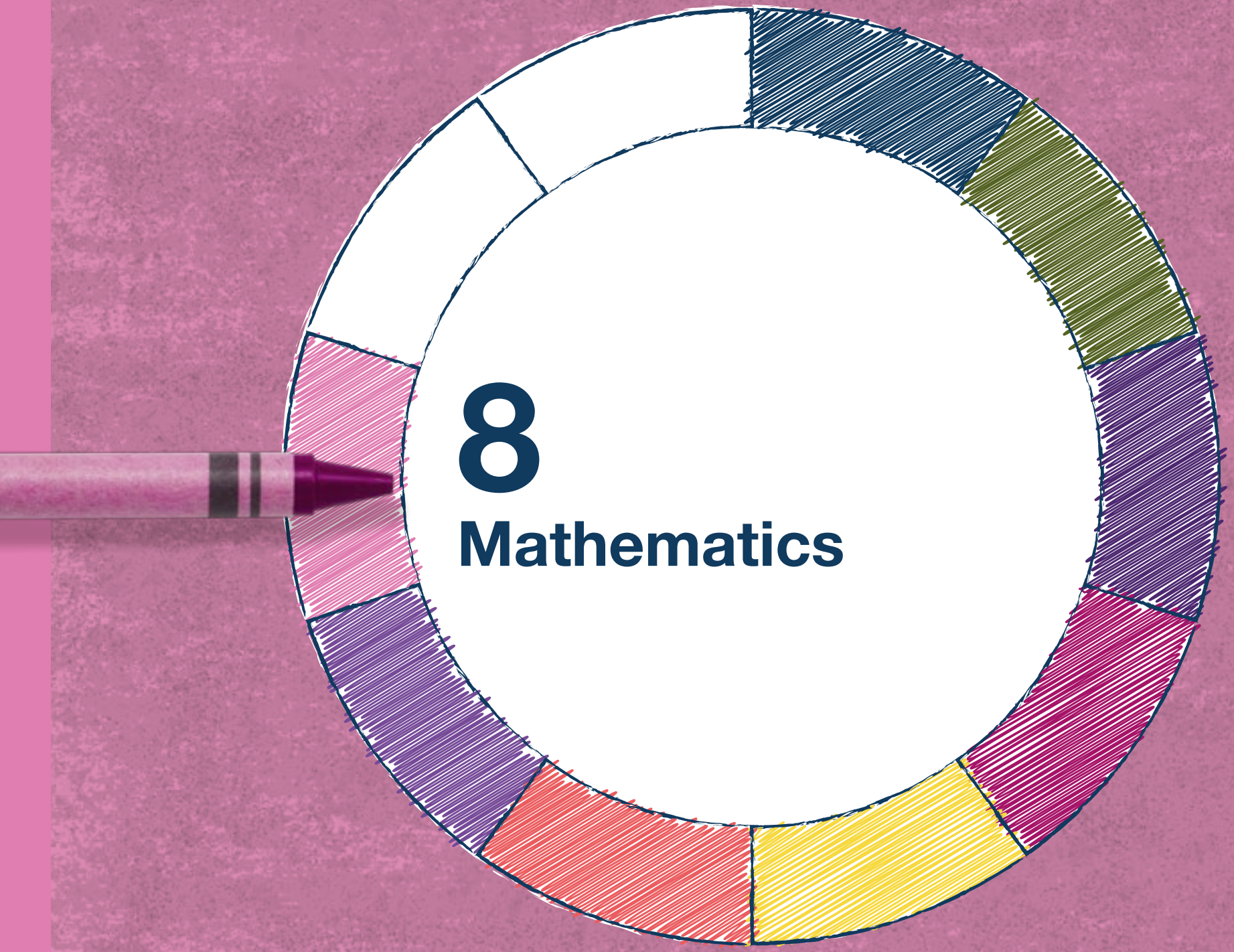


8
Mathematics

Mathematics

EYFS Statutory Educational Programme:
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.

