



Early maths

Mathematics is an important discipline that helps us understand the world and plays an important role in our lives; therefore at LTNS we put a strong emphasis on helping children acquire mathematical concepts from an early age. The Froebelian approach supports us in perceiving teaching and learning as a holistic and interdisciplinary process that requires consideration of all factors, including developmental, individual learning pace and the child's interests.

We extend our educational environment to outdoor experiences as we know how valuable unrestrained play is and how it promotes exploring and problem solving, reasoning and logical thinking, investigating, making connections and creating conclusions. Counting, addition, multiplication, division, estimation, measuring, fractions and mathematical reasoning emerge from explorations with objects and actions in real-world contexts as well as engaging in conversations which help develop children's mathematical thinking.

'The importance of direct experience and the way it makes possible the development of real learning cannot be over-emphasized'

(Bruce 2004: 126)



Counting and Numbers

The Froebelian approach emphasizes the importance of developing number sense in young children. Number sense refers to the ability to understand the meaning of numbers and to use them in a meaningful way. We help children develop number sense by using concrete materials and real-life situations to teach mathematical concepts. For example, children can learn about number sense by sorting objects by size, shape, and colour, or by counting objects in a real-life context, such as counting the number of apples in a basket. Teaching number recognition too early before the child acquires the understanding of quantity and its meaning does not contribute to the child's mathematical knowledge. Since it is crucial to recognise numerals it is also important to master the ability to count which manifests itself in the ability to use this knowledge in practice. When children acquire the skills of identifying numerals, they can link it to their understanding of the amount each numeral represents.



Shapes, Space and Patterns.

Finding shapes and patterns in nature is a great way to integrate the teaching of shapes and patterns into the Froebelian approach to early childhood education. Natural materials such as leaves, flowers, and rocks can be used to explore different shapes, sizes, and patterns. We take children on nature walks and encourage them to collect natural materials and use them to create their own designs and patterns. This approach not only allows children to explore mathematical concepts, but also helps to foster an appreciation and respect for nature. By incorporating the natural world into their learning experiences, children can develop a sense of wonder and curiosity about the world around them, leading to a deeper connection to both mathematics and the natural world.

Dear Finn

Today, you were creating numbers using the different equipment around you. You were trying to make the number 7 out of connecting blocks. You found the wooden block with the number 7 on it and counted the dips to make sure it was the right number. When using the cubes, you kept making the wrong number as you were counting faster than you were picking up the cubes. You realised this and used the dips on the wooden block to count out the correct amount.



Mathematics is one of the areas of the EYFS: *Effective early mathematics experiences involve seeking patterns, creating and solving mathematical problems and engaging with stories, songs, games, practical activities and imaginative play. Plenty of time is required for children to revisit, develop and make sense for themselves. This is supported by sensitive interactions with adults who observe, listen to and value children's mathematical ideas and build upon children's interests, including those developed with their families. It is crucial to maintain children's enthusiasm so they develop positive self-esteem as learners of mathematics and feel confident to express their ideas.*

<https://birthto5matters.org.uk/specific-areas-of-learning-and-development-provide-children-with-knowledge-and-skills-to-flourish-in-society/>



Measurement and Comparison

Comparison is a fundamental concept which helps children develop their understanding of numbers and quantities. It develops gradually and it is important to provide opportunities for them to explore in different contexts. It involves the ability to recognise and describe the differences, similarities and relationship between objects, quantities, or numbers and to identify which is greater, smaller or equal. At LTNS the children practice comparing objects through the use of manipulatives such as blocks, beads, stones, sticks, sand etc. They sort them by colour, size; compare the quantity, length or weight. Through activities and conversation they develop understanding of concepts like 'more', 'less', 'bigger', 'smaller', 'greater than', 'less than'. This process undergoes constantly during playing, discussing what they observe, problem solving situations, real-life connections



