



# The Gateway Federation

## Mathematics & The Early Years

# Early Maths

Research on children's learning in the first six years of life demonstrates the importance of early experiences in mathematics. An engaging and encouraging climate for children's early encounters with mathematics develops their confidence in their ability to understand and use mathematics. These positive experiences help children to develop dispositions such as curiosity, imagination, flexibility, inventiveness, and persistence, which contribute to their future success in and out of school (Clements & Conference Working Group, 2004).

The NCTM (National Council of Teachers of Mathematics) states

***“Young learners’ future understanding of mathematics requires an early foundation based on a high-quality, challenging, and accessible mathematics education. Young children in every setting should experience mathematics through effective, research- based curricula and teaching practices. Such practices in turn require that teachers have the support of policies and resources that enable them to succeed in this challenging and important work.”***

Statutory framework for the early years foundation stage 1 September 2021:

Mathematics 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.

## **THE EARLY YEARS FOUNDATION STAGE (taken from the 2023 EYFS Handbook)**

### **Mathematics**

#### ***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 aids) 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:

- Verbally count 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.

# In preparation for addition and subtraction

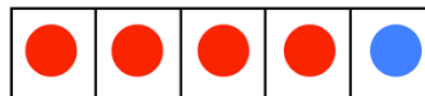
- Children are introduced to and encouraged to develop their subitising skills in the nursery. Opportunities are provided to ensure that they recognise quantities and can manipulate concrete resources in order to prove their answers and reasoning. An enabling environment encourages this in continuous provision.
- In Nursery children are exposed to vocabulary that enables them to express the reasons for their answers.
- In Reception these skills are furthered by asking the children to independently reason their answers and show their understanding of quantities by using sentences such as “*I know there are 4 because there’s a group of 2 here and a group of 2 there and I know that 2 and 2 makes 4*”
- When subitising, children are encouraged to represent what they see through marks and pictures.
- Subitising skills are furthered in Reception and each number is looked at in detail. Children are expected to be able to subitise to at least 4 and be able to explain and reason their answers according to the number bonds they know.
- Children are encouraged to manipulate small resources in order to show that they understand all the ways of making each number. Children demonstrate what they know about number in order to solve problems in everyday circumstances.
- When teaching subitising children are given real life objects to not only count with but also to look at and to subitise quantities that may contained within it. For example legs on a spider or spots on a bow etc.
- Throughout the EYFS children are exposed to subitising in everyday contexts and situations. For example in snack, counting fruit, cups or straws.

- Children are introduced to the part, part, whole method once they are fluent in subitising and are encouraged to use pictures and marks to record their workings
- When children are confident with subitising, are fluent in both their understanding of quantity and reasoning their thoughts they are then able to transfer their skills to wider addition and subtraction problems.
- Number bonds of higher numbers, outside their ability to subitise are taught to 10 and subitising skills drawn upon to aid their reasoning.
- Children are introduced to 10s frames to help develop subitising, addition and subtraction skills.

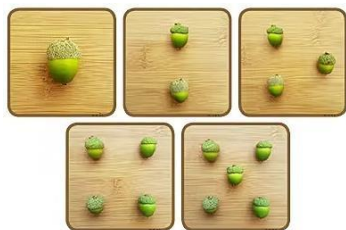
# Things you will see us using to help us develop a sense of number.



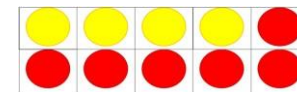
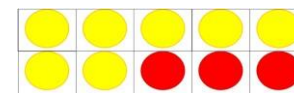
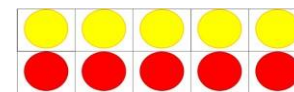
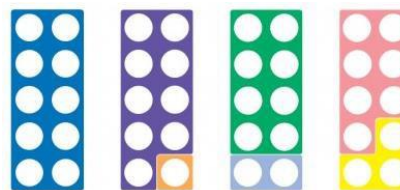
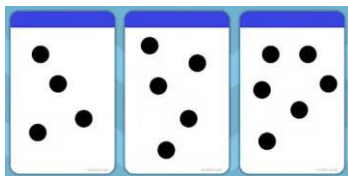
We learn that we have 5 fingers on one hand.



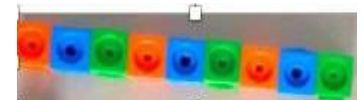
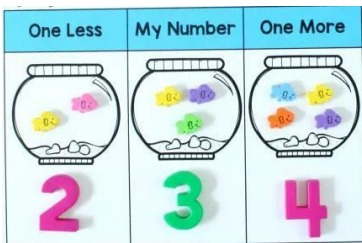
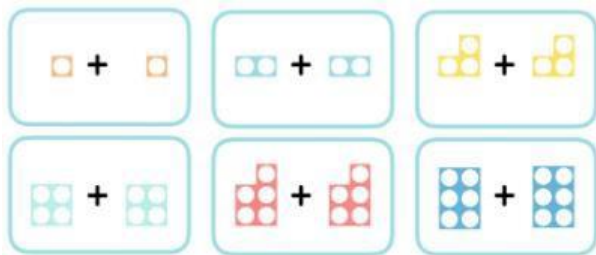
We learn that we can show numbers in different ways.



