Birth to Five Matters mathematics guidance with recommended links

Number

Early Childhood Mathematics Group

These charts supplement the mathematics section of Birth to Five Matters, with examples of what children are typically learning and how to support them. They provide links to videos of children and a range of resources for practitioners. This Number document is one of a series about five aspects of mathematics: the others are spatial awareness, shape, pattern and measures. These are presented as separate developmental progressions to help practitioners observe and plan, however in reality children simultaneously draw on a range of areas of learning in their everyday activities and play. Children's mathematical development will depend on their experiences, and the pace of their learning across different aspects will vary. All children learn differently but development tends to broadly follow the sequences described.

The charts include a summary of early number development followed by expanded versions of four aspects of number: counting, comparison, cardinality and composition. These are intended to help practitioners in identifying and supporting the full breadth of number learning. For babies (ranges 1 & 2), guidance is the same across the number strands. The composition strand builds on cardinality and develops later (ranges 5 & 6). The charts can be used alongside Birth to Five Matters and Development Matters.

The embedded links are to specific sources, such as our Mathematical Moments vignettes, some of which include videos. There are also links to more general mathematics guidance (situated along the top of the charts and in the range boxes where these are range specific). For links provided by other organisations, ECMG cannot accept responsibility for their content or longevity.
We hope that they will be useful to individual practitioners and teams of colleagues to support observation, planning and professional development.

Counting

Saying or using the number words. We use many skills to count. The order is crucial and numerals are helpful.

Cardinality

The meaning or 'how many- ness' of numbers. We count or subitise to know 'how many'.

Composition

Numbers are made up of other numbers. 3 is made up of 2 and 1 as well as 1, 1 and 1, also 3 and 0

Ordinality

Ordinality is placing numbers in sequence. 3 comes after 2 and before 4. It is the relationship between numbers.

Comparison

Comparing two or more numbers to find which is more/less (how many), smaller/greater (size) or before/after (order).

Mathematical developmental progressions from birth to five years old
Number: overview

Children's development will depend on their experiences, and the pace of their learning across the different aspects of mathematics will vary. All children learn differently but development tends to follow the sequences described below. Number learning develops alongside and in relation to other areas of maths and indeed children's holistic learning. For younger and older babies (ranges 1 & 2) our guidance is the same for all the number strands. The composition strand develops later in ranges 5 & 6, building on cardinality.

Click on the text links to access examples and related guidance from a range of sources to support practice. You may also find these sources of general guidance helpful for practice around number and other areas of mathematics.

*indicates a login is required (free)

ECMG | Development Matters | Birth to Five Matters | NCETM | Learning Trajectories* | Erikson | DREME

Range	For **counting**, children are learning to...	For **comparison** of number, children are learning to...	For number **cardinality and ordinality**, children are learning to...	For number **composition**, children are learning to...
1 Younger babies	React to changes of amount when those amounts are significant (more than double)*			
2 Older babies	Become aware of number names through their enjoyment of action rhymes and songs involving numbers Look for things which have moved out of sight			
3 Toddlers	Say some number words Engage in counting-like behaviour, making sounds and pointing, saying some numbers in sequence	Respond to words like *lots* or *more*	Use number words, like *one* or *two* and sometimes responds accurately when asked to give one or two things*	
4 2 year olds	Say some numbers in the right order * (ordinality) Begin to count on their fingers	Begin to compare and recognise changes in numbers of things, using words like more, lots or same	In everyday situations, take or give two or three objects from a group Begin to count their fingers Begin to notice numerals (number symbols)	
5 3 year olds	Enjoy counting verbally as far as they can go Point to or touch (tag) each item, saying one number for each, using the stable order of 1,2,3,4,5 …	Compare 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!*	Subitise one, two and three objects (without counting) including fingers Count up to five items, recognising that the last number said represents the total counted so far (cardinal principle)	Through play and exploration, begin to learn that numbers are made up (composed) of smaller numbers Begin to recognise that each counting number is one more than the one before

