Head start Primary website)

Many children show signs of repetitive play; these are known as schemas,

"Almost all schemas are linked to mathematics. When exploring one particular schema a child can be finding out about many different aspects of mathematics, e.g. capacity, area, space, shape, volume, perimeter, corners and vertices. Children's early exploration during early schemas helps them to understand more complicated mathematical ideas." (Maths at Play – Lancashire Early Years Foundation Stage Consultants) Children explore their schemas through their play, for example when young children line up objects (Horizontal), fill and empty containers (containment) and moving objects from one place to another (transporting). Staff observe children and plan activities based around their next steps in their learning.

	I am showing awareness of numbers in my environment and beginning to use language around number and compare quantities.	I am able to identify number names and beginning to match numbers to the correct quantities.	I am able to identify and order numbers, I am able to compare sets and use and represent zero.	I know what numbers mean and how many things they refer to.
Cardinality, counting and comparison	• Numbers and number lines to be on display around nursery • 1, 2, 3, 4, 5, 5 little speckled frogs, 5 little ducks, 5 currant buns. (sang forwards and backwards) • Natural objects and open ended resources • Notices when another child has more • Putting some objects into a sock, feeling to guess how many they think there is, and then counting these • Through discussion,	• Recite numbers when playing, maybe missing some out, adults to model this • Singing number songs that encourage this, i.e. '1, 2, 3, 4, 5' • Number lines on display to encourage children to show an interest and begin to recite numbers • Outdoor games, hopping, jumping, parachute games to include numbers e.g. we've got 3 balls on the parachute • Reading core books	• Counting how many children we have altogether at group time, playing dice games, collect up a number of objects • Making cakes in the play dough, counting how many there is altogether • Group activities, when looking for a number of objects and matching these up • Secret number – put numbers in a bag, choose one and see if they can guess the	• Noticing numbers in the environment, on registration board, can you find the correct number for how many children we have • Playing hopscotch outdoors and ladder games, throwing a bean bag into a hoop • Interactive number lines on display starting from zero, what number is missing, what number comes next • When taking part in

	you have one car in each hand how many do you have?	that encourage counting, e.g. 3 little pigs, Goldilocks and the 3 bears • Playing what time is it Mr wolf outdoours, and taking the right number of steps • Singing number rhymes together that encourage forwards and backwards counting, e.g 5 cheeky monkeys, 1 elephant • Using numeral dice to play games and then find a number of objects • On birthday cards, begins to point out 2, 3, 4. • Through play, roleplay, giving out plates/cutlery to their friends. • Counting different things around nursery, how many people, how many cars, beginning to count actions, such as claps • Singing number rhymes together, using fingers to	number and then do that many jumps/claps • Using pipe cleaners to make numbers • Kims game – laying number cards on a tray, covering them up and then removing one, asking them to spot what number is missing • Problem solving games outdoors, playing skittles • Singing number songs such as ten green bottles, ten in a bed, extending songs to go up to 10 (singing forwards and backwards) • Number cards available for children to access and arrange • Open ended resources, talking about how many objects there are, making different patterns with these and discussing that the	activities in project groups • Interactive number lines on a washing line for children to access, talking about the order and what comes next • Singing number rhymes, ten in a bed, ten green bottles, adults to encourage children to say how many is next Order numbers across the 10 boundary (e.g. 8 to 11) • Number cards 0-15 on a washing line, adults to model this during CP and group times Say the numbers that come before and after a given number within the number sequence 0-20 Use the ordinal language of 1st, 2nd, 3rd • Outdoor games, such

		represent how many are left for example 5 little ducks • Exploring the open ended resources, organizing them into different groups, and discussing how many is in each group • Talking about how many objects we have, for example we have 3 buckets for the sand • When cutting up snack compare how many pieces of tangerine and how many pieces of apple	number is the same • Playing games that include counting jumps, claps, beats • Counting coins dropped in a tin from the sounds and checking if they are right • Counting bubbles • Sticking natural objects into play dough • Playing dice games, finding a number of objects • Using dot cards and dominoes as part of a game • Adults to model this, I think there are 9 children in our group, how many do you think? • Comparing a group of conkers and leaves, discussing which group has more or less • Singing number rhymes, what number do you think will be next	as races • Talking about who is 1st to arrive at nursery, who do you think will be next • Going on a treasure hunt in the garden, collecting up lots of items and counting how many there are • Begin to organise objects so that they can begin to count them, e.g. I've counted all the red cars, I'm going to count the blue ones next • Putting some objects in a jar, how many do you think are in? • Grabbing a handful of buttons, how many do you think that you have got? • Play games with dice, rolling two together and counting how many spots there are altogether

			• During registration if one more child comes how many will we have • Making snack we have 6 pieces and we need 7 pieces how many more do we need? • Building sandcastles outside, then squashing one, talking about how many are left • Playing with small world animals, I have 5 animals and one went hiding how many are left	