We learn to spot numbers when they are in an ordered configuration and when they are not.



Things you will see us using when learning about pattern.



## Key to understanding the age ranges:

### A Unique Child

When referring to the guidance for the Areas of Learning and Development, it is important to start with what is observed and understood about the individual child.

A typical progression in development and learning has been grouped into broad ranges in the column for A Unique Child. This is intended to support knowledge of a general pattern of child development.

Practitioners can identify a range that most closely describes the child's development and learning, and then consider the suggestions for adults within that range (or earlier ranges) to plan to support continued progress.

The guidance can also help to identify when children may need additional support, by referring to the key provided here which links the ranges to typical age spans.

In summative assessments, comparing best-fit judgements of ranges with typical age spans can help identify whether children are roughly on track, or are progressing more slowly or quickly. This information can be useful for leaders and managers in planning for the continual improvement of practice and provision in the setting.




Children develop and learn at their own rates, and in their own ways. The guidance on possible development trajectories should not be taken as necessary steps, nor assumed to be in a particular order, for individual children. The guidance should not be used as a checklist. The age links overlap Ranges because these are not fixed age boundaries but suggest a typical range of development.





A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
<p><b>Number</b></p> <ul style="list-style-type: none"><li>• Reacts to changes of amount when those amounts are significant (more than double)</li></ul>	<ul style="list-style-type: none"><li>• Notice and mirror children's reactions to changes in amount.</li><li>• Add to objects &amp; draw attention to the change in amount, using words like <i>more</i>.</li><li>• When feeding babies comment on whether they would like more after being winded, e.g. <i>Oh, you want more</i>.</li><li>• Use feeding, changing and bathing times for finger-play with young babies</li></ul>	<ul style="list-style-type: none"><li>• Provide small groups of the same objects in treasure baskets, as well as single items.</li></ul>
<p><b>Spatial awareness</b></p> <ul style="list-style-type: none"><li>• Explores space when they are free to move, roll and stretch</li><li>• Developing an awareness of their own bodies, that their body has different parts and where these are in relation to each other</li></ul>	<ul style="list-style-type: none"><li>• Support babies' developing awareness of their own bodies e.g. through baby massage and singing songs</li><li>• During floor play sometimes place objects that are just in or just out of reach, including small objects on cloths that babies can pull towards themselves.</li></ul>	<ul style="list-style-type: none"><li>• Provide opportunities for babies to move freely on carpets, grass etc. Observe and sensitively support babies' play and give them long stretches of uninterrupted time to explore.</li><li>• Provide low mirrors to support babies to develop a body awareness.</li></ul>
<p><b>Shape</b></p> <ul style="list-style-type: none"><li>• Explores differently sized and shaped objects</li><li>• Beginning to put objects of similar shapes inside others and take them out again</li></ul>	<ul style="list-style-type: none"><li>• Encourage babies' explorations of the characteristics of objects, e.g. by rolling a ball or sliding a block.</li><li>• Demonstrate putting items inside others of similar shape</li></ul>	<ul style="list-style-type: none"><li>• Provide interestingly shaped objects to explore.</li><li>• Make towers for children to knock down using objects that stack.</li></ul>
<p><b>Pattern</b></p> <ul style="list-style-type: none"><li>• Shows interest in patterned songs and rhymes, perhaps with repeated actions</li><li>• Experiences patterned objects and images</li><li>• Begins to predict what happens next in predictable situations</li></ul>	<ul style="list-style-type: none"><li>• Sing patterned songs and rhymes with predictable movements or actions (including from children's families).</li><li>• Move with babies to the rhythm patterns in familiar songs, Encourage older babies to join in tapping and clapping along to simple rhythms.</li><li>• Use repeated noises, movements and activities.</li><li>• Play simple "to and fro" games, passing and rolling between the adult and child so they begin to predict which comes next.</li></ul>	<ul style="list-style-type: none"><li>• Plan for adults to have time to enjoy repetitive activities with babies.</li><li>• Provide resources with high-contrast patterns.</li></ul>
<p><b>Measures</b></p> <ul style="list-style-type: none"><li>• Responds to size, reacting to very big or very small items that they see or try to pick up</li></ul>	<ul style="list-style-type: none"><li>• Comment on the size and weight of objects when babies grasp objects that are <i>big</i> or <i>heavy</i>.</li><li>• During water play and bathing routines, show filling and emptying containers.</li><li>• At the end of mealtimes show and comment on the empty bowl, cup or bottle: <i>All gone!</i></li></ul>	<ul style="list-style-type: none"><li>• Provide a range of objects of various lengths and weights in treasure baskets to excite and encourage babies' interests including larger and smaller items.</li></ul>