	Count actions and sounds as well as objects* Use some number names and number language within play, beginning to show fascination with large numbers Begin to recognise numerals 0 to 10		including sounds and actions Link numerals with amounts up to 5 and maybe beyond Explore using a range of their own marks and signs to which they ascribe mathematical meanings	Separate a group of three or four objects in different ways, beginning to recognise that the total is still the same Begin to use understanding of number to solve practical problems in play and meaningful activities
6 4 & 5 year olds	Enjoy reciting numbers from 0 to 10 (and beyond) and back from 10 to 0 Count items beyond 10, including images in irregular arrangements, actions and sounds Become increasingly confident at putting numerals in order 0 to 10 (ordinality)	Use number names and symbols when comparing numbers e.g. knowing six is worth more than four, with dot and numeral dice Know the order of numbers and where they go in relation to others e.g. whether six is before or after five, whether seven is nearer to five or ten. Estimate numbers of things, showing understanding of relative size Show an interest in large numbers, e.g. talking about *hundreds, thousands* and *a million!*	Engage in subitising numbers to four (and maybe five) Count out up to 10 objects from a larger group Match the numeral with a number of items to show how many there are (up to 10)	Show awareness that numbers are made up (composed) of smaller numbers, exploring partitioning in different ways with a wide range of objects Begin to conceptually subitise* larger numbers in less familiar arrangements by subitising smaller groups within the number, e.g. sees six raisins on a plate as three and three In practical activities, add one and subtract one with numbers to 10 Begin to represent mathematical problems, using signs and strategies of their own choice, including (when appropriate) standard numerals, tallies and + or -

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Mathematical learning trajectories from birth to five years old

Number: Counting

Children's learning trajectories will depend on their experiences and the pace of their learning across the different aspects of mathematics will vary. All children learn differently but development tends to follow the sequences described below. Counting is one of the four strands of number (the others are comparison, cardinality and composition). For younger and older babies (ranges 1 & 2) our guidance is the same for all the number strands. The counting strand develops later and is included with ranges 5 & 6. Click on links in the table to access specific examples and guidance to support practice.

You may find the sources below helpful for general guidance about counting and other areas of mathematics. *indicates a login is required (free)

ECMG | Development Matters | Birth to Five Matters | NCETM | Learning Trajectories* | Erikson | DREME

Range	Children are learning to...	Adults might...	The environment might include….
1 Younger babies ECMG Count with me	**React to changes of amount when those amounts are significant (more than double)***	- Notice and mirror children's reactions to changes in amount. - Play peekaboo hiding games with toys and people. - Add to objects & draw attention to the change in amount, using words like more. - Provide opportunities for babies to notice a difference in amounts e.g. when enticing a baby to crawl towards you, offer a choice of one item or a larger number of the same item. - When feeding babies comment on whether they would like more after being winded, e.g. *Oh, you want **more.***	-Small groups of the same objects in treasure baskets, as well as single items e.g. two fir cones or three shells. - Singing number rhymes and finger play during routines like dressing, changing or bathing e.g. Round and round the garden, like a teddy bear..
2 Older babies ECMG Count with me	**Become aware of number names through their enjoyment of action rhymes and songs involving numbers** **Look for things which have moved out of sight**	-Take opportunities to sing relevant number rhymes e.g. Peter hammers with one hammer when a child is hammering or Two little eyes, pointing to their eyes, one by one. - During personal care routines make a point of using numbers e.g. *Let's put one arm through here and one arm through here.*	- Singing number rhymes with actions, related to routines, e.g. Three in the bed. - Engaging families in sharing number rhymes, including those in home languages, e.g. Count with me (Urdu), and from home cultures, e.g. Three craws.
3 Toddlers ECMG Count with me	**Say some number words** **Engage in counting-like behaviour, making sounds and pointing, saying some numbers in sequence**	- Point out small numbers of objects, e.g., *Look, there are two dogs! Here is your other mitten: now we have two.* - Count forwards and backwards e.g., *1, 2, 3!* before revealing something or counting down, *5,4,3,2,1, lift off!* - Model counting objects, emphasising the cardinal meaning of the last number e.g.,*1, 2, 3… that's 3 pieces for you.*	- Counting in everyday situations, e.g. stairs, toys, food items, passing cars, sounds, actions. - Singing songs with counting strings, e.g. One, two, buckle my shoe and 1,2,3,4,5, once I caught a fish alive.