Dear Millie,

Today you were very focussed on our water experiment. You were curious to find out which cylinder held the most water. You started off with a specific amount of water (200ml in the measuring jug), and decided to pour the water into a taller measuring cylinder. You noticed that the same amount of water fit into the taller cylinder. You then decided to pour the water into the smaller beaker wondering if it would hold the same amount. As you poured you realised that the small beaker was getting full. After you stopped pouring you asked me to mark the new measurement of the water, 100ml. I then explained to you that 100 was half the amount of the original water. You then poured all the water back into the weighing scale. You decided to experiment with pushing the different sized beakers into the water, noticing that the water would get higher on the scale with the bigger beakers. You compared the different heights of the water noting that the water wouldn't go very high if you used a smaller beaker.

How children learn maths

Concrete-Pictorial-Abstract is an approach to teaching maths, which is based on the idea that children's understanding of mathematical concepts should progress from hands-on experiences with concrete objects, to pictorial representations, and finally to abstract symbols. Children need scaffolding with the use of manipulatives to understand abstract concepts.

In the **concrete stage**, children need to play physically experience a concept. Many mathematical processes are going on while children build a tower of blocks or make mud cakes in the sand pit. They learn concepts such as *more, less, one more, not enough, how many, plenty, fewer, take a way and add on*. Children compare objects and learn that value can be attached to objects.



In the **pictorial stage**, which follows the concrete stage, children are able to see a picture of objects and understand that it represents real objects. For example, a child can see a dice with 4 dots on it and assign value 4, knowing that the dots could represent anything.



Abstract is the final stage of understanding a mathematical concept. It means that a child can look at a sum $4+3$, written in number symbols and add them without concrete objects or picture. The child has matured enough to understand that symbols 4 and 3 represent a number of objects to be added.



Are Pre-schoolers in the Concrete, Pictorial or Abstract stage?

Pre-schoolers are mostly in the concrete stage. In the preschool years, trying to push a child to count pictures of objects or understand the value of the number symbol is premature and will cause frustration. Children are exposed to numbers, e.g., playing with wooden numbers or magnetic number tiles or rhymes that teach them counting, but we cannot expect a child to understand the value of these numbers yet.

Read more [here](#)

Mastering maths concepts prepares learners for a life time of deep mathematical understanding by giving them invaluable real world tools like resilience and problem solving ability.

For more reading click [here](#)

Block Play as a Helpful Way of Learning Maths Concepts

Block play is a fun and engaging way for young children to explore a range of mathematical concepts, including number sense, measurement, shape, space, and geometry. By building structures with blocks, children can develop a deep understanding of mathematical concepts in a playful and hands-on way.

By counting blocks and comparing the number of blocks used in different structures, children can develop an understanding of numerical concepts such as addition, subtraction, and multiplication.

By building structures of varying heights and lengths, children can learn to compare and order objects based on their size. They can also explore the relationship between different units of measurement, such as how two shorter blocks stacked on top of each other can be the same height as a taller block.

By building structures with different shapes and sizes of blocks, children can explore geometric concepts such as symmetry, balance, and spatial relationships. They can also begin to identify and describe different shapes, such as squares, rectangles, and triangles, and use them to build more complex structures.

Block play can also help children develop an understanding of geometric concepts such as angles and 3D shapes.



Block play is an integral part of Froebelian setting. Froebel intended the blocks to be used for children to represent:

- **Forms of life** – using the blocks to create and represent things and events in the world around them
- **Forms of beauty** – where the focus is on aesthetic aspects of pattern, order, symmetry and harmony
- **Forms of knowledge** – exploring mathematical forms and scientific concepts such as shape, size, area, stability and balance

Helen Tovey, 'Bringing the Froebel Approach to your Early Years Practice'



Learning maths everyday through practical situations

Young children are natural mathematicians, and they are constantly exploring and experimenting with mathematical concepts in their everyday lives. By incorporating maths learning into practical everyday situations, such as sharing resources, cooking, counting and sharing food and plates, we help children develop a deep understanding of mathematical concepts in a meaningful and relevant way.