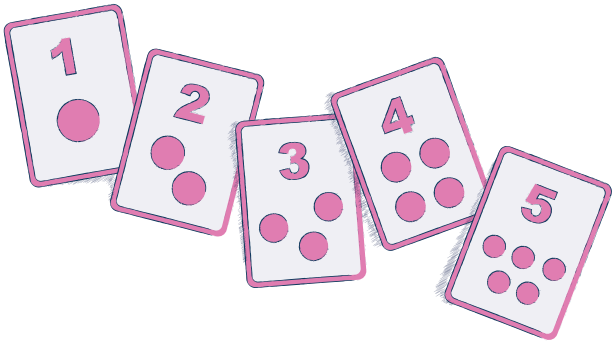
By providing frequent and varied opportunities to build and apply this understanding – such as using manipulatives, including small pebbles and tens frames for organising counting – children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, 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.



Birth to three – babies, toddlers and young children will be learning to:	Examples of how to support this:
Combine objects like stacking blocks and cups. Put objects inside others and take them out again.	Encourage babies and young toddlers to play freely with a wide range of objects - toddlers engage spontaneously in mathematics during nearly half of every minute of free play. Suggestions: when appropriate, sensitively join in and comment on: • interestingly shaped objects like vegetables, wooden pegs, spoons, pans, corks, cones, balls • pots and pans, boxes and objects to put in them, shape sorters • stacking cups: hiding one, building them into a tower, nesting them and lining them up.
Take part in finger rhymes with numbers. React to changes of amount in a group of up to three items.	Use available opportunities, including feeding and changing times for finger-play, outdoors and inside, such as 'Round and round the garden'. Sing finger rhymes which involve hiding and returning, like 'Two little dicky birds'.
Compare amounts, saying 'lots', 'more' or 'same'. Develop counting-like behaviour, such as making sounds, pointing or saying some numbers in sequence.	Draw attention to changes in amounts, for example, by adding more bricks to a tower, or eating things up. Offer repeated experiences with the counting sequence in meaningful and varied contexts, outside and indoors. Suggestions: count fingers and toes, stairs, toys, food items, sounds and actions.
Count in everyday contexts, sometimes skipping numbers – '1-2-3-5'.	Help children to match their counting words with objects. Suggestions: move a piece of apple to one side once they have counted it. If children are saying one number word for each object, it is not always necessary to correct them if they skip a number. Learning to count accurately takes a long time and repeated experience. Confidence is important.

Birth to three – babies, toddlers and young children will be learning to:	Examples of how to support this:
Climb and squeeze themselves into different types of spaces. Build with a range of resources. Complete inset puzzles.	Describe children's climbing, tunnelling and hiding using spatial words like 'on top of', 'up', 'down' and 'through'. Provide blocks and boxes to play freely with and build with, indoors and outside. Provide inset puzzles and jigsaws at different levels of difficulty.
Compare sizes, weights etc. using gesture and language - 'bigger/little/smaller', 'high/low', 'tall', 'heavy'.	Use the language of size and weight in everyday contexts. Provide objects with marked differences in size to play freely with. Suggestions: dolls' and adult chairs, tiny and big bears, shoes, cups and bowls, blocks and containers.
Notice patterns and arrange things in patterns.	Provide patterned material – gingham, polka dots, stripes etc. – and small objects to arrange in patterns. Use words like 'repeated' and 'the same' over and over.

