Primary framework for mathematics: learning objectives

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1 Using and applying mathematics		
Solve one-step and two-step problems involving numbers, money or measures, including time; choose and carry out appropriate calculations, using calculator methods where appropriate	Solve one-step and two-step problems involving whole numbers and decimals and all four operations, choosing and using appropriate calculation strategies, including calculator use	Solve multi-step problems, and problems involving fractions, decimals and percentages; choose and use appropriate calculation strategies at each stage, including calculator use
Represent a puzzle or problem using number sentences, statements or diagrams; use these to solve the problem; present and interpret the solution in the context of the problem	Represent a puzzle or problem by identifying and recording the information or calculations needed to solve it; find possible solutions and confirm them in the context of the problem	Tabulate systematically the information in a problem or puzzle; identify and record the steps or calculations needed to solve it, using symbols where appropriate; interpret solutions in the original context and check their accuracy
Suggest a line of enquiry and the strategy needed to follow it; collect, organise and interpret selected information to find answers	Plan and pursue an enquiry; present evidence by collecting, organising and interpreting information; suggest extensions to the enquiry	Suggest, plan and develop lines of enquiry; collect, organise and represent information, interpret results and review methods; identify and answer related questions
Identify and use patterns, relationships and properties of numbers or shapes; investigate a statement involving numbers and test it with examples	Explore patterns, properties and relationships and propose a general statement involving numbers or shapes; identify examples for which the statement is true or false	Represent and interpret sequences, patterns and relationships involving numbers and shapes; suggest and test hypotheses; construct and use simple expressions and formulae in words then symbols (e.g. the cost of c pens at 15 pence each is 15c pence)
Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols	Explain reasoning using diagrams, graphs and text; refine ways of recording using images and symbols	Explain reasoning and conclusions, using words, symbols or diagrams as appropriate
2 Counting and understanding number		
Recognise and continue number sequences formed by counting on or back in steps of constant size	Count from any given number in whole-number and decimal steps, extending beyond zero when counting backwards; relate the numbers to their position on a number line	Find the difference between a positive and a negative integer, or two negative integers, in context
Partition, round and order four-digit whole numbers; use positive and negative numbers in context and position them on a number line; state inequalities using the symbols < and > (e.g. -3 > -5, -1 < plus1)	Explain what each digit represents in whole numbers and decimals with up to two places, and partition, round and order these numbers	Use decimal notation for tenths, hundredths and thousandths; partition, round and order decimals with up to three places, and position them on the number line
Use decimal notation for tenths and hundredths and partition decimals; relate the notation to money and measurement; position one-place and two-place decimals on a number line	Express a smaller whole number as a fraction of a larger one (e.g. recognise that 5 out of 8 is $^{5}/_{8}$); find equivalent fractions (e.g. $^{7}/_{10}$= $^{14}/_{20}$, or $^{19}/_{10}$= 1 $^{9}/_{10}$); relate fractions to their decimal representations	Express a larger whole number as a fraction of a smaller one (e.g. recognise that 8 slices of a 5-slice pizza represents $^{8}/_{5}$or 1 $^{3}/_{5}$ pizzas); simplify fractions by cancelling common factors; order a set of fractions by converting them to fractions with a common denominator
Recognise the equivalence between decimal and fraction forms of one half, quarters, tenths and hundredths	Understand percentage as the number of parts in every 100 and express tenths and hundredths as percentages	Express one quantity as a percentage of another (e.g. express £400 as a percentage of £1000); find equivalent percentages, decimals and fractions
