

## Areas of Early Years Maths (as described by NCETM)

At Lanercost, we support the view that the following six main areas of maths collectively underpin children's early mathematical learning, and provide the firm foundations for the maths that children will encounter as they progress up through the school:

Cardinality and Counting: The cardinal value of a number refers to the number of things it represents, e.g. the numerosity, 'how many-ness', or 'three-ness' of three. When children understand the cardinality of numbers, they know what the numbers mean in terms of knowing how many things they refer to. Counting is one way of establishing how many things are in a group, because the last number you say (the *cardinal number*) tells you how many there are. Children enjoy learning the sequence of counting numbers long before they understand the cardinal value of numbers. Subitising is another way of recognising how many there are, without counting.

There are *5 counting principles* children must understand:

- *Stable order principle* refers to the understanding that numbers must always be said in the same order i.e. 1, 2, 3, 4, 5 and not 1, 3, 2, 5, 4.
- *One-to-one correspondence* refers to the ability to match one object to one number consistently.
- *Cardinality* refers to understanding that the last number counted indicates how many things are in the set.
- *Abstraction* refers to understanding the abstract nature of number e.g. that it is not only objects that can be counted but actions as well, e.g. the number of bangs on a drum.
- *Order irrelevance* refers to understanding that when counting a collection of objects it doesn't matter what order you count the objects in, you will still arrive at the same number.

Comparison: Comparing numbers involves knowing which numbers are worth more or less than each other. This depends both on understanding cardinal values of numbers and also knowing that the later counting numbers are worth more (because the next number is always one more). This understanding underpins the mental number line which children will develop later which represents the relative value of numbers i.e. how much bigger or smaller they are than each other.

Composition: Knowing numbers are made up of two or more other smaller numbers involves 'part-whole' understanding. Learning to 'see' a whole number and its parts at the same time is a key development in children's number understanding. Partitioning

numbers into other numbers and putting them back together again underpins understanding of addition and subtraction as inverse operations.

Pattern: Seeking and exploring patterns is fundamental to maths, since developing an awareness of pattern helps young children to notice and understand mathematical relationships. Children benefit from engaging in activities that involve recognising pattern, copying pattern, identifying the 'unit of repeat' and creating their own patterns.

### **Areas of Early Years Maths (as described by NCETM) continued**

Shape and Space: Mathematically, understanding what happens when shapes move, or combine with other shapes, helps develop wider mathematical thinking. Spatial skills are important for understanding other areas of maths and children need structured experiences to ensure they develop these, such as opportunities to visualise how things appear when turned round and imagining how things might fit together.

Measures: Young children actively engage in making comparisons and exploring equivalence of length, capacity and weight in different ways, often through spontaneous play. However, some aspects of 'measure' such as the units of measurement can be challenging and will develop later at a later stage.

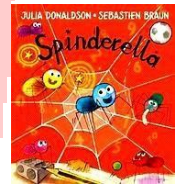
## Our approach to teaching Maths in Nursery and Reception at Lanercost

Throughout their time in Nursery and Reception, we provide our children with as many opportunities as possible to develop their mathematical knowledge and skills across all of these six areas. We do this in order to provide them with the firm foundations essential for accessing maths further up the school and also to enable them to meet the requirements for the Maths Early Learning Goals of 'Number' and 'Numerical Patterns'.

Our approach to teaching Maths in the classroom draws on elements of *Maths Mastery* (including using resources from the White Rose Maths Hub, Numberblocks and Tara Loughran Mastery resources) and *Numeracy Recovery* approaches. An important aspect of our approach to teaching maths is to actively develop our children's ability to talk about maths when solving problems: we call this '*maths talk*'.

### Numbers all around us

We provide lots of opportunities for children to talk about counting and to recognise numbers in their everyday life and through their play. We count with them everyday, for example, counting our cups at snack time, counting how many steps take us up into the treehouse, counting how many children are in class today. We also encourage the children to notice numbers in their environment both at school and at home. We often read number books together or share stories involving 'counting'. We want numbers to become as natural a part of our children's learning experiences, as letters and sounds.