4 **2 year olds** ECMG Count with me	**Say some numbers in the right order** ***(ordinality)** **Begin to count on their fingers**	- Point out the number of things whenever possible e.g. instead of saying *chairs*, say, *four chairs* - count objects, emphasising the cardinal meaning of the last number, e.g. *1,2,3. There are 3 leaves.* - Model and encourage counting on fingers. - When singing number rhymes, draw attention to changes in numbers, checking together, *How many now?* - Help children to give or get two or three items, e.g. during snack time children can each take two pieces of fruit.	- Saying the number sequence, sometimes going to higher numbers or counting backwards, in a variety of contexts, indoors and out, e.g. going up and down stairs, playing hide and seek -Singing number rhymes with props, including those which count forwards: e.g. One little teddy or An elephant went out to play. - Buckets and bags for children to collect large and small objects which they can count e.g. beads, pine cones, pebbles
5 **3 year olds** ECMG Count with me	- **Enjoy counting verbally as far as they can go** **-Point or touch (tag) each item, saying one number for each item, using the stable order of 1,2,3,4,5 …** **-Count actions and sounds as well as objects*** **- Use some number names and number language within play, beginning to show fascination with large numbers** **- Begin to recognise numerals 0 to 10**	- Enjoy counting forwards and back (sometimes to much higher numbers) using rhythmic actions and different voices, e.g. high, low, squeaky or growly. Playfully make deliberate mistakes for children to correct, e.g. *1,2,3,5.* - Model counting items rhythmically, e.g. moving objects into or out of a container, as well as actions and sounds, e.g. jumps, claps and drumbeats -When counting objects emphasise the cardinal meaning of the last word, e.g. *1, 2, **3**: there are **three** cups.* - Encourage children to share items between two people or toys, e.g. playdough cakes, trains or mud pies, counting to check they have the same number. - Invite children to count out a number of things from a larger group, e.g. *Can you get five crackers?* - Emphasise the *one more, one less* pattern in rhymes and traditional tales, using objects, fingers, pictures and numerals, asking children to predict and show the next number e.g. how many frogs will be left on the log after the next one jumps off. - Model using and writing numbers within activities including role play, e.g. making a telephone call using numbers, writing numerals on badges, birthday cards and banners, making books about familiar numbers, e.g. birthdays, bus and door numbers	- Routines involving counting e.g. checking no balls have been lost by reading the label with the numeral and dot pattern on the storage basket or storing cups away from the snack table so children have to count the number of cups needed - Props and numerals for counting songs, rhymes and number stories, for children to use independently. e.g. *5 little speckled frogs*, - Games involving doing a number of actions or collecting a number of things, with both dot and numeral dice. - Numerals that children can pick up and use within all aspects of their play in all areas, including the bike park, mud-kitchen recipes and in role-play, e.g. post-office, telephone, hotel keys, appointment books, diaries and telephone pads - Numerals in order e.g. on toilet doors, on the stairs, on walls, up pillars, as well as on tracks or standing in a line - Resources indoors and out for children to explore and talk about higher numbers e.g. height charts, calculators, large scale number tracks and 100 squares, - A variety of mathematical picture books to share as part of "warm and cuddly" maths times e.g. Count with Maisie, Cheep, cheep, cheep
6 **4 & 5 year olds** ECMG Count with me	**- Enjoy reciting numbers from 0 to 10 (and beyond) and back from 10 to 0** **-Count items beyond 10, including images in irregular arrangements, actions and sounds** **- Become increasingly**	- Count together forwards and backwards, sometimes starting from different numbers. Discuss numbers coming *before, after* and *between* and stress patterns e.g. twenty ONE, twenty TWO… Sometimes count in different step sizes. e.g. *10 fat sausages* number rhyme - Encourage cardinal counting by saying how many there are after counting: *…6, 7, **8.** There are **8 balls**.* - Drop marbles into a tin and ask the children to listen (without looking) and count how many there are. - Model purposeful counting in routines, such as register time, ,snacktime tidying up and lining up, including recording numbers e.g.	- Games such as Hide and seek, which involve counting forwards and backwards. - Large collections of objects to count, order and label in their play, including natural objects and structured resources, e.g. bead strings - resources for large numbers e.g. abacus, 100 square, outdoor number track, including mats and markings, painted or chalked. - A Voting Station, e.g. voting for books to read at story time, using linking cubes with children's names on. - A games centre with commercial and traditional games (snakes and ladders, playing cards, Uno, matching pairs) with a range of numeral

	confident at putting numerals in order 0 to 10 (ordinality)	dinner numbers - 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 about what the outcome will be in stories, rhymes and songs if one is added or taken away. - Discuss the ordinal numbers in context, e.g. finding a page number: *Where is page 7? I know it is after page 5… this is page 10 - Oh no! I've gone too far.* - Model how to count jumps along a number track, counting each movement or counting on e.g. *You've thrown 2 on the dice, you are on 6, now count on: 7, 8.* - Teach children how to play board games- this could involve older children, families or members of the local community - Model recording numbers in different ways e.g. selecting a number card, or Numicon piece, using a calculator, drawing pictures or tallies. Encourage children to combine ways, including their own. - When children are interested, teach them how to form numerals, using a range of playful ways and interesting materials e.g. finger paint, sand, foam, pasting brushes.	and dot dice, spinners with zero, counters and blank tracks for children to create their own. Outdoor counting games (e.g. throwing beanbags in a tyre) with clipboards, whiteboards or chalk to keep score, e.g. tallying - An Estimation Station with objects in a jar (or in a crate outdoors) and a reference jar of 10 items, record guesses then count the objects and order the guesses - Resources to make "staircase" patterns which show that the next counting number includes the previous number plus one. - Mixed-up numerals to put in order e.g. numeral cards for children to peg on a line, number track jigsaws, dot to dot puzzles. - Props for role play queues and turn-taking with tickets e.g. car wash, shoe shop, clinic - Books about ordinal numbers e.g. Loo queue *(The rhino is number 2 in the queue and the tiger is number 5, how many animals between them?)* numbers to 10 e.g. Anno's counting book and large numbers, e.g. How big is a million?