Use diagrams to identify equivalent fractions (e.g. $^{6}/_{8}$and $^{3}/_{4}$, or $^{70}/_{100}$and $^{7}/_{10}$); interpret mixed numbers and position them on a number line (e.g. 3 $^{1}/_{2}$) (EOY)	Use sequences to scale numbers up or down; solve problems involving proportions of quantities (e.g. decrease quantities in a recipe designed to feed six people)	Solve simple problems involving direct proportion by scaling quantities up or down
Use the vocabulary of ratio and proportion to describe the relationship between two quantities (e.g. 'There are 2 red beads to every 3 blue beads, or 2 beads in every 5		

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beads are red'); estimate a proportion (e.g. 'About one quarter of the apples in the box are green')		
3 Knowing and using number facts		
Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000	Use knowledge of place value and addition and subtraction of two-digit numbers to derive sums and differences and doubles and halves of decimals (e.g. 6.5 ± 2.7, half of 5.6, double 0.34) (EOY)	Use knowledge of place value and multiplication facts to 10 × 10 to derive related multiplication and division facts involving decimals (e.g. 0.8 × 7, 4.8 ÷ 6)
Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves	Recall quickly multiplication facts up to 10 × 10 and use them to multiply pairs of multiples of 10 and 100; derive quickly corresponding division facts	Use knowledge of multiplication facts to derive quickly squares of numbers to 12 × 12 and the corresponding squares of multiples of 10
Derive and recall multiplication facts up to 10 × 10, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple	Identify pairs of factors of two-digit whole numbers and find common multiples (e.g. for 6 and 9)	Recognise that prime numbers have only two factors and identify prime numbers less than 100; find the prime factors of two-digit numbers
Use knowledge of rounding, number operations and inverses to estimate and check calculations	Use knowledge of rounding, place value, number facts and inverse operations to estimate and check calculations	Use approximations, inverse operations and tests of divisibility to estimate and check results
Identify pairs of fractions that total 1		
4 Calculating		
Add or subtract mentally pairs of two-digit whole numbers (e.g. 47 + 58, 91 - 35)	Extend mental-methods for whole-number calculations, for example to multiply a two-digit by a one-digit number (e.g. 12 × 9), to multiply by 25 (e.g. 16 × 25), to subtract one near-multiple of 1000 from another (e.g. 6070 - 4097)	Calculate mentally with integers and decimals: U.t ± U.t, TU × U, TU ÷ U, U.t × U, U.t ÷ U
Refine and use efficient written methods to add and subtract two-digit and three-digit whole numbers and £.p	Use efficient written methods to add and subtract whole numbers and decimals with up to two places	Use efficient written methods to add and subtract integers and decimals, to multiply and divide integers and decimals by a one-digit integer, and to multiply two-digit and three-digit integers by a two-digit integer (EOY)
Multiply and divide numbers to 1000 by 10 and then 100 (whole-number answers), understanding the effect; relate to scaling up or down	Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 or 1000	Relate fractions to multiplication and division (e.g. 6 ÷ 2 = $\frac{1}{2}$ of 6 = 6 × $\frac{1}{2}$); express a quotient as a fraction or decimal (e.g. 67 ÷ 5 = 13.4 or 13 $\frac{2}{5}$); find fractions and percentages of whole-number quantities (e.g. $\frac{5}{8}$ of 96, 65% of £260)
Develop and use written methods to record, support and explain multiplication and division of two-digit numbers by a one-digit number, including division with remainders (e.g. 15 × 9, 98 ÷ 6)	Refine and use efficient written methods to multiply and divide HTU × U, TU × TU, U.t × U and HTU ÷ U	Use a calculator to solve problems involving multi-step calculations
Find fractions of numbers, quantities or shapes (e.g. $\frac{1}{5}$ of 30 plums, $\frac{3}{8}$ of a 6 by 4 rectangle)	Find fractions using division (e.g. $\frac{1}{100}$ of 5 kg), and percentages of numbers and quantities (e.g. 10%, 5% and 15% of £80)	
Use a calculator to carry out one-step and two-step calculations involving all four operations; recognise negative numbers in the display, correct mistaken entries and interpret the display correctly in the context of money	Use a calculator to solve problems, including those involving decimals or fractions (e.g. find $\frac{3}{4}$ of 150 g); interpret the display correctly in the context of measurement	
5 Understanding shape		
Draw polygons and classify them by identifying their properties, including their line	Identify, visualise and describe properties of rectangles, triangles, regular polygons	Describe, identify and visualise parallel and perpendicular edges or faces; use these

