

Mathematics; Gateshead Assessment Profile (MGAP)

Year 6 Understanding and investigating within number

	Developing Y6 expectations	Mastering Y6 expectations	Going to greater depth with Y6 expectations
<b>Place value, ordering and rounding</b> <ul style="list-style-type: none"> <li>Counting reading, writing, comparing, ordering and rounding whole numbers using place value</li> </ul>	Reads, writes, says, orders and compares numbers up to at least 1 000 000 and determines the value of each digit including in appropriate contexts including measurement.	Reads, writes, says, orders and compares numbers up to 10 000 000 and determine the value of each digit including in appropriate contexts including measurement.	<p>Uses understanding of the number system and place value to solve more complex problems or evaluate given statements requiring higher levels of reasoning and often in real life contexts. Explains thinking.</p> <p>Continues to explore properties of numbers and number sequences, relating them to pictures, patterns and structures when appropriate. Discusses, explores and writes sequence generating rules and number statements. Explains thinking supported by representations when appropriate.</p>
	Continues to round any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000	Rounds any whole number to a required degree of accuracy e.g. to the nearest 10, 100, 1000, 10000, 100 000	
		Continues to read Roman numerals to 1000 (M)	
	Continues to, interpret negative numbers in context, counts forwards and backwards including through zero. Places positive and negative integers in order.	Uses, interprets and orders negative numbers in context, solves problems and calculates intervals across zero.	
	Solve number and practical problems in a wide range of contexts.	Solve number and practical problems in a wide range of contexts, explains methods and reasoning.	
<b>Properties of numbers and number sequences</b>	Continue to use all the multiplication tables to calculate mathematical statements including with larger numbers and decimals in order to maintain fluency.	Continue to use all the multiplication tables to calculate mathematical statements including with larger numbers and decimals in order to maintain fluency. Explore number sequences and generate term to term rules.	
	Continue to identify common factors, common multiples, prime numbers, squared and cubed numbers.	Apply knowledge of common factors, common multiples, prime numbers, squared and cubed numbers to problems in a range of contexts.	
<b>Fractions, decimals and percentages</b>	Compare and order fractions, including fractions > 1	Compare and order a greater range of fractions, including fractions > 1	<p>Shows good understanding of and explains the relationship between fractions and division giving examples in a range of contexts e.g. work backwards by multiplying a quantity that represents a non -unit fraction to find the whole quantity.</p> <p>For simple fractions with recurring decimal equivalents pupils learn about rounding the decimal to three decimal places or other appropriate approximations depending on the context.</p> <p>Explores more complex situations, problems or given statements involving fractions, decimals and percentages which require a higher level of reasoning and understanding of the relationships between these</p>
	Continue to use common factors to simplify fractions and common multiples to express fractions in the same denomination	Use common factors to simplify a greater range of fractions and common multiples to express fractions in the same denomination.	
	Continue to develop understanding of relationship between fractions and division E.g. Use understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example if $\frac{1}{4}$ of a length is 36cm, then the whole length is $36 \times 4 = 144$ cm).	Continue to develop understanding of relationship between fractions and division E.g. Associate a fraction with division and begin to calculate decimal fraction equivalents [for example, 0.375] for a simple fraction (for example, $\frac{3}{8}$ )	
	Continues to add and subtract fractions with the same denominator and with denominators that are multiples of the same number	Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions	

