

BECKINGHAM PRIMARY SCHOOL

# MATHS CURRICULUM

ENSURING EVERY CHILD SUCCEEDS AND  
THRIVES, BECOMING A LIFE-LONG LEARNER  
PREPARED FOR THE WORLD OF TOMORROW

2022





## Aims

The National Curriculum for Maths aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects. The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

## *Intent - What are we trying to achieve for our children in Maths?*

At BPS we believe a high-quality Maths curriculum should inspire pupils' curiosity and develop a sense of awe and wonder about Mathematics. We teach Maths in a way that:

- Lessons are delivered in line with National Curriculum objectives
- Creates a lively, exciting and stimulating environment
- Ensures the delivery of Maths is filled with cross-curricular opportunities
- Develops children's fluency of mathematical concepts through varied and frequent practice over time
- Develops mental strategies that can be applied rapidly and accurately
- Encourages children's understanding and ability to recall and apply knowledge accurately
- Encourages children to use mathematical vocabulary to explain and reason
- Challenges children and allows them to take risks in their learning
- Develops positive attitudes towards the subject



- Develops an ability to solve problems, to think logically and to work systematically
- Ensures all children are given the opportunity to 'master' their year group's curriculum

## **Implementation** - *How is the curriculum delivered?*

It is important that children are allowed to explore Maths and present their findings not only in a written form but also visually and verbally; to that end the school adopts a CPA approach; concrete, pictorial and abstract. This approach allows the children to experience the physical aspects of Maths before finding a way to present their findings and understandings in a visual form before relying on abstract numbers.

The BPS Calculation Policy sets out the age stage expectations as set out with the National Curriculum 2014, however, pupils' progress in their own learning is fundamental. Therefore, it is vital that pupils are being taught according to the stages that they are currently at, whether this means being moved onto the next stage as soon as they are ready, or working at a lower stage until they are secure enough to move on. It is also designed to give pupils a consistent and smooth progression of learning in calculations across the school. Please note that early learning in number and calculation in the Foundation Stage follows the 'Development Matters' EYFS document, and this calculation policy is designed to build on progressively from the content and methods established in the early Years Foundation.

Years 1-6 follow the school's long term plan which is based upon the White Rose Scheme of work for mixed year groups and the National Curriculum. Foundation Stage follow 'Development Matters' (Number, Shape, Space and Measure) for their long term planning.

Mathematics planning is carried out on a weekly basis by Class Teachers using the White Rose Schemes of Learning's Small Steps as a basis for their plans, using a concrete, pictorial, abstract approach. A balance of fluency, reasoning and problem solving is planned for.

In Foundation Stage, children are supported in developing their understanding of mathematics in a broad range of contexts in which they can explore, enjoy, learn, practice and talk about and consolidate their learning both indoors and outdoors. We recognize that children learn through routine, continuous provision and incidental learning opportunities, as well as planned and structured adult led lessons and activities. Structured adult led Maths lessons are taught daily. Over the week, these lessons include a good balance between whole-class work, group teaching and individual practice which is supported through provision.

Mathematics is differentiated three ways, offering challenges that increase in difficulty. Children are encouraged to select their own challenge and aspire to achieve, demonstrating a thirst for knowledge. The Teacher and Teaching Assistant support and challenge pupils during each lesson, ensuring all children make progress.

Each classroom is resourced with the materials to support the delivery of Maths in a concrete, pictorial and abstract way. Resources include place value counters, tens frames, base 10, 2D and 3D shapes, place value grids and 100 squares. The list is not exhaustive. Children are encouraged to use whatever resources are available to them in the classroom and which they feel would benefit them in their Maths work. Each classroom has a display dedicated to Maths. The display should include the vocabulary relevant to the year groups in that class. It could be used as a strategy board or a working wall.

Children have access to Times Tables Rockstars and Y2-6 are encouraged to use this both in school and at home.



**Impact** - *What difference is the curriculum making? How do you know whether pupils know what you think they know?*

Assessments in Mathematics are carried out in various ways. Children are assessed during group and individual discussions, written tasks and more formally through SATs. . We measure the impact of our Maths curriculum using the following measures:

- Evidence from children's books will show a range of fluency, problem solving and reasoning.
- Our Long-Term Plan (LTP) will show a clear progression of knowledge and skills across Key Stage 1 and 2 that builds on prior knowledge
- Pupil discussion about their learning
- Termly teacher judgements track progress and inform subsequent planning

### **Role of the Subject Leader**

- To lead in the development of Maths across school
- To monitor the planning, teaching and learning of Mathematics throughout the school
- To help raise standards in Maths
- To provide teachers support in teaching Mathematics
- To provide staff with CPD opportunities in relation to Maths in the confines of the school budget and the School Improvement Plan.
- To monitor and maintain high quality resources
- To keep up with new developments in the area of Maths



EYFS LTP – FS2

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Getting to know you		Match, sort and compare		Talk about measure and patterns		It's me 1, 2, 3		Circles and triangles	1, 2, 3, 4, 5		Shapes with 4 sides
Spring	Alive in 5		Mass and capacity	Growing 6, 7, 8		Length, height and time		Building 9 and 10			Explore 3-D shapes	
Summer	To 20 and beyond		How many now?	Manipulate, compose and decompose		Sharing and grouping		Visualise, build and map			Make connections	Consolidation



KS1 LTP – Year 1/ 2

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value Y1 – Numbers to 20 Y2 – Numbers to 100			Number: Addition and Subtraction Year 1- Numbers within 20 (including recognising money) Year 2- Numbers within 100 (including money)						Number: Year 1: Place Value to 50 and Multiplication Year 2: Multiplication		
Spring	Number: Year 1: Division & consolidation Year 2: Division		Year 1: Place Value to 100	Measurement: Length and Height	Geometry: Year 1: Shape and Consolidation Year 2: Properties of Shape			Number: Year 1: Fractions and Consolidation Year 2: Fractions		Consolidation		
			Year 2: Statistics									
Summer	Geometry: Position and Direction	Measurement: Time		Year 1: Place Value recap	Measurement: Year 1: Weight and Volume Year 2: Mass, Capacity and Temperature			Year 1: Four Operations recap		Consolidation		
				Year 2: Problem solving								



LKS2 LTP– Year 3/ 4

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value				Number: Addition and Subtraction				Number: Multiplication and Division			
Spring	Number: Multiplication and Division		Measurement: Length, Perimeter and Area		Number: Fractions				Y3: Measurement: Mass and Capacity		Consolidation	
									Y4: Number: Decimals			
Summer	Number: Decimals (including Money)			Measurement: Time		Statistics		Geometry: Properties of Shape (including Y4 Position and Direction)			Consolidation	



UKS2 LTP– Year 5/ 6

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value		Number: Four Operations					Number: Fractions				
Spring	Y5: Number: Fractions	Number: Decimals and Percentages				Y5: Number: Decimals		Measurement: Converting Units	Measurement: Perimeter, Area and Volume		Statistics	
	Y6: Number: Ratio					Y6: Number: Algebra						
Summer	Geometry: Properties of Shape		Geometry: Position and Direction	Y5: Four Operations consolidation			Y5: FDP consolidation		Y5: Measure consolidation		Consolidation	
				Y6: SATS		Investigations						



Counting

	Nursery	R1 September to January	R2 February to July
Progression milestones	<ul style="list-style-type: none"> <li>Verbally counts with separate words, but not necessarily in the correct order.</li> <li>Verbally counts to ten with some correspondence with objects. May point to objects to count a few items but then loses track.</li> </ul>	<ul style="list-style-type: none"> <li>Keeps one-to-one correspondence for small groups of objects in a line.</li> <li>Answers 'How many?' by counting again.</li> <li>Accurately counts to five and can answer 'How many?' by using the last number (e.g. 'One, two, three, four. There are four.').</li> <li>Is beginning to demonstrate cardinality. Can count to ten and may write or draw the numeral 5.</li> </ul>	<ul style="list-style-type: none"> <li>Shows a group of four objects.</li> <li>Counts structured arrangements to ten.</li> <li>Draws or writes numerals to ten.</li> <li>Accurately counts a line of objects and says how many. Says what comes before or after a number by counting up from one. Counts beyond 20.</li> </ul>
Learning Experiences	<ul style="list-style-type: none"> <li>Sing counting songs and rhymes. Maximise opportunities to count, such as steps to the playground.</li> </ul> <p>Count small groups of numbers, starting from three. Throw a die with numbers 3, 4 and 5, and collect the correct number of objects.</p>	<ul style="list-style-type: none"> <li>Build a tower and ask 'How many blocks can we build before it falls over?'. Establish routines that involve counting, e.g. at snack time: 'How many apples/oranges, etc. are there?'. Count larger groups of objects. Provide arrays of the same number in different formats, e.g. dot cards, beads on a string..</li> </ul>	<ul style="list-style-type: none"> <li>Give children a collection of ten objects. Throw a die, and children count out that number of objects. Provide different arrays of numbers and ask children 'How many?'. Provide manipulatives such as Numicon®, Multilink® Cubes and ten-frames (5 x 2 grids of squares) for children to see the different arrays possible for larger numbers.</li> </ul>
Continuous Provision	<ul style="list-style-type: none"> <li>Provide a variety of containers in the sand. Ask questions such as 'How many spoonfuls to fill the bucket/jar/box, etc.? Hide jewels in the sand and ask children to count how many they find.</li> </ul>	<ul style="list-style-type: none"> <li>Play Teddies at the Picnic: ask, 'How many plates/ cups/spoons/table mats do we need?'. Play Treasure Buckets: label buckets with different numbers; children put the appropriate number of 'treasure' objects into the buckets.</li> </ul>	<ul style="list-style-type: none"> <li>Make a post sack with non-traditional dot arrays of numbers up to ten on envelopes. Label houses 1–10 around the room and ask children to deliver the right letters to the right house.</li> </ul>



<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Outdoor Environment</p>	<ul style="list-style-type: none"> <li>Provide collections of objects in different areas to encourage children to count. Use natural objects to count at different times of the year, e.g. how many conkers they can pick up in one hand in autumn or how many daisies they can collect in summer.</li> </ul>	<ul style="list-style-type: none"> <li>Throw beanbags into a hoop. Ask, 'How many went in?'. Make a 'river' using skipping ropes for the banks. Place stepping stones (floor markers) in the river and count how many steps it takes to cross the river. Children can record their number of steps on a whiteboard.</li> </ul>	<ul style="list-style-type: none"> <li>Mud pie cooking: arrange pictorial recipe cards in the 'mud kitchen' for children to follow, e.g. 23 conkers, or 2 ladles of water. Ask children to come up with their own recipes.</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Purposeful pedagogy</p>	<ul style="list-style-type: none"> <li>Notice things children often compare, e.g. their ages, numbers of rungs on the climbing frame. Make up games about them.</li> </ul> <p>Make numbers prominent by placing numbers of different sizes and materials around the classroom.</p> <p>Provide dot cards for children to put in order.</p> <p>Provide opportunities for children to mark make, e.g. writing price labels for items in the shop.</p> <p>Read books about counting.</p> <p>Encourage families to play counting games with children.</p>	<ul style="list-style-type: none"> <li>Establish daily routines, e.g. 'How many children are in class today?'. Set up increasingly complex routines, e.g. children make a mark next to a stick person on a whiteboard to indicate they are present. Discuss how many people are absent. How do they know people are missing?</li> </ul> <p>Use everyday opportunities to practise counting, e.g. 'How many things have you tidied away?'. Encourage children to record using the correct numerals.</p>	<ul style="list-style-type: none"> <li>Self-registration daily routine: make an arrangement of pockets on a board and place a pot of lolly sticks next to it. Explain that one stick represents one person (to explain one-to-one correspondence). Children pick up a lolly stick from a pot and place it in a pocket to indicate they are present. To assist cardinality, when each pocket has five sticks the child that places the fifth stick labels the pocket as '5'. Ask children how they can use the new chart to work out how many children are present. Count the sticks in a variety of ways to encourage mathematically flexible thinking.</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Learning Conversations</p>	<ul style="list-style-type: none"> <li>Listen carefully to children's play. Are they counting items? Ask them questions about what they are counting, e.g. 'How do you know you have five?'. Watch out for double counting, saying the number words in the incorrect order or missing objects when counting. Ask, 'Are you sure? Shall we check?'.</li> </ul>	<ul style="list-style-type: none"> <li>Ask questions such as 'What do you notice?', 'What do you wonder?' and 'How do you know?'.</li> </ul> <p>Listen carefully to children's responses and watch for children recounting when you ask 'How many?'.</p>	<ul style="list-style-type: none"> <li>Encourage children to describe what they see and how they see it.</li> </ul>



