



Maths

Mental Calculation Strategies

Operation	Vocabulary	Mental Methods (informal)	Written Methods (formal)
Addition	<ul style="list-style-type: none"> • Deconstruct • Partition • Boundary number 	<p>Count up – when the number added does not cross a boundary number</p> <p>Near doubles – e.g. $63 + 61$</p> <p>Partition the 2nd number – adding 2d or 3d numbers</p> <p>Compensation – when the number added ends in 8 or 9</p> <p>Bridging – when the number added takes you over a boundary number</p> <p>Refined number line – steps on a number line written as calculations rather than as a jotting</p> <p>Images: 100 square (snakes and ladders set up), beadstring, 100 square with cubes, coins, dienes, number lines, jumps on pre or part numbered number lines</p>	<p>Empty number line</p> <p>Column addition (exchange below the line)</p>

<h1 style="writing-mode: vertical-rl; transform: rotate(180deg);">Subtraction</h1>	<ul style="list-style-type: none"> • Deconstruct • Partition • Boundary number • Taking away • Finding the difference 	<p>Count back – when the number added doesn't cross a boundary number</p> <p>Finding the difference (what was 'Silly Subtraction') – when numbers are relatively close together</p> <p>Partition the 2nd number ONLY – subtracting 2d or 3d numbers</p> <p>Compensation – subtracting a number ending in 8 or 9</p> <p>Bridging – when the number subtracted crosses a boundary number</p> <p>Refined number line – steps on a number line written as calculations rather than as a jotting</p> <p style="text-align: center;">Always subtract underneath the numberline</p> <p>Images: 100 square (snakes and ladders set up), beadstring, 100 square with cubes, coins, dienes, number lines, jumps on pre or part numbered number lines</p>	<p>Empty number line</p> <p>Column subtraction (exchange below the line)</p>
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Division	<ul style="list-style-type: none"> • Dividend • Divisor • Quotient • Remainder 	<p>Sharing – early but inefficient (links to fractions)</p> <p>Grouping (chunking) – efficient for when dividends increase (links to multiplication)</p> <p>20/5 = <i>‘How many 5s are there in 20?’</i> Use bead strings to model.</p> <p>Halving - dividing by 2</p> <p>Halving twice - dividing by 4</p> <p>Move digits - dividing by 10, 100 etc</p> <p>Divide by 10 and double - dividing by 5</p> <p>Divide by 100 and double - dividing by 50</p> <p>Remainders – ‘out of the next group of...we have...’ (natural experiences of this from an early age)</p> <p>Refined number line – steps on a number line written as calculations rather than as a jotting</p> <p>Model with arrays and number lines Images: pictures, tallies, systematic mark making, arrays, record hops on a part numbered number line)</p>	<p>Empty number line (chunking)</p> <p>Long division (exchange below the line)</p> <p>Short division (bus stop)</p>
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Multiplication	<ul style="list-style-type: none"> • Refinement of repeated addition • Multiplier • Multiplicand 	<p style="text-align: center;">$4 \times 3 = 4 + 4 + 4$ (3 rows of 4 in an array)</p> <p style="text-align: center;">$3 \times 4 = 3 + 3 + 3 + 3$ (4 rows of 3 in an array)</p> <p>Once children know their times tables...</p> <p>Doubling – $\times 2$ (may still involve partitioning)</p> <p>Double, double again – $\times 4$ (may still involve doubling)</p> <p>Compensation – $\times 9$ ($\times 10$ then take one group away)</p> <p>Move digits – $\times 10$ (not add zero!)</p> <p>X 10 and halve – $\times 5$ (show with an array of $\times 10$ then split in half)</p> <p>Partition – e.g. 32×6 becomes 30×6 and 2×6 (model on an array)</p> <p>Images: pictures, tallies, systematic mark making, arrays, record hops on a part numbered number line)</p>	<p>Short multiplication</p> <p>Long multiplication (carry below the line)</p>
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