

Development and progression in mathematics: estimation and rounding; number and number processes; and fractions, decimal fractions and percentages.

EARLY	FIRST	SECOND	THIRD	FOURTH
LEARNERS CONTINUALLY DEVELOP, REINFORCE AND EXTEND THEIR UNDERSTANDING OF ESTIMATION AND ROUNDING THROUGH:				
estimating relative sizes and amounts	estimating the answer to a calculation and comparing their estimate and the actual answer	beginning to use rounding techniques to estimate an answer and then deciding if it is reasonable	using a range of rounding techniques to estimate, calculate and check, with a wide range of fractions and decimal fractions	understanding the impact of rounding to an appropriate degree of accuracy when making and justifying estimates and approximations, and interpreting simple tolerances
LEARNERS CONTINUALLY DEVELOP, REINFORCE AND EXTEND THEIR UNDERSTANDING OF NUMBER AND NUMBER PROCESSES THROUGH:				
<p>creating sets of objects; matching, sorting and classifying things by size, number and other properties</p> <p>using number words and numerals; applying their understanding of size and amount; and recognising a small number of objects without counting</p> <p>counting on and back from a given number including 'crossing the decades'</p> <p>e.g. 18,19, 20, 21, 22</p> <p>understanding and using horizontal, vertical and other number lines such as dials on cookers and clocks</p> <p>reciting counting words with one-to-one relationship and understanding that the last word tells 'how many'</p>	<p>describing and explaining number patterns and making generalisations from them</p> <p>beginning to understand place value and using it to compare numbers and in calculating</p> <p>developing their understanding of the meaning of mathematical notation</p> <p>understanding multiplication and division as groupings, arrays (for example 8 is four 2s or two 4s), 'jumps', sharing and repeated addition and subtraction</p> <p>calculating and solving addition, subtraction, multiplication and division problems, with an emphasis on using a range of 'mental' strategies</p> <p>understanding that calculations can be set out differently – both horizontally and vertically</p>	<p>describing sets of numbers according to their features – for example through patterns, factors and multiples</p> <p>understanding and using decimal notation and place value in decimal fractions</p> <p>understanding the extension of the number system to include numbers which have values less than zero, locating them on the number line and working with them in everyday contexts and familiar applications</p> <p>understanding and using inverse relationships of adding, subtracting, multiplying and dividing when simplifying calculations and solving problems</p> <p>developing an understanding of 1 as the 'identity' for multiplication and division. i.e. multiplying or dividing by one does not change the answer</p>	<p>ordering and carrying out calculations with numbers less than zero, in relevant contexts</p> <p>using their knowledge of place value to compare and order a wide range of decimal fractions in a variety of contexts, for example making a link to measurement where units must be the same</p> <p>consolidating quick and accurate recall of a wide range of number facts, and quickly deriving appropriate related facts, including multiplication by multiples and powers of 10</p> <p>understanding the appropriate order of operations and applying this knowledge to calculations</p> <p>extending, deepening, discussing and applying a wide range of efficient strategies for mental calculation, and using appropriate written algorithms</p>	<p>performing a wide range of calculations when solving problems, including those involving numbers less than zero, in practical contexts</p> <p>demonstrating their understanding of the appropriate order of operations when calculating in more complex situations</p> <p>discussing alternative ways to solve challenging problems and determine the most efficient strategies for mental and written calculation; for example, how to calculate $17\frac{1}{2}\%$ of £600</p>

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<p>using counting strategies such as 'jumps' to explain and make simple number sequences</p> <p>finding the total when combining sets of objects (in any order) and forming simple 'number sentences' such as $1 + 5 = 6$</p> <p>splitting (or sharing) a larger number to find the 'number partners' which make up larger numbers</p> <p>understanding the idea that $3 + 4$ is the same as $4 + 3$ (commutative) and $6 + 3 + 7$ is the same as $9 + 7$, which is the same as $6 + 10$ (associative)</p> <p>understanding addition and subtraction as inverse processes and using number bonds which they know to find related families of four facts</p> <p>$4 + 3 = 7, 3 + 4 = 7$ $7 - 3 = 4, 7 - 4 = 3$</p> <p>using numbers to solve problems described in words</p>	<p>solving word problems involving the four number operations</p> <p>understanding and using commutative and associative properties when calculating</p> <p>developing their knowledge of multiplication and related division facts and applying these</p> <p>$4 \times 8 = 32, 8 \times 4 = 32$ $32 \div 4 = 8, 32 \div 8 = 4$</p> <p>understanding multiplication and division as inverse processes and using the bonds which they know to derive families of four facts</p> <p>using their knowledge of multiplication tables to discuss and derive related facts, for example multiplying by 6 is the same as multiplying by 2 and then multiplying the answer by 3; multiplying a number by 7 is the same as multiplying the number by 3, multiplying the same number by 4 and adding the results together</p> <p>developing an understanding of zero as the 'identity' for addition and subtraction. i.e. adding or subtracting zero does not change the answer</p>	<p>using their knowledge of commutative, associative and distributive properties to simplify calculations, for example:</p> <p>$6 \times 27 = (6 \times 20) + (6 \times 7)$ $72 \div 3 = (60 \div 3) + (12 \div 3)$</p> <p>developing quick and accurate recall of multiplication and related division facts, including multiplying and dividing by common multiples of 10 and powers of 10</p> <p>mentally calculating problems involving multiplication by whole and decimal numbers, and division by whole numbers</p> <p>developing efficient mental and written strategies for addition, subtraction, multiplication and division calculations</p>		

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EARLY	FIRST	SECOND	THIRD	FOURTH
<p>LEARNERS CONTINUALLY DEVELOP, REINFORCE AND EXTEND THEIR UNDERSTANDING OF FRACTIONS, DECIMAL FRACTIONS AND PERCENTAGES THROUGH:</p>				
<p>splitting or sharing a whole object into smaller parts</p>	<p>understanding the concept and notation of fractions and using common fractions to represent parts of a whole or of a set, points on a number line, and to find a fraction of an amount</p>	<p>comparing and ordering fractions, decimal fractions and percentages and locating where they sit on the number line (approximately)</p> <p>finding equivalent fractions, decimal fractions and percentages and using the preferred form in solving problems</p>	<p>comparing and ordering a wider range of fractions using equivalent forms</p> <p>identifying a wide range of equivalent fractions, decimals fractions and percentages, and using a preferred form to solve problems in context</p> <p>understanding the relationship between simple proportion and ratio and using these concepts to solve problems in context</p>	<p>working with a wide range of equivalent fractions, decimal fractions and percentages</p> <p>solving problems involving calculation with fractions, including mixed numbers, decimal fractions and percentages</p> <p>solving problems involving percentage changes such as salary increase and population decrease</p> <p>understanding and applying proportional reasoning to solve problems in a range of contexts</p> <p>understanding and applying ratio in a range of contexts</p>