Number Sense

	Nursery	R1 September to January	R2 February to July
Progression milestones	<p>Subitises up to three or four objects quickly.</p> <p>Identifies first and second.</p> <p>Matches numeral to quantity up to five.</p> <p>Can place numeral cards in order up to five.</p>	<p>Subitises to five in familiar arrangements.</p> <p>Identifies first to fifth.</p> <p>Can place numbers on a blank number line to ten.</p>	<p>Subitises to six in familiar and non-familiar arrangements, describing how they see the number.</p> <p>Identifies first to tenth.</p> <p>Can place numbers on a blank number line to 20.</p> <p>Can place numbers on a vertical number line (which includes zero and negative numbers).</p>
Learning Experiences	<p>Ask children to make groups of items, e.g. groups of three: three pens, three balls, three elephants.</p> <p>Point out positions of children in lines. e.g. 'Who is first?', 'Who is second?'</p> <p>Show number dot cards with easy arrangements of quantities up to four for children to subitise (instantly recognise quantities, without having to count).</p>	<p>Show number dot cards with easy arrangements up to five.</p> <p>Provide horizontal and vertical blank number lines to ten that children place numbers on.</p> <p>Make lines of cubes and ask children to point out which is the fourth cube in the line.</p>	<p>Show number dot cards up to the value of six with some more complex arrangements.</p> <p>Encourage children to talk about how they see the number.</p> <p>Play Secret Number with a blank number line: children have to guess your number. As they guess, ask them to write their number on the line. Tell them if your number is more or less than their guess before the next person guesses.</p>
Continuous Provision	<ul style="list-style-type: none"> <li>Around the classroom, display groups of objects with a numeral that represents the number in each group. Provide equipment such as dominoes and dice, and ask children to match numbers.</li> </ul>	<ul style="list-style-type: none"> <li>Provide laminated numbers for children to use as labels.</li> </ul> <p>Provide tubs with numbers or dots on them for children to fill with the corresponding number of objects.</p>	<ul style="list-style-type: none"> <li>Provide small world houses or construction kits for children to make streets and number the houses. Provide slopes for children to race cars down and say which position each car finished in.</li> </ul> <p>Provide egg boxes for children to put objects in.</p>



<p style="text-align: center;"><b>Outdoor Environment</b></p>	<ul style="list-style-type: none"> <li>Go on a Number Scavenger Hunt: children pick out a number card (which can be a numeral or a dot card) and find that quantity of objects outside.</li> </ul> <p>Hide numerals outside for children to find to make a number line.</p>	<ul style="list-style-type: none"> <li>Play Roll and Run: place hoops in a line and label them 1 to 6. Children roll a die and run to the hoop that has the corresponding number.</li> </ul>	<ul style="list-style-type: none"> <li>Label sit-and-ride vehicles with numbers. Place numbers in a bag and ask children to choose one and then find the corresponding vehicle. Make numbered parking bays for the vehicles and ask children to park them in the right place.</li> </ul>
<p style="text-align: center;"><b>Purposeful pedagogy</b></p>	<ul style="list-style-type: none"> <li>Use real objects for children to manipulate.</li> </ul> <p>Comment on number phenomena that occur during play, e.g. 'Bilal's car has four wheels. Jodie's truck has six. That's two more wheels than Bilal's car has.'</p> <p>Watch and listen carefully to the strategies children use to subitise numbers.</p> <p>Use different coloured dots to encourage children to pick out patterns. For example, five is made up of two 2's and a 1.</p>	<ul style="list-style-type: none"> <li>Create ten-frames (5 x 2 grids of squares). Ask children to place up to five dots on the grid and discuss the different ways in which they can display numbers.</li> </ul> <p>Ask children to compare their arrangements with someone else's.</p> <p>Use 'number talks' to encourage children to explore numbers within numbers. Start off with simple examples, such as arranging five toy animals on a tray.</p> <p>Confirm that everyone sees five. Ask 'What numbers can you see hidden inside five?'</p>	<ul style="list-style-type: none"> <li>Ask children to place a number of dots in ten-frames (5 x 2 grids of squares) and talk to them about the different ways in which they can display numbers. Ask them how many different ways they can find to arrange the dots. Encourage children to explore a variety of ways in which to arrange the dots.</li> </ul> <p>Use 'number talks' to encourage children to clarify their thinking, consider other strategies and build a repertoire of efficient strategies.</p>
<p style="text-align: center;"><b>Learning Conversations</b></p>	<ul style="list-style-type: none"> <li>Ask questions such as 'What do you notice?'</li> </ul>	<ul style="list-style-type: none"> <li>Ask questions such as 'What do you notice?', 'What do you wonder?' and 'How do you know?'. Listen carefully to children's responses and ask appropriate subsequent questions.</li> </ul>	<ul style="list-style-type: none"> <li>When subitising, ask children to describe how they see the numbers. For example, a child may see the 5 on a die as a square of four dots, with one in the middle.</li> </ul> <p>Encourage children to share with each other the differing ways in which they see the same number.</p>



Patterns

	Nursery	R1 September to January	R2 February to July
Progression milestones	<ul style="list-style-type: none"> <li>Recognises, describes and builds A B repeating patterns, e.g. A B; A B; A B.</li> <li>Fills in the missing element of an A B pattern.</li> <li>Duplicates an A B pattern when the model is close by.</li> </ul>	<ul style="list-style-type: none"> <li>Recognises, describes and builds more complex patterns, e.g. A A B, A B C and A B B C.</li> <li>Fills in the missing elements of a pattern.</li> <li>Extends a pattern if it ends with a whole unit within the pattern, e.g. Red, Red, Blue ; Red, Red, Blue ; Red, Red, Blue (where Red, Red, Blue is a whole unit).</li> </ul>	<ul style="list-style-type: none"> <li>Can translate patterns by using new materials or actions to represent a pattern, e.g. blue button, red button, yellow button might become cube, circle, triangle.</li> <li>Recognises core units of a pattern, e.g. cube, circle, triangle is a unit within a pattern, followed by another unit of cube, circle, triangle.</li> <li>Is able to extend a pattern even if it ends in a partial unit, e.g. cube, circle, triangle; cube, circle.</li> <li>Creates their own patterns.</li> </ul>
Learning Experiences	<ul style="list-style-type: none"> <li>Read <i>Brown Bear, Brown Bear, What Do You See?</i> by Bill Martin, Jr. Encourage children to identify the repeating pattern and join in with it. Sing songs with repeats, e.g. 'When Goldilocks Went to the House of the Bears'.</li> </ul>	<ul style="list-style-type: none"> <li>Read <i>The Napping House</i> by Audrey Wood. Use pictures of the characters to build up a sequence of the dozing dog, the dreaming child, the snoozing cat, the slumbering mouse, the snoozing cat, and – finally – a wakeful flea. Encourage children to predict what comes next.</li> </ul>	<ul style="list-style-type: none"> <li>Read <i>One Grain of Rice: A Mathematical Folktale</i> by Demi. Ask children if they recognise the pattern and if they think Rani made a good deal. Sing songs with patterns, e.g. 'Head, Shoulders, Knees and Toes' and 'Bobby Bingo', clapping out the BINGO rhythm. Ask children what they notice about the patterns in the songs.</li> </ul>



<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Continuous Provision</p>	<ul style="list-style-type: none"> <li>Provide percussion instruments to make sound patterns; different pasta shapes which can be put into sequences; construction blocks to arrange while building. Potato printing is a good way to encourage pattern making.</li> </ul>	<ul style="list-style-type: none"> <li>Tape pictures of the story characters onto blocks so children can make their own patterns.</li> </ul> <p>Provide other examples of patterns such as pictures of paving block and tile patterns, quilts and wallpaper. Ask children to copy them and then make their own. Leave a copy of Elmer the Elephant or Pattern Bugs in the reading corner for inspiration.</p>	<ul style="list-style-type: none"> <li>Provide fruit for children to make kebabs, and ask them to make a repeating pattern.</li> </ul> <p>Provide paper to make paper chains. Ask children how many different patterns they can make with three colours.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Outdoor Environment</p>	<ul style="list-style-type: none"> <li>Encourage children to make bunting with repeating patterns, e.g. red, blue; red, blue. Provide collections of objects for children to make repeating patterns with, e.g. sticks and leaves (e.g. stick, leaf; stick, leaf).</li> </ul>	<ul style="list-style-type: none"> <li>Ask children to identify patterns in nature. Provide photos of patterns, such as a leopard's spots, snowflakes and petals. Provide opportunities for children to make patterns. e.g. mud-pie castles, shells in the sand and seasonal items, such as conkers and leaves.</li> </ul>	<ul style="list-style-type: none"> <li>Dance traditional dances with children as many have repeating patterns.</li> </ul> <p>Play movement pattern games, e.g. <b>Clap High, Clap Low; Stamp Right, Stamp Left</b>. Ask children to make up their own. Ask children to change '<b>Bobby Bingo</b>' claps to actions.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Purposeful pedagogy</p>	<ul style="list-style-type: none"> <li>Describing patterns is difficult for children; scaffolding helps them use mathematical language: Ask children to explain how a pattern works and encourage them to state the rule. If the pattern is red, blue; red, blue; red, blue, the rule is one red and one blue (rather than red, blue, red, blue ...).</li> </ul>	<ul style="list-style-type: none"> <li>Growing patterns are more difficult for children to recognise than repeating patterns, e.g.</li> </ul> <div data-bbox="1205 981 1366 1101" data-label="Image"> </div> <p>Provide opportunities to identify growing patterns. If children are asked to describe their pattern and explain how it works, they are more likely to identify a unit of repeat.</p>	<ul style="list-style-type: none"> <li>Use sound patterns as there is a strong link between patterns and rhythm. Play sound patterns and ask children to recreate them and then create their own. Mix up the order of some familiar songs, e.g. '<b>Head, Shoulders, Knees and Toes</b>' becomes '<b>Shoulders, Head, Toes and Knees</b>'. Discuss why the new one is so tricky. Keep this as a fun and engaging activity rather than a lesson.</li> </ul>



<p>Learning Conversations</p>	<ul style="list-style-type: none"><li>• Ask questions such as: 'What comes next?', 'How does the pattern continue?'</li></ul> <p>When reading <i>Brown Bear, Brown Bear, What Do You See?</i>, ask children 'What keeps happening?'</p>	<ul style="list-style-type: none"><li>• Use words like 'pattern' and 'repeating'. Ask 'What comes next in the pattern?', 'How do you know?' and 'Are you sure?'</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as, 'Can you tell me what sound would come next in this pattern?', 'How many times will we hear that sound?' and 'What can you see/hear changing?'</li></ul>
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Number Operations

	Nursery	R1 September to January	R2 February to July
Progression milestones	<ul style="list-style-type: none"> <li>Finds answers to ‘result unknown’ problems up to five, by counting with objects, e.g. ‘You have two books and get one more. How many are there altogether?’</li> <li>(Counts out two, then one and then counts all three.)</li> <li>Matches sets by lining them up with one-to-one correspondence.</li> <li>Knows a whole is bigger than the parts but may not accurately quantify each.</li> </ul>	<ul style="list-style-type: none"> <li>Finds answers to ‘result unknown’ problems up to ten, by counting with objects, e.g. ‘You have six toys and are given three more. How many are there altogether?’ (Counts out six, then three and then counts all nine.)</li> <li>Solves subtraction problems by separating objects, e.g. ‘You have six balls and you give Mustafa two. How many balls do you have left?’ (Counts out six, then takes away two and counts the remaining four.)</li> <li>Compares by counting with groups up to five.</li> <li>Quickly names parts of a set up to six.</li> </ul>	<ul style="list-style-type: none"> <li>Counts on from the first set, rather than counting the whole, e.g. 5; 6, 7, 8.</li> <li>Solves ‘change unknown’ problems, e.g. ‘You have six sweets. Taylor gives you some more so now you have eight. How many did he give you?’ When subtracting, counts back from first number, keeping track of counts.</li> <li>Compares larger sets by counting and says which has more or less.</li> <li>Can compose and decompose numbers to ten.</li> </ul>
Learning Experiences	<ul style="list-style-type: none"> <li>Provide opportunities to count and compare sets. Ask ‘How many?’ and ‘Which collection is bigger/smaller?’.</li> </ul> <p>Use activities where children have to reproduce a number with manipulatives, e.g. place two counters on a table, hide another under a cloth and show it to children. Ask them to make the group that you have (three).</p>	<ul style="list-style-type: none"> <li>Play Snap It: children move around to music with a tower of Multilink® Cubes of a given quantity (say five) behind their backs. When the music stops, they find a partner, snap the tower and show their partner what is in one hand; the partner has to work out how many are in the other hand. Start with small numbers and increase.</li> </ul>	<ul style="list-style-type: none"> <li>Play <b>Find the Dominoes</b>: place domino cards around the room, shout out a number and ask children to find a card with that number of dots on. Ask them to compare with someone else, who may have chosen a card with a different combination of dots. Ask children to think about how many different ways they can find to make the number.</li> </ul>



