



NURSERY YEARLY OVERVIEW 2022-23

“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.” **Statutory framework for the early years foundation stage**

“The objective for those working in Early Years, then, is to ensure that all children develop firm mathematical foundations in a way that is engaging, and appropriate for their age.” **NCETM**

The progression of learning in the Nursery is to enable children to become independent and confident mathematicians who:

- Say the numbers in order from 1-10.
- Know that numbers tell them how many things there are altogether (0-5).
- Use their fingers, pictures, marks or symbols to show how many things there are (0-5).
- Begin to appropriately match some numerals to groups of objects (0-5).
- Are interested in talking and asking questions about numbers.
- Know when there are the same number of objects in groups (0-5).
- Begin to share objects out into different groups.
- Know that they can count sounds and actions as well as objects.
- Can identify shapes in the environment.
- Enjoy exploring and talking about shapes in their play activities.



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- Make simple comparisons of length, weight and capacity using some appropriate vocabulary and mathematical language.
 - Are beginning to use positional and prepositional language.

There are six key areas of early mathematics learning, which collectively provide a platform for everything children will encounter as they progress through their maths learning at primary school, and beyond. These are incorporated into the long term overview.

- Cardinality and counting
- Comparison
- Composition
- Measuring
- Pattern
- Shape and space



Term	Mental Arithmetic	Mathematical Learning Progression in Nursery		
Autumn 1		Settling in Baselines	Number Place value 0 – 5 Reciting number names Number recognition Oral counting forwards and backwards Developing 1:1 correspondence Identifying numbers and patterns in the environment Introduce five frames	Exposure to shape and patterns in the environment
Autumn 2		Number Place Value Numbers 0-5 (including the concept of 0) Place value & one to one counting Cardinal principle. Linking the numeral with the amount (0-5). Number collections Counting a fixed number of things (including objects that cannot be moved, pictorial and representation)		Geometry Introduction of 2d shapes names. Triangle, square, circle, rectangle Introduction of 3d shape names Cone, sphere, cube, cuboid, cylinder Exploring properties/attributes of shape
Spring 1	Count forwards to 5 confidently	Number Cardinality Comparing groups / quantities more than / fewer than) (1-3 / 1-5) Comparing to include length, weight and capacity Abstraction to 5 Number representation Symbol & Mark making Subitising (1-3) Spatial language	Measure Make direct comparisons between two items. Compare two items against a measurer item e.g. stick/tape (longer than). Conservation of size. Compare objects by length, weight, size, capacity.	
Spring 2	Count backwards from 5 confidently	Number Orally reciting numbers to 10. Order numbers 1-5 Sequencing language match quantity to numeral 1- 5	Geometry Shape in the environment Recognise basic 2d shapes and 3d shapes Select shapes Combining shapes Create patterns using 2d shapes (ABAB)	



		Subitising (1-3) Number conservation Compare quantities using language: 'more than', 'fewer than' Composition: make and break 1, 2, 3	Language of size / length Notice errors in patterns	
Summer 1	Subitise to 3	Geometry Exploring patterns Creating patterns Repeating patterns Extend beyond ABAB patterns Notice errors in patterns	Positional language Describing familiar routes, locations Using sequencing language	Number Order numbers 0 – 5 Compare numbers 0 – 5 Identify numerals beyond 5 Subitising to 5 Exposure to numbers to 10 in the environment (orally recite) Introduce tens frame Abstraction beyond 5
Summer 2	Subitise to 5	Number Link / write number symbol with cardinal value. Comparing numbers. Is it still five even if it looks different? Real world number problems Subitising to 5 using a variety of number patterns Making number: Making 4 and 5 Use five / tens frame in a variety of ways	Measurement Weight, capacity comparing (can draw on 2d and 3d shape knowledge) Language of weight, length and capacity	Time language: first, then, next

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." Development Matters

Through direct teaching, small group, one to one and continuous provision, children will have frequent and varied opportunities to build and apply this understanding – such as using manipulatives, including small pebbles and five/tens frames for organising counting – children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built.