### Singing and play involving numbers

We often sing counting songs such as *5 currant buns in a bakers shop* to help the children learn to rote count and to practise concepts such as 1 more or 1 less. We play games that encourage children to count such as '*What's the time Mr Wolf?*' or '*Lily pad leap*'. We introduce children to simple board games such as *Snakes and Ladders* which involve progression along a *number-line*.

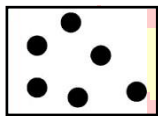


### Cardinality and counting with one-to-one correspondence

We support the children to count objects accurately by moving or touching the objects as they say the number names. We encourage the children to arrange irregular groups of objects into *number shapes* or *patterns* to help them count them accurately. We provide opportunities for the children to 'count out' or 'give' a number of things from a larger group, not just to count the number that are there. This is to support them in focusing on the 'stopping number' which gives the *cardinal value*.

### Subitising

We provide lots of opportunities for children to see *regular arrangements* of small quantities such as dot cards, the face of a die, patterns on a domino, or toy dinosaurs arranged in a regular pattern. We help children to '*subitise*' or recognise how many things are in a group without having to count them one by one. Often these arrangements



are '*flashed*' at the children e.g. a dot pattern card is flipped up to show the pattern for just a few seconds, or a group of toy dinosaurs is shown for a few seconds and then covered over by a cloth. We also show the children *irregular patterns* of objects, helping them to 'count' by 'seeing' patterns or groups of objects within the larger group.

### 'Threeness of three': number tray explorations

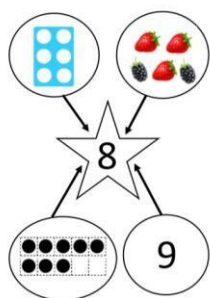
We develop the children's understanding of the *cardinal value* of numbers (their *numerosity*) through exploring as many different ways of making, or representing numbers

e.g. showing 3 fingers, counting out 3 minions, jumping 3 times, painting 3 dots on a piece of paper, finding 3 dots on the face of a die, finding the numicon shape for 3, finding the birthday badge that shows the numeral 3 etc.

### Correct or not correct?

To further support the understanding of numerosity, we ask questions such as '*correct or not correct*' where the children have to justify whether a given representation of a number 'is' or 'is not' that number. The children love this activity and it helps them develop the skill of '*comparison*' which is so important for understanding the relationships between numbers. If a representation is not correct the children are then asked how they could make it correct, eliciting responses such as 'I need to add one more' or 'There's too many. I need to take one away.'

Correct or not correct?		
	= 6	
	= 6	
	= 6	
	= 6	
	= 6	
	= 6	

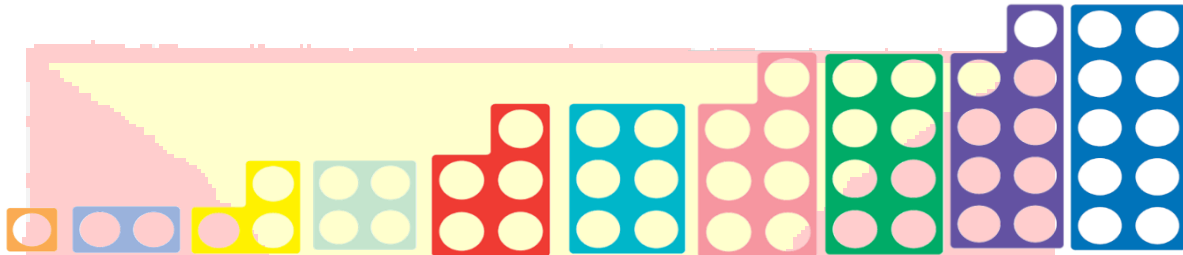


### Star number

The children are provided with a star number surrounded by other numbers or representations of a number and then asked what needs to happen to change the outside numbers into the star number in the middle e.g. 'You need to add 3 more pieces of fruit to make 8.'