	Using a variety of images to support understanding starts <b>to multiply simple pairs of proper fractions</b> e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ . Makes links with earlier work on fractions as operators (fractions of), as numbers, and as equal parts of objects e.g. a rectangle	<b>Multiplies simple pairs of proper fractions, writing the answer in its simplest form</b> (for example $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ ). Demonstrates understanding using different representations.	ideas. Demonstrates understanding using different representations and clear explanations. Relate to real life contexts where appropriate.
	Using a variety of images to support their understanding starts to <b>divide proper fractions by whole numbers</b> e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$	<b>Divides proper fractions by whole numbers</b> [for example $\frac{1}{3} \div 2 = \frac{1}{6}$ . Demonstrates understanding using different representations.	Shows understanding of calculation with fractions to calculate, explore statements, solve problems and number puzzles, explaining reasoning often supporting this with flexible use of representations.
	Continues to recognize and use thousandths and relate them to tenths, hundredths, decimal equivalents and measures. Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.	<b>Identifies the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places</b>	
	<i>Continues to recognize per cent symbol (%), understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with denominator 100 and a decimal fraction</i>	<b>Solve problems involving the calculation of percentages</b> [for example, of measures, and such as 50% of 360] and the use of percentages for simple comparison	
	<b>Recalls equivalences between simple fractions, decimals and percentages.</b> Continues to understand fractions, decimals and percentages as different ways to express a proportion	<b>Recalls and uses equivalences between simple fractions, decimals and percentages, including in different contexts.</b> Understand fractions, decimals and percentages as different ways to express a proportion	
• <b>Ratio and Proportion</b>	Recognise proportionality in contexts where the relations between quantities are in the same ratio (for example, similar shapes and recipes)	<b>Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples</b> , for example 'one egg to 3 spoons of flour, '3/5 of the class are boys'.	Solve more complex problems involving unequal sharing and grouping using knowledge and understanding fractions and multiples and demonstrating reasoning.
	Starts to understand ratio when comparing quantities, sizes and scale drawings by solving a variety of practical problems.	<b>Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts</b> Uses the notation a:b to record work <i>if appropriate</i>	Uses ratio and proportional reasoning to solve a wider range of more complex problems and to investigate given situations or statements.
		<b>Solve problems involving similar shapes where the scale factor is known or can be found</b>	Applies understanding in a wide range of contexts. Uses representations to support understanding and explanations.
• <b>Algebra</b>	Starts to <b>express missing number problems algebraically</b> and <b>use simple formulae</b> , expressed first in words then moving to symbols	<b>Express missing number problems algebraically. Use simple formulae</b> e.g. to represent familiar situations e.g. $a + b = b + a$ ; to find missing lengths, coordinates or angles	<b>Use simple formulae</b> to express generalisations in number patterns and represent a wider range of situations in maths and science
	Continue to recognise and describe linear number sequences and find the term to term rule.	<b>Generate and describe linear number sequences</b>	<b>Generate and describe</b> a wider range of more complex <b>linear number sequences</b>
		Starts to <b>finds pairs of numbers that satisfy an equation with two unknowns</b>	<b>Finds pairs of numbers that satisfy an equation with two unknowns</b>
	<b>Start to enumerate possibilities of combinations of two variables</b> e.g. what two numbers can add up to.	<b>Enumerate possibilities of combinations of two variables.</b>	<b>Enumerate possibilities of combinations of two or more variables.</b>

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Year 6 Developing and applying calculation