Appendices

1) Number rhyme progression

2) Vocabulary and language progression – sentence structures to support adults

3) Key representations

4) Further guidance:

- *The learning trajectories will support assessment- the age range is a rough guide, the important aspect to know and remember is the order in which they are acquired.*
- Colours
- Sorting
- Pattern
- Size
- Counting principles
- Comparing
- 2d and 3d shapes
- Time
- Length and height
- Weight
- Capacity
- Positional language



Scaffolding number rhymes

Number rhymes help children develop number sense in a fun and low pressured way. Children learn through repetition so singing number rhymes throughout the day will help them to become familiar with numbers and the patterns between them. Different number rhymes will help children develop different mathematical skills.

Number rhymes are best used in a scaffolded and repetitive way such as below:

Resources available to explore during continuous provision throughout.

Day one – introduction of rhyme using objects. E.g., five plastic bears / frogs.

Day 2 – further consolidation of rhyme using objects. E.g., five plastic bears / frogs.

Day 3 – Revisit rhyme using pictures. E.g., five laminated bears or frog pictures.

Day 4 and 5 - Revisit rhymes using coloured marks on the board (e.g. green from frogs) and later five/ten frames.

Number rhyme resources to be available to explore during continuous provision dependently and/or give the practitioner an opportunity to explore the activity with the children.

A selection of rhymes to support children's development of counting forward before starting counting backwards. Link to powerpoint
<https://docs.google.com/presentation/d/1JtGhKZmU19B79VBN8jYe4gqikTVUWEVG/edit?usp=sharing&oid=105614174357458160222&rt=poof=true&sd=true>

Autumn 1

Number rhymes weekly counting objects/showing fingers 1-3 and 1-5. Introduction to a five frame



Autumn 2

Number rhymes counting objects/ showing fingers 1-3 and 1-5 and beginning to look at “I still have three/five”. Using a five frame.

Spring 1

Number rhymes weekly counting objects/ showing fingers 1-3 and 1-5 and beginning to look at “I still have three/five”. The whole amount is...Using a five frame.

Spring 2

Number rhymes. Looking at rhymes over number 5, whole amount, and number patterns. (How else can I make 5?)

Summer 1

Number rhymes. Looking at rhymes over number 5, whole amount, and number patterns. (How else can I make 5?)

Summer 2

Number rhymes. Looking at rhymes over number 5, whole amount, and number patterns, including using tens frame.



Vocabulary and language progression

Vocabulary progression example:

Prepositional tiered language – also see table in the space category

Year 1	Underneath, centre,
Reception	below, beside, in between, close to, in front of, opposite
Nursery	in, under, on, above, up, down, next to, before, behind



Explain- Mathematics

I've got the ...one It's the same/ different... It's the same number.

They / We both have...

There is one more... Its one less...

Another one. I have more...

They/We have two each


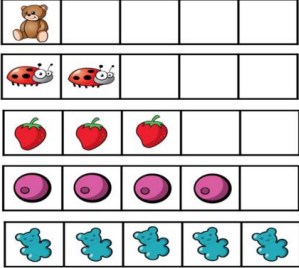


Altogether I have...

I think the... is heavier...lighter...

Progression in language sentence stems general for Mathematics








Key Representations:

Real life objects	
Five frames	
Cubes/ counters	
Fingers	

Commented [SD1]: I have put this first as children learn using real objects as a first level of representation.



Dice	
Numicon	
Numerals	
Numberblocks	
Drawings	



Further guidance:

Colours

Children should recognise and name colours in the indoor and outdoor environments. Children should experiment with matching colours through sorting and comparing objects. Children should be able to group objects that are 'the same colour' and 'not the same colour'.

Resources:

The Usborne Big Book of Colours

Monsters Love Colours – Mike Austin

Brown Bear Brown Bear, What do you see? – Bill Martin Jnr.

Mixed up Chameleon- Eric Carle

The button box – Margret Reid

Stem sentences:

The ... is red.

The ... is not red.

The ... is red the same as a ____.

The ... and ... are the same colour.

The ... and ... are different colours.

Sorting

Children should be encouraged to sort objects by their own rules. Model stem sentences to encourage children to communicate how they have sorted their group of objects. Provide opportunities to sort different colours, shapes, sizes, animals, textures, people. During tidy-up time, pictures can support the children to sort objects into different boxes/ shelves.