<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Continuous Provision</p>	<ul style="list-style-type: none"> <li>Provide objects in the sand tray for children to sort into sets.</li> </ul>	<ul style="list-style-type: none"> <li>Use small world activities to provide number stories, e.g. 'Three people are on the bus. Two more get on. How many are now on the bus?'. Draw number tracks from 0 to 10 for children to jump along.</li> </ul>	<ul style="list-style-type: none"> <li>Use five- and ten-frames to help children compose and decompose numbers. Make two boat docks in the water tray and have a paper boat race, using fans to move the boats along. Ask children to calculate how many ended up in each dock.</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Outdoor Environment</p>	<ul style="list-style-type: none"> <li>Provide collections of natural objects for children to collect, count, group and compare quantities.</li> </ul>	<ul style="list-style-type: none"> <li>Make marble runs with two pipes running into two containers. Ask children to each grab a handful of marbles and drop them into one of the pipes. Ask them to compare how many marbles each has by asking 'Who has the most?', 'Who has least?', etc.</li> </ul>	<ul style="list-style-type: none"> <li>Provide large construction blocks for children to build with and ask questions, such as 'How many more bricks do you need for another layer in the wall?'.</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Purposeful pedagogy</p>	<ul style="list-style-type: none"> <li>Provide opportunities to make sense of number stories in different ways: act them out, use fingers, use concrete objects and make drawings. Start with small numbers. Look at the structure of the word problem; 'result unknown' problems are the easiest, e.g. 'Jonah had two balls and gets two more. How many does he have now?'. Encourage children to use fingers; they are the best manipulative. If children are struggling, use 'you' instead of names, e.g. 'You have two oranges.' rather than 'Jasmin has two oranges.'</li> </ul>	<ul style="list-style-type: none"> <li>Use stories to bring number problems to life. Encourage children to use manipulatives as the numbers in the stories grow. Encourage children to describe comparisons they see in different ways, e.g. 'There are more lions than tigers.', 'There are fewer tigers than lions.'</li> </ul>	<ul style="list-style-type: none"> <li>Ensure children have a good understanding of the relationship between numbers before introducing mathematical symbols. Introduce children to the commutative principle by demonstrating, e.g. 'Three and two more makes five. Two and three more makes five.' Introduce the more complex structure of 'change unknown' problems.</li> </ul>



<p>Learning Conversations</p>	<ul style="list-style-type: none"><li>• Look for children lining up objects and ask questions such as, 'How many do you have?' and 'How many would you have if you added two more?'.</li></ul>	<ul style="list-style-type: none"><li>• Encourage children to reflect on their number operations before giving them the right answer, e.g. 'Jayden says five and two makes six altogether. What do five and one make?'.</li></ul>	<ul style="list-style-type: none"><li>• Encourage children to use number problems in everyday situations, e.g. 'I usually put five cups out for snack time but Lakshmi isn't here today. How many cups do I need?'.</li></ul>
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Number Operations 2

	Nursery	R1 September to January	R2 February to July
Progression milestones	<ul style="list-style-type: none"> <li>• Shares by dealing out a group of objects between two people.</li> <li>• Engages in rhythmic counting, emphasising alternate numbers, e.g. one, two, one, two.</li> </ul>	<ul style="list-style-type: none"> <li>• Makes small equal groups (up to six) in the context of sharing fairly.</li> <li>• Skips one-to-one counting, saying 'two, four, six', missing out, or counting internally, the other numbers.</li> </ul>	<ul style="list-style-type: none"> <li>• Solves sharing problems using concrete objects up to 20 and between two and five people.</li> <li>• Solves small number multiplication problems by sorting objects into small groups.</li> </ul>
Learning Experiences	<ul style="list-style-type: none"> <li>• Provide lots of practical opportunities for children to group objects into sets and count how many sets there are.</li> </ul> <p>Read <i>One is a Snail, Ten is a Crab</i> by April Pulley Sayre and Jeff Sayre. Encourage children to make fingerprint paint pathways to show the number of feet the animals have. Make sets of one dot, sets of two dots, etc. Start with up to five.</p>	<ul style="list-style-type: none"> <li>• Ask children to sort socks into pairs. Ask them how many there are altogether. Show them how to count in twos; provide number cards for two, four and six, and ask children to place pairs of socks against the correct card. Read stories that include patterns, e.g. <i>Mrs McTats and Her Houseful of Cats</i> by Alyssa Satin Capucilli. Use objects to demonstrate the pattern.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure children see multiplication arrays by using columns and rows. Egg boxes and muffin tins are good resources for this.</li> </ul> <p>Sing songs to children which include patterns, e.g. 'Ten Fat Sausages'. Make some make-believe sausages and every time one goes pop and one goes bang, throw two out to children. Encourage children to use their fingers to count back in twos.</p>



<p>Continuous Provision</p>	<ul style="list-style-type: none"> <li>• Create a restaurant area: children have to make sure everyone gets a fair share of the food.</li> </ul>	<ul style="list-style-type: none"> <li>• Plan a party bag – five small sacks in which children have to put the same items. Ask, 'How many more items do you need if two extra people come to the party?'.</li> </ul>	<ul style="list-style-type: none"> <li>• Cooking provides lots of opportunities to talk about sharing and multiplying. Put three chocolate chips on each muffin and ask 'How many threes do we have?'.</li> </ul>
<p>Outdoor Environment</p>	<ul style="list-style-type: none"> <li>• Provide air bricks for children to arrange natural materials in, e.g. sticks, leaves, flowers. Encourage children to sort using their own criteria.</li> </ul> <p>Encourage children to jump through water or paint in their wellies, shouting 'Two, two, two', as the number of feet they have. The water or paint leaves a trail.</p>	<ul style="list-style-type: none"> <li>• Play <b>Double Trouble</b>: using number cards to five, ask children to choose a number. They should make a tower with that number of bricks and then one twice as big.</li> </ul>	<ul style="list-style-type: none"> <li>• Jump in twos: draw a number line, along which children jump in twos. Make a number pattern with pebbles behind the line: two pebbles, then four pebbles. Ask children to finish the pattern.</li> </ul>
<p>Purposeful pedagogy</p>	<ul style="list-style-type: none"> <li>• Pose simple number problems throughout the day, e.g. if a child is lining up small world animals, ask 'How many would there be if you added two more?'.</li> </ul> <p>Wonder aloud, e.g. 'I wonder how many children are on the climbing frame.' Or 'How many will there be (at the see-saw) if Jack and Grace go too?'.</p> <p>Encourage the use of concrete objects; early number operations have a strong spatial component.</p>	<ul style="list-style-type: none"> <li>• Tell number stories and provide problems that use smaller numbers at first, and have a simple structure. Remember, 'result unknown' problems are the easiest for children to understand.</li> </ul> <p>Ensure you describe the problems in many ways; often, children's lack of vocabulary is the problem, not a lack of mathematical understanding.</p>	<ul style="list-style-type: none"> <li>• Expose children to a range of problem situations without telling them how to work out the answers.</li> </ul> <p>Supporting children to find solutions which make sense to them, rather than teaching a procedure, lays a strong foundation for number sense.</p>



<p>Learning Conversations</p>	<ul style="list-style-type: none"><li>• Use prompts such as 'I wonder what might happen if ...' and 'Show me, then tell me about it.'</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as 'How many are there?' and 'How might we work it out without counting one by one?'</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as 'How did you work that out?' and 'Can you think of a different way to do it?'</li></ul>
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Finger Gnosis

	Nursery	R1 September to January	R2 February to July
Progression milestones	<ul style="list-style-type: none"> <li>• Uses fingers during fine motor skills activities.</li> <li>• Takes part in finger rhymes.</li> </ul>	<ul style="list-style-type: none"> <li>• Identifies different fingers especially in songs like <b>'Peter Pointer'</b> and <b>'Baby Small'</b>.</li> <li>• Matches finger symbols to collections of objects.</li> </ul>	<ul style="list-style-type: none"> <li>• Shows numbers with fingers.</li> <li>• Follows lines on a maze with different fingers.</li> </ul>
Learning Experiences	<ul style="list-style-type: none"> <li>• Ask children to warm up their 'learning tools' by wiggling their fingers and opening and closing their hands. This could be done to music. Have a disco with dough: play music and encourage children to squeeze the dough and poke it with different fingers.</li> </ul>	<ul style="list-style-type: none"> <li>• Sing finger-action songs such as <b>'Five Little Speckled Frogs'</b>, <b>'Five Little Ducks'</b> and <b>'Five Little Monkeys'</b>. Ask children to show you five fingers, three fingers, etc. Provide small groups with a bag of numbers up to five: one person picks out a number and the others show them that number on their fingers.</li> </ul>	<ul style="list-style-type: none"> <li>• Play <b>Finger Disco</b>: stick coloured dots to children's fingers; play music and shout out colours. Children have to touch their thumb with the correct finger. Do this activity with both hands.</li> </ul>
Continuous Provision	<ul style="list-style-type: none"> <li>• Provide lots of fine motor skill activities, such as picking up pom-poms with tweezers; making paper clip worms from card and paper clips (see page 57); making button caterpillars by threading buttons onto pipe cleaners.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide materials for finger painting. Encourage children to make different-sized dots by using different fingers. (This activity could be linked to expressive arts and design by taking inspiration from great artists, e.g. Seurat.)</li> </ul>	<ul style="list-style-type: none"> <li>• Ask children to put coloured dots on their finger nails. Draw mazes using the same colours with a start and end point. Encourage children to follow the lines with the correct colour finger. Ask children to make some mazes of their own.</li> </ul>



<b>Outdoor Environment</b>	<ul style="list-style-type: none"><li>• Provide small tools for children to pick up objects in the environment, e.g. tweezers to pick up leaves, spoons to pick up sand.</li></ul>	<ul style="list-style-type: none"><li>• Provide frames for weaving in the outdoor area, with strips of recycled plastic, twigs or fabric.</li></ul>	<ul style="list-style-type: none"><li>• Encourage children to move around the outdoor area in different ways. Shout 'Stop' and throw a large die numbered 0–5. Children have to show that number of fingers.</li></ul>
<b>Purposeful pedagogy</b>	<ul style="list-style-type: none"><li>• Talk about using your fingers in maths: show children how to touch objects for one-to-one correspondence. Say 'Touch five ... (objects)'.</li></ul>	<ul style="list-style-type: none"><li>• Encourage children to use their fingers to count. Use cards with finger symbols on, which children have to match to a collection of objects or to a numeral.</li></ul>	<ul style="list-style-type: none"><li>• Be aware of any opportunities for children to use their fingers, e.g. remind them during the day to count on their fingers. Play games using a colour mat: you name a colour and children have to tap it as quickly as possible.</li></ul>
<b>Learning Conversations</b>	<ul style="list-style-type: none"><li>• Ask questions such as 'Have you got your learning tools ready?'.</li></ul>	<ul style="list-style-type: none"><li>• Ask children questions such as, 'Can you show me ways to make four (or any other number to ten) with your fingers?'.</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as 'How can you move your fingers more quickly?' and 'Which other activities involve using fingers?'. (Link this to the use of musical instruments.)</li></ul>