# Mathematics

A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
 <p><b>Number</b></p> <ul style="list-style-type: none"> <li>• May be aware of number names through their enjoyment of action rhymes and songs that relate to numbers</li> <li>• Looks for things which have moved out of sight</li> </ul>	<ul style="list-style-type: none"> <li>• Take opportunities during play to sing number rhymes.</li> <li>• During personal care routines make a point of using numbers.</li> <li>• Play peek-a-boo hiding games with toys and people.</li> </ul>	<ul style="list-style-type: none"> <li>• Plan to sing number rhymes with actions. Involve families in sharing number rhymes from home cultures.</li> </ul>
<p><b>Spatial awareness</b></p> <ul style="list-style-type: none"> <li>• Explores space around them and engages with position and direction, such as pointing to where they would like to go</li> </ul>	<ul style="list-style-type: none"> <li>• Use spatial words during everyday play and routines. or one-word comments e.g. as you get children <i>in</i> and <i>out</i> of a highchair.</li> <li>• Take opportunities to play hide and reveal games with objects in boxes and under cups.</li> <li>• Support babies' physical experience of positions and direction, e.g. describing <i>up</i> and <i>down</i>.</li> </ul>	<ul style="list-style-type: none"> <li>• Play games that involve curling and stretching, popping <i>up</i> and bobbing <i>down</i>.</li> <li>• Provide boxes, cloths and bags for children to store, hide and transport items.</li> <li>• Provide nested boxes, cups and toys of different sizes that fit inside each other.</li> <li>• Share books that provide opportunities to use spatial language and describe movement</li> </ul>
<p><b>Shape</b></p> <ul style="list-style-type: none"> <li>• Stacks objects using flat surfaces</li> <li>• Responds to changes of shape</li> <li>• Attempts, sometimes successfully, to match shapes with spaces on inset puzzles</li> </ul>	<ul style="list-style-type: none"> <li>• When playing with malleable materials draw attention to shapes as they are created and changed.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide blocks and boxes to stack, build and solve problems with.</li> <li>• Provide a range of inset puzzles and support children as they explore matching shapes with spaces.</li> </ul>
<p><b>Pattern</b></p> <ul style="list-style-type: none"> <li>• Joins in with repeated actions in songs and stories</li> <li>• Initiates and continues repeated actions</li> </ul>	<ul style="list-style-type: none"> <li>• Talk about patterns in the environment e.g. spots and stripes on clothing or bumps in the pavement.</li> <li>• Spot opportunities to play "back and forth" and repetitive "again" games.</li> </ul>	<ul style="list-style-type: none"> <li>• Sing familiar songs with repeated actions, jig to and tap out simple beats, encouraging children to join in.</li> <li>• Provide items for children to make repetitive sounds.</li> </ul>
<p><b>Measures</b></p> <ul style="list-style-type: none"> <li>• Shows an interest in objects of contrasting sizes in meaningful contexts</li> <li>• Gets to know and enjoys daily routine</li> <li>• Shows an interest in emptying containers</li> </ul>	<ul style="list-style-type: none"> <li>• During play and everyday contexts, comment on the sizes and weights of objects using a range of language such as <i>big</i>, <i>huge</i>, <i>enormous</i>, <i>long</i>, <i>tall</i>, <i>heavy</i>.</li> <li>• Talk about what is going to happen and what has happened during the day using <i>first</i>, <i>next</i> and <i>then</i>.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide big and little versions of objects for children to play with and compare.</li> <li>• Share picture books showing objects of contrasting sizes.</li> </ul>