Other resources:

Sort it out! – Barbara Mariconda

Sorting at the market – Tracey Steffora

The button box – Margarett Reid

<https://nrich.maths.org/13373>



Stem sentences:

I have sorted the buttons by ...

Those cars are big and those cars are small.

Pattern

Patterning is occurring all the time, walking and breathing – inhale and exhale etc..

Children use pattern to help them predict what will happen – when is it lunchtime?

They also use patterning to automatize everyday tasks (brushing teeth)

Patterning in a Mathematical sense occurs when the children demonstrate that they are noticing attributes or features and these are being paid attention to - this can be size or colour but another day as they become more sophisticated it may be due to orientation. The adult should ask the child and allow them to share their explanation.

When using objects, pictures or actions; children engage in 3 patterning styles :

- Spatial patterns – the arrangement of the objects/ shapes These patterns can involve symmetry both reflection and rotation.
- Repeating patterns – involving a repeating element for example patterns which go around or frame something or even just one element repeated over and over (a spotty item of clothing). Adults often think of repeating patterns as colours or shapes but it may be size, type or orientation. They can often be recorded as AB or ABBA



- Growing patterns have regular increases or decreases (for example see image)

Children need the opportunity to explore pattern through loose parts or transient art play opportunities. Adults must engage alongside children in playing and patterning – making mistakes for the children to correct.

Look for, share and discover patterns in the environment.

Encourage children to notice and verbalise patterns in their everyday environments, books or models they make. Discuss AB patterns with the children, and encourage them to continue an AB pattern, verbalising the pattern as it is constructed and extended.

Other resources:

[Pattern, Pattern, Everywhere | DREME TE \(stanford.edu\)](#)

[Developing Pattern Awareness with Young Children \(maths.org\)](#)

[Joanne Mulligan on Early Conceptions of Patterns \(erikson.edu\)](#)



[Pattern Paths To Algebra | DREME TE \(stanford.edu\)](#)

[EYFS Best Practice: All about ... Pattern, Part 1 | Nursery World](#)

[EYFS Best Practice: All about ... Pattern, Part 2 | Nursery World](#)

Suggested book links for Patterning:

1. Pattern Fish by Trudy Harris
 2. Pattern Bugs by Trudy Harris
 3. Hooray for Fish by Lucy Cousins
 4. Socks by Nick Sharratt
 5. Pants by Nick Sharratt
 6. My Mum and Dad Make Me Laugh by Nick Sharratt
 7. There Was an Old Lady Who Swallowed a Fly by Pam Adams
 8. Brown Bear Brown Bear What Do You See? by Bill Martin Jr.
 9. The Shopping Basket by John Burningham
 10. Ten in the Bed by Penny Dale
- Lots and lots of zebra stripes – Stephen Swinburne*

Stem sentences:

My pattern is red block, blue block, red block, blue block.

<https://www.ncetm.org.uk/resources/52504>

Expected learning trajectory for Pattern:

Under 2 years old:

- Enjoy patterned songs, rhymes and activities, joining in with repeated actions or sounds.
- Very young children might anticipate what comes next using the pattern of familiar routines. *Link to time*

2 years old:

- Enjoy patterned songs, rhymes, stories and activities, joining in with repeated actions or phrases, predicting what comes next using the pattern.
- Arrange objects in their own pattern (such as in a line).



3 years old:

- Join in with action patterns in dance, stories, games, etc.
- Arrange objects in spatial patterns with some organisation or regularity (such as spacing around the middle or in the corners).
- Copy, create, correct and continue repeating patterns of two repeating elements (AB)

4 years old and over:

- Copy, create, correct and continue repeating patterns with three elements.
- Make the same pattern using different objects (or perhaps body actions or sound)
- Make simple repeating patterns that join up as one continuous pattern (circular or border pattern).

Size

Focus on identifying objects as big/large and small/little. Use extreme examples of real life examples to begin with, such as an elephant and a mouse. Then move onto objects that have a smaller difference in size. Encourage reasoning questions such as, could we have a pet giraffe in nursery?

Other resources:

Big bear, small mouse – Karma Wilson and Jane Chapman

Goldilocks and the three bears – trad.