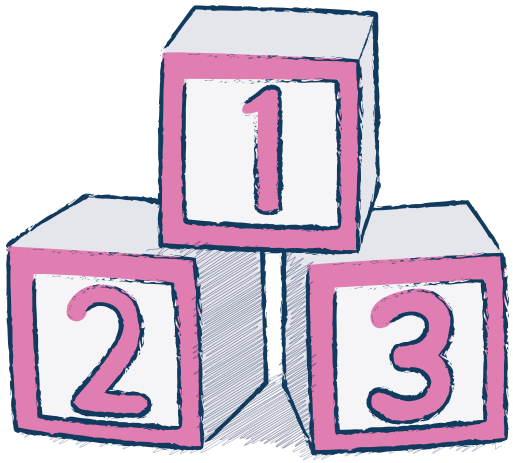
3 and 4-year-olds will be learning to:	Examples of how to support this:
Develop fast recognition of up to 3 objects, without having to count them individually (‘subitising’).	Point to small groups of two or three objects: “Look, there are two!” Occasionally ask children how many there are in a small set of two or three.
Recite numbers past 5.	Regularly say the counting sequence, in a variety of playful contexts, inside and outdoors, forwards and backwards, sometimes going to high numbers. For example: hide and seek, rocket-launch countdowns.
Say one number for each item in order: 1,2,3,4,5.	Count things and then repeat the last number. For example: “1, 2, 3 – **3 cars**”. Point out the number of things whenever possible; so, rather than just ‘chairs’, ‘apples’ or ‘children’, say ‘two chairs’, ‘three apples’, ‘four children’.
Know that the last number reached when counting a small set of objects tells you how many there are in total (‘cardinal principle’).	Ask children to get you several things and emphasise the total number in your conversation with the child.
Show ‘finger numbers’ up to 5.	Use small numbers to manage the learning environment. Suggestions: have a pot labelled ‘5 pencils’ or a crate for ‘3 trucks’. Draw children’s attention to these throughout the session and especially at tidy-up time: “How many pencils should be in this pot?” or “How many have we got?” etc.
Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5.	



3 and 4-year-olds will be learning to:	Examples of how to support this:
Experiment with their own symbols and marks as well as numerals. Solve real world mathematical problems with numbers up to 5. Compare quantities using language: ‘more than’, ‘fewer than’.	Encourage children in their own ways of recording (for example) how many balls they managed to throw through the hoop. Provide numerals nearby for reference. Suggestions: wooden numerals in a basket or a number track on the fence. Discuss mathematical ideas throughout the day, inside and outdoors. Suggestions: • “I think Jasmin has got more crackers…” • support children to solve problems using fingers, objects and marks: “There are four of you, but there aren’t enough chairs….” • draw children’s attention to differences and changes in amounts, such as those in stories like ‘The Enormous Turnip’.
Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: ‘sides’, ‘corners’; ‘straight’, ‘flat’, ‘round’.	Encourage children to play freely with blocks, shapes, shape puzzles and shape-sorters. Sensitively support and discuss questions like: “What is the same and what is different?” Encourage children to talk informally about shape properties using words like ‘sharp corner’, ‘pointy’ or ‘curvy’. Talk about shapes as you play with them: “We need a piece with a straight edge.”

3 and 4-year-olds will be learning to:	Examples of how to support this:
Understand position through words alone – for example, “The bag is under the table,” – with no pointing. Describe a familiar route. Discuss routes and locations, using words like ‘in front of’ and ‘behind’.	Discuss position in real contexts. Suggestions: how to shift the leaves **off** a path or sweep water away **down** the drain. Use spatial words in play, including ‘in’, ‘on’, ‘under’, ‘up’, ‘down’, ‘besides’ and ‘between’. Suggestion: “Let’s put the troll under the bridge and the billy goat beside the stream.” Take children out to shops or the park: recall the route and the order of things seen on the way. Set up obstacle courses, interesting pathways and hiding places for children to play with freely. When appropriate, ask children to describe their route and give directions to each other. Provide complex train tracks, with loops and bridges, or water-flowing challenges with guttering that direct the flow to a water tray, for children to play freely with. Read stories about journeys, such as ‘Rosie’s Walk’.
Make comparisons between objects relating to size, length, weight and capacity.	Provide experiences of size changes. Suggestions: “Can you make a puddle larger?”, “When you squeeze a sponge, does it stay small?”, “What happens when you stretch dough, or elastic?” Talk with children about their everyday ways of comparing size, length, weight and capacity. Model more specific techniques, such as lining up ends of lengths and straightening ribbons, discussing accuracy: “Is it **exactly**…?”