### Numicon Shapes

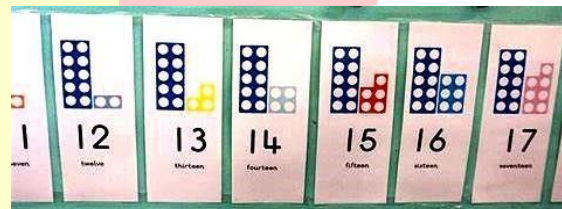
We introduce the children to *numicon* shapes, encouraging them to explore these shapes through play in a variety of contexts e.g. pretending the shapes are floating lily pads during water play, hunting for the shapes as buried treasure in the sand area, or printing with them in the creative area.



We encourage them to recognise the shapes of each piece of numicon alongside the numerals and to create *numberlines* using the numicon:

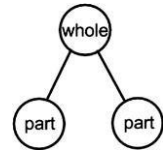
1      2 3      4      5      6      7      8

We use numicon to help children understand teen numbers e.g.  $10 + 2 = 12$



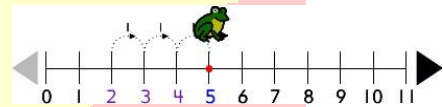
### Part - whole model:

Part-whole thinking refers to how numbers can be split into parts. It allows children to see the relationship between a number and its component parts, which helps them to see the connections between adding and subtracting. We use physical objects to help children explore the idea of part-whole models in different contexts.



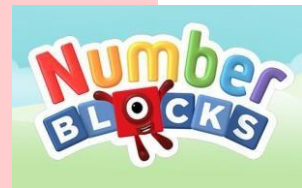
### Numberlines

Children are introduced to the idea of 'frog jumps' along a *numberline*. Numberlines provide a useful visual prompt for children as they learn how to 'count on' to solve simple additions and how to 'count back' to solve simple subtractions. We do a lot of physical jumping along largescale numberlines made from number tiles, or chalked out in the playground.



### Numberblocks

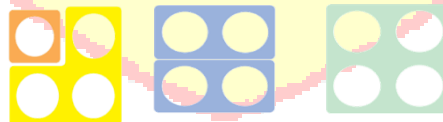
Numberblocks, first broadcast in January 2017, is a pre-school BBC television series aimed at introducing children to early number. Snappy animation and loveable characters combine with engaging storylines to gently introduce concepts of number to support early mathematical understanding. Our children love watching Number- blocks and engaging in follow-on activities to secure their understanding of concepts.



### Simple addition and subtraction

When children are able to recognise numicon shapes, without counting each time (in a similar way to recognising the dots on a die without counting them), we begin to use numicon to help the children to solve simple addition and subtraction problems.

Addition and subtraction are introduced through practical activities, with an emphasis on developing language, e.g. '3 and a 1 is the same as 4', '2 and 2 make 4', '2 add 2 equals 4'...

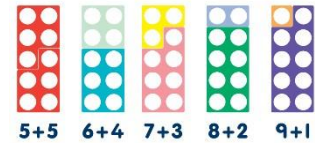


Later on in Reception we introduce children to the idea of *number sentences* (e.g.  $2+2=4$ ) at the point that the children are confidently using the mathematical language of addition and subtraction including:

**Add**, and, all together, more, makes, equals, double, the same number as, how many.  
**Subtract**, smaller than, the difference between, leaves, equals, how many, less.

### Number bonds

When the children have become familiar with addition and subtraction, we begin to look at all the possible ways of making a number. We will work towards automatically being able to recall number bonds to five and then ways to make 10.

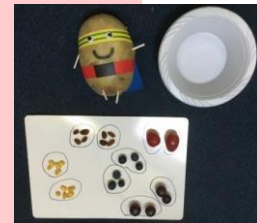


### 'Screening' to develop 'counting on' and 'counting back'

We use '*screening*' of physical objects to practise the skill of '*counting on*' to add two groups of objects: screening the larger of the two groups of objects to encourage children to hold the larger number in their head and then getting the children to '*count on*' just by looking at the smaller group of objects to work out the total number of objects. For simple subtraction, the group of objects is screened and then some are removed. The children are then encouraged to count back from the original number to work out how many are left under the screen before removing the screen to check if they are right.