Big and small – Elizabeth Bennett

Stem sentences:

The ... is big/large

The ... is small/little

Counting principles

One-one correspondence principle: *assigning one number name to each object that is being counted*

Teach children to line up the objects before they start to count. Teach the children to touch each object as they count, saying one number name for each object. When counting pictures, teach the children the strategy of drawing a line through each picture object they count.

This is not secure if – a child uses more than one number name for each object – counts an object twice – misses out some objects



Stable order principle: *reciting numbers in the correct order*

Use number songs, stories and daily routines to embed stable order counting.

This is not secure if: - a child misses a word out – restarts part of sequence – Says number names in the wrong order

Cardinal principle: *knowing the total number of items is the last word spoken as you count*

Challenge children to select a given amount of objects from a larger group. When asked, ‘how many are there?’ children should say the total amount without having to recount the whole group of objects again.

This is not secure if – a child always counts from 1 (thinking “how many” means counting from 1 rather than total) – the child counts all items when they been asked for a specific number from a larger group.

Abstraction principle: *counting different sized objects but treating them the same numerically or counting objects which can not be seen*

Encourage children to count the number of claps/ stamps/ jumps/ hops.

Show an object or group of objects and then place material over it, so you can no longer see it. Ask, ‘where has the ... gone?’, encourage the children to understand ‘it is under the blanket’.

Order irrelevance principle: *understanding the order in which the objects are counted is not important*

Encourage the children to count objects in different directions: left to right/ left to right, down/ up. When the children have counted a group of objects move them around and then ask them ‘how many are there now?’

Other resources:

Anno’s counting book – M Anno

The Very Hungry Caterpillar – Eric Carle

Cockatoo- Quinton Blake

One is a snail, ten is a crab – Jeff Sayre

Ten little dinosaurs – Michael Brownlow

<https://nrich.maths.org/13372>

<https://www.ncetm.org.uk/resources/52502>

Stem sentences:

1, 2, 3, 4, I have 4 cubes.

Counting-

Children are often exposed to number, but need to understand what these symbols mean as well as recognising how many and knowing the name. They need to be able to say number names in order (both forwards and backwards) as both a chain and understand and know these numbers as separate words to find a total. Younger children may not accurately use the words for counting/number but can still enjoy and



participate in non-verbal ways e.g. pointing, gesture, moving items select numerals and make choices. Counting develops over time and children need frequent and varied experiences of counting to support this learning and development.

Children learning English may have learnt the number names in another language it is important to value this learning through our partnerships with parents.

Counting can be thought of in 2 ways – verbal counting (saying number names in order) & object counting (count items to find how many) Verbal counting requires repetition and practice to remember, it should be learnt collaboratively with object counting.

The children need to develop children's number sense. Recognising which is more/less when comparing objects. The children knowing the meaning of the number words and symbols the "twoness of two". Estimating and having a feel for the relative size of numbers. Recognising the number of items in familiar arrangements dice/domino patterns.

REALLY IMPORTANT – *Must expose children to symbols for numerals to help their understanding of the value of the numeral as well as the name.*

When singing number rhymes have moveable objects and manipulatives available for the children to act out the rhyme. The children will be available to see, touch and experience the number quantities throughout the rhyme.

Other resources:

Simple rhymes for counting

[One Little Teddy | Bookbug Song & Rhyme Library - YouTube](#)

Videos for counting –

[Every Child Counts - YouTube](#)

[Counting on Counting | DREME TE \(stanford.edu\)](#)

[Developing Number Through Tidying Up \(maths.org\)](#)

Counting book suggestions:

1. The Very Hungry Caterpillar by Eric Carle
2. One to 10 and Back Again by Nick Sharratt and Sue Heap
3. Ten Tall Giraffes by Brian Moses
4. Ten in the Bed by Penny Dale
5. Ten Terrible Dinosaurs by Paul Stickland



6. Mouse Count by Ellen Stoll Walsh
7. Ten Little Ladybirds by Melanie Gerth
8. One Gorilla: A Counting Book by Anthony Browne
9. 123 to the Zoo by Eric Carle
10. Count with Maisy, Cheep, Cheep, Cheep! by Lucy Cousins
11. Big Fat Hen by Keith Baker

Expected learning trajectory for counting

Under 2 years old:

- Say number words to 5 (as a string, “one, two, three” or song tune)
- Sometimes use number or number-like words.