	Developing Y6 expectations	Mastering Y6 expectations	Going to greater depth with Y6 expectations
<b>Understanding and using all four number operations</b>	Starts to explore the order of operations using brackets; for example, $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$ .	Uses knowledge of the order of operations to carry out calculations and solve problems including puzzles within number involving the four operations	<p>Use their knowledge of the order of operations in a more challenging range of puzzles and contexts to carry out calculations involving the four operations</p> <p>Use estimation to check answers to calculations and determine and explain, in the context of a problem, an appropriate degree of accuracy.</p> <p>Understand and explain reasons for rounding and relate to real life contexts.</p> <p>Maintains fluency with mental and written calculation with all four number operations through application in a wide range of multistep problems and investigations in a range of contexts requiring greater levels of reasoning.</p> <p>Explains when and why a calculation is more efficiently done by a mental or written approach and when a calculator may be more appropriate.</p> <p>Explores and comments on methods of calculation and solves problems and puzzles about calculation showing understanding of structures and relationships between numbers and explaining reasoning.</p> <p>Can use a range of representations to support their explanations.</p>
	Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.	Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.	
	Develops skills of rounding and estimating as a means of predicting and checking the order of magnitude of answers to decimal calculations.	Develops skills of rounding and estimating as a means of predicting and checking the order of magnitude of answers to decimal calculations. Solve problems which require answers to be rounded to specified degrees of accuracy	
<b>Addition and subtraction</b> • <b>Mental calculation</b>	Perform mental calculations, including with mixed operations, appropriate large numbers and decimals.	Perform mental calculations, including with mixed operations, appropriate large numbers and decimals and more complex calculations.	
<b>Addition and subtraction</b> • <b>Written calculations</b>	Practise addition and subtraction for larger numbers using the formal written methods of columnar addition and subtraction.	Practise addition and subtraction for larger numbers with more than four digits using the formal written methods of columnar addition and subtraction.	
<b>Multiplication and division</b> • <b>Mental calculation</b>	Continue to use all multiplication tables to calculate mathematical statements to maintain fluency. Use these to undertake mental calculations with increasingly large (appropriate) numbers and decimals, using mixed operations	Continue to use all multiplication tables to calculate mathematical statements to maintain fluency. Use these to undertake mental calculations with increasingly large (appropriate) numbers and decimals, using mixed operations and more complex calculations.	
		Use understanding of place value to multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.	
	Starts to multiply decimals with simpler cases e.g. $0.4 \times 2 = 0.8$ in practical contexts involving measures or money.	Multiplies one-digit numbers with up to two decimal places by whole numbers up to two digits, using appropriate method of calculation.	
<b>Multiplication and division</b> • <b>Written calculations</b>	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication	Fluently multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication	
	Divide numbers up to 4 digits by a two-digit whole number using the formal written method of short division where appropriate, interpreting remainders according to the context	Fluently divide numbers up to 4 digits by a two-digit whole number using the formal written method of short division where appropriate, interpreting remainders according to the context	

	<p>Begin to use long division to 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</p>	<p>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</p>	
	<p>Start to divide decimals with simpler cases e.g. <math>5.6 \div 7 = 0.8</math> or division of decimal numbers by one-digit whole numbers, in practical contexts involving measures or money. Recognises division calculations as the inverse of multiplication.</p>	<p>Divides numbers with up to two decimal places by single digit whole numbers. Uses written division methods in cases where the answer has up to two decimal places</p>	
<ul style="list-style-type: none"> <li><b>Problem solving</b></li> </ul>	<p>Solve multi-step problems involving all operations in a range of contexts, deciding which operations and methods to use and why.</p>	<p>Solve multi-step problems involving all operations in a range of contexts, deciding which operations and methods to use and why.</p>	

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Year 6 Measurement

	Developing Y6 expectations	Mastering Y6 expectations	Going to greater depth with Y6 expectations
<b>Measurement:</b> <ul style="list-style-type: none"> <li>Practical measuring skills</li> </ul>	Continue to use read and write standard metric units and their abbreviations, being fluent in their relationships. Suggest and use suitable units and equipment to measure and read scales accurately.	Continue to use read and write standard metric units and their abbreviations, being fluent in their relationships. Suggest and use suitable units and equipment to measure and read scales accurately.	Continue to use read and write standard metric units and their abbreviations, being fluent in their relationships. Suggest and use suitable units and equipment to measure and read scales accurately.
<b>Measuring</b> <ul style="list-style-type: none"> <li>Length</li> <li>mass/weight and</li> <li>capacity / volume</li> </ul>	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 to up to three decimal places	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 to up to three decimal places	<p>Apply knowledge and understanding of measures and conversions between units to solve more complex problem that often require making connections across aspects of mathematics, explaining thinking.</p> <p>Explore problems and statements based on diagrams and annotate as appropriate to support thinking and explain approaches.</p> <p>Pose own problems or conjectures for exploration.</p> <p>Apply measures knowledge and understanding widely across other aspects of mathematics.</p>
		Convert between miles and kilometres	
<ul style="list-style-type: none"> <li>Area and perimeter</li> </ul>	Continue to measure and calculate the perimeter of composite rectilinear shapes in cm and m.	Recognise that shapes with the same areas can have different perimeters and vice versa	
	Calculate the area of squares and other rectangles including using standard units, centimetre squared (cm <sup>2</sup> ) and squared metres (m <sup>2</sup> ).	Recognise when it is possible to use formulae for area and volume of shapes	
	Estimate the area of irregular shapes by counting squares (half squares and fractions of squares).		
	Start to relate area of rectangles to parallelograms and triangles e.g. by dissection,	Calculate the area of parallelograms and triangles, understanding and using formulae in words.	
		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 extend to other units [for example, mm <sup>3</sup> and km <sup>3</sup> ].	
<ul style="list-style-type: none"> <li>Temperature</li> </ul>		Measure and calculate for temperature problems.	
<ul style="list-style-type: none"> <li>Time</li> </ul>	Solve problems involving converting between units of time including problems involving the duration of events.	Solve problems involving converting between units of time including problems involving the duration of events.	
<ul style="list-style-type: none"> <li>Problem solving</li> </ul>	Uses all four operations to solve problems involving calculation and conversion of units of measure) using decimal notation up to three places where appropriate.	Uses all four operations to solve problems involving calculation and conversion of units of measure) using decimal notation up to three places where appropriate.	