Sets

	Nursery	R1 September to January	R2 February to July
Progression milestones	<ul style="list-style-type: none"> <li>Recognises and identifies objects that are alike, e.g. red objects.</li> <li>Sorts by using a single attribute, e.g. 'I picked out all the heart-shaped pieces.'</li> </ul>	<ul style="list-style-type: none"> <li>Uses binary sorting: dividing a collection into two groups, ones with a specific attribute and ones without.</li> <li>Comes up with their own criteria for sorting.</li> </ul>	<ul style="list-style-type: none"> <li>Uses multiple set sorting by focusing on different attributes, e.g. red gloves and mittens can become large red gloves and large red mittens.</li> <li>Compares and orders sets by using specifically mathematical attributes, e.g. the set that has the most (quantity) and the set that has the the biggest objects (magnitude).</li> </ul>
Learning Experiences	<ul style="list-style-type: none"> <li>Read <i>Monkey Puzzle</i> by Julia Donaldson and Axel Scheffler. Talk to children about the attributes the animals have in common with the monkey. Ask, 'Why does the butterfly think certain animals might be the monkey's mum?'. Draw a chart with the animals' names on. Record children's ideas of how each animal is the same as and different from others.</li> </ul>	<ul style="list-style-type: none"> <li>Read <i>Five Creatures</i> by Emily Jenkins. Carry out whole-body sorts with children sorting themselves. Start with a small group: 'I have five children in front of me. Some have red tops [point to one side], some don't [point to the other side].' This provides a large-scale version of sorting. Ask the other children to check. Gradually introduce some multiple sets. Use dressing-up clothes if children wear uniform.</li> </ul>	<ul style="list-style-type: none"> <li><i>Shoes, Shoes, Shoes</i> by Ann Morris. If children wear uniform, ask them to bring in their favourite shoes. Sit in a circle and ask children to each put one of their shoes in the centre. Ask them to come up with some ideas of how to sort the shoes into groups. Make a grid and use a realia graph (a 3D bar graph that uses real- life objects) to work out how many are in each category.</li> </ul>



<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Continuous Provision</p>	<ul style="list-style-type: none"> <li>Provide small world animals for children and ask them to talk about how the animals are the same or different. Provide a variety of different objects at various stations for children to sort. Provide some that are already partially sorted so children have to add to the set.</li> </ul>	<ul style="list-style-type: none"> <li>Place groups of between five and ten related objects, such as cuddly toys or plastic food, around the classroom. Ask children to sort them into two sets.</li> </ul> <p>Play <b>What's My Rule?</b>: sort some objects from a collection and ask children to guess the rule. Ask them to make up their own rules.</p>	<ul style="list-style-type: none"> <li>Provide realia templates for children to sort objects, in different areas of the classroom.</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Outdoor Environment</p>	<ul style="list-style-type: none"> <li>Provide pictures of natural objects that children might find in the outdoor area. Ask them to find an object that matches the picture.</li> </ul>	<ul style="list-style-type: none"> <li>Provide objects for children to sort, e.g. leaves, seeds and stones. Place coloured hoops, baskets, beanbags and balls in the area so children can find ways to sort them.</li> </ul>	<ul style="list-style-type: none"> <li>Chalk large grids onto the playground and ask children to sort the outdoor toys.</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Purposeful pedagogy</p>	<ul style="list-style-type: none"> <li>Provide objects related to children's lives for them to sort. This helps them make meaningful connections. (Commercial objects can only be sorted in limited ways.)</li> </ul>	<ul style="list-style-type: none"> <li>Help children realise that, although there may not necessarily be a right and wrong answer, they need to agree about the attribute by which the objects will be sorted.</li> </ul> <p>Make comments when you see sorting going on in the classroom, e.g. identify those children who eat a packed lunch and those who eat a school lunch.</p>	<ul style="list-style-type: none"> <li>Explain to children how to use a graph. Show them how the column starts at the line (axis). Explain that only one shoe may be placed in each square. Explain that missing out squares makes it difficult to compare each column. Make labels for the categories as decided by children. If children are struggling, spend time looking at pictures of different shoes and talking about how they are the same but different. Take a photo of the graph.</li> </ul>



<p>Learning Conversations</p>	<ul style="list-style-type: none"><li>• Ask open-ended questions, e.g. 'You remembered that the monkey's mum and the elephant are big. Can you think of any other ways in which they may be the same?', 'Can you think of any other animals that are big?' and 'Can you think of any other animals that are similar to the monkey?'.</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as 'What else do you notice?'. Give children time to explain how they have sorted the objects. Don't jump in with your ideas; they may surprise you.</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as 'What could we do with shoes that have laces and VELCRO®?', 'Why do you think the trainer column is so much longer than the others?' and 'Do you think the shoes would be different if it was summer (or winter)?'.</li></ul>
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Measurement - Length

	Nursery	R1 September to January	R2 February to July
Progression milestones	<ul style="list-style-type: none"> <li>Identifies length, weight and capacity as attributes.</li> <li>Explores differences in size, weight and length.</li> <li>Can compare the capacity of two containers by pouring from one to the other.</li> <li>Understands recent past and future.</li> <li>Is beginning to anticipate times of the day, e.g. lunch time, home time.                             <ul style="list-style-type: none"> <li>Describes length or height measurements as big or small.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Makes comparisons between objects relative to size, length, weight and capacity.</li> <li>Physically aligns two objects to see which is longer.</li> <li>Packs cubes into a box in an organised way.</li> <li>Can order up to five objects by length.                             <ul style="list-style-type: none"> <li>Uses 'than' to compare objects.</li> </ul> </li> <li>Remembers the sequence of events in a book or in real life.                             <ul style="list-style-type: none"> <li>Uses non-standard measuring tools.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Describes measurable attributes of objects.</li> <li>Enjoys predicting and discussing comparisons of attributes.</li> <li>Focuses on fairness and accuracy. Uses a variety of measuring tools.</li> <li>Compares the length of two objects by using a third object (a measuring tool).</li> <li>Estimates how many cubes will fill a space.                             <ul style="list-style-type: none"> <li>Sequences and orders events.</li> </ul> </li> <li>Is beginning to use a timer and a calendar.</li> <li>Uses an increasing amount of measurement vocabulary.</li> <li>Is beginning to use some indirect comparison, e.g. turning a circumference into a length using string.</li> </ul>



<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Learning Experiences</p>	<ul style="list-style-type: none"> <li>Read <i>Twelve Snails to One Lizard</i> by Susan Hightower. (This does include imperial measures, but can easily be changed when reading.) The story is a lovely introduction to measuring length. Ask children for ways in which they might measure objects in the classroom.</li> </ul>	<ul style="list-style-type: none"> <li>Read <i>Super Sand Castle Saturday</i> by Stuart J. Murphy. (This does include imperial measures, but can easily be changed when reading.) The story is a good introduction to non-standard measuring and the need for accuracy. Ask children questions such as ‘Is a spoon the best way of measuring the moat?’.</li> </ul>	<ul style="list-style-type: none"> <li>Read <i>Goldilocks and the Three Bears</i> (traditional). Ask children ‘Why do you think Baby Bear’s things were always the right size for Goldilocks?’, ‘Do you think Daddy Bear’s chair was too big for him?’, ‘Why do you think that?’. Encourage children to see that what is right for one person may not be right for another. Make footprint rulers: draw an outline of each child’s foot. Ask them to cut it out and write their name on it.</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Continuous Provision</p>	<ul style="list-style-type: none"> <li>Encourage children to think about measuring in a range of areas, by asking questions such as, ‘Who can make a tall sandcastle?’; ‘Who can make a long dough sausage?’; ‘Who can build the tallest tower?’.</li> </ul> <p>Make footprints in the sand and ask ‘Who has the longest feet?’.</p>	<ul style="list-style-type: none"> <li>Make ‘longer than, shorter than’ charts that have photographs on the left, a symbol for short or long in the middle, and a box for children to draw another object at the right. Children find and draw objects that are shorter or longer than each photograph.</li> </ul>	<ul style="list-style-type: none"> <li>Ask children to compare their footprint rulers, asking ‘Which is longer/shorter?’. Encourage children to go into the different areas and find things that are the same length as their footprint ruler.</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Outdoor Environment</p>	<ul style="list-style-type: none"> <li>Use two skipping ropes to make a river. Ask children to make a bridge/dam across the river with different materials. Make the activity more challenging by making one end of the river wider.</li> </ul>	<ul style="list-style-type: none"> <li>Encourage children to measure using a variety of different methods. Ask them ‘How many feet/hands/ twigs/pencils/rulers does this measure?’. Encourage children to come up with their own ideas. Refer back to the story: ask children if they think they have chosen the best tools for measuring.</li> </ul>	<ul style="list-style-type: none"> <li>Ask children what they can find outside that is the same length as their footprint ruler. Ask them to sort three objects: one shorter, one the same and one longer than their footprint ruler. Encourage children to look for objects that are the length of two of (double) their footprint ruler.</li> </ul>



<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Purposeful pedagogy</b></p>	<ul style="list-style-type: none"> <li>• Ensure children have lots of opportunities to compare length. Provide long and wide shapes. Children find height an easier concept to understand as all objects ‘rise up’ from a surface. When they start to lie things down to measure them, encourage them to make sure all the objects are being measured from the same starting point. Revisit comparisons using visual and verbal inputs to help children believe that the conclusion they have reached is fair.</li> </ul>	<ul style="list-style-type: none"> <li>• Children often start with general descriptions, such as ‘This is a tall book. This is a short book.’, rather than specific comparisons that involve counting or measuring. This involves children saying things like ‘My book is two blocks taller than yours.’ Use mathematical language to make children’s comments more quantitative. Listen for evidence of understanding of the big ideas (attributes, measurement and accuracy).</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure children are only isolating the attribute of length. Reflect on how you could use all areas of continuous provision to include authentic opportunities for measuring length. Some of these opportunities will arise as children play, but reflecting on this in advance can help you to enhance provision.</li> </ul> <p>Take opportunities to comment on length in class, e.g. ‘Look, the blue truck is longer than the red one.’ and ‘The snake picture is longer than the giraffe picture.’ Ensure children measure end to end, without gaps.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Learning Conversations</b></p>	<ul style="list-style-type: none"> <li>• Ask questions such as, ‘Which is the longest?’, ‘How do you know?’, ‘Why do you think that?’ and ‘How can we compare x and y?’.</li> </ul>	<ul style="list-style-type: none"> <li>• Make a line of cuddly toys and ask children questions such as ‘Which one is the tallest?’, ‘Which one is the smallest?’, ‘Can we line them up in order?’, ‘How do you know it is right?’ and ‘How might we check?’.</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage children to use more precise language related to length, e.g. ‘Does the truck seem just a little bit longer than your footprint ruler?’.</li> </ul>



## Measurement - Weight

	Nursery	R1 September to January	R2 February to July
Learning Experiences	<ul style="list-style-type: none"> <li>Show children a variety of different objects. Ask them to say if they are heavy or light. Include large, light objects and small, heavy objects.</li> </ul>	<ul style="list-style-type: none"> <li>Read <i>Balancing Act</i> by Ellen Stoll Walsh. Show children a variety of objects in pairs. Ask them to say which may be heavier. Use a pan balance-scale to check. On the pan balance-scale, show them two different objects that weigh the same. Ask them what it means when the scales do not tip either way.</li> </ul>	<ul style="list-style-type: none"> <li>Show children a variety of different weighing scales, demonstrating how they work. Pre-prepare some parcels: tell children they are birthday presents. Explain to children that when they send a parcel, it is weighed and the price depends on the weight. Pass the parcels around. Encourage children to predict the weight and then check using the different scales.</li> </ul>
Continuous Provision	<ul style="list-style-type: none"> <li>Provide different containers for children to fill in different areas. Ask them to think about which containers are heavy and which are light. Put sponges in the water area for children to see what happens to their weight when they get wet.</li> </ul>	<ul style="list-style-type: none"> <li>Working in pairs, children visit the different areas of the classroom and try to find objects that weigh the same as each other. Ask them to devise a way to keep a record of the things they have found.</li> </ul>	<ul style="list-style-type: none"> <li>Make two-egg cakes in small groups: place two eggs on one side of the scales. Children have to weigh out the same amount of each of the other ingredients – sugar, self-raising flour and butter.</li> </ul>
Outdoor Environment	<ul style="list-style-type: none"> <li>Place a variety of cuddly toys into bags. Ask children to take two at a time for a walk. Ask, 'Which toy is the heavier?'. Repeat this until they have tried all the cuddly toys and come to a decision about the heaviest toy. (Note: a small toy filled with grains may be heavier than a large toy stuffed with kapok.)</li> </ul>	<ul style="list-style-type: none"> <li>Let children experiment with comparing the weights of a variety of items using outdoor bucket-scales. With one constant item in one of the buckets, ask them to find one heavier, one lighter and one object that weighs the same. Hang containers on elastic bands for children to experiment with how different objects stretch the bands.</li> </ul>	<ul style="list-style-type: none"> <li>Play <b>How Heavy is Teddy?</b> Place a teddy on one side of the scales. Ask children to find objects to add to the other bucket to balance the scales. For example, ten conkers weigh the same as Teddy.</li> </ul>