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symmetry	and 3-D solids; use knowledge of properties to draw 2-D shapes, and to identify and draw nets of 3-D shapes	properties to classify 2-D shapes and 3-D solids
Visualise 3-D objects from 2-D drawings; make nets of common solids	Read and plot coordinates in the first quadrant; recognise parallel and perpendicular lines in grids and shapes; use a set-square and ruler to draw shapes with perpendicular or parallel sides	Make and draw shapes with increasing accuracy and apply knowledge of their properties
Recognise horizontal and vertical lines; use the eight compass points to describe direction; describe and identify the position of a square on a grid of squares	Complete patterns with up to two lines of symmetry; draw the position of a shape after a reflection or translation	Visualise and draw on grids of different types where a shape will be after reflection, after translations, or after rotation through 90° or 180° about its centre or one of its vertices
Know that angles are measured in degrees and that one whole turn is 360°; compare and order angles less than 180°	Estimate, draw and measure acute and obtuse angles using an angle measurer or protractor to a suitable degree of accuracy; calculate angles in a straight line	Use coordinates in the first quadrant to draw, locate and complete shapes that meet given properties
		Estimate angles, and use a protractor to measure and draw them, on their own and in shapes; calculate angles in a triangle or around a point
6 Measuring		
Choose and use standard metric units and their abbreviations when estimating, measuring and recording length, weight and capacity; know the meaning of 'kilo', 'centi' and 'milli' and, where appropriate, use decimal notation to record measurements (e.g. 1.3 m or 0.6 kg)	Read, choose, use and record standard metric units to estimate and measure length, weight and capacity to a suitable degree of accuracy (e.g. the nearest centimetre); convert larger to smaller units using decimals to one place (e.g. change 2.6 kg to 2600 g)	Select and use standard metric units of measure and convert between units using decimals to two places (e.g. change 2.75 litres to 2750 ml, or vice versa)
Interpret intervals and divisions on partially numbered scales and record readings accurately, where appropriate to the nearest tenth of a unit	Interpret a reading that lies between two unnumbered divisions on a scale	Read and interpret scales on a range of measuring instruments, recognising that the measurement made is approximate and recording results to a required degree of accuracy; compare readings on different scales, for example when using different instruments
Draw rectangles and measure and calculate their perimeters; find the area of rectilinear shapes drawn on a square grid by counting squares	Draw and measure lines to the nearest millimetre; measure and calculate the perimeter of regular and irregular polygons; use the formula for the area of a rectangle to calculate the rectangle's area	Calculate the perimeter and area of rectilinear shapes; estimate the area of an irregular shape by counting squares
Read time to the nearest minute; use am, pm and 12-hour clock notation; choose units of time to measure time intervals; calculate time intervals from clocks and timetables	Read timetables and time using 24-hour clock notation; use a calendar to calculate time intervals	
7 Handling data		
Answer a question by identifying what data to collect; organise, present, analyse and interpret the data in tables, diagrams, tally charts, pictograms and bar charts, using ICT where appropriate	Describe the occurrence of familiar events using the language of chance or likelihood	Describe and predict outcomes from data using the language of chance or likelihood
Compare the impact of representations where scales have intervals of differing step size	Answer a set of related questions by collecting, selecting and organising relevant data; draw conclusions, using ICT to present features, and identify further questions to ask	Solve problems by collecting, selecting, processing, presenting and interpreting data, using ICT where appropriate; draw conclusions and identify further questions to ask

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	Construct frequency tables, pictograms and bar and line graphs to represent the frequencies of events and changes over time	Construct and interpret frequency tables, bar charts with grouped discrete data, and line graphs; interpret pie charts