RANGE  
3

A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
<p><b>Comparison</b></p> <ul style="list-style-type: none"><li>• Responds to words like <i>lots</i> or <i>more</i></li></ul> <p><b>Counting</b></p> <ul style="list-style-type: none"><li>• Says some counting words</li><li>• May engage in counting-like behaviour, making sounds and pointing or saying some numbers in sequence</li></ul> <p><b>Cardinality</b></p> <ul style="list-style-type: none"><li>• Uses number words, like <i>one</i> or <i>two</i> and sometimes responds accurately when asked to give one or two things</li></ul>	<ul style="list-style-type: none"><li>• Talk with young children about <i>lots</i>, <i>more</i> and <i>not many</i> and <i>not enough</i> as they play.</li><li>• Draw attention to contrasting differences and changes in amounts e.g. adding more bricks to a tower or eating things up.</li><li>• Model counting things in everyday situations and routines.</li><li>• Take opportunities to say number words in order with children as they play, e.g. <i>1, 2, 3 go!</i></li><li>• Use number words in meaningful contexts, e.g. <i>Here is your other mitten. Now we have two.</i></li></ul>	<ul style="list-style-type: none"><li>• Play hiding games so children notice that something has gone.</li><li>• Provide varied sets of objects for playful opportunities for children to independently explore <i>lots</i>, <i>more</i>, <i>not many</i> and <i>not enough</i>.</li><li>• Count while engaging in everyday tasks and while moving around.</li><li>• Sing songs with counting strings.</li></ul>
<p><b>Spatial Awareness</b></p> <ul style="list-style-type: none"><li>• Enjoys filling and emptying containers</li><li>• Investigates fitting themselves inside and moving through spaces</li></ul>	<ul style="list-style-type: none"><li>• Model thinking during tidy up routines to promote logic and reasoning about where things fit in or are kept.</li><li>• Support children's interest in body-sized spaces and provide commentary on the child going <i>inside</i>, <i>under</i>, <i>over</i>, <i>between</i> and <i>squeezing through</i>.</li><li>• Look for opportunities to use spatial language during play activities.</li></ul>	<ul style="list-style-type: none"><li>• Designate specific places or spaces for items to be kept and fitted into for tidying.</li><li>• Respect children's urge to explore spaces, to get inside and move between.</li><li>• Build towers <i>up</i> for the child to knock <i>down</i>.</li><li>• Provide shape sorters and packaging where children can hide, enclose or post items through holes.</li></ul>
<p><b>Shape</b></p> <ul style="list-style-type: none"><li>• Pushes objects through different shaped holes, and attempts to fit shapes into spaces on inset boards or puzzles</li><li>• Beginning to select a shape for a specific space</li><li>• Enjoys using blocks to create their own simple structures and arrangements</li></ul>	<ul style="list-style-type: none"><li>• Model thinking about the properties of shapes when selecting them to fit into spaces, e.g. <i>Oh look, we need a round one.</i></li><li>• When playing alongside children who are building, provide commentary about the shapes you are using.</li></ul>	<ul style="list-style-type: none"><li>• Provide a range of inset board and puzzles with large pieces.</li><li>• Provide a range of construction materials for independent play.</li><li>• Organise storage by their shape, with photos or silhouettes to show where things are kept.</li></ul>
<p><b>Pattern</b></p> <ul style="list-style-type: none"><li>• Becoming familiar with patterns in daily routines</li><li>• Joins in with and predicts what comes next in a story or rhyme</li><li>• Beginning to arrange items in their own patterns, e.g. lining up toys</li></ul>	<ul style="list-style-type: none"><li>• Highlight different times of the day and talk about what comes next within the pattern of the day.</li><li>• Leave a space for children to do the next action or word in familiar songs and stories with repeating elements.</li><li>• Comment on what is <i>the same</i> and what is <i>over and over again</i> in patterns found in the environment.</li></ul>	<ul style="list-style-type: none"><li>• Plan to share stories and songs that contain repeated elements which help children to anticipate what might come next.</li></ul>

## A Unique Child: what a child might be doing

## Positive Relationships: what adults might do

## Enabling Environments: what adults might provide

RANGE 3  
(cont.)

### Measures

- Shows an interest in size and weight
- Explores capacity by selecting, filling and emptying containers, e.g. fitting toys in a pram
- Beginning to understand that things might happen now or at another time, in routines

- Use the language of size and weight as children are involved in everyday play and routines.
- Use the language of capacity as children explore water or sand to encourage them to think about when something is *full*, *empty* or *holds more*.
- Emphasise the sequence within familiar activities or routines.

- Provide a range of objects, including big, heavy and awkward ones that can be transported, both indoors and outdoors.
- Provide different sizes and shapes of bags, boxes and containers so that children can experiment with filling, experiencing weight and size.
- Plan to share images and books which show the order of daily routines.



### Comparison

- Beginning to compare and recognise changes in numbers of things, using words like *more*, *lots* or *'same'*

### Counting

- Begins to say numbers in order, some of which are in the right order (ordinality)

### Cardinality (*How many?*)

- In everyday situations, takes or gives two or three objects from a group
- Beginning to notice numerals (number symbols)
- Beginning to count on their fingers.

- Include the number sequence in everyday contexts and songs so children experience the order of the numbers (ordinality)
- Encourage children to explore the collections they make, comparing amounts and counting some of the items, emphasising the last number, e.g. 1,2,3. *There are 3 leaves.*
- Use opportunities to model and encourage counting on fingers.
- When singing number rhymes with props, draw attention to contrasting differences and changes in numbers, checking together *How many now?*
- Point out the number of things whenever possible, e.g. rather than just *chairs*, say *four chairs*.
- Encourage children to use marks to represent their mathematical ideas in role play.
- Help children to give or get two or three items, e.g. during snack time help children to take two pieces of fruit.

- Provide buckets and bags for children to create collections of objects which they can count.
- Provide mark-making materials indoors and outdoors for children to represent their own ideas in play.
- Provide opportunities for children to explore cardinality in the environment using self-correcting resources, e.g. jigsaw with two ducks and the number two, or displays showing the numeral and the number of items.
- Sing counting songs and rhymes which help to develop children's understanding of number.
- Say the counting sequence going to higher numbers, in a variety of contexts, indoors and out, and sometimes counting backwards.

RANGE 4

### Spatial Awareness

- Moves their bodies and toys around objects and explores fitting into spaces
- Begins to remember their way around familiar environments
- Responds to some spatial and positional language
- Explores how things look from different viewpoints including things that are near or far away

- Encourage children to predict what they will see next on a familiar route.
- Take everyday opportunities to use words for position and direction accompanied by gesture (e.g. *in*, *on*, *inside*, *under*, *over*) using equivalent terms for these in home languages through liaison with families where possible.
- Enjoy games involving jumping, running and hiding and make very simple obstacle courses, e.g. *going up* and *down*.
- Model your thinking when arranging things, using some position words.
- Help children to create simple roads and rail tracks and talk about position.
- Value children's explorations of spaces and viewpoints and their interest in how things look different.