Pattern	I am able to organise and categories objects.	I am exploring making patterns with different objects, colours and sizes and can create an AB pattern.	I am able to follow and create my own versions of ABC patterns.	I am able to create a pattern of my own and use symbols / shapes to create structures.
	• Having sets of various items available for children to organise, these could be shells, pebbles, different sized circles/eggs or balls • Adults to encourage children to help at tidy up time by placing the toys back where they belong • Talking through patterns at group time, talking about what children are wearing, matching up different patterned socks • Noticing patterns in their environment, this could include sounds, and rhythms such as wipers on a car, or in songs that repeat,	• Building using towers of different colours and sizes, after an adult has modelled this. • Using the magnetic shapes to make a pattern, blue, green, blue, green • Sticking natural objects or sticks into play dough to make a pattern • Photographs of patterns for children to copy, i.e pine cone, pebble, pine cone pebble • Collecting objects whilst outdoors, i.e. stick, leaf, stick, leaf • Exploring the open ended resources, making patterns during CP and group times • Taking turns with a friend to make a pattern • Making fruit kebabs,	• Building towers using 3 different sizes/colours • Making a pattern horizontally and vertically • Photographs of patterns for children to use to continue patterns • Making patterns in play dough, for example, pebble, stick, stick, leaf • Presenting patterns with deliberate errors in them, asking children to make their own patterns with errors in them for others to spot NB: An ABC pattern is a pattern using 3 features for example (red/green/blue/red/ green/blue…) An ABBC pattern is a	• Begin to create pattern using a coding structure and transfer this to different objects • Using paper plates to make patterns • Making bracelets or necklaces using beads or dry pasta shapes • To create patterns within a set space such as on a piece of paper to see if a pattern could fit

	head, shoulders knees and toes	making a pattern using the fruit • Adults to show children a pattern with deliberate errors and then talk about the pattern what is wrong with it, and how it can be fixed • Talking through patterns and highlighting what the pattern is NB: An AB pattern is a simple pattern using 2 features, for example colour, (red/green/red/green) size (big, small, big, small), or objects (car/dinosaur/car/dinosaur)	pattern using 3 features for example (dinosaur/car/car/train….)	

Shape, space	I am able to create simple block structures and arrangements.	I can identify shapes by properties and use shapes appropriately in play.	I am developing spatial vocabulary and use knowledge of spatial awareness to create structures.	I know the mathematical names for 2D and 3D shapes and confidently use positional language.
	• CP – large and small building blocks out for children to access independently and with adult support • Running around outdoors, avoiding other children and objects • Creating obstacle courses outdoors for children to move their bodies around • Tatty bumpkins • Music and movement activities, moving in different ways around a space	• Magnetic shapes, copying and building shapes from pictures • Building using the magnetic shapes, using all the squares and then the triangles • When building add circles for wheels or triangles for a roof, adult to talk about the properties of these and model this • Den building outside, adult to talk about what we might use and how we might build it • Adult to join block play, discussing how a structure was made, how it may be made more stable • Begin to use shapes to represent another	• Going on a hunt for a hidden object, adult to model vocabulary can you look behind/in front of • Reading core book, bear hunt and then going on their own bear hunt outdoors in the garden • CP – large building blocks, when supported by an adult, put this behind, on top	• Shape hunts around nursery inside and outside looking for and naming different shapes

		object, e.g, building a car and adding circles to represent wheels • Looking around nursery, going on shape hunts • Adults to discuss shape properties such as a cylinder having being round,		
Measure	• Exploring clay and playdough, making different sized balls/snakes talking about the shape of them • Talking together about the size of objects can you pass me the small/big spoon • Following the daily routine with adult support • CP – water play, indoors and outdoors and open ended resources • Through conversation at group times i.e. we will do this today/ tomorrow	• Going on a stick hunt in the garden finding different sized sticks • Adults to talk to children at group time, and after an activity has finished, where there are going to play and what they will do • Water play, indoors and outdoors, filling and emptying different sized containers • When drinking milk at snack time	• Measuring children, talking about who is the tallest and the shortest • Working together to build two towers, which one is taller and which one is shorter • Collecting sticks in the garden and arranging them into length order • Baking and cooking with adult support talk about how much is needed and is it too much or too little • Using the weighing scales to weigh different objects in the open ended resources, this pebble is heavier	• Through project work and group activities, supported by an adult • Collecting a variety of sticks and ordering them by length and height • Measuring a group of children and talk • Water play, using jugs • Through activities in the building area, using the tape measure to measure structures with adult support • In the mark making area, with adult support, using the ruler to draw a line • Adults to model and

			than the shell • Having different sized boxes, which box will the teddy fit into • Adult to model, the car is three cubes long, the train is ten cubes long • In group time, talking about what day it is, writing it down and discussing what day it is tomorrow	talk about, the time, e.g. at 9 o'clock we can go to play • Setting a challenge using sand timers, how many jumps can you do before it finishes