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Year 6 Geometry

	Developing Y6 expectations	Mastering Y6 expectations	Going to greater depth with Y6 expectations
<b>Geometry:</b> <ul style="list-style-type: none"> <li>properties of shapes</li> </ul>	Compare and classify geometric shapes based on their properties and sizes.	Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons	<p>Apply knowledge and understanding of properties of shapes to solve more complex shape problems, investigate and make statements about shapes or to draw diagrams requiring higher levels of reasoning</p> <p>Apply reasoning about properties in the context of shapes drawn on a coordinate grid across all 4 quadrants.</p>
	Draw 2-D shapes using given dimensions and angles with increasing accuracy. Use conventional markings and labels for lines and angles.	Draw 2-D shapes using given dimensions and angles accurately. Use conventional markings and labels for lines and angles.	
	Start to illustrate and name parts of circles including radius, diameter and circumference.	Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius Express some relationships algebraically e.g. $d = 2 \times r$	
		Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. Express some relationships algebraically e.g. $a = 180 - (b + c)$ .	
	Recognise, describe and build simple 3-D shapes.	Recognise, describe and build simple 3-D shapes, including making nets	
	Solve problems, involving reasoning about shapes and their properties. Explain solutions.	Solve problems, involving reasoning about shapes and their properties. Explain solutions.	
<b>Geometry</b> <ul style="list-style-type: none"> <li>Position and direction</li> </ul>	Draw and label a pair of axes in all four quadrants with equal scaling, extending knowledge of one quadrant to all four quadrants, including the use of negative numbers.	Describe positions on the full coordinate grid (all four quadrants)	<p>Reflections or translations might be expressed algebraically for example, translating vertex (a,b) to (a-2, b+3);(a,b) and (a+d, b+d) being opposite vertices of a square of side d</p>
	Draw and translate simple shapes on the coordinate plane in the first quadrant.	Draw and translate simple shapes on the coordinate plane, and reflect them in the axes. Draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates, using the properties of the shapes. Use reasoning to solve problems related to coordinates, reflections and translations.	

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Year 6 Statistics

Statistics	Developing Y6 expectations	Mastering Y6 expectations	Going to greater depth with Y6 expectations
	Present, complete, read and interpret information in table, bar charts and line graphs. Start to <b>interpret pie charts.</b>	<b>Construct and interpret line graphs, interpret pie charts and use both to solve problems.</b> Connect work on angles, fractions and percentages to the interpretation of pie charts.	Interpret a wide range of increasingly more complex statistical data to solve problems of greater complexity or to evaluate given statements based on the data, explaining reasoning.  Make and justify own statements based on the data.  Investigates real life data of interest to themselves and identifies how it is useful.  Solves problems requiring making connections across aspects of mathematics and explains thinking
		Connect conversion from kilometres to miles in measurement to its graphical representation.	
		Encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects	
	<b>Start to calculate and interpret the mean as an average</b> for simple sets of discrete data.	<b>Calculate and interpret the mean as an average</b> for simple sets of discrete data in different contexts.	