<p>Purposeful pedagogy</p>	<ul style="list-style-type: none"><li>• Ensure children have lots of opportunities to compare the weights of objects.</li></ul> <p>Be aware of how you use comparative language in the classroom: expressing relationships between objects is important and much more difficult for children than naming concrete items. Keep in mind that for something to be described as heavy, it is being compared to something that is lighter. With this in mind, try to focus on comparisons rather than absolute descriptions when discussing weight.</p>	<ul style="list-style-type: none"><li>• When using a balance scale, children tend to focus on the fact that the heavier item goes down. Bring their attention also to the one that goes up, and is lighter.</li></ul>	<ul style="list-style-type: none"><li>• Make comments during the day about weights of objects. Give each child a ball of modelling clay of the same weight. Ask them to work with a partner to check the balls are the same weight on a pair of scales. Ask children to change the shape of their clay and discuss what they think will happen to its weight. Provide other scenarios, e.g. making a worm with their clay. Use lots of questions and repeat with other items until children understand that an object's weight does not change when its shape changes.</li></ul>
<p>Learning Conversations</p>	<ul style="list-style-type: none"><li>• Ask questions such as 'How do you know?' and 'How can we compare?'.</li></ul>	<ul style="list-style-type: none"><li>• Ask children to hold the objects in their hands first and make predictions about their weight, before checking on a balance scale.</li></ul>	<ul style="list-style-type: none"><li>• Ask children questions that emphasise the conservation of weight. With clay that is of equal weights, ask children to make a worm and ask 'Whose worm is the longest?', 'Whose worm is the heaviest?' and 'Why are they the same?'.</li></ul>



Measurement - Capacity

	Nursery	R1 September to January	R2 February to July
Learning Experiences	<ul style="list-style-type: none"> <li>Capacity is a hard concept for children to grasp. Provide a range of different objects for them to explore, e.g. teapots, buckets, spoons, scoops and ladles. Use nests of containers to generate discussions. Provide pouring media such as water; sand; lentils and discrete, countable materials like blocks, beans and conkers.</li> </ul>	<ul style="list-style-type: none"> <li>Read <i>Goldilocks and the Three Bears</i> (traditional). Show children three bowls and ask ‘Which one do you think belongs to which bear?’. Use puffed rice to illustrate the varying capacities of each bowl.</li> </ul> <p>Ask children to come up with ideas to check the different capacities of containers. Some children see that it is possible to put one bowl inside another. This demonstrates increased conceptual understanding.</p>	<ul style="list-style-type: none"> <li>Tell children they are toy makers. Choose some items from the small world equipment, e.g. dinosaurs, and explain to children that they have to pack their toys into a container to sell. Show them a container and ask, ‘How many dinosaurs do you think it will hold?’. Show them another container with a different capacity and label each with the quantity it holds.</li> </ul>
Continuous Provision	<ul style="list-style-type: none"> <li>Create a fill-and-empty centre with trays of beans with funnels, spoons, jugs, etc. Change the pouring media regularly. Provide a water tray with a selection of containers beside it. Encourage children to select from the containers to experiment with pouring and transferring water.</li> </ul>	<ul style="list-style-type: none"> <li>Explain to children that there are other containers belonging to the bears around the classroom: lunch boxes in the construction area; cups and water bottles in the water area. Ask them to work out which containers belong to which bear.</li> </ul>	<ul style="list-style-type: none"> <li>Provide children, working in pairs, with a variety of different containers and dinosaurs. Ask them to check and label how many dinosaurs each container can hold. Show children how to make a vertical cylinder with a base and challenge them to work in pairs to make their own that can contain ten dinosaurs.</li> </ul>
Outdoor Environment	<ul style="list-style-type: none"> <li>Set up a car wash: explain to children that the sit-and-ride vehicles are dirty and need to be washed. Provide large containers of water and a variety of smaller containers and piping. Ask children to devise a way to get the water to the car wash. Experiment with how many of each container of water will be needed to wash a vehicle.</li> </ul>	<ul style="list-style-type: none"> <li>Place boxes of different sizes in the outdoor area. These are the bears’ treasure boxes. Children use objects in the outdoor area to check capacity.</li> </ul>	<ul style="list-style-type: none"> <li>Encourage children to make a cylinder and see what objects they can find in the outdoor area to fill it. Ask them to record their findings, e.g. 12 pebbles, 10 conkers, 8 twigs.</li> </ul>



<p>Purposeful pedagogy</p>	<ul style="list-style-type: none"><li>• Play with children: model the language of capacity by asking ‘Is your container full?’ and ‘What happens when you pour water out?’. Set a challenge for children: ‘Which will be quicker: washing a vehicle with a bucket or a cup?’, ‘How many bottles did you need?’, ‘How many cups?’.</li></ul>	<ul style="list-style-type: none"><li>• Ensure children have a large variety of containers to explore. Give them lots of time for this activity; it could last for a week or longer, as the more children experiment the more they will learn. Draw their attention to different shapes containing the same amount. This is the first step towards understanding conservation of volume.</li></ul>	<ul style="list-style-type: none"><li>• Ask children how they decided on the size of their cylinder for ten. This activity could be expanded by encouraging children to make cylinders for numbers of dinosaurs up to 20: children choose a number from a bag and make a cylinder for that number of dinosaurs which are then displayed in a line. Ask children whether a cylinder was the most suitable shape to use for packing dinosaurs. Discuss which shape of container would be better.</li></ul>
<p>Learning Conversations</p>	<ul style="list-style-type: none"><li>• Ask questions such as, ‘How many spoonfuls of water are needed to fill the cup?’ and ‘How many cups are needed to fill the bucket?’. Also make comments on the weight of items.</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as, ‘Why do you think that?’, ‘How could you check?’, ‘How are you going to work out which one holds the most?’, ‘These containers are the same size. How do you know they contain the same amount?’.</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as, ‘What do you think a cylinder for 20 dinosaurs would look like?’.</li></ul>



Measurement - Time

	Nursery	R1 September to January	R2 February to July
Learning Experiences	<ul style="list-style-type: none"> <li>Play the <b>Day and Night Game</b>: ask children to think of things they do at night and during the day. Encourage them to mime some of them. Ask them to move around to music and when the music stops, say 'Night' or 'Day'. They then perform an action appropriate to the time of day. You could do this with a visual signal, e.g. a picture of the sun or moon.</li> </ul>	<ul style="list-style-type: none"> <li>Create a comic strip of events that happen during the day. Explain to children you have muddled up the order and would like their help in putting it right.</li> </ul>	<ul style="list-style-type: none"> <li>Build time into daily routines. Talk about what day it is and what month it is. Provide a class birthday calendar. Use it to talk about age, next week, last week, today, last month, etc.</li> </ul>
Continuous Provision	<ul style="list-style-type: none"> <li>Place sand timers around the classroom. Initially do not show children how to use the timers. Observe what they do with them and then explain they are measuring time.</li> </ul>	<ul style="list-style-type: none"> <li>Provide children with cards on which they draw their own routines or other things that they might add to the comic strip. Leave familiar books with simple timelines in the book corner. Encourage children to retell the stories to each other.</li> </ul>	<ul style="list-style-type: none"> <li>Set up a variety of different timers (sand timers, digital timers, etc.) with challenges in different areas. How many spoonfuls of sand can they put into the container before the timer ends? How many beads, blocks, small word characters? Make these more challenging by asking children how long it would take to do something.</li> </ul>
Outdoor Environment	<ul style="list-style-type: none"> <li>Place sand timers in the outdoor area. Place beanbags in a hoop some distance from children and give them a bucket. Challenge them to see how many beanbags they can collect before the sand runs out.</li> </ul> <p>Create an obstacle course: challenge children to see how much of it they can complete before the sand runs out.</p>	<ul style="list-style-type: none"> <li>Set up a short trail through the outdoor area or school grounds. Time how long it takes children to complete it.</li> </ul>	<ul style="list-style-type: none"> <li>Make a chart for a week with a list of some typical activities in the outdoor area. Encourage children to write their name next to the activity/ies they have done that day. Refer back to it at the end of the week. Use it to create conversations using the vocabulary of time.</li> </ul>



<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Purposeful pedagogy</b></p>	<ul style="list-style-type: none"> <li>Time is a difficult concept that includes two elements: the time (of day, year, etc.) that something happens; the duration of an event. Be clear about which your activities are designed to promote. Children learn about time of day through discussing when things happen; they learn about duration by reflecting on how long things take to do. Children of this age tend to focus only on the present so make frequent reference to both the time of the event and its duration during the day. e.g. 'Now we are eating.', 'Later we will play.', 'This took a short time to do.', 'That took a long time.'</li> </ul>	<ul style="list-style-type: none"> <li>Use vocabulary relating to time as much as possible. There are a vast number of words and phrases associated with time, e.g. (duration) how long, minute, second, hours, days, weeks; (time of event) now, this afternoon, at lunch time, at 1 o'clock, spring, summer, autumn, winter, later, earlier, immediately. Make a list of words and expressions about time and take opportunities to use them with children.</li> </ul>	<ul style="list-style-type: none"> <li>During stories, emphasise time phrases, e.g. once upon a time, a long time ago, suddenly, in the blink of an eye.</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Learning Conversations</b></p>	<ul style="list-style-type: none"> <li>Ask children about what they did at the weekend. Talk to them about events they might be anticipating, e.g. their birthday or a visit from family/friends. Talk to children about how long it takes to do something.</li> </ul>	<ul style="list-style-type: none"> <li>Ask children questions, e.g. (time of event) 'What do you do first?', 'What happens after that?', 'What do you think comes next?', 'What time is lunchtime?', 'What time is home time?'; (duration) 'Which things can you do quickly/slowly?', 'How many minutes did this take?'</li> </ul>	<ul style="list-style-type: none"> <li>Ask questions such as 'What would happen if you used a different timer?', 'What if you used a different container?', 'What might you change to do it even more quickly?'</li> </ul>



Shapes – 2D Shapes

	Nursery	R1 September to January	R2 February to July
Progression milestones	<ul style="list-style-type: none"> <li>• Uses names of 2D shapes as labels, with no reference to attributes.</li> <li>• May physically rotate shapes to match a prototype shape.</li> <li>• Uses everyday language for 3D shapes, e.g. ball or block.</li> <li>• Is beginning to see shapes in the environment, e.g. a house is seen as a square with a triangle roof.</li> <li>• Uses blocks to build structures.</li> </ul>	<ul style="list-style-type: none"> <li>• Is beginning to use attributes to describe shapes.               <ul style="list-style-type: none"> <li>• Recognises corners.</li> </ul> </li> <li>• Describes 3D shapes using 2D names, e.g. a cuboid is called a rectangle.               <ul style="list-style-type: none"> <li>• Recognises edges and sides.</li> </ul> </li> <li>• Can make a picture using 2D shapes.</li> <li>• Can build structures with arches, roofs and gaps for windows.</li> </ul>	<ul style="list-style-type: none"> <li>• Uses attributes to identify some unusual shapes.</li> <li>• May recognise a right-angled triangle. Recognises most familiar shapes and typical examples of other shapes, e.g. a hexagon or a rhombus.</li> <li>• Ignores the orientation of shapes when identifying them.</li> <li>• Describes the faces on a 3D shape.</li> <li>• Names some common 3D shapes, e.g. a sphere or cube.</li> </ul> <p>Puts 2D shapes together to make part of a picture, e.g. triangles and a circle to make a flower.</p> <ul style="list-style-type: none"> <li>• Builds more complex structures, substituting combinations for another shape.</li> </ul>



