Mathematics
Years 5 and 6
'Milestone 3'
These are the targets a child in Years 5 and 6 are required to meet to be assessed to be on track to meet end of Key Stage Two expectations.

		Milestone 3
To know and use numbers	Counting	• Read numbers up to 10 000 000. • Use negative numbers in context and calculate intervals across zero.
	Representing	• Write numbers up to 10 000 000 • Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.
	Comparing	• Order and compare numbers up to 10 000 000.
	Place value	• Round any whole number to a required degree of accuracy. • Determine the value of each digit in any number.
	Solving problems	• Solve number and practical problems.
To add and subtract	Complexity	• Solve multi-step addition and subtraction problems in contexts, deciding which operations and methods to use and why.
	Methods	• Add and subtract whole numbers with more than 4 digits, including using formal written methods. (columnar addition and subtraction) • Add and subtract numbers mentally with increasingly large numbers.
	Checking	• Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.

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	Using number facts	• Add and subtract negative integers.
To multiply and divide	Complexity	• Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign. • Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates. • Use knowledge of the order of operations to carry out calculations involving the four operations.
	Methods	• 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 long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. • 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. • Perform mental calculations, including with mixed operations and large numbers.
	Checking	• Estimate and use inverse operations and rounding to check answers to a calculation.

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	Using multiplication and division facts	• Identify common factors, common multiples and prime numbers. • Establish whether a number up to 100 is prime and recall prime numbers up to 19. • Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000. • Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3). • Solve problems involving multiplication and division including using knowledge of factors and multiples, squares and cubes.
Fractions (including decimals, percentages, ratio and proportion)	Recognising fractions	• Compare and order fractions whose denominators are all multiples of the same number. • Compare and order fractions, including fractions > 1. • Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number. • Round decimals with two decimal places to the nearest whole number and to one decimal place. • Read, write, order and compare numbers with up to three decimal places. • Identify the value of each digit in numbers given to three decimal places. • Solve problems involving number up to three decimal places.

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		• Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.
	Equivalence	• Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths. • Read and write decimal numbers as fractions. • Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. • Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. • Associate a fraction with division and calculate decimal fraction equivalents. • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
	Solving problems	• Add and subtract fractions with the same denominator and denominators that are multiples of the same number. • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. • Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. • Multiply simple pairs of proper fractions, writing the answer in its simplest form.

		• Solve problems which require knowing percentage and decimal equivalents of, 1/2, 1/4, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25. • Divide proper fractions by whole numbers. • Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places. **Ratio and proportion** • Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts. • Solve problems involving the calculation of percentages and the use of percentages for comparison. • Solve problems involving similar shapes where the scale factor is known or can be found. • Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.
To understand the properties of shapes		• Identify 3-D shapes, including cubes and other cuboids, from 2-D representations. • Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. • Draw given angles, and measure them in degrees (°). • Identify: • Angles at a point and one whole turn (total 360°). • Angles at a point on a straight line and a turn (total 180°).

		• Other multiples of 90°. • Use the properties of rectangles to deduce related facts and find missing lengths and angles. • Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. • Draw 2-D shapes using given dimensions and angles. • Recognise, describe and build simple 3-D shapes, including making nets. • Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons. • Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius. • Recognise angles where they meet at a point, are on a straight line, or are vertically opposite and find missing angles.
To describe position, direction and movement		• 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. • Describe positions on the full coordinate grid. (all four quadrants) • Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.
To use measures		• Convert between different units of metric measure.

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		• Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints. • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres. • Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes. • Estimate volume and capacity. • Solve problems involving converting between units of time. • Use all four operations to solve problems involving measure (for example, length, mass, volume, money) using decimal notation, including scaling. • Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate. • 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. • Convert between miles and kilometres. • Recognise that shapes with the same areas can have different perimeters and vice versa.

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		• Recognise when it is possible to use formulae for area and volume of shapes. • Calculate the area of parallelograms and triangles. • Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units.
To use statistics		• Solve comparison, sum and difference problems using information presented in a line graph. • Complete, read and interpret information in tables, including timetables. • Interpret and construct pie charts and line graphs and use these to solve problems. • Calculate and interpret the mean as an average.
To use algebra		• Use simple formulae. • Generate and describe linear number sequences. • Express missing number problems algebraically. • Find pairs of numbers that satisfy an equation with two unknowns. • Enumerate possibilities of combinations of two variables.