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Mathematical learning trajectories from birth to five years old

Number: Comparison

Children's learning trajectories will depend on their experiences and the pace of their learning across the different aspects of mathematics will vary. All children learn differently but development tends to follow the sequences described below. Comparison is one of the four strands of number (the others are counting, cardinality and composition). For younger and older babies (ranges 1 & 2) our guidance is the same for all the number strands. The composition strand develops later and is included with ranges 5 & 6.

Click on the text links to access examples and related guidance from a range of sources to support practice. You may also find these sources of general guidance helpful for practice around comparison and other areas of mathematics. *indicates a login is required (free)

ECMG | Development Matters | Birth to Five Matters | NCETM | Learning Trajectories* | Erikson | DREME

Range	Children are learning to...	Adults might...	The environment might include….
1 Younger babies ECMG Count with me	**React to changes of amount when those amounts are significant (more than double)***	- Notice and mirror children's reactions to changes in amount. - Play peekaboo hiding games with toys and people. - Add to objects & draw attention to the change in amount, using words like more. - Provide opportunities for babies to notice a difference in amounts e.g. when enticing a baby to crawl towards you, offer a choice of one item or a larger number of the same item. - When feeding babies comment on whether they would like more after being winded, e.g. *Oh, you want **more.***	- Small groups of the same objects in treasure baskets, as well as single items e.g. two fir cones or three shells. - Singing number rhymes and finger play during routines like dressing, changing or bathing e.g. Round and round the garden, like a teddy bear..
2 Older babies ECMG Count with me	**Become aware of number names through their enjoyment of action rhymes and songs involving numbers** **Look for things which have moved out of sight**	- Take opportunities to sing relevant number rhymes e.g. Peter hammers with one hammer when a child is hammering or Two little eyes, pointing to their eyes, one by one. - During personal care routines make a point of using numbers e.g. *Let's put one arm through here and one arm through here.*	- Singing number rhymes with actions, related to routines, e.g. Three in the bed. - Engaging families in sharing number rhymes, including those in home languages, e.g. Count with me (Urdu), and from home cultures, e.g. Three craws.
3 Toddlers ECMG Count with me	**Respond to words like *lots* or *more***	-Talk with young children about *lots, more*, *not many*, *not enough* and *few* as they play. - Draw attention to contrasting differences and changes in amounts e.g. adding more bricks to a tower or eating things up. - Take opportunities to say number words in order with children as they play, e.g. *1,2,3 go!*	- Varied sets of objects for children to independently explore *lots, more, not many* and *not enough* e.g. a huge pile of leaves for throwing, chocolate box or biscuit trays to put items into or counting the number of crackers at snack time. - Share books like More, More, More said the Baby.