For example, when it is time for a meal children help get the room ready. They count how many children are present and prepare the same amount of chairs, plates, forks, etc. Very often they have to find out how many more chairs/plates they need. They use their problem solving skills and mathematical language.



Cooking is another excellent opportunity for children to develop their mathematical skills. Measuring ingredients, counting and sequencing steps, and adjusting recipes to serve different numbers of people are all practical maths skills that can be developed through cooking. By involving children in the cooking process, we help children develop a range of mathematical concepts, such as measurement, estimation, and proportion.

Counting and sharing food and plates is another practical everyday situation that can help children develop their understanding of mathematical concepts. For example, when children are sharing a pizza or a plate of sandwiches, they learn to divide it equally between themselves, count the number of slices or cookies each child has, and compare the quantities to see if they are fair. They can also learn about fractions by sharing food in halves, quarters, and thirds.



Acquisition of mathematical skills through games

Our approach is predominantly play-based and exploratory, with progressive introduction of teacher-led lessons which also require attention, listening to instructions, taking turns, paying attention to details, self-control. Some of the activities take a form of active games which enable child's physical, sensory, cognitive, social, emotional, and also brain development. Our children's favourite outdoor game is 'What's the time Mr. Wolf?'



Parachute games are a great way to incorporate all the areas of development as this gives opportunities to learn a range of skills in a play-based approach.



Acting out songs and rhymes with props support children's learning and make their experience more enjoyable and memorable. Children are more likely to understand mathematical concepts and retain and apply their learning to different contexts if their mathematics experiences are meaningful to them.



More reading about learning maths through songs

<https://www.earlyyearseducator.co.uk/features/article/mathematics-sing-a-song-of-mathematics>

How can parents support Maths at home?

Children, in their everyday life, experience Maths and are building their understanding of mathematical ideas and concepts. Through their play, curiosity, observations and testing out of ideas, they are constantly gaining some understanding of the concepts of size, shape, weight, capacity, number, and colour and of many other mathematical concepts.

Maths is around us

Fractions



Time



Numbers



Pattern



Geometry



Measurement



Problem solving



Money



By using and building on everyday situations and family routines parents have a vital role to play in helping their children develop and understanding of maths.

What can parents do?

- point to numbers on calendars, front doors, signs, play games, buses, train platform, etc.
- count steps as you walk
- look for shapes and patterns, name and describe them, e.g., patterns of bricks on the wall
- during cooking, involve your child in counting and measuring
- during shopping, give your child coins to count, use prices to show that numbers mean something
- when there is a difficulty, ask your child if they can find a solution (problem solving)
- during meal time encourage counting, sharing; introduce mathematical language such as fractions, etc.
- talk about the position of objects, e.g., behind, in front of, etc

Early Learning Goals (ELG)

The level of progress children should be expected to have attained **by the end of their EYFS reception year** is defined by the early learning goals, or ELGs.

They are more focused on the main factors that support child development at age 5. The goals are there to be used to assess children at the end of reception year, rather than for pre-school children.

Number	Numerical Patterns
<p data-bbox="316 815 710 880">Children at the expected level of development will:</p> <ul data-bbox="188 925 778 1240" style="list-style-type: none"> <li data-bbox="188 925 778 990">• Have a deep understanding of number to 10, including the composition of each number; <li data-bbox="188 996 778 1061">• Subitise (recognise quantities without counting) up to 5; <li data-bbox="188 1068 778 1240">• Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. 	<p data-bbox="916 815 1310 880">Children at the expected level of development will:</p> <ul data-bbox="817 925 1353 1279" style="list-style-type: none"> <li data-bbox="817 925 1353 990">• Verbally count beyond 20, recognising the pattern of the counting system; <li data-bbox="817 996 1353 1135">• Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity; <li data-bbox="817 1142 1353 1279">• Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.