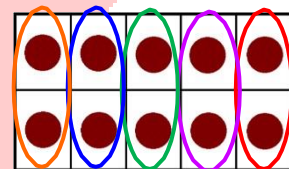
### Sharing, doubling and halving

We provide plenty of opportunities for children to practise the essential skills of sharing, doubling and halving. Often linking our mathematical exploration to the current book we are reading e.g. doubling food items so Supertato has enough energy to outwit two evil peas.



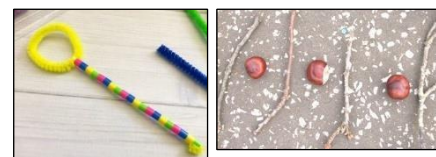
### Grouping

We use *ten frames* to help children begin to understand *grouping*, both through making groups and through 'seeing' larger numbers as being made up of smaller groups. Grouping helps children begin to develop the skills they will need for *multiplication* further up the school. Towards the end of the Reception we begin to look at combining and sharing groups of 2, 5 and 10. For example, we help the children to understand that the number 10 can be seen as 5 'lots' (or groups) of 2 and also as 2 'lots' (or groups) of 5.



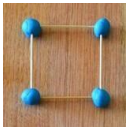
### Patterns

We encourage our children to engage in a wide-range of pattern exploration, including creating repeating patterns, with beads on pipecleaners, pegs on boards, numicon shapes, magnetic shapes, natural objects, buttons and anything else they can find!



### Shapes

We



encourage the children to engage in all kinds of construction tasks involving shapes. They learn about the properties of different shapes through playing with them and also exploring shapes within our environment and at home, e.g. through hunting



for different 3D shapes when shopping. An important part of our focus on shapes is to help children develop the mathematical language they will need further up the school to describe the properties of shapes. The children enjoy the challenge of using 'maths talk' to describe shapes; answering questions such as 'Why is this shape not a circle?' 'How is this shape similar or different to a square etc'.

### Everyday language about time

We provide opportunities for children to develop a sense of the passing of time and to talk about whether an event happened in the past or is going to happen in the future. We model the use of everyday time related vocabulary such as: 'now', 'next', 'later', 'soon', 'today', 'yesterday', 'tomorrow', 'last week', 'next week', 'next month', 'next year', as well as teaching the days of the week and the months of the year. We help children understand that an hour is longer than half an hour, and minutes are longer than seconds and encourage children to measure short periods of time in simple ways e.g. by counting, using a sand timer or using a simple stopwatch. Through experience the children soon learn that choosing a 5 minute sand timer will give them longer with their chosen toy before they have to swap than choosing a 3 minute timer!



### Everyday language about money

We introduce children to the concept of money through exploring different ways of 'paying' for items during play, or setting up a shop to 'sell' our morning snack. We model the use of everyday language relating to money such as 'amount', 'coins', 'cash', 'notes', 'money', 'cheap', 'expensive', 'costs', 'pay', 'pence', 'pounds'. Towards the end of Reception the children also learn to identify different coins and to understand their relative value.

### Everyday language about capacity

We provide a wide range of opportunities in different contexts for children to explore the concept of capacity, including through child-led sand and water play. They also have opportunities to measure out quantities and explore the capacity of different containers through adult-led play inspired by the books we are reading e.g. potion making whilst exploring the book *Room on the Broom*. They are introduced to useful vocabulary such as 'full', 'empty', 'half-full', 'nearly full', 'overflowing' and encouraged to use 'maths talk' during their play to share their learning.





### Everyday language about distance

We provide opportunities for children to gain a simple appreciation of distances by focusing on places and distances that are meaningful to them e.g. the distance they travel from home to school compared to the distance they have to travel from home to Carlisle to go shopping, or to Newcastle to visit a museum etc. We help the children learn how to measure distances simply e.g. by pacing out distances around the school, using tape measures or metre rules, as well as modelling the use of everyday language relating to distance e.g. 'near', 'far', 'farther away', 'closer' etc.

### Everyday language about weight and size

We explore weight, length, height and size through play and through planned problem solving activities linked to our story books such as 'Whose shopping bag is heavier? How can we check?' or 'Which raft will support 10 gingerbread men? Will it still float with 20 gingerbread men on board?' or 'It's the turn of the three shortest children in our class to help with snack today. How can we work out which children are the snack monitors today?'