3 and 4-year-olds will be learning to:	Examples of how to support this:
Select shapes appropriately: flat surfaces for building, a triangular prism for a roof, etc. Combine shapes to make new ones – an arch, a bigger triangle, etc.	Provide a variety of construction materials like blocks and interlocking bricks. Provide den-making materials. Allow children to play freely with these materials, outdoors and inside. When appropriate, talk about the shapes and how their properties suit the purpose. Provide shapes that combine to make other shapes, such as pattern blocks and interlocking shapes, for children to play freely with. When appropriate, discuss the different designs that children make. Occasionally suggest challenges, so that children build increasingly more complex constructions. Use tidy-up time to match blocks to silhouettes or fit things in containers, describing and naming shapes. Suggestion: “Where does this triangular one /cylinder /cuboid go?”



3 and 4-year-olds will be learning to:	Examples of how to support this:
Talk about and identify the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like ‘pointy’, ‘spotty’, ‘blobs’, etc.	Provide patterns from different cultures, such as fabrics.
Extend and create ABAB patterns – stick, leaf, stick, leaf.	Provide a range of natural and everyday objects and materials, as well as blocks and shapes, for children to play with freely and to make patterns with. When appropriate, encourage children to continue patterns and spot mistakes.
Notice and correct an error in a repeating pattern.	Engage children in following and inventing movement and music patterns, such as clap, clap, stamp.
Begin to describe a sequence of events, real or fictional, using words such as ‘first’, ‘then...’	Talk about patterns of events, in cooking, gardening, sewing or getting dressed. Suggestions: • ‘First’, ‘then’, ‘after’, ‘before’ • “Every day we…” • “Every evening we…”
	Talk about the sequence of events in stories.
	Use vocabulary like ‘morning’, ‘afternoon’, ‘evening’ and ‘night-time’, ‘earlier’, ‘later’, ‘too late’, ‘too soon’, ‘in a minute’.
	Count down to forthcoming events on the calendar in terms of number of days or sleeps. Refer to the days of the week, and the day before or day after, ‘yesterday’ and ‘tomorrow’.

Children in reception will be learning to:	Examples of how to support this:
Count objects, actions and sounds.	Develop the key skills of counting objects including saying the numbers in order and matching one number name to each item. Say how many there are after counting – for example, "…6, 7, 8. There are **8 balls**" – to help children appreciate that the last number of the count indicates the total number of the group. This is the cardinal counting principle. Say how many there might be before you count to give a purpose to counting: "I think there are about 8. Shall we count to see?" Count out a smaller number from a larger group: "Give me seven…" Knowing when to stop shows that children understand the cardinal principle. Build counting into everyday routines such as register time, tidying up, lining up or counting out pieces of fruit at snack time. Sing counting songs and number rhymes and read stories that involve counting. Play games which involve counting. Identify children who have had less prior experience of counting and provide additional opportunities for counting practice.

Children in reception will be learning to:	Examples of how to support this:
Subitise.	Show small quantities in familiar patterns (for example, dice) and random arrangements. Play games which involve quickly revealing and hiding numbers of objects. Put objects into five frames and then ten frames to begin to familiarise children with the tens structure of the number system. Prompt children to subitise first when enumerating groups of up to 4 or 5 objects: “I don’t think we need to count those. They are in a square shape so there must be 4.” Count to check. Encourage children to show a number of fingers ‘all at once’, without counting.
Link the number symbol (numeral) with its cardinal number value.	Display numerals in order alongside dot quantities or tens frame arrangements. Play card games such as snap or matching pairs with cards where some have numerals, and some have dot arrangements. Discuss the different ways children might record quantities (for example, scores in games), such as tallies, dots and using numeral cards.