- Design outdoor spaces where children can learn through a variety of spatial experiences (*going under, over, around, on top, through*) and hear spatial language in context.
- Encourage children to freely communicate their mathematical thinking through gesture, talk and graphical signs.
- Plan stimulating indoor and outdoor spaces where children make choices about where to go and create their own routes. Provide materials to create trails.
- Provide resources for transporting.



# Mathematics

A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
 <p><b>Shape</b></p> <ul style="list-style-type: none"> <li>• Chooses puzzle pieces and tries to fit them in</li> <li>• Recognises that two objects have the same shape</li> <li>• Makes simple constructions</li> </ul>	<ul style="list-style-type: none"> <li>• Chat about the shape of the pieces and the holes when fitting pieces into inset puzzles.</li> <li>• Model comparing two objects to see if they have the same shape in purposeful contexts.</li> <li>• Suggest choosing a particular shaped item for a purpose.</li> <li>• Model your thinking when building.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide a range of inset and jigsaw puzzles of increasing complexity for children to choose.</li> <li>• Provide a variety of construction materials including some with identical pieces so that children freely explore <i>same</i> and <i>different</i>.</li> </ul>
<p><b>Pattern</b></p> <ul style="list-style-type: none"> <li>• Joins in and anticipates repeated sound and action patterns</li> <li>• Is interested in what happens next using the pattern of everyday routines</li> </ul>	<ul style="list-style-type: none"> <li>• Talk with children about the patterns you notice around you.</li> <li>• Comment on and help children to recognise the patterns they make in their mark making, loose parts and construction.</li> <li>• Draw children's attention to the patterns in their routines by asking what comes next.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide a range of natural and everyday materials, as well as blocks and shapes, with which to make patterns.</li> <li>• Plan opportunities for children to experience pattern such as percussion, music and action games that involve repeated sounds or actions.</li> </ul>
<p><b>Measures</b></p> <ul style="list-style-type: none"> <li>• Explores differences in size, length, weight and capacity</li> <li>• Beginning to understand some talk about immediate past and future</li> <li>• Beginning to anticipate times of the day such as mealtimes or home time</li> </ul>	<ul style="list-style-type: none"> <li>• Use everyday opportunities to describe everyday items and contexts using informal language of size (<i>giant, teeny, big, little, huge, small</i>), length (<i>long, tall, short</i>), weight (<i>heavy, light</i>) and capacity (<i>full, empty</i>).</li> <li>• Observe children's problem-solving when ordering things by size, e.g. stacking cups, sensitively supporting by offering one if they are really struggling.</li> <li>• Look out for opportunities to compare things purposefully such as finding out whether a teddy will fit in a bed.</li> <li>• When children talk about their experiences at home and in the setting, use some language of time (<i>before, later, soon, next, after, morning, afternoon, evening, night-time</i>).</li> <li>• In everyday activities, make a commentary about the sequence of events.</li> <li>• When sharing stories and books, draw attention to routines and time sequences within them.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide similar items of contrasting sizes so that children have many opportunities to encounter the language of size.</li> <li>• Provide resources with clearly different weights to support direct comparison, and something to carry them in.</li> <li>• Provide equipment with varied capacities and shapes in the sand, water, mud kitchen and role play areas.</li> </ul>

## A Unique Child: what a child might be doing



### Comparison

- Compares two small groups of up to five objects, saying when there are the same number of objects in each group, e.g. *You've got two, I've got two. Same!*

### Counting

- May enjoy counting verbally as far as they can go
- Points or touches (tags) each item, saying one number for each item, using the stable order of 1,2,3,4,5.
- Uses some number names and number language within play, and may show fascination with large numbers
- Begin to recognise numerals 0 to 10

### Cardinality

- Subitises one, two and three objects (without counting)
- Counts up to five items, recognising that the last number said represents the total counted so far (cardinal principle)
- Links numerals with amounts up to 5 and maybe beyond
- Explores using a range of their own marks and signs to which they ascribe mathematical meanings

### Composition

- Through play and exploration, beginning to learn that numbers are made up (composed) of smaller numbers
- Beginning to use understanding of number to solve practical problems in play and meaningful activities
- Beginning to recognise that each counting number is one more than the one before
- Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same


## Positive Relationships: what adults might do

- Encourage children to share items between two people or toys.
- Capitalise on children's fascination with counting by joining in when they count in games.
- Enjoy counting forwards and back (sometimes to much higher numbers). Use different voices, e.g. high or growly.
- Use opportunities within daily routines to support children's developing sense of number.
- Model and encourage counting and representing numbers within role play, e.g. making a telephone call using a list of numbers.
- Value children's own mathematical representations within their pretend play.
- When counting with children, playfully make deliberate mistakes for fun, expecting children to correct them.
- Model writing numerals, e.g. on badges, birthday cards and banners.
- When counting objects with children emphasise the cardinal principle: 1, 2, 3, *there are three cups*.
- Invite children to count out a number of things from a larger group, e.g. *Can you get five crackers?*
- Encourage children to use their fingers to show an amount e.g. when asking another child to share resources, to show on their fingers how many they need.
- Emphasise the *one more, one less* pattern in rhymes and traditional tales, asking children to predict the next number.
- Model wondering and talking about how you might solve a number problem.
- Value and support children to use their own graphics when problem solving.