<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Learning Experiences</p>	<ul style="list-style-type: none"> <li>Read <i>Mouse Shapes</i> by Ellen Stoll Walsh. Talk to children about all the different shapes in the book. Ask them if they can see anything that is the same shape in the classroom. Point out the shapes of doors, windows, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Read <i>City Shapes</i> by Diana Murray. Take children on a walk in the local area and see which shapes they can spot. As they find the shapes, they could then tick them off on a checklist.</li> </ul>	<ul style="list-style-type: none"> <li>Read <i>Grandfather Tang</i> by Ann Tompert. Encourage children to have a go at making some basic tangrams.</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Continuous Provision</p>	<ul style="list-style-type: none"> <li>Using juggling scarves, encourage children to make shapes in the air. Provide different shape cutters in the modelling dough area. Also ask children to make shapes without cutters. Children can make shapes in the sand area with tools or their hands. Provide flat shapes for children to explore.</li> </ul>	<ul style="list-style-type: none"> <li>Ask children to make shape bingo cards (with six boxes each) by drawing around shape templates. Play the game. Provide boards and flat shapes for children to make pictures.</li> </ul>	<ul style="list-style-type: none"> <li>Show children how to play <b>Guess My Rule</b>: place two or three shapes into two different circles, and ask children what your rule is. Provide equipment for them to play this with partners. Play <b>Guess My Shape</b>: hide shapes in bags, and ask children to put their hands in and feel the shape to identify it. Provide magnetic shape tiles.</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Outdoor Environment</p>	<ul style="list-style-type: none"> <li>Provide large brushes and water for children to paint shapes on the wall or ground. Provide twigs to make shapes. Draw large shapes in chalk on the ground for children to walk around or jump into.</li> </ul>	<ul style="list-style-type: none"> <li>Tie a number of skipping ropes together to make a circle. Children stand inside and pull the rope up to waist level. Then ask them, using different numbers of children, to make different shapes. Ask children to make different shapes with their bodies.</li> </ul>	<ul style="list-style-type: none"> <li>Make courses of different shapes for children to ride around on sit-and-ride vehicles. Provide children with lengths of string and ask them to make different shapes with them.</li> </ul>



<p>Purposeful pedagogy</p>	<ul style="list-style-type: none"><li>• Ensure children experience many different examples of shapes. Do not use common objects as children already have names for these. Instead, use drawings or manipulatives. Encourage children's descriptions and add mathematical language relating to the shape's attributes. Encourage children to handle the shapes.</li></ul> <p>Learning the attributes is more important at this stage than learning the name of the shape.</p>	<ul style="list-style-type: none"><li>• Tell children that squares are a type of rectangle because they have the same features. Encourage children to describe why a shape does not belong to a certain category. Show non-examples to focus children's attention on critical attributes, e.g. a slice of pizza is not a triangle because it has a curved outer edge. Children learn more about shapes through guided play, with teachers interacting and asking questions.</li></ul>	<ul style="list-style-type: none"><li>• Provide lots of books about shapes for children to look at or to read to them. Encourage children to use programmable toys to make shapes on the ground.</li></ul>
<p>Learning Conversations</p>	<ul style="list-style-type: none"><li>• Ask questions such as, 'What can you see?', 'How do you know that it is a square?', 'What is the difference between these two shapes?', 'Can you see any other shapes like this one?'.</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as, 'Do you think we could make a bigger square than the one you have?'.</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as, 'How do you know?', 'Describe this shape to me.', 'These don't look the same. Can you explain to me how you know they are both triangles?'.</li></ul>



Shapes – 3D Shapes

	Nursery	R1 September to January	R2 February to July
Learning Experiences	<ul style="list-style-type: none"> <li>Read <i>Circle! Sphere!</i> by Grace Lin. Show children a bubble wand. Ask them to name the shape of the opening of the wand. Blow a bubble and ask them to name the shape that comes out.</li> </ul>	<ul style="list-style-type: none"> <li>Play Tower Challenge: explain to children that you want to build a block tower that is as tall as them. Deliberately build it with a small base so it is not very stable. Ask children how you might solve the problem and which might be the best bricks to use.</li> </ul>	<ul style="list-style-type: none"> <li>Share <i>Cool Architecture: 50 fantastic facts for kids of all ages</i> by Simon Armstrong, <i>Skyscrapers</i> by Libby Romero or <i>Look at That Building!</i> by Scot Ritchie. Talk to children about all the different types of structures they see. Encourage them to point out any shapes they recognise.</li> </ul>
Continuous Provision	<ul style="list-style-type: none"> <li>Provide lots of different materials for children to build with, e.g. cardboard boxes and blocks. (Avoid blocks that stick together.)</li> </ul> <p>Provide 3D shapes and damp sand for children to make shape impressions.</p>	<ul style="list-style-type: none"> <li>Place blocks near the small world toys. Encourage children to build a town for the toys.</li> </ul> <p>Encourage children to build their own towers. Provide pictures of famous towers around the world for them to look at.</p>	<ul style="list-style-type: none"> <li>Provide magnetic tiles for children to turn 2D into 3D shapes.</li> </ul> <p>Set challenges for children, e.g. ask them to build a bridge over a river. Provide non-fiction books about buildings to inspire children.</p>
Outdoor Environment	<ul style="list-style-type: none"> <li>Provide bubble mix in large trays and make some wands with openings of different shapes, e.g. triangles, squares and rectangles. Ask children to blow bubbles and to say what they notice about the shapes.</li> </ul>	<ul style="list-style-type: none"> <li>Encourage children to take part in <b>Loose Parts Play</b> by providing a variety of different equipment. (Play Scotland provides a useful Toolkit for this: <a href="http://www.playscotland.org">www.playscotland.org</a>)</li> </ul> <p>Ensure there is a variety of 3D shapes.</p>	<ul style="list-style-type: none"> <li>Encourage children to take part in <b>Loose Parts Play</b> by providing a variety of different equipment. Ask children to plan in advance what they intend to make and draw a picture of it. Ask them to come up with a list of materials they will use. Give children a purpose for the activity, e.g. make a shelter for a sit-and-ride vehicle.</li> </ul>



<p>Purposeful pedagogy</p>	<ul style="list-style-type: none"><li>• Ensure children experience many different examples of shapes. Do not use common objects as children already have names for these. Instead, use drawings or manipulatives. Encourage children's descriptions and add mathematical language relating to the attributes of the shape. Encourage children to handle the shapes.</li></ul> <p>Learning the attributes is more important at this stage than learning the name of a shape.</p>	<ul style="list-style-type: none"><li>• Allow extended time for children to play and experiment with the 3D blocks. Encourage children to build constructions with an interior space and objects within them, e.g. a bed for a teddy, or walls for a farm.</li></ul>	<ul style="list-style-type: none"><li>• Encourage children to enclose an interior space by adding a roof or ceiling. Encourage them to plan ahead what the structure will be used for (link to design and technology).</li></ul>
<p>Learning Conversations</p>	<ul style="list-style-type: none"><li>• Tell children that the sides of 3D shapes are called faces. Ask children questions such as, 'Which shapes can you see on the faces of these shapes?'. Encourage children to count the faces.</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as 'Which shapes do you think are the strongest?', 'Which shapes are you going to use for your tower?' and 'Why?'.</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as 'Which shapes did you choose to use?' and 'I wonder what would happen if ...'.</li></ul>



Shapes within shapes

	Nursery	R1 September to January	R2 February to July
Learning Experiences	<ul style="list-style-type: none"> <li>Read <i>Mouse Shapes</i> by Ellen Stoll Walsh. Pick out some of the pictures from the book and ask children to describe which shapes they can see. Encourage children to use shapes to make their own versions of the pictures.</li> </ul>	<ul style="list-style-type: none"> <li>Read <i>Color Zoo</i> by Lois Ehlert. Encourage children to make pictures using shapes. Discuss the shapes that they have used.</li> </ul>	<ul style="list-style-type: none"> <li>Read <i>Mooshka, A Quilt Story</i> by Julia Paschkis. Ask children what shapes they can see in the quilt. Ask them to identify ways in which the shapes have been arranged. Ask questions such as ‘Can we join triangles together to make any other shapes?’.</li> </ul>
Continuous Provision	<ul style="list-style-type: none"> <li>Provide foam shapes to stick down on paper. Provide paint to print shape-pictures.</li> </ul>	<ul style="list-style-type: none"> <li>Provide simple tangram mats for children to use. Initially, make sure the mats are colour coded with corresponding coloured tiles. Later, the tangram outline can be uncoloured so that children can devise their own combinations of shapes within the outline.</li> </ul> <p>Make sandwiches and cut them into a variety of shapes.</p>	<ul style="list-style-type: none"> <li>Provide small groups with a ‘quilt block’ board – a piece of card that can be entirely covered with shapes. Also provide a basket of shapes of different colours that, together, will cover the board. Children take turns to pick out a shape and discuss with the others where it will fit on the board.</li> </ul>
Outdoor Environment	<ul style="list-style-type: none"> <li>Encourage children to make mud pies and pizzas. Ask them to notice the shapes they make when they cut them up.</li> </ul>	<ul style="list-style-type: none"> <li>Hide pieces of shapes in the outdoor area, one colour per shape. Encourage children to find all the pieces of the same colour and see what shapes they can make.</li> </ul>	<ul style="list-style-type: none"> <li>If any children have traditional quilts in their homes, ask their families if it is possible to bring them to school. Display them on washing lines and discuss the shapes children see. Alternatively, mark a large block board on the ground and ask children to create a quilt using natural materials.</li> </ul>



<p>Purposeful pedagogy</p>	<ul style="list-style-type: none"> <li>Children will initially use single shapes that don't combine into a bigger shape. Encourage them to begin joining shapes together to make a picture. This activity helps children to learn the properties of shapes and to work creatively.</li> </ul>	<ul style="list-style-type: none"> <li>Making pictures with shapes involves children rotating, combining and changing sizes of shapes. This will prepare them to find shapes inside other shapes.</li> </ul> <p>Children will initially use single shapes that do not combine into a bigger shape. They will then move on to combining shapes to make a picture.</p>	<ul style="list-style-type: none"> <li>Listen to the language children use and encourage them to use words that describe the attributes of the shapes. Point out shapes that could be made with other shapes, e.g. 'There is a square on the pattern block.'</li> </ul> <p>Which other shapes could we use to make a square?</p>
<p>Learning Conversations</p>	<ul style="list-style-type: none"> <li>Ask children questions such as 'Which shapes have you chosen?'. Encourage children to talk about the shape and its attributes rather than its colour.</li> </ul>	<ul style="list-style-type: none"> <li>Talk to children about their pictures. Comment on any rotations they have made and if they have used the same shape but in different sizes. Use correct mathematical terminology.</li> </ul>	<ul style="list-style-type: none"> <li>Show children <i>The Quiltmaker's Gift</i> by Jeff Brumbeau. This contains pictures of many kinds of quilt patterns. Ask children questions such as 'Which shapes can you see?', 'Which pattern do you like best and why?' and 'Which shapes fit together well?'</li> </ul>



Spatial Relationships

	Nursery	R1 September to January	R2 February to July
Progression milestones	<ul style="list-style-type: none"> <li>• Responds to and uses some spatial language.</li> <li>• Walks different routes and points out landmarks.</li> <li>• Uses trial and error to move and rotate objects to fit spaces.</li> </ul>	<ul style="list-style-type: none"> <li>• Describes the position of an object.</li> <li>• Follows/gives verbal directions to find something using spatial language.                             <ul style="list-style-type: none"> <li>• Follows a simple map.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Describes where an object is, using spatial language.</li> <li>• Follows a sequence of directions. Plans and discusses different routes.</li> <li>• Rotates and flips objects to make shapes fit, using spatial reasoning.</li> <li>• Enjoys making simple maps.</li> </ul>
Learning Experiences	<ul style="list-style-type: none"> <li>• Read <i>Rosie's Walk</i> by Pat Hutchins. Draw children's attention to the positional words in the story and what is happening in the pictures. Work with children to create a simple map of the story. In the following days, provide map-making equipment in different areas for children to use.</li> </ul>	<ul style="list-style-type: none"> <li>• Display a simple map of the outdoor area. Tell children that a teddy is coming to visit and you have to show him how to negotiate the outdoor area. Display symbols and the words: over, under, through, around, out, past, into, and across. Create a story about Teddy using the symbols and words. Read <i>A Lion in the Night</i> by Pamela Allen. Encourage children to point out when they hear positional and directional words.</li> </ul>	<ul style="list-style-type: none"> <li>• Read <i>Tangram Cat</i> by Maranke Rinck and Martijn van den Linden. Use a tangram board and pieces to create the animals from the story. Encourage children to join in. Deliberately put some of the shapes in the wrong places.</li> </ul>



