



Mathematics Concept Overview

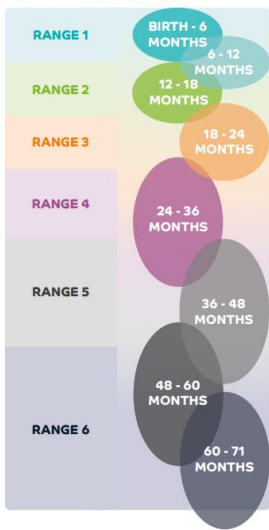
Number Concepts 2-5 years

(taken from <https://birthto5matters.org.uk/>)

The 4 C's of Number

- **Counting:** Reciting the sequence and patterns of number, this could be the oral sequence of words or the saying the numeral words when touch and counting a set of objects.
- **Cardinality:** This means that children count out a set of objects to find out the total quantity and as they say the number words, they understand that the last number word used, is the total quantity in the set.
- **Comparison:** The comparison of different amounts or quantity, being able to have a visual sense of an amount and to see differences between groups of items. It includes comparing and recognising changes in numbers of things, using words like more, lots or 'same' and progressing to 1 more/1 less.
- **Composition:** Seeing smaller amounts in larger quantities and understanding that one number can be made up (composed from) two or more smaller numbers . It includes subitising, recognising how many is in a group without counting, partitioning numbers into other numbers and putting them back together again, processes that will later underpin addition and subtraction.





Counting/Cardinality 2-5 years

A Unique Child:
what a child might be doing

Positive Relationships:
what adults might do

Enabling Environments:
what adults might provide

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.

- 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 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

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

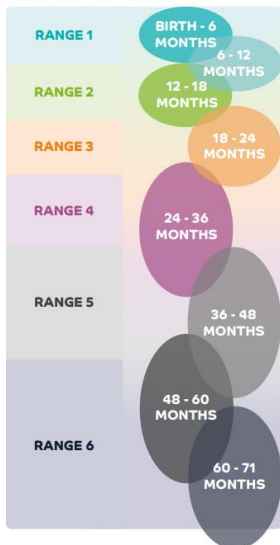
Cardinality

- 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

- 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.

- 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.

RANGE 5



Counting/Cardinality 2-5 years

A Unique Child:
what a child might be doing

Positive Relationships:
what adults might do

Enabling Environments:
what adults might provide

RANGE 6

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)

- 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).

- 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).

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

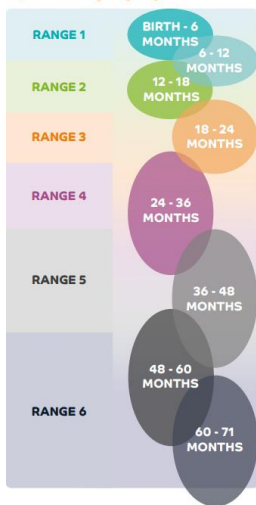
Children at the expected level of development will:

- 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.

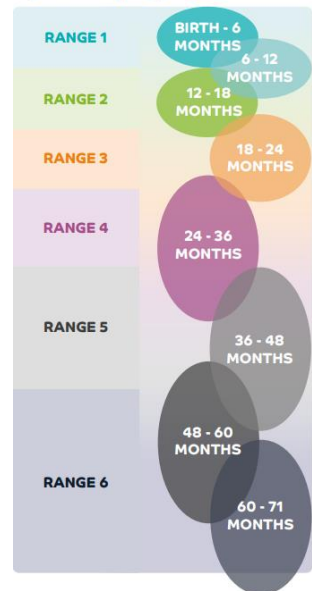




Comparison 2-5 years

	A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
RANGE 4	<p>Comparison</p> <ul style="list-style-type: none"> Beginning to compare and recognise changes in numbers of things, using words like <i>more</i>, <i>lots</i> or <i>'same'</i> 	<ul style="list-style-type: none"> 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. <i>There are 3 leaves.</i> 	<ul style="list-style-type: none"> 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.
RANGE 5	<p>Comparison</p> <ul style="list-style-type: none"> Compares two small groups of up to five objects, saying when there are the same number of objects in each group, e.g. <i>You've got two, I've got two. Same!</i> <p>Counting</p>	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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.
RANGE 6	<p>Comparison</p> <ul style="list-style-type: none"> Uses number names and symbols when comparing numbers, showing interest in large numbers Estimates of numbers of things, showing understanding of relative size 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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.





RANGE 5

RANGE 6

Composition 2-5 years

A Unique Child: what a child might be doing	Positive Relationships: what adults might do	Enabling Environments: what adults might provide
<p>Composition</p> <ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Value and support children to use their own graphics when problem solving. 	<ul style="list-style-type: none"> Provide spaces to display children's ongoing mathematical thinking, e.g. their own ways of representing their thinking, and scribing children's words.
<p>Composition</p> <ul style="list-style-type: none"> 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 "-" 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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.