## Enabling Environments: what adults might provide

- Provide a numeral rich environment, e.g. in role-play areas, mud-kitchen recipes, numbers on trikes and toilet doors.
- Provide numerals that children can pick up and use within all aspects of their play.
- Provide resources indoors and outside for children to explore and talk about higher numbers.
- Model using objects to illustrate counting songs, rhymes and number stories, sometimes using pictures and numerals, to enable children to use those resources independently.
- Play with either dot or numeral dice. Discuss that six on the dice is worth more than four.
- Provide a variety of mathematical picture books and share them as part of "warm and cuddly" maths times.
- Explore different arrangements of the same number, e.g. partitioning five in different ways; hiding one group and "guessing" the hidden number.
- Model counting items rhythmically, including objects into a container, claps or drumbeats.
- Support children to choose how to arrange collections of two, three and four objects in different ways.
- Provide spaces to display children's ongoing mathematical thinking, e.g. their own ways of representing their thinking, and scribing children's words.



A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
 <p><b>Spatial Awareness</b></p> <ul style="list-style-type: none"> <li>• Responds to and uses language of position and direction</li> <li>• Predicts, moves and rotates objects to fit the space or create the shape they would like</li> </ul>	<ul style="list-style-type: none"> <li>• When children are exploring, use the language of position and direction in context (<i>in, on, inside, under, over</i>, progressing to <i>between, beside, next to, through, along</i>, including relative terms which depend on where you are, e.g. <i>behind, in front of, forwards, backwards</i>) using equivalent terms for these in home languages through liaison with families where possible.</li> <li>• On walks, in pictures or while playing, point out how things or people that are far away look smaller.</li> <li>• Support children in their problem solving when they are creating rail tracks and road layouts.</li> <li>• In block play, sensitively support and challenge experienced builders to make bridges and enclosures.</li> <li>• Encourage children to persevere with jigsaws, perhaps demonstrating "hovering" jigsaw pieces to check if they will fit.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide spaces to display children's ongoing mathematical thinking, e.g. their own ways of representing their thinking and scribing children's words.</li> <li>• Provide opportunities for children to explore position themselves <i>inside, behind, on top</i> and so on.</li> <li>• Provide picture books to stimulate discussion about position and direction.</li> <li>• Create trails and treasure hunts with the children.</li> <li>• Organise the indoor and outdoor environment with outlines for objects or specific places for children to tidy up items by fitting them into the designated space.</li> </ul>
<p><b>Shape</b></p> <ul style="list-style-type: none"> <li>• Chooses items based on their shape which are appropriate for the child's purpose</li> <li>• Responds to both informal language and common shape names</li> <li>• Shows awareness of shape similarities and differences between objects</li> <li>• Enjoys partitioning and combining shapes to make new shapes with 2D and 3D shapes</li> <li>• Attempts to create arches and enclosures when building, using trial and improvement to select blocks</li> </ul>	<ul style="list-style-type: none"> <li>• Help children to choose shapes for a purpose, e.g. a triangular block for a roof and the wedge-shaped block for a ramp.</li> <li>• Offer an appropriate or inappropriate shape for what you think the child's purpose might be to investigate their thinking.</li> <li>• As children experience shapes, use informal language (e.g. <i>slanty, pointy, twisty, wiggly, bumpy</i>), common shape names (e.g. <i>cylinder, cone, circle, square</i>) and "nearly" shapes (e.g. <i>This is almost a square but it's got curvy corners</i>). Find out and use equivalent terms for shapes in home languages.</li> <li>• Discuss how shapes can be partitioned in everyday contexts, e.g. cutting food in different ways.</li> <li>• Value children's constructions and solutions to problems they have set themselves and talk about how the shapes have combined to make new shapes.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide differently shaped resources to handle, carry, move and explore.</li> <li>• Provide large and small blocks and boxes for construction both indoors and outdoors.</li> </ul>