2 years old:

- Say the numbers in order to 5 (usually as distinct words but sometimes missing a number).
- Use counting-like behaviour, pointing/touching and saying number words (not one-to-one).

3 years old:

- Say the numbers in order to 10, and backwards from 10 to 0.
- Says one number for each item when counting to 5 (one-to-one), perhaps by pointing or touching.
- Recognise some numerals

4 years old and over:

- Say the numbers to 20 and perhaps beyond.
- Says one number for each item when counting to 10 (one-to-one), perhaps by pointing or touching.
- Put numerals in order to 10.

Cardinality

Children in the Nursery can count (subitise for smaller numbers) – How many people are there? How many pieces of fruit for snack? – when clearing up snack – how many are left? Snack time is a great time/motivator for children to count and use the skills of cardinality with a purpose. They will always notice when another child has more. It also provides an opportunity for mathematical problem solving – not having enough, this will give them the opportunity to practically offer solutions. How many more are needed? As the children gain confidence and understanding – they may offer a solution of cutting the food in half. *Linked to comparing quantities see below*



Other resources:

Links to support cardinality:

[The Value of Two \(maths.org\)](#)

[Subitising \(maths.org\)](#)

[A New Focus for Familiar Card Games \(erikson.edu\)](#)

[Cardinality is Critical Preschool Concept with Barbara Sarnecka \(erikson.edu\)](#)

[Counting Collections in the Early Years \(maths.org\)](#)

Books linked to cardinality:

1. Ten Black Dots by Donald Crews
2. Farm 123 by Rod Campbell
3. I Spy Numbers in Art by Lucy Micklethwait
4. Maisy's First Numbers by Lucy Cousins
5. I Spy Numbers by Jean Marzello
6. Ten Red Apples by Pat Hutchins
7. One Child One Seed by Kathryn Cave
8. Anno's Counting Book by Mitsumasa Anno
9. Fish Eyes by Lois Ehlert

Expected learning trajectory for cardinality:

Under 2 years old:

- Recognise obvious or significant changes in amount in a group of up to 3 items.
- Respond to familiar number words as relating to a number of things.
- Sometimes responds to one or two by showing or getting one or two things (although these may not be correct).

2 years old:

- Count up to three objects (one at a time).
- Sometimes subitise a small group of 1, 2 or 3 objects (instantly recognise without counting).
- Notice numerals in their environment.



3years old:

- Count up to 5 objects (one at a time).
- Count out up to 5 objects from a larger group.
- Subitise a small group of 1, 2, 3 objects (instantly recognise without counting).
- Link numerals with amounts up to 5.

4years old and over:

- Count up to 10 objects (one at a time).
- Count out up to 10 objects from a larger group.
- Subitise a small group of up to 5 objects (for 5 they may see them as 4 and 1 or 3 and 2 but recognise there are 5 without counting)
- Link numerals to amounts up to 10.

Comparing quantities

Start by using perceptual comparison (comparing the number of object without counting), using obvious differences in the amount of objects in each group e.g. a group of 9 objects compared with 3 objects. Then move onto comparing groups with a less obvious difference in the amount in each group e.g. a group of 3 objects and a group of 4 objects (using small amounts so children can confidently count and compare amount in each group). Also explore two groups of different objects but where the amount is the same/ equal.

In the context of the children's play, talk to them about 'lots' and 'few' in relation to the loose parts they are using.

Other resources:

Just enough carrots – Stuart Murphy

Harry keeps score – Daphne Skinner

<https://www.ncetm.org.uk/resources/52501>

Stem sentences:

This group has more cubes.

This group has fewer cubes.

The groups are equal.

The groups have the same number of objects.



Space understanding relationship and perspective

This is the consideration of relationships and perspectives being able to visualise and mentally manipulate objects and places – exploring how things appear from different positions. Visualising and manipulating objects to co-ordinate the movement of their bodies within space and navigate their way around (*physical development link*). These skills support shape and number within Maths e.g. dot patterns or positions of numbers on a number line 6 is closer to 5 than 10.