### Positional language

We teach children how to describe their relative position, and the position of objects, by using '*positional language*' in a range of different contexts, such as: 'up', 'down', 'over', 'under', 'into', 'beside', 'next to', 'away from', 'across', 'between', 'behind', 'in front of', 'at the back', 'through', 'top', 'bottom', 'inside', 'outside' and 'upside down'. Understanding and using positional language is important for developing the spatial awareness required to tackle geometry further up the school.

### Estimating

Estimating is a useful skill which we practise with the children through everyday opportunities such as estimating whether we have enough apples for everyone who wants one and then checking by counting.

### Writing numerals

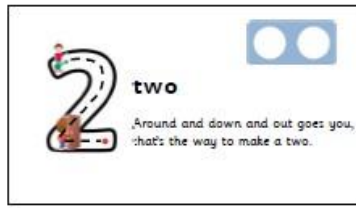
As the children's fine motor skills develop they begin to write *numerals*. We have created our own set of Numeral rhymes and flashcards to help the children learn to recognise numerals and how to write them.



**1** **one**

Number 1 is like a stick,  
a straight line is very quick.

Illustration: A vertical wooden stick with a small orange square containing a white circle to its right.



**2** **two**

Around and down and out goes you,  
that's the way to make a two.

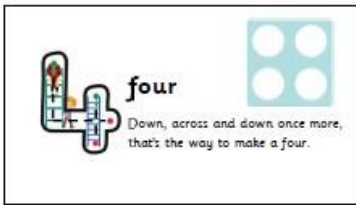
Illustration: A number 2 with a red car on top and a blue rectangle with two white circles to its right.



**3** **three**

Round and round just like a bee,  
that's the way to make a three.

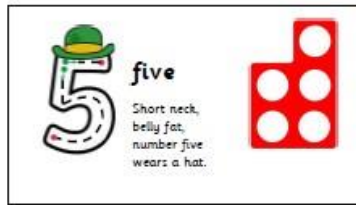
Illustration: A number 3 with a bee on top and a yellow shape with three white circles to its right.



**4** **four**

Down, across and down once more,  
that's the way to make a four.

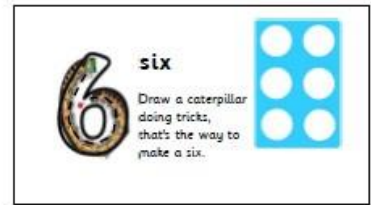
Illustration: A number 4 with a car on top and a light blue shape with four white circles to its right.



**5** **five**

Short neck,  
belly fat,  
number five  
wears a hat.

Illustration: A number 5 with a green hat on top and a red shape with five white circles to its right.



**6** **six**

Draw a caterpillar  
doing tricks,  
that's the way to  
make a six.

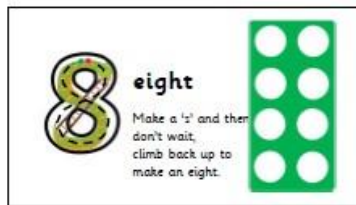
Illustration: A number 6 with a caterpillar on top and a light blue shape with six white circles to its right.



**7** **seven**

Across the sky and  
down from heaven,  
that's the way to  
make a seven.

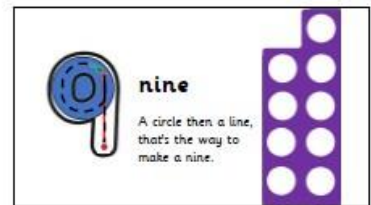
Illustration: A number 7 with a car on top and a pink shape with seven white circles to its right.



**8** **eight**

Make a '1' and then  
don't wait,  
climb back up to  
make an eight.

Illustration: A number 8 with a green caterpillar on top and a green shape with eight white circles to its right.



**9** **nine**

A circle then a line,  
that's the way to  
make a nine.

Illustration: A number 9 with a blue car on top and a purple shape with nine white circles to its right.

