

2019-2020 Maths Curriculum: Year 6

Concept *mental fluency*

	Working towards the expected standard	Working at the expected standard	Working above the expected standard
Number & place Value	<i>Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000</i>		All aspects of number and place value at the national standard are embedded.
	Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero.	Use negative numbers in practical contexts and solve problems, including calculating intervals across 0.	Test generalisations by checking particular cases.
	Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	Use place value in whole numbers to at least 10 000 000 to read, write, compare and order numbers.	Order and approximate decimals when solving numerical problems and equations such as $x + 3 + x = 20$, using trial-and-improvement methods.
	Read roman numerals to 1000 (m) and recognise years written in roman numerals.	Read Roman numerals to 1000 (M).	
	<i>Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000</i>	Identify the value of each digit in numbers with up to 3 decimal places <i>Round any whole number to the nearest 10, 100, 1,000, 10,000, 100,000.</i>	Round positive numbers to any given power of 10.
	Understand and use various concrete and pictorial representations of numbers (including up to 1000000 and numbers including tenths, hundredths and thousandths (including all of dienes, place value counters and number line)	Use approximation to estimate and check answers to calculations and determine, in the context of a problem, levels of accuracy	
	Solve number problems and practical problems that involve all of the above.	Solve problems and reason about place value and number.	Choose and use efficient techniques for calculation
Addition & Subtraction	Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)	Add and subtract whole numbers with more than 4 digits, using formal written methods	All aspects of number - addition and subtraction at the national standard are embedded.
	<i>Add and subtract numbers mentally, including:</i> <ul style="list-style-type: none"> • a four digit number and ones • a four digit number and tens • a four digit number and hundreds 	<i>Add and subtract numbers mentally with increasingly large numbers</i>	
	Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	Use estimation to check answers to calculations and determine, in the context of a problem, appropriate levels of accuracy.	Choose and use efficient techniques for calculation.
	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.	Solve addition and subtraction multi-step problems in context.	
		Solve problems involving addition, subtraction, multiplication and division. Use knowledge of the 4 operations to reason and to solve problems, including puzzles not set in a context.	Carry through substantial tasks and solve quite complex problems by independently breaking them down into smaller, more manageable tasks
Multiplication & Division	<i>Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000</i>	<i>Use understanding of place value to multiply and divide whole numbers and decimals with up to 3 decimal places by 10, 100 and 1000</i>	All aspects of number – multiplication and division at the national standard are embedded
	Recall multiplication and division facts for multiplication tables up to 12×12	<i>Recall multiplication and division facts for multiplication tables up to 12×12</i>	
	<i>Multiply and divide numbers mentally drawing upon known facts</i>	<i>Multiply and divide numbers mentally, drawing upon multiplication facts, including with mixed operations and large numbers</i>	
	<i>Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers</i>	Perform mental calculations including with mixed operations and large numbers.	
	Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.	Fluently multiply numbers up to 4 digits by a 2-digit number using the long multiplication method.	Multiply and divide integers and decimals by 0.1, 0.01
	Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers	Recognise and use: <ul style="list-style-type: none"> • multiples and factors; • prime numbers to at least 19; and • square numbers, at least up to 144 	
	Establish whether a number up to 100 is prime and recall prime numbers up to 19	Use estimation to check answers to calculations and determine, in the context of a problem, appropriate levels of accuracy.	
	Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)	Fluently divide numbers with up to 4 digits by a 1-digit number using the formal written method.	
Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context			

	Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes	Use long division with 2-digit divisors.	
	Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	Interpret remainders according to the context	
	Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates	Solve problems involving addition, subtraction, multiplication and division.	Choose and use efficient techniques for calculation.
Fractions	Read and write decimal numbers as fractions [for example, $0.71 = 71/100$]	Use knowledge of the 4 operations to reason and to solve problems, including puzzles not set in a context.	Carry through substantial tasks and solve quite complex problems by independently breaking them down into smaller, more manageable tasks.
	Count up and down in tenths and hundredths	Multiply one-digit numbers with up to 2 decimal places by whole numbers.	All aspects of number - fractions at the national standard are embedded
	Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.		Multiply and divide integers and decimals by 0.1, 0.01.
	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	Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred'.	I know which number to consider as 100 per cent, or a whole, in problems involving comparisons, and can use this to evaluate one number as a fraction or percentage of another.
	Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $1\frac{1}{2} = 1\frac{1}{2}$]	Use common factors to: <ul style="list-style-type: none"> simplify fractions; identify equivalent fractions, using common multiples to express fractions in the same denomination. 	Multiply and divide a fraction by an integer.
	Compare and order fractions whose denominators are all multiples of the same number	Convert and calculate between improper fractions, decimals and percentages, in different contexts	
	Read, write, order and compare numbers up to three decimal places		
	<i>Round decimals with two decimal places to the nearest whole number and to one decimal place</i>	<i>Fluently add and subtract decimal numbers and round when required to specified degrees of accuracy</i>	
	Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	Recall and use equivalences between simple fractions, decimals and percentages, in different contexts.	Understand and use 'useful' equivalencies between fractions, decimals and percentages when solving problems.
	Add and subtract fractions with the same denominator and denominators that are multiples of the same number	Associate a fraction with division and begin to calculate decimal fraction equivalents.	I can add and subtract fractions by writing them with a common denominator.
	Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	Add and subtract fractions with denominators that are multiples of the same number.	
	Solve problems involving number up to three decimal places	Calculate simple fractions and percentages of whole numbers and quantities.	
	Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25.	Use written division methods in cases where the answer has up to 2 decimal places.	
	Solve problems involving converting between units of time	Solve problems and reason about fractions, decimals and percentages.	Solve problems, using knowledge that the total probability of all the mutually exclusive outcomes of an experiment is 1.
	Measurement	Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)	Solve problems involving converting units of time, including problems involving the duration of events.
Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints		Use, read, write and convert between standard metric units of measure.	
Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres		Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.	Find volumes of cuboids when solving problems
Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm ²) and square metres (m ²) and estimate the area of irregular shapes		Recognise that shapes with the same areas can have different perimeters and vice versa.	
Estimate volume [for example, using 1 cm ³ blocks to build cuboids (including cubes)] and capacity [for example, using water]		Calculate and compare the area of squares and other rectangles including using standard units, square centimetres (cm ²) and square metres (m ²).	
		Estimate the area of irregular shapes by counting squares (including half squares and fractions of squares).	

		Read, write and convert time between analogue clocks (including clock faces using Roman numerals) and digital 12- and 24-hour clocks, using am and pm where necessary.	
	Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.	Reason and solve problems involving measures.	
R & P		Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate.	Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate.
		Use simple ratio and proportional reasoning to solve problems	All aspects of ratio and proportion at the national standard are embedded
Algebra		Solve problems involving similar shapes where the scale factor is known or can be found	Calculate using ratios in situations
		Use simple formulae in words, and express missing number problems algebraically.	Enlarge shapes by a positive whole-number scale factor.
		Generate and describe linear number sequences	Find and describe in words the rule for the next term or nth term of a sequence where the rule is linear, when exploring number sequences.
		Find possible values in missing number problems and equations involving 1 or 2 unknowns.	Recognise relationships that grow in a linear way and those that grow in a non-linear way.
	Identify 3-D shapes, including cubes and other cuboids, from 2-D representations	Compare and classify geometric shapes based on their properties and sizes.	Formulate and solve linear equations with whole-number coefficients.
	Use the properties of rectangles to deduce related facts and find missing lengths and angles	Recognise, describe and build simple 3-D shapes, including using nets and other 2-D representations.	I need to simplify algebraic expressions by factorising.
	Distinguish between regular and irregular polygons based on reasoning about equal sides and angles	Draw 2-D shapes using given lengths and angles with increasing accuracy.	All aspects of geometry – properties of shape at the national standard are embedded
Shape	Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles	Illustrate and describe parts of circles including radius, diameter and circumference.	Understand that π is a constant proportion, that is useful for finding certain measurements of a circle.
	Draw given angles, and measure them in degrees (o) Identify: • Angles at a point and one whole turn (total 360o) • Angles at a point on a straight line and a turn (total 180°) • Other multiples of 90°	Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.	Understand and can use appropriate formulae for finding circumferences and areas of circles.
	Solve problems involving shapes and reason about their properties	Find unknown angles in triangles.	Solve problems using angle and symmetry properties of polygons and angle properties of intersecting and parallel lines, and explain these properties.
P&D	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.	Solve problems and reason about shapes and their properties.	
		Describe positions of a 2-D grid as co-ordinates in the first quadrant.	Solve problems and reason about shapes and their properties.
		Draw and translate simple shapes on the co-ordinate plane in the first quadrant	All aspects of geometry – position and direction at the national standard are embedded
		Use reasoning to solve problems related to co-ordinates, reflections and translations.	Represent mappings expressed algebraically and use Cartesian coordinates
Statistics	Complete, read and interpret information in tables, including timetables, bar charts, pictograms, tables and time graphs.	Present, complete, read and interpret information in tables and bar charts	Devise instructions for a computer to generate and transform shapes and paths.
	Solve comparison, sum and difference problems using information presented in a line graph	Construct and interpret line graphs, interpret pie charts and use both to solve problems.	Collect and record continuous data, choosing appropriate equal class intervals over a sensible range to create frequency tables.
		Calculate and interpret the mean as an average for simple sets of discrete data in different contexts.	Draw conclusions from scatter diagrams, and have a basic understanding of correlation.
			Understand the difference between discrete and continuous data
			Identify which type of graph is most useful in the context of the problem.