4 **2 year olds** ECMG Count with me	**Compare and recognise changes in numbers of things, using words like more, lots or same**	- Include the number sequence in everyday contexts and songs so children experience the order of the numbers (ordinality). - Make and discuss collections with children, encouraging them to compare amounts. - When singing number rhymes with props, draw attention to contrasting differences and changes in numbers e.g. increasing amounts of fruit in The very hungry caterpillar.	- Buckets and bags for children to create collections of objects so they can to compare numbers e.g. beads, pine cones, pebbles - Singing number rhymes with props, including those with increasing numbers e.g. One little teddy or An elephant went out to play - Counting to higher numbers, in a variety of contexts, indoors and out, sometimes counting backwards to zero e.g. playing hide and seek, going up and down stairs.
5 **3 year olds** ECMG Count with me	**Compare 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!***	- Encourage children to share items fairly between two people or toys e.g. playdough cakes, trains or mud pies. - Sometimes suggest making one group bigger than another e.g. *The bigger teddy needs more than the little one.* - Enjoy counting forwards and back (sometimes to much higher numbers). Use different voices, e.g. high or growly. - Emphasise the *one more, one less pattern* in rhymes and traditional tales, asking children to predict the next number, e.g. when one frog jumps off the log.	- Mats, dishes and trays for sharing items between two people or toys. - Stories with props for comparing e.g. Kipper's toybox and More, fewer, less. - Games with dot and numeral dice to do a number of actions or collect a number of things, discussing e.g. *that six on the dice is worth more than the four.* - Resources and collections indoors and outside for children to explore and talk about higher numbers.
6 **4 & 5 year olds** ECMG Count with me	**Use number names and symbols when comparing numbers e.g. knowing six is worth more than four, with dot and numeral dice** Know the order of numbers and where they go in relation to others e.g. whether six is before or after five, whether seven is nearer to five or ten. Estimate numbers of things, showing understanding of relative size **Show an interest in large numbers, e.g. talking about *hundreds, thousands* and *a million!***	- Pose problems about fair shares e.g. tell stories about a character distributing things unfairly, varying and increasing numbers of things and people. Model comparing numbers e.g. *Little teddy says it isn't fair- the big bear has five and she only has four.* - Sing counting songs and count together in games such as Hide and seek, counting forwards and backwards, sometimes starting from different numbers and in different step sizes. Discuss numbers coming *before, after* and *between* and stress patterns. - Discuss ordinal numbers in context, e.g. model finding a page number: *Where is page 7? I know it is after page 5… this is page 10. Oh no! I've gone too far.* - Encourage children to make predictions and visualise the outcome in stories, rhymes and songs if one (or two) is added or taken away, varying numbers. - Pose everyday estimation problems e.g. *How many sandwiches will we make for the picnic?* Establish mental benchmarks e.g. *Do you think there are more than 10, less than 10 or about 10 here?* - Discuss examples and display large numbers including hundreds, thousand and a million, e.g. making stars for the sky in the space station, herds of animals or crowds of people.	- Stories and props for sharing problems e.g. The doorbell rang - A Voting Station, e.g. for books to read at storytime, using linking cubes with children's names on. - Opportunities to order mixed-up numerals e.g. numeral cards on a washing line. - Resources to make "staircase" patterns which showing the one more/one less relationship with next/previous counting numbers - An Estimation Station with objects in a jar (or large items in a crate outdoors) recording guesses before later counting the objects and putting the guesses in order. Provide a reference jar of 10 items or 3 identical jars, filled with e.g. beads, cubes & sticks. - Books about ordinal numbers e.g. Loo queue (The rhino is number 2 in the queue and the tiger is number 5, how many animals between them?) - Books about large numbers e.g. 365 penguins, How big is a million? or A million fish, more or less.

Mathematical learning trajectories from birth to five years old
Number: Cardinality

Children's learning trajectories will depend on their experiences, and the pace of their learning across the different aspects of mathematics will vary. All children learn differently but development tends to follow the sequences described below. Cardinality is one of the four strands of number (the others are comparison, counting and composition). For younger and older babies (ranges 1 & 2) our guidance is the same for all the number strands. The composition strand develops later, building on cardinality, and is included with ranges 5 & 6.

Click on the text links to access examples and related guidance from a range of sources to support practice. You may also find the sources below helpful for general guidance about counting and other areas of mathematics.

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Range	Children are learning to...	Adults might...	The environment might include….
1 **Younger babies** ECMG Count with me	**React to changes of amount when those amounts are significant (more than double)***	- Notice and mirror children's reactions to changes in amount. - Play peekaboo hiding games with toys and people. - Add to objects & draw attention to the change in amount, using words like more. - Provide opportunities for babies to notice a difference in amounts e.g. when enticing a baby to crawl towards you, offer a choice of one item or a larger number of the same item. - When feeding babies comment on whether they would like more after being winded, e.g. *Oh, you want **more.***	- Small groups of the same objects in treasure baskets, as well as single items e.g. two fir cones or three shells. - Singing number rhymes and finger play during routines like dressing, changing or bathing e.g. Round and round the garden, like a teddy bear..
2 **Older babies** ECMG Count with me	**Become aware of number names through their enjoyment of action rhymes and songs involving numbers** **Look for things which have moved out of sight**	-Take opportunities to sing relevant number rhymes e.g. Peter hammers with one hammer when a child is hammering or Two little eyes, pointing to their eyes, one by one. - During personal care routines make a point of using numbers e.g. *Let's put one arm through here and one arm through here.*	- Singing number rhymes with actions, related to routines, e.g. Three in the bed. - Engaging families in sharing number rhymes, including those in home languages, e.g. Count with me (Urdu), and from home cultures, e.g. Three craws.
3 **Toddlers** ECMG Count with me	**Use number words, like *one* or *two* and sometimes responds accurately when asked to give one or two things**	- Point out small numbers of objects, e.g. *Look, there are two dogs! Here is your other shoe, now we have two.* - Model counting objects, emphasising the cardinal meaning of the last number e.g. *1, 2, 3 – that's 3 pieces for you.*	- Play hiding games so children notice that something has gone e.g. put a few similar toys under a cloth, secretly remove one, then reveal. - Varied sets of objects for children to independently explore *one, two, lots, more, not many and not enough*. e.g. counting the number of crackers at snack time, a huge pile of leaves for throwing, a chocolate box or biscuit trays to put items into. - Songs featuring *one* and *two* e.g. Two little dicky birds sitting on a