## Mathematics

A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
<p><b>RANGE 5</b> (cont.)</p> <p><b>Pattern</b></p> <ul style="list-style-type: none"> <li>Creates their own spatial patterns showing some organisation or regularity</li> <li>Explores and adds to simple linear patterns of two or three repeating items, e.g. stick, leaf (AB) or stick, leaf, stone (ABC)</li> <li>Joins in with simple patterns in sounds, objects, games and stories dance and movement, predicting what comes next</li> </ul>	<ul style="list-style-type: none"> <li>Whilst playing alongside children, model simple repeating patterns of two or three items and encourage children to create and continue patterns.</li> <li>Demonstrate arranging objects in spatial patterns when building, collaging or playing with loose parts.</li> <li>Draw children's attention to patterns around them including from a range of cultures.</li> <li>When making patterns, help children to solve problems.</li> </ul>	<ul style="list-style-type: none"> <li>Provide a range of items for free exploration of patterning indoors and outdoors including natural materials, pattern blocks, loose parts, mats, trays and strips.</li> <li>Encourage children to join in with body patterns or repeating sections of songs.</li> <li>Pause to encourage prediction when enjoying stories and rhymes with repeating elements, sometimes using props.</li> <li>Emphasise the repeating pattern when turn taking.</li> <li>Provide patterned resources including those representing a range of cultures, such as clothing, fabrics or wrapping paper.</li> </ul>
<p><b>Measures</b></p> <ul style="list-style-type: none"> <li>In meaningful contexts, finds the longer or shorter, heavier or lighter and more/less full of two items</li> <li>Recalls a sequence of events in everyday life and stories</li> </ul>	<ul style="list-style-type: none"> <li>During play, model comparing lengths and distances.</li> <li>Look out for meaningful opportunities for children to compare by length, weight, capacity and time using comparative language (<i>longer/shorter, heavier/lighter, holds more/holds less, longer time/shorter time</i>).</li> <li>Encourage children to participate in seesaw and balance scale play.</li> <li>Encourage children to respond to and use words such as <i>before, after, soon or later</i> when talking about routines, recent events and events in a story or rhyme.</li> </ul>	<ul style="list-style-type: none"> <li>Provide problem-solving opportunities indoors and outdoors for comparing length, weight and capacity, e.g. <i>Which is the best bottle so we'll have enough drink for everyone at the picnic?</i></li> <li>Ask children to predict <i>What happens next?</i> using visual timetables, books and stories.</li> <li>Provide items that can be ordered by size, such as plates and clothes in role play.</li> </ul>





## A Unique Child: what a child might be doing

### Comparison

- Uses number names and symbols when comparing numbers, showing interest in large numbers
- Estimates of numbers of things, showing understanding of relative size

### Counting

- Enjoys reciting numbers from 0 to 10 (and beyond) and back from 10 to 0
- Increasingly confident at putting numerals in order 0 to 10 (ordinality)

### Cardinality

- Engages in subitising numbers to four and maybe five
- Counts out up to 10 objects from a larger group
- Matches the numeral with a group of items to show how many there are (up to 10)

### Composition

- Shows awareness that numbers are made up (composed) of smaller numbers, exploring partitioning in different ways with a wide range of objects
- Begins to conceptually subitise larger numbers by subitising smaller groups within the number, e.g. sees six raisins on a plate as three and three
- In practical activities, adds one and subtracts one with numbers to 10
- Begins to explore and work out mathematical problems, using signs and strategies of their own choice, including (when appropriate) standard numerals, tallies and "+" or "-"

## Positive Relationships: what adults might do

- Model comparing numbers in problems about fair shares.
- Play games such as hide and seek that involve counting, forwards and backwards.
- Talk with children about the strategies they have used to solve a problem. Spot opportunities to playfully pose composition problems for children to explore.
- Discuss the order of numbers in context, e.g. finding a page number.
- Enjoy subitising games and sustained shared thinking about number, indoors and outdoors.
- Encourage cardinal counting by saying how many there are after counting (...6, 7, 8. *There are 8 balls.*)
- In everyday activities, ask children to count out a number of things from a group (e.g. *Could you get seven cups for snacktime?*)
- Encourage children to make predictions and visualise the outcome in stories, rhymes and songs if one (or two) is added or taken away.
- Talk to children about the marks and signs they use to represent and communicate their thinking. As appropriate, model and discuss informal and standard ways (e.g. using arrows, plus and minus signs).
- Begin to model calculations in mathematical stories and number rhymes and in real contexts, using a range of ways of representing (e.g. five-frames). Use both informal and standard ways to record these, including tallies and symbols. Discuss children's own graphical strategies to solve problems, using some vocabulary of addition and subtraction.

## Enabling Environments: what adults might provide

- Involve children in voting, e.g. for books to read at story time, using linking cubes with children's names on.
- Discuss examples and display large numbers including hundreds, thousands and a million.
- Jump with children along a number track, counting each jump or counting on.
- Sing counting songs and count together forwards and backwards, sometimes starting from different numbers and in different step sizes. Discuss numbers coming *before*, *after* and *between* and stress patterns.
- Plan opportunities to order mixed-up numerals.
- When counting groups as part of routines, e.g. self-registration with ten-frames, dinner chart etc., record the final total as a label for children to see.
- Subitise with children, talking about how they see numbers of things made up in a variety of arrangements (e.g. recognising odd and even numbers).
- Pose everyday estimation problems and establish mental estimation benchmarks, e.g. more or less than 10.
- Set up an estimation station where everyone records guesses; later count and order the guesses.
- Build counting and ways of representing numbers into everyday routines.
- Provide numeral cards for children to order on a washing line.
- Play subitising games which involve quickly revealing and hiding numbers of objects, perhaps showing numeral cards and fingers.
- Drop marbles into a tin and ask the children to listen (without looking) to count how many there are.
- Provide opportunities for children to match a number of objects to the numeral, including zero, and display number lines to 100 at child height.
- Provide dice, board and card games, sometimes involving older children, families and members of the local community.
- Provide resources to make "staircase" patterns which show that the next counting number includes the previous number plus one.
- Display children's mathematical representations, including explanations of the children's meaning making.