They need the physical opportunity to explore shape outdoors, e.g. opportunities to lie on their tummies, back, swing and see things from many angles. https://drive.google.com/file/d/1OfsGITrk45QXNiuDpMft0ptyeHXEnvu_L/view?usp=sharing (further knowledge of why this is important to children's learning) <https://drive.google.com/file/d/1FTnSbN1sQaf2VDxpHYPZZIaTxrfvVDw/view?usp=sharing> (ideas of what and how to develop this within the setting)

Positional language

Give children regular instructions involving positional language. If a child is communicating with an adult by pointing, model verbalising the child's body language. E.g. if a child points to a teddy, say 'Teddy is on top of the box'. Children should begin to understand and use the language: in, on, under, in front and behind. Activities such as hide and seek with objects, provides great opportunity for applying positional language.

Children need to mentally map their surroundings to consider how objects fit within a space developing and enhancing vocabulary of position and direction. This supports a child being able to clarify special relationships, predict or plan a route. Adults using this language and vocabulary supports children's understanding and ability to use the new vocabulary with some accuracy.

Other resources:

<https://nrich.maths.org/14690>

<https://www.ncetm.org.uk/resources/52505>

Stem sentences:

... is in/on/ under/ in front/ behind



Vocabulary relating to space – categorised	
Positional language	on, in, under
Positional language related to vertical/directional movement	up and down
Spatial thinking	between, next to, opposite, in front of, behind, above, below
Changing direction and movement	forwards, backwards, through, sideways, across, along and around as well as towards and away from

Other resources to support space:

[Spatial Reasoning: Why Math Talk is About More Than Numbers | Development and Research in Early Math Education \(stanford.edu\)](#)

[Spatial Reasoning – ECMG \(earlymaths.org\)](#)

[Make Space: The Importance of Spatial Thinking for Learning Mathematics · Frontiers for Young Minds \(frontiersin.org\)](#)

Books linked to spatial awareness and positional language:

1. Inside Outside Upside Down by Stan Berenstain and Jan Berenstain
2. We're going on a Bear Hunt by Michael Rosen
3. Rosie's Walk by Pat Hutchins
4. The Secret Path by Nick Butterworth
5. Henry's Map by David Elliot
6. As the Crow Flies: A First Book of Maps by Gail Hartman
7. Lucy in the City by Julie Dillemath
8. Mapping Penny's World by Loreen Leedy
9. My Map Book by Sara Fanelli
10. Over, Under and Through by Tana Hoban
11. Dinosaur's Day Out by Nick Sharratt
12. Dear Zoo by Rod Campbell



13. Up and Down by Britta Teckentrupp

Expected learning trajectory for space:

Under 2 years old:

- **Indicate where something is or where they would like to go.**
- **Push objects through holes and try to make things fit in space**
- **Explore the environment and create mental maps of familiar places by learning where different objects are located.**

2 years old:

- **Respond to some position and direction words/gestures to find objects or landmarks in their environment (even when on the move).**
- **Move and turn objects if they will not fit.**
- **Find their way around familiar environments, navigating around obstacles.**

3 years old:

- **Respond to a range of position and direction words/gestures to find objects or landmarks in their environment, recognising if they are near or far away.**
- **Move and turn objects, judging how they will fit.**
- **Recognise and predict items or landmarks along familiar routes (indoors and out).**

4 years old and over:

- **Use relative position to locate objects or landmarks (where something is in relation to something else, such as behind or in front of).**
- **Follow and give directions. Move, turn and flip objects, judging how they will fit.**
- **Mentally keep track of where they are along a route. Use a simple map of a familiar area to find a hidden object.**

Shapes- both 2D and 3D

When teaching 2d and 3d shape, focus on the shape properties as well as names of shapes (square, rectangle/oblong, circle and triangle). Use language such as: straight, curved, round and flat to describe and compare the properties of shapes. Encourage the children to identify shapes within the environment, shapes they use in their art work or shapes they use in construction activities. Encourage children to fit or arrange shapes into spaces, for example on a jigsaw board or shape insert games.

As children begin to recognise specific properties and attributes of shape. They can begin to compare shapes based on these properties e.g. curvedness, straightness, flatness of sides or surfaces, numbers of corners and edges and even angle size. They can then begin to correctly use formal vocabulary to communicate their understanding including shape names. They will also be playing with, exploring and combining shapes as they build and construct within the provision. This will aid the children to learn about their properties. The children need to play with flat 2d shapes



and 3d shapes. Opportunities to visualise shapes, planning models and constructions alongside adults who will be modelling language, talk about shapes and pose challenge. Through the adults accurately and consistently using shape names and vocabulary they will build up the children's understanding of what a shape is and is not, based upon the properties that define a shape. Children need frequent exposure to regular and irregular shapes in a variety of orientations to avoid limitations of a child's understanding.