			wall. - Books showing small numbers of things e.g. The very hungry caterpillar.
4 **2 year olds** **ECMG** **Count with me**	**In everyday situations, take or give two or three objects from a group** **Begin to count their fingers** **Begin to notice numerals (number symbols)**	- Point out the number of things whenever possible, e.g. rather than just *chairs*, say *four chairs*. - Help children to give or get two or three items, e.g. during snacktime help children to take two pieces of fruit. -Use opportunities to model and encourage counting fingers and holding up a number of fingers e.g. two or three. -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.* - When singing number rhymes with props, draw attention to contrasting differences and changes in numbers, checking together *How many now?* • Model reading and using numerals and tallies which represent numbers of things.	-Singing number rhymes with props, fingers and numerals, including those which count forwards, e.g. One little teddy or An elephant went out to play - Buckets and bags for children to create collections of objects, like shells, twigs or leaves, which they can count. - Opportunities for children to explore cardinality using self-correcting resources, e.g. jigsaw with two ducks and the numeral 2 and displays showing the numeral and the number of items. - Mark-making materials and numerals indoors and outdoors for children to represent their own numbers in play.
5 **3 year olds** **ECMG** **Count with me**	**Subitise one, two and three objects (without counting) including fingers** **Count up to five items, recognising that the last number said represents the total counted so far (cardinal principle) including sounds and actions** **Link numerals with amounts up to 5 and maybe beyond** **Explore using a range of their own marks and signs to which they ascribe mathematical meanings**	- Encourage children to use their fingers to show an amount e.g. in number rhymes and stories, or when asking another child for resources. - Play subitising hide-and-reveal games with one, two or three items, with dishes, cloth or screens. - Play games with dot dice or spinners and dominoes, sometimes with numbers to 3 to encourage subitising. - Encourage children to share items fairly between two people or toys e.g. playdough cakes, trains or mud pies and check they have the same number each. - 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 four crackers?* - Model arranging collections of 2s, 3s and 4s in different ways e.g. on matching cards or displays. Support children to choose how to arrange collections in different ways. - Model wondering and talking about how you might solve a problem, e.g. having enough sandwiches for everyone. - Model writing numerals, e.g. on badges, birthday cards and banners, linking to numbers of things e.g. candles.	- Mats, dishes and trays for sharing items between two people or toys and checking they have the same number each. - Routines focusing on *How many?* e.g. checking no balls have been lost by reading the label with the numeral and dot pattern on the storage basket or storing cups away from the snack table so children have to count the number of cups needed. - Props and numerals for counting songs, rhymes and number stories, for children to use independently e.g. 5 little speckled frogs - Numerals that children can pick up and use to represent numbers of things in their play. - Games involving doing a number of actions or collecting a number of things, with both dot and numeral dice. - A variety of mathematical picture books and share them as part of 'warm and cuddly' maths times. e.g.10 black dots, Pete the Cat and his four groovy buttons. - Displays and opportunities for matching numerals to numbers of items, including self-correcting puzzles. - Spaces to display children's ongoing mathematical thinking, e.g. their own ways of representing their thinking, and scribing children's words.