<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Continuous Provision</p>	<ul style="list-style-type: none"> <li>Encourage children to make obstacle courses for small world characters in different areas of the classroom. Encourage them to describe to the other children how to negotiate the obstacle course.</li> </ul> <p>Encourage block building: it is crucial for the development of spatial relationships.</p>	<ul style="list-style-type: none"> <li>Encourage children, working in pairs, to create scenes in different areas of the classroom. Give them a set of vocabulary cards (using the words above). Taking turns, children turn over a card and give their partner an instruction, e.g. ‘Go through the forest.’, ‘Go under the bridge.’ You may have to model this activity first.</li> </ul>	<ul style="list-style-type: none"> <li>Create a puzzle area for children with tangrams and pattern block puzzles. Give children challenges, e.g. set out a six-pointed star and a variety of pattern blocks. Ask children how many different ways they can find to make the stars with different shapes.</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Outdoor Environment</p>	<ul style="list-style-type: none"> <li>Create an obstacle course for children to negotiate. Talk to children about how they will be able to navigate the course. Model position words and encourage children to shout them out with you.</li> </ul>	<ul style="list-style-type: none"> <li>Encourage children to use the vocabulary cards to give directions in the outdoor area.</li> </ul>	<ul style="list-style-type: none"> <li>Ask children to hide an object and then give instructions to a partner on how to find it. Leave map-making equipment outside and ask children to draw a map with the object marked on to give to their partner.</li> </ul>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Purposeful pedagogy</p>	<ul style="list-style-type: none"> <li>Take photographs of the obstacle course from different positions and discuss how it looks different from each viewpoint.</li> </ul> <p>Use the opportunities that arise during the day to use mathematical vocabulary, e.g. ‘Let’s put away the blocks on the shelf.’, ‘Please could you put the paints away under the bench.’ Make sure your spatial language is rich and precise; children’s language will become more specific as a result. Help children whose language is not well developed to draw pictures.</p>	<ul style="list-style-type: none"> <li>Spend lots of time discussing positional and directional aspects with children. Provide lots of books, such as:  <i>We’re Going on a Bear Hunt</i> by Michael Rosen  <i>Last Stop on Market Street</i> by Matt de la Peña  <i>Little Red Riding Hood</i> (traditional)  <i>Cat Up, Cat Down</i> by Catherine Hnatov  <i>In-Between Things</i> by Priscilla Tey  <i>A Parade of Elephants</i> by Kevin Henkes  <i>Into the Outdoors</i> by Susan Gal.</li> </ul>	<ul style="list-style-type: none"> <li>Provide, initially, colour-coded tangrams and then some with only the shape patterns, without colour. For those children who are finding it easy, provide tangrams that only have the outside shape.</li> </ul> <p>Be aware of gender disparities: sometimes boys have had more experience with using blocks and construction toys than girls.</p>



<p>Learning Conversations</p>	<ul style="list-style-type: none"><li>• Ask questions such as ‘Where is it?’, ‘Can you describe to me how to get there?’, ‘Which way do I go around your obstacle course?’.</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as ‘How are you going to get past that obstacle?’ and ‘How did you decide which card to use?’.</li></ul>	<ul style="list-style-type: none"><li>• Ask questions such as ‘Which of the shapes can you use instead of the hexagon?’, ‘Where is the blue shape?’, ‘What is different about the way the trapezoids are placed?’, ‘Which directions were helpful for finding the object?’ and ‘Did you change your words to help your partner find the object?’.</li></ul>
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Data

	Nursery	R1 September to January	R2 February to July
Progression milestones	<ul style="list-style-type: none"> <li>Recognises and identifies objects that are alike.</li> <li>Sorts by using a single attribute, e.g. colour, shape or function.</li> <li>Interprets a realia graph by saying which has more or less.</li> </ul>	<ul style="list-style-type: none"> <li>Sorts objects by a single attribute and is able to say how many.</li> <li>Interprets a realia graph and pictogram with some adult guidance.</li> </ul>	<ul style="list-style-type: none"> <li>Sorts objects for a reason.</li> <li>Creates realia graphs and pictograms.</li> <li>Can say which has more and which less on a bar graph.</li> <li>Makes labels for a graph.</li> </ul>
Learning Experiences	<ul style="list-style-type: none"> <li>Show children a tray of fruit from snack time. Explain that the cook is sad because too much fruit is going to waste. Talk to children about how to solve the problem. Discuss which are their favourite fruits and ask them to choose them from the tray. Create a realia graph, on which each child puts their piece of fruit. Analyse the graph and ask, 'What might we ask the cook to order more and less of?</li> </ul>	<ul style="list-style-type: none"> <li>Read <i>Hannah's Collections</i> by Marthe Jocelyn. Ask children if they have any collections at home.</li> </ul> <p>Show them some objects you have collected and explain to them that, like Hannah, you need to sort them out and need their help. Ensure your objects have about five different categories and ask children for suggestions for sorting them. First create a realia graph then a pictogram.</p>	<ul style="list-style-type: none"> <li>Read <i>The Best Food in The Forest</i> by Mi-Ae Lee. Encourage children to talk about their favourite foods. Listen to children's responses and think of ways to decide which foods are the most popular.</li> </ul>



<p>Continuous Provision</p>	<ul style="list-style-type: none"> <li>Ask children to sort objects in the classroom. Offer a grid for placing objects in when children want to organise their results.</li> </ul>	<ul style="list-style-type: none"> <li>Leave a variety of different collections for children to sort in each area. Provide realia grids in case children want to use them.</li> </ul> <p>Encourage children to make their own collections. Provide bowls, boxes and baskets for them to store them in.</p>	<ul style="list-style-type: none"> <li>Mix up manageable numbers of objects in different areas. Explain to children that some things have been mixed up or lost and you need their help to sort them out. Provide grids for children to produce realia graphs or pictograms.</li> </ul>
<p>Outdoor Environment</p>	<ul style="list-style-type: none"> <li>Encourage children to collect and sort items in the outdoor area. Ask them how they have sorted the objects.</li> </ul>	<ul style="list-style-type: none"> <li>Make a large realia grid outside. Use it to classify different objects such as bikes, trikes, push-along toys, leaves, twigs, stones, shells, etc. Encourage children to choose their own categories for sorting.</li> </ul>	<ul style="list-style-type: none"> <li>Ask children to conduct surveys in the outdoor area, such as ‘Which toys do children in our class prefer?’, ‘Which type of vehicles pass the school most often?’ and ‘What types of leaves can you see?’.</li> </ul>
<p>Purposeful pedagogy</p>	<ul style="list-style-type: none"> <li>When children have chosen sorting criteria, acknowledge and repeat their ideas. Resist the temptation to jump in with alternative ideas as this will hinder their thought processes.</li> </ul>	<ul style="list-style-type: none"> <li>Think about which daily routines could be displayed using a graph, e.g. weather data could be collected over a month.</li> </ul> <p>Often the use of data in schools is focused on collecting and sorting. The analysis of the data is often missed or done superficially. Research has shown that spending more time on the analysis has greater impact on children’s mathematical development.</p>	<ul style="list-style-type: none"> <li>Take opportunities when children are sorting to model to them ways of quantifying, e.g. if there are five leaves in a group, demonstrate how five Multilink® Cubes can represent the leaves. Joined together, the cubes form the basis for a bar graph.</li> </ul>
<p>Learning Conversations</p>	<ul style="list-style-type: none"> <li>Ask questions such as ‘Which fruit is most people’s favourite?’ and ‘Which is the least favourite?’ (Ensure children realise this is about analysing the data, not a popularity contest.) Do most children prefer apples or oranges?</li> </ul>	<ul style="list-style-type: none"> <li>Ask questions such as ‘How does the graph help us answer our questions?’, ‘What are the differences between a realia graph and a pictogram?’ and ‘What can you tell me about the graphs?’.</li> </ul>	<ul style="list-style-type: none"> <li>Ask questions such as ‘What is the difference between a bar graph and a pictogram?’, ‘Why is it important to use labels?’ and ‘On the bar graph, which has the most and which the least?’.</li> </ul>



BPS Mid-Term Planning Objectives

Concept	Skills	Milestone 1 Years 1 and 2	Milestone 2 Years 3 and 4	Milestone 3 Years 5 and 6
Know and use Numbers	Counting	<ul style="list-style-type: none"> <li>Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number.</li> <li>Count, read and write numbers to 100 in numerals.</li> <li>Given a number, identify one more and one less.</li> <li>Count in steps of 2, 3, 5 and 10 from 0 or 1 and in tens from any number, forward and backward.</li> </ul>	<ul style="list-style-type: none"> <li>Count in multiples of 2 to 9, 25, 50, 100 and 1000.</li> <li>Find 1000 more or less than a given number.</li> <li>Count backwards through zero to include negative numbers.</li> </ul>	<ul style="list-style-type: none"> <li>Read numbers up to 10 000 000.</li> <li>Use negative numbers in context and calculate intervals across zero.</li> </ul>
	Representing	<ul style="list-style-type: none"> <li>Identify, represent and estimate numbers using different representations, including the number line.</li> <li>Read and write numbers initially from 1 to 20 and then to at least 100 in numerals and in words.</li> </ul>	<ul style="list-style-type: none"> <li>Identify, represent and estimate numbers using different representations.</li> <li>Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.</li> </ul>	<ul style="list-style-type: none"> <li>Write numbers up to 10 000 000</li> <li>Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.</li> </ul>



	<b>Comparing</b>	<ul style="list-style-type: none"><li>• Use the language of: equal to, more than, less than (fewer), most and least.</li><li>• Compare and order numbers from 0 up to 100; use <math>&lt;</math>, <math>&gt;</math> and <math>=</math> signs.</li></ul>	<ul style="list-style-type: none"><li>• Order and compare numbers beyond 1000.</li></ul>	<ul style="list-style-type: none"><li>• Order and compare numbers beyond 10000000.</li></ul>
<b>Know and use Numbers</b>	<b>Place Value</b>	<ul style="list-style-type: none"><li>• Recognise the place value of each digit in a two-digit number (tens, ones).</li></ul>	<ul style="list-style-type: none"><li>• Recognise the place value of each digit in a four-digit number. (thousands, hundreds, tens, and ones)</li><li>• Round any number to the nearest 10, 100 or 1000.</li></ul>	<ul style="list-style-type: none"><li>• Round any whole number to a required degree of accuracy.</li><li>• Determine the value of each digit in any number.</li></ul>
	<b>Solving Problems</b>	<ul style="list-style-type: none"><li>• Use place value and number facts to solve problems.</li></ul>	<ul style="list-style-type: none"><li>• Solve number and practical problems with increasingly large positive numbers.</li></ul>	<ul style="list-style-type: none"><li>• Solve number and practical problems.</li></ul>



<b>Add and subtract</b>	<b>Complexity</b>	<ul style="list-style-type: none"> <li>• Solve one-step problems with addition and subtraction:             <ul style="list-style-type: none"> <li>• Using concrete objects and pictorial representations including those involving numbers, quantities and measures.</li> </ul> </li> <li>• Using the addition (+), subtraction (-) and equals (=) signs.</li> <li>• Applying their increasing knowledge of mental and written methods.</li> </ul>	<ul style="list-style-type: none"> <li>• Solve two-step addition and subtraction problems in contexts, deciding which operations and methods to use and why.</li> </ul>	<ul style="list-style-type: none"> <li>• Solve multi-step addition and subtraction problems in contexts, deciding which operations and methods to use and why.</li> </ul>
	<b>Methods</b>	<ul style="list-style-type: none"> <li>• Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:             <ul style="list-style-type: none"> <li>• One-digit and two-digit numbers to 20, including zero.</li> <li>• A two-digit number and ones.</li> <li>• A two-digit number and tens.                 <ul style="list-style-type: none"> <li>• Two two-digit numbers.</li> </ul> </li> <li>• Adding three one-digit numbers.</li> </ul> </li> <li>• Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.</li> </ul>	<ul style="list-style-type: none"> <li>• Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.</li> <li>• Add and subtract numbers mentally, including:             <ul style="list-style-type: none"> <li>• A three-digit number and ones.</li> <li>• A three-digit number and tens.</li> <li>• A three-digit number and hundreds.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Add and subtract whole numbers with more than 4 digits, including using formal written methods. (columnar addition and subtraction)</li> <li>• Add and subtract numbers mentally with increasingly large numbers.</li> </ul>