Expected learning trajectory for Shape:

Under 2 years old:

- Explore the shape of objects. Select an object by its shape, sometimes to fit into a particular shaped space.
- Enjoy putting different shapes on top of each other (sometimes successfully) and taking shapes apart that have been put together.

2 years old:

- Select an object by its shape for a particular purpose or to fit into a specific space.
- Recognise that two objects have the same shape.
- Build towers/stacks or lines of blocks.

3 years old:

- Use own words or gestures to indicate or describe shape properties, such as corners and sides.
- Recognise two or three familiar shapes (in different sizes and orientations).
- Use shapes to make pictures.
- Build simple structures such as walls.

4 years old and over:

- Use words or gestures to describe shapes by their properties.
- Recognise four or more shapes by their properties (including different triangles and rectangles, in a range of orientations).
- Combine and separate shapes to make new shapes and find shapes within shapes.
- Build corners, arches or enclosures (perhaps with windows or doors) when constructing.

Other resources to support shape:

Video to support shape:

[Foundations: Building STEM skills - YouTube](#)

Links to support shapes:

[Imprecise Geometry with Doug Clements \(erikson.edu\)](#)

[What Children Know and Need to Learn about Shape and Space | DREME TE \(stanford.edu\)](#)



[Shape Assessment Protocol | DREME TE \(stanford.edu\)](#)

Books to use to support shape:

1. A triangle for Adaora by Frances Ifeoma Onyefulu
2. Grandpa's Quilt by Betsy Franco
3. Change Changes by Pat Hutchins
4. Block City by Robert Louis Stevenson
5. Have You Seen My Monster? by Steve Light
6. Mouse Shapes by Ellen Stoll Walsh
7. Peppa Pig Shapes by Ladybird (board book)
8. The Secret Birthday Message by Eric Carle
9. 'Triangle', 'Circle' and 'Square' by Mac Barnett and Jon Klassen
10. Shapes, Shapes, Shapes by Tana Hoban
11. Cubes, Cones, Cylinders, Spheres by Tana Hoban
12. Round is a Mooncake: A book of Shapes by Roseanne Thong and Grace Lin

Other resources:

Round is a tortilla – Roseanne Greenfield

Brown Rabbit's shape book – Alan Baker

Mouse shapes – Ellen Walsh

Brown Rabbit's shape book – Alan

<https://www.ncetm.org.uk/resources/52505>

<https://nrich.maths.org/13373>

<https://www.youtube.com/watch?v=XnZHQp-8IUc>

Stem sentences:

The square has 4 straight sides.

My house is like a square with a triangle on top.



Time

Discuss the daily routine and encourage the children to use pictures on the daily timetable to order some key events e.g play time, snack time, lunch time, story time. Use words such as before, now, soon and after to talk about immediate past, present or future events.

Other resources:

What's the time Mr Wolf – Debbi Giori

Day monkey, night monkey – Julia Donaldson

<https://www.nctm.org.uk/resources/52506>

Stem sentences:

First we will..., then we will ..., after that we will...

Tomorrow we will...

Comparison through measure

When looking at comparisons within measure – always start with concrete attributes – for example long snake, heavy bag

Key element of understanding for Nursery children is the understanding of which physical attribute is being considered – whether length or height or weight or capacity or volume. See related vocabulary to support the children in utilising full sentences and stem sentences to support.

Always start with a direct comparison – comparing one item against another the new vocabulary of more, less, same, longer etc... must be heard used and practiced in context and then generalised within the wider provision and at home.

REALLY IMPORTANT CONCEPT – the importance of starting both items at the same point, having empty containers etc...

Progress onto indirect comparison when the children are ready (normally older Nursery children) – the children should be able to compare an item against another item for example a stick which is “the measurer item” The measurer can be a ruler, scale or non-uniform unit of measure again using comparative and superlative language in context and then generalised beyond within the wider provision and at home.