6 **4 & 5 year olds** **ECMG** **Count with me**	**Engage in subitising numbers to four or maybe five.** **Count out up to 10 objects from a larger group** **Match the numeral with a number of items to show how many there are (up to 10)**	- Enjoy subitising games, including fingers, or quickly revealing and hiding numbers of objects or images e.g. Splat! using a fly swatter to hit cards with matching number images. - Encourage cardinal counting by saying how many there are after counting e.g.…*6, 7, 8. There are 8 balls*. - Drop marbles into a tin and ask the children to listen (without looking) to say how many there are. - In everyday activities, ask children to count out a number of things from a group, e.g. *Could you get seven cups for snacktime?* - Link numerals to numbers of things in purposeful contexts, e.g. when counting groups as part of routines (story voting, self-registration, dinner chart etc.) record the total as a label for children to discuss. - Pose everyday estimation problems and establish mental estimation benchmarks, e.g. more or less than 10. - Discuss the different ways children might record numbers (e.g. scores in games), such as tallies, dots or numeral cards.	-Throwing games outdoors e.g. beanbags in tyres, skittles, hoops over cones. - Collecting or giving games like Ten nice things where children throw a dice and give that many of their 10 things to the person on their right. - An Estimation Station with objects in a jar (or large items in a crate outdoors) and a reference jar of 10 items, recording guesses before later counting the objects and putting the guesses in order. - Opportunities for children to match a number of objects to a numeral, including zero, including resources to help them to self-correct. - Books about numbers to 10 e.g. Anno's counting book or One gorilla which give opportunities for subitising. - Displays of children's mathematical graphics, including scribing children's explanations.

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Mathematical learning trajectories from birth to five years old
Number: Composition

Children's learning trajectories will depend on their experiences, and the pace of their learning across the different aspects of mathematics will vary. All children learn differently but development tends to follow the sequences described below. Composition is one of the four strands of number (the others are comparison, counting and cardinality). For younger and older babies (ranges 1 & 2) our guidance is the same for all the number strands. The composition strand develops later in ranges 5 & 6, building on cardinality.

Click on the text links to access examples and related guidance from a range of sources to support practice. You may also find the sources below helpful for general guidance about counting and other areas of mathematics.

*indicates a login is required (free)

ECMG | Development Matters | Birth to Five Matters | NCETM | Learning Trajectories* | Erikson | DREME

Range	Children are learning to...	Adults might...	The environment might include….
1 Younger babies ECMG Count with me	**React to changes of amount when those amounts are significant (more than double)***	- Notice and mirror children's reactions to changes in amount. - Play peekaboo hiding games with toys and people. - Add to objects & draw attention to the change in amount, using words like more. - Provide opportunities for babies to notice a difference in amounts e.g. when enticing a baby to crawl towards you, offer a choice of one item or a larger number of the same item. - When feeding babies comment on whether they would like more after being winded, e.g. *Oh, you want **more.***	- Small groups of the same objects in treasure baskets, as well as single items e.g. two fir cones or three shells. - Singing number rhymes and finger play during routines like dressing, changing or bathing e.g. Round and round the garden, like a teddy bear..
2 Older babies ECMG Count with me	**Become aware of number names through their enjoyment of action rhymes and songs involving numbers** **Look for things which have moved out of sight**	-Take opportunities to sing relevant number rhymes e.g. Peter hammers with one hammer when a child is hammering or Two little eyes,, pointing to their eyes, one by one. - During personal care routines make a point of using numbers e.g. *Let's put one arm through here and one arm through here.*	- Singing number rhymes with actions, related to routines, e.g. Three in the bed - Engaging families in sharing number rhymes, including those in home languages, e.g. Count with me (Urdu), and from home cultures, e.g. Three craws.
3 Toddlers ECMG Count	**Use number words, like *one* or *two* and sometimes responds accurately when asked to give one or two things**	- Point out small numbers of objects, e.g. *Look, there are two dogs! Here is your other shoe, now we have two.* - Model counting objects, emphasising the cardinal meaning of the last number e.g.*1, 2, 3… that's 3 pieces for you.*	- Play hiding games so children notice that something has gone e.g. put a few similar toys under a cloth, secretly remove one, then reveal. - Varied sets of objects for children to independently explore *one, two, lots, more, not many and not enough*. e.g. counting the number of crackers at snack time, a