## A Unique Child: what a child might be doing

### Spatial Awareness

- Uses spatial language, including following and giving directions, using relative terms and describing what they see from different viewpoints
- Investigates turning and flipping objects in order to make shapes fit and create models; predicting and visualising how they will look (spatial reasoning)
- May enjoy making simple maps of familiar and imaginative environments, with landmarks

### Shape

- Uses informal language and analogies, (e.g. *heart-shaped and hand-shaped leaves*), as well as mathematical terms to describe shapes
- Enjoys composing and decomposing shapes, learning which shapes combine to make other shapes
- Uses own ideas to make models of increasing complexity, selecting blocks needed, solving problems and visualising what they will build

### Pattern

- Spots patterns in the environment, beginning to identify the pattern "rule"
- Chooses familiar objects to create and recreate repeating patterns beyond AB patterns and begins to identify the unit of repeat

## Positive Relationships: what adults might do

- Encourage the use of relative terms (*in front of, behind, before and after, in a line, next to and between*).
- Encourage children to explore what can be seen from different viewpoints.
- Encourage children to describe position and give directions in play and in everyday routines.
- Encourage children to create scaled-down models such as in small world play.
- When children are fitting shapes into an outline or making a model from a 2D picture, help them to select more spatially challenging activities.
- Encourage children to make maps of routes they have walked or travelled in some way.

- Encourage children to use the names of shapes and their properties (e.g. *straight, curved, edges*) and prompt them to say what shapes remind them of.
- Discuss different examples of the same shape (e.g. equilateral and right-angled triangles) in a variety of orientations.
- Take opportunities to discuss the shapes that children paint, draw and collage and shapes noticed in their local environment using regular shapes and shapes with no name.
- When acting out their own stories encourage children to make the shapes involved on their own or with others.
- When constructing, sensitively discuss which shapes make other shapes (e.g. triangles making rectangles and hexagons with pattern blocks or mosaic tiles).
- Challenge children to make more complex constructions such as towers of arches, a window or a staircase.

- Encourage children to notice and appreciate a range of patterns involving repetition and symmetry in the environment, including traditional patterns from a range of cultures.
- Model using symbols to represent a pattern in other ways (e.g. using a spot/cross/dash pattern of symbols and doing a swirl/jump/glide in response).
- Make deliberate mistakes when creating patterns alongside children and playfully challenge them to fix the problem.
- Make border patterns where the repeating pattern continues around an object or frame.

## Enabling Environments: what adults might provide

- Play barrier games (where players have an identical set of objects which are hidden from each other; one player makes an arrangement of objects and gives instructions to the other to try to make the same arrangement).
- Plan opportunities for children to describe and recall familiar routes.
- Engage families in taking photos of familiar things from different viewpoints.
- Provide resources for shape play including unit blocks, pattern blocks, mosaic tiles and jigsaw puzzles with different levels of challenge.
- Teach strategies for solving shape and jigsaw puzzles, describing shape properties and modelling the mathematical vocabulary such as *straight, corner, edges*.
- Play games focussing on the properties of shapes, such as hiding and partially revealing a shape, asking children to say what different shapes it could be or not, and why.
- Provide opportunities for printing patterns using a variety of objects.
- Using photos, challenge children to copy and continue patterns.
- Invite children to create a pattern with the same structure using different objects (e.g. instead of a red/blue/blue pattern, create a sheep/cow/cow pattern).



## Mathematics

### A Unique Child: what a child might be doing



**RANGE 6**  
(cont.)

#### Measures

- Enjoys tackling problems involving prediction and discussion of comparisons of length, weight or capacity, paying attention to fairness and accuracy
- Becomes familiar with measuring tools in everyday experiences and play
- Is increasingly able to order and sequence events using everyday language related to time
- Beginning to experience measuring time with timers and calendars

### Positive Relationships: what adults might do

- When comparing the length, weight and capacity of things in play and everyday activities, encourage children to predict and give reasons.
- Discuss accuracy, for instance matching ends or starting points, balancing exactly or "fullness".
- Support timed challenges by timing runs, trails, obstacle courses, etc. and teach children how to use the stopwatch.
- Discuss the order and sequence of events in routines and role play using the language of time (*first, then, after, before, next, sooner, later*).
- Draw children's attention to visual timetables and clock times, focusing on the hour hand.

### Enabling Environments: what adults might provide

- Have areas where children can explore the properties of objects, compare lengths, weigh and measure.
- Provide objects in a range of contexts varying in length, capacity or weight, including tall thin, short fat, large light and small heavy things.
- Provide pictorial sequences for instructions.
- Model using measuring tools including height charts, rulers, tape-measures, scales and timers.
- Sing songs about the days of the week and months of the year, referring to a calendar. Countdown to events.

#### Statutory ELG: 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 aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

#### Statutory ELG: Numerical Patterns

Children at the expected level of development will:

- Verbally count 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.

#### Statutory Educational Programme: Mathematics

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.