Conservation of amount

The children need to be taught the idea of conservation that the amount stays the same even if the appearance alters for example, 2 containers of different shapes hold the same amount of sand or when you stretch/roll out BUT not CUT a ball of playdough; the amount remains the same even when stretched or reshaped. You can explore the visualisation and understanding of this with a ball of string or a lump of playdough when manipulated BUT not CUT. This is a very visual experience for the children and the opportunity to explore this and play with this concept needs to happen to support later mathematical capacity based concepts –

Children may be seen lining up items around the edge of the mat or table or drawing an outline (beginnings of perimeter)



When children enclose or wrap items or even cover the top of a shape or space with objects (beginnings of area)
Time and understanding abstract concepts of yesterday, before, later link through to the use of timelines/timetables within the classroom linking to the children's routine.

Length and height

By using extreme examples, introduce and model the language short/ long, short/tall. E.g a tall adult and a small child, a long skipping rope and a short lolly pop stick. Encourage children to compare the height and length of models they construct or when using craft materials in arts and design. Move onto comparing objects that have a smaller difference in height/ length, for example the length of two leaves. Model how to measure accurately by aligning the starting points of the objects that are being measured.

Other resources:

<https://www.ncetm.org.uk/resources/52506>

<https://nrich.maths.org/13532>

Stem sentences:

... is tall and ... is short.

... is long and ... is short.

... is taller than...

... is shorter than...

... is the tallest.

... is the shortest.

Weight

Model language heavy/ light when carrying objects, as part of the daily routine. Encourage children to experience holding objects of different weight. Associate heavier objects with a downwards pull when you hold them, linking to weighing scales. Have small heavy objects and large lighter objects, to address misconception of larger things being heavier. Have weighing scales available in the home corner and playdough areas.

Other resources:

<https://nrich.maths.org/9720>



Stem sentences:

- ... is heavy.*
- ... is light.*
- ... is lighter than...*
- ... is heavier than...*

Capacity

Children should have regular access to water and sand play. Model playing with a variety of containers using words, full, empty and half full. Move onto comparing the capacity of different sized containers, commenting on which containers hold more/less water/ sand.

Other resources:

<https://nrich.maths.org/10698>

Stem sentences:

- The cup is full/ half full/ empty*
- The ... holds the least water and the ... holds the most water.*

Other resources to support measure and time:

[Sand: Exploring Measurement | NZ Maths](#)

[Measuring Up | DREME TE \(stanford.edu\)](#)

[Balances : nrich.maths.org](#)

[Let's Talk About Math_ Everyday Fun With Measurement.pdf](#)

[Everyday Fun With Measurement: Let's Talk About Math Video • ZERO TO THREE](#)

Suggested book links for measure and time

1. Spot Bakes a Cake by Eric Hill
2. The Smartest Giant in Town by Julia Donaldson
3. The Balancing Act by Ellen Stoll Walsh



4. Mr Wolf's Week by Colin Hawkins
5. The Line Up Book by Marisabina Russo
6. Dear Zoo by Rod Campbell
7. Jasper's Beanstalk by Nick Butterworth and Mick Inkpen
8. Just a Little Bit by Ann Tompert
9. Washing Line by Jez Alborough
10. What's the Time, Mr. Wolf? by Debi Gliori

Expected learning trajectory for measuring, attributes, comparison and conservation *Progression in time shown in italics*

Under 2 years old:

- a child will experience and explore items of different sizes
- enjoying both filling and emptying containers
- *they show an appreciation that things may happen now or at another time*

At 2 years old:

- a child will demonstrate an understanding of size by gesturing, using their words or their response
- *anticipate what comes next in their daily routine, for example knowing it's home time after story time*

At 3 years old :

- a child will compare 2 items using the language of longer/shorter heavier/lighter
- pour from one container to another and compare amount
- sequence a small number of familiar events

At 4 years old and over :

- Use direct comparison to find the longer/shorter and heavier/lighter of two items, recognising when they are the same.
- Fill a container using a smaller container or spoon to see how much it holds.
- Use a ruler, stick, paper strip or length of string as a measurer to measure the length of two objects and find which is the longer/shorter.
- Use time words such as yesterday, tomorrow or the days of the week.