with me			huge pile of leaves for throwing, a chocolate box or biscuit trays to put items into - Songs featuring *one* and *two* e.g. Two little dicky birds sitting on a wall - Books showing small numbers of things e.g. The very hungry caterpillar
4 **2 year olds** **ECMG** **Count with me**	**In everyday situations, take or give two or three objects from a group** **Begin to count their fingers** **Begin to notice numerals (number symbols)**	- Point out the number of things whenever possible, e.g. rather than just *chairs*, say *four chairs*. - Help children to give or get two or three items, e.g. during snacktime help children to take two pieces of fruit -Use opportunities to model and encourage counting fingers and holding up a number of fingers e.g. two or three. -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.* - When singing number rhymes with props, draw attention to contrasting differences and changes in numbers, checking together *How many now?* • Model reading and using numerals and tallies which represent numbers of things	-Singing number rhymes with props, fingers and numerals, including those which count forwards, e.g. One little teddy or An elephant went out to play - Buckets and bags for children to create collections of objects, like shells, twigs or leaves, which they can count. - Opportunities for children to explore cardinality using self-correcting resources, e.g. jigsaw with two ducks and the numeral 2 and displays showing the numeral and the number of items. - Mark-making materials and numerals indoors and outdoors for children to represent their own numbers in play.
5 **3 year olds** **ECMG** **Count with me**	Through play and exploration beginning to learn that numbers are made up (composed) of smaller numbers **Begin to recognise that each counting number is one more than the one before** **Separate a group of three or four objects in different ways, beginning to recognise that the total is still the same** **Begin to use understanding of number to solve practical problems in play and meaningful activities**	- Encourage children to share items fairly between two people or toys e.g playdough cakes, trains or mud pies - Ask two children to use their fingers together to show a number - Emphasise the *one more, one less* pattern in rhymes and traditional tales, using objects, fingers, pictures and numerals, asking children to predict and show the next number e.g *How many frogs will be left on the log after the next one jumps off?* Then progressing to asking *What if two frogs jump off the log at the same time?* - Support children to choose how to arrange collections of two, three and four objects in different ways, including partitioning, e.g. hiding a subgroup and "guessing" the number hidden. - Model wondering and talking about how you might solve a number problem, including using fingers	- Mats, dishes and trays for sharing items between two people or toys - props for counting songs and number stories, for children to use independently, e.g. 5 little speckled frogs or The shopping basket - Routines focusing on *How many?* And involving two groups, e.g. *We have four bikes but can only find two, how many are missing?* - Play with dot dice and dominoes, discussing the numbers in the patterns on the dice e.g. twos in the four pattern and threes in the six pattern. - A variety of mathematical picture books, to discuss numbers arranged in different ways, e.g. *10 black dots, Count and see*

6 **4 & 5 year olds** **ECMG** **Count with me**	**Show awareness that numbers are made up (composed) of smaller numbers, exploring partitioning in different ways with a wide range of objects** **Begin to** conceptually subitise* larger numbers in less familiar arrangements by subitising smaller groups within the number, **e.g. sees six raisins on a plate as three and three** **In practical activities, add one and subtract one with numbers to 10** **Begin to represent mathematical problems, using signs and strategies of their own choice, including (when appropriate) standard numerals, tallies and + or -**	- Encourage children to use their fingers to show numbers to 10 - Have daily 'number talks' that model conceptual subitising and invite children to say how they 'see' an image of e.g. eight things, as *four and four*, or t*wo and two and four*, or f*ive and three* or *six and two,* etc. - Provide opportunities for children to explore ways of making numbers in two groups e.g. *What are the choices if you can have 5 grapes, out of green and black grapes?* - Encourage children to make predictions and visualise the outcome in stories, rhymes and songs, focusing on two groups making a number e.g. frogs on the log and in the pool, green bottles upright and fallen, the numbers in and out of the bed e.g. Ten in the bed - Make up stories together which involve composition into two or more groups e.g. Five friends counting,* where some toys are doing one thing and some another. Invite children to come up with their own versions. - Play hiding games, separating a group of objects, e.g. count 5 shells, put some in your left hand and hide some in your right hand. *'How many are in this hand? How do you know?'* - Discuss number composition in problems about fair shares using small totals e.g. six shared between two or three children. Spot and use opportunities for children to apply number combinations: '*There are 5 of us but only 2 clipboards. How many more do we need?'* - Talk with children about the strategies they have used to solve a problem. Spot opportunities to playfully pose composition problems for children to explore e.g. *What if there are five people hiding in the tent and two come out?* - Begin to model calculations in stories, rhymes and in real contexts, using a range of ways of representing (e.g. five-frames) using some vocabulary of addition and subtraction. - Use both informal and standard ways to record these, including tallies, arrows, plus and minus signs, and discuss children's own representations	- Counting groups as part of routines, e.g. self-registration with ten-frames, dinner chart etc., discussing numbers of two groups making a total e.g. children here and away. - A Voting Station, discussing the numbers of children voting for the options (and yet to vote), making up the total for the class - Subitising games which involve quickly revealing and hiding numbers of objects, perhaps showing numeral cards and fingers and talking about how children see numbers of things made up in a variety of arrangements . -- resources to make "staircase" patterns which show that the next counting number includes the previous number plus one. e.g. Ten terrible dinosaurs Books involving number composition e.g. Anno's counting book, Maisie goes camping and One is a snail and ten is a crab - Displays of children's mathematical representations, including explanations of the children's meaning making.

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