Children in reception will be learning to:	Examples of how to support this:
Count beyond ten.	Count verbally beyond 20, pausing at each multiple of 10 to draw out the structure, for instance when playing hide and seek, or to time children getting ready. Provide images such as number tracks, calendars and hundred squares indoors and out, including painted on the ground, so children become familiar with two-digit numbers and can start to spot patterns within them.
Compare numbers.	Provide collections to compare, starting with a very different number of things. Include more small things and fewer large things, spread them out and bunch them up, to draw attention to the number not the size of things or the space they take up. Include groups where the number of items is the same. Use vocabulary: 'more than', 'less than', 'fewer', 'the same as', 'equal to'. Encourage children to use these words as well. Distribute items evenly, for example: "Put 3 in each bag," or give the same number of pieces of fruit to each child. Make deliberate mistakes to provoke discussion. Tell a story about a character distributing snacks unfairly and invite children to make sure everyone has the same.
Understand the 'one more than/one less than' relationship between consecutive numbers.	Make predictions about what the outcome will be in stories, rhymes and songs if one is added, or if one is taken away. Provide 'staircase' patterns which show that the next counting number includes the previous number plus one.

Children in reception will be learning to:	Examples of how to support this:
Explore the composition of numbers to 10.	Focus on composition of 2, 3, 4 and 5 before moving onto larger numbers Provide a range of visual models of numbers: for example, six as double three on dice, or the fingers on one hand and one more, or as four and two with ten frame images. Model conceptual subitising: “Well, there are three here and three here, so there must be six.” Emphasise the parts within the whole: “There were 8 eggs in the incubator. Two have hatched and 6 have not yet hatched.” Plan games which involve partitioning and recombining sets. For example, throw 5 beanbags, aiming for a hoop. How many go in and how many don’t?

Children in reception will be learning to:	Examples of how to support this:
Automatically recall number bonds for numbers 0–5 and some to 10.	Have a sustained focus on each number to and within 5. Make visual and practical displays in the classroom showing the different ways of making numbers to 5 so that children can refer to these. Help children to learn number bonds through lots of hands-on experiences of partitioning and combining numbers in different contexts, and seeing subitising patterns. Play hiding games with a number of objects in a box, under a cloth, in a tent, in a cave, etc.: “6 went in the tent and 3 came out. I wonder how many are still in there?” Intentionally give children the wrong number of things. For example: ask each child to plant 4 seeds then give them 1, 2 or 3. “I’ve only got 1 seed, I need 3 more.” Spot and use opportunities for children to apply number bonds: “There are 5 of us but only 2 clipboards. How many more do we need?” Place objects into a five frame and talk about how many spaces are filled and unfilled.

Children in reception will be learning to:	Examples of how to support this:
Select, rotate and manipulate shapes to develop spatial reasoning skills.	Provide high-quality pattern and building sets, including pattern blocks, tangrams, building blocks and magnetic construction tiles, as well as found materials. Challenge children to copy increasingly complex 2D pictures and patterns with these 3D resources, guided by knowledge of learning trajectories: "I bet you can't add an arch to that," or "Maybe tomorrow someone will build a staircase." Teach children to solve a range of jigsaws of increasing challenge.
Compose and decompose shapes so that children recognise a shape can have other shapes *within* it, just as numbers can.	Investigate how shapes can be combined to make new shapes: for example, two triangles can be put together to make a square. Encourage children to predict what shapes they will make when paper is folded. Wonder aloud how many ways there are to make a hexagon with pattern blocks. Find 2D shapes within 3D shapes, including through printing or shadow play.
Continue, copy and create repeating patterns.	Make patterns with varying rules (including AB, ABB and ABBC) and objects and invite children to continue the pattern. Make a deliberate mistake and discuss how to fix it.
Compare length, weight and capacity.	Model comparative language using 'than' and encourage children to use this vocabulary. For example: "This is heavier than that." Ask children to make and test predictions. "What if we pour the jugful into the teapot? Which holds more?"