Add and subtract

<p>Checking</p>	<ul style="list-style-type: none"> <li>Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.</li> </ul>	<ul style="list-style-type: none"> <li>Estimate and use inverse operations to check answers to a calculation.</li> </ul>	<ul style="list-style-type: none"> <li>Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.</li> </ul>
<p>Using number facts</p>	<ul style="list-style-type: none"> <li>Represent and use number bonds and related subtraction facts within 20.</li> <li>Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.</li> </ul>	<ul style="list-style-type: none"> <li>Solve problems, including missing number problems, using number facts, place value and more complex addition and subtraction.</li> </ul>	<ul style="list-style-type: none"> <li>Add and subtract negative integers.</li> </ul>
<p>Complexity</p>	<ul style="list-style-type: none"> <li>Solve one-step (two-step at greater depth) problems involving multiplication and division.</li> </ul>	<ul style="list-style-type: none"> <li>Solve problems involving multiplying and dividing, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems (such as <math>n</math> objects are connected to <math>m</math> objects).</li> </ul>	<ul style="list-style-type: none"> <li>Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.</li> <li>Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.</li> <li>Use knowledge of the order of operations to carry out calculations involving the four operations.</li> </ul>



Multiply and divide	Methods	<ul style="list-style-type: none"><li>• Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (<math>\times</math>), division (<math>\div</math>) and equals (<math>=</math>) signs.</li><li>• Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.</li><li>• Solve problems involving multiplication and division using mental methods.</li></ul>	<ul style="list-style-type: none"><li>• Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.</li><li>• Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers.</li><li>• Recognise and use factor pairs and commutativity in mental calculations.</li></ul>	<ul style="list-style-type: none"><li>• Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.</li><li>• Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.</li><li>• Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.</li><li>• Perform mental calculations, including with mixed operations and large numbers.</li></ul>
	Checking	<ul style="list-style-type: none"><li>• Use known multiplication facts to check the accuracy of calculations.</li></ul>	<ul style="list-style-type: none"><li>• Recognise and use the inverse relationship between multiplication and division and use this to check calculations and solve missing number problems.</li></ul>	<ul style="list-style-type: none"><li>• Estimate and use inverse operations and rounding to check answers to a calculation.</li></ul>



<p>Multiply and divide</p>	<p>Using multiplication and division facts</p>	<ul style="list-style-type: none"><li>• Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables.</li><li>• Recognise odd and even numbers.</li><li>• Use multiplication and division facts to solve problems.</li></ul>	<ul style="list-style-type: none"><li>• Recall multiplication and division facts for multiplication tables up to <math>12 \times 12</math>.</li></ul>	<ul style="list-style-type: none"><li>• Identify common factors, common multiples and prime numbers.</li><li>• Establish whether a number up to 100 is prime and recall prime numbers up to 19</li><li>• Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.</li><li>• Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3).</li><li>• Solve problems involving multiplication and division including using knowledge of factors and multiples, squares and cubes.</li></ul>
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<p>Fractions</p>	<p>Recognising fractions</p>	<ul style="list-style-type: none"><li>• Recognise, find and name a half as one of two equal parts of an object, shape or quantity.</li><li>• Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.</li><li>• Recognise, find, name and write fractions <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{2}{4}</math> and <math>\frac{3}{4}</math> of a length, shape, set of objects or quantity.</li></ul>	<ul style="list-style-type: none"><li>• Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.</li><li>• Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators.</li><li>• Round decimals with one decimal place to the nearest whole number.</li><li>• Compare numbers with the same number of decimal places up to two decimal places.</li><li>• Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.</li><li>• Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.</li><li>• Compare and order unit fractions and fractions with the same denominators.</li></ul>	<ul style="list-style-type: none"><li>• Compare and order fractions whose denominators are all multiples of the same number.</li><li>• Compare and order fractions, including fractions <math>&gt; 1</math></li><li>• Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements <math>&gt; 1</math> as a mixed number.</li><li>• Round decimals with two decimal places to the nearest whole number and to one decimal place</li><li>• Read, write, order and compare numbers with up to three decimal places<ul style="list-style-type: none"><li>• Identify the value of each digit in numbers given to three decimal places.</li></ul></li><li>• Solve problems involving number up to three decimal places.</li><li>• Recognise the percent symbol (%) and understand that percent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.</li></ul>
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Fractions	Equivalence	<ul style="list-style-type: none"><li>Recognise the equivalence of <math>\frac{2}{4}</math> and <math>\frac{1}{2}</math>.</li></ul>	<ul style="list-style-type: none"><li>Recognise and show, using diagrams, families of common equivalent fractions</li><li>Recognise and write decimal equivalents of any number of tenths or hundredths</li><li>Recognise and write decimal equivalents to <math>\frac{1}{4}</math>, <math>\frac{1}{2}</math>, <math>\frac{3}{4}</math>.</li></ul>	<ul style="list-style-type: none"><li>Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.</li><li>Read and write decimal numbers as fractions.</li><li>Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.</li><li>Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.</li><li>Associate a fraction with division and calculate decimal fraction equivalents</li><li>Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.</li></ul>
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<p>Understand the properties of shapes</p>		<ul style="list-style-type: none"> <li>• Recognise and name common 2D and 3D shapes</li> <li>• Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line</li> <li>• Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces.</li> <li>• Identify 2-D shapes on the surface of 3-D shapes.</li> <li>• Compare and sort common 2-D and 3-D shapes and everyday objects.</li> </ul>	<ul style="list-style-type: none"> <li>• Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them</li> <li>• Recognise angles as a property of shape or a description of a turn</li> <li>• Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle</li> <li>• Identify horizontal and vertical lines and pairs of perpendicular and parallel lines</li> <li>• Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.</li> <li>• Identify acute and obtuse angles and compare and order angles up to two right angles by size</li> <li>• Identify lines of symmetry in 2-D shapes presented in different orientations</li> <li>• Complete a simple symmetric figure with respect to a specific line of symmetry.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify 3-D shapes, including cubes and other cuboids, from 2-D representations.</li> <li>• Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles.</li> <li>• Draw given angles, and measure them in degrees (<math>^{\circ}</math>). Identify:             <ul style="list-style-type: none"> <li>• Angles at a point and one whole turn (total <math>360^{\circ}</math>).</li> <li>• Angles at a point on a straight line and a turn (total <math>180^{\circ}</math>).                 <ul style="list-style-type: none"> <li>• Other multiples of <math>90^{\circ}</math>.</li> </ul> </li> </ul> </li> <li>• Use the properties of rectangles to deduce related facts and find missing lengths and angles.</li> <li>• Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.</li> <li>• Draw 2-D shapes using given dimensions and angles.</li> <li>• Recognise, describe and build simple 3-D shapes, including making nets</li> <li>• Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.</li> <li>• Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.</li> <li>• Recognise angles where they meet at a point, are on a straight line, or are vertically opposite and find missing angles.</li> </ul>
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Describe position, direction and movement		<ul style="list-style-type: none"> <li>Describe position, direction and movement, including whole, half, quarter and three-quarter turns.</li> <li>Order and arrange combinations of mathematical objects in patterns and sequences.</li> <li>Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).</li> </ul>	<ul style="list-style-type: none"> <li>Recognise angles as a property of shape and as an amount of rotation.</li> <li>Identify right angles, recognise that 2 right angles make a half turn and 4 make a whole turn.</li> <li>Identify angles that are greater than a right angle.</li> <li>Describe positions on a 2-D grid as coordinates in the first quadrant.</li> <li>Describe movements between positions as translations of a given unit to the left/right and up/down.</li> <li>Plot specified points and draw sides to complete a given polygon.</li> </ul>	<ul style="list-style-type: none"> <li>Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.</li> <li>Describe positions on the full coordinate grid. (all four quadrants)</li> <li>Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.</li> </ul>
Use measures		<ul style="list-style-type: none"> <li>Compare, describe and solve practical problems for:             <ul style="list-style-type: none"> <li>lengths and heights</li> <li>mass/weight</li> </ul> </li> <li>capacity and volume             <ul style="list-style-type: none"> <li>time.</li> </ul> </li> <li>Measure and begin to record:             <ul style="list-style-type: none"> <li>lengths and heights</li> <li>mass/weight</li> <li>capacity and volume</li> </ul> </li> <li>time (hours, minutes, seconds).</li> </ul>	<ul style="list-style-type: none"> <li>Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml).</li> <li>Measure the perimeter of simple 2-D shapes.</li> <li>Add and subtract amounts of money to give change. (£ and p)</li> <li>Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks.</li> </ul>	<ul style="list-style-type: none"> <li>Convert between different units of metric measure.</li> <li>Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.</li> <li>Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.</li> <li>Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm<sup>2</sup>) and square metres (m<sup>2</sup>) and estimate the area of irregular shapes.</li> </ul>



<p>Use measures</p>	<ul style="list-style-type: none"> <li>• Recognise and know the value of different denominations of coins and notes.</li> <li>• Sequence events in chronological order using language.</li> <li>• Recognise and use language relating to dates, including days of the week, weeks, months and years.</li> <li>• Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.             <ul style="list-style-type: none"> <li>• Use standard units to estimate and measure length/height (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels.</li> </ul> </li> <li>• Compare and order lengths, mass, volume/capacity and record the results using G, q and =.</li> <li>• Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value.</li> <li>• Find different combinations of coins that equal the same amounts of money.</li> <li>• Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.</li> <li>• Compare and sequence intervals of time</li> <li>• Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times.</li> <li>• Know the number of minutes in an hour and the number of hours in a day.</li> </ul>	<ul style="list-style-type: none"> <li>• Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use appropriate vocabulary.</li> <li>• Know the number of seconds in a minute and the number of days in each month, year and leap year.             <ul style="list-style-type: none"> <li>• Compare durations of events.</li> <li>• Convert between different units of measure. (for example, kilometre to metre; hour to minute)</li> </ul> </li> <li>• Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres</li> <li>• Find the area of rectilinear shapes by counting squares</li> <li>• Estimate, compare and calculate different measures, including money in pounds and pence.</li> <li>• Read, write and convert time between analogue and digital 12- and 24-hour clocks.</li> <li>• Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.</li> </ul>	<ul style="list-style-type: none"> <li>• Estimate volume and capacity.</li> <li>• Solve problems involving converting between units of time.</li> <li>• Use all four operations to solve problems involving measure (for example, length, mass, volume, money) using decimal notation, including scaling.</li> <li>• Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate.</li> <li>• Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation up to three decimal places.</li> <li>• Convert between miles and kilometres.</li> <li>• Recognise that shapes with the same areas can have different perimeters and vice versa.</li> <li>• Recognise when it is possible to use formulae for area and volume of shapes.</li> <li>• Calculate the area of parallelograms and triangles.</li> <li>• Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm<sup>3</sup>) and cubic metres (m<sup>3</sup>), and extending to other units.</li> </ul>
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Use statistics		<ul style="list-style-type: none"> <li>• Interpret and construct simple pictograms, tally charts, block diagrams and simple tables.</li> <li>• Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity.</li> <li>• Ask and answer questions about totalling and comparing categorical data.</li> </ul>	<ul style="list-style-type: none"> <li>• Interpret and present data using bar charts, pictograms and tables.</li> <li>• Solve one-step and two-step questions (for example, ‘How many more?’ and ‘How many fewer?’) using information presented in scaled bar charts, pictograms and tables.</li> <li>• Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.</li> <li>• Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.</li> </ul>	<ul style="list-style-type: none"> <li>• Solve comparison, sum and difference problems using information presented in a line graph.</li> <li>• Complete, read and interpret information in tables, including timetables.</li> <li>• Interpret and construct pie charts and line graphs and use these to solve problems.</li> <li>• Calculate and interpret the mean as an average.</li> </ul>
Use algebra		<ul style="list-style-type: none"> <li>• Solve addition and subtraction problems involving missing numbers.</li> </ul>	<ul style="list-style-type: none"> <li>• Solve addition and subtraction, multiplication and division problems that involve missing numbers.</li> </ul>	<ul style="list-style-type: none"> <li>• Use simple formulae.</li> <li>• Generate and describe linear number sequences.</li> <li>• Express missing number problems algebraically.</li> <li>• Find pairs of numbers that satisfy an equation with two unknowns.</li> <li>• Enumerate possibilities of combinations of two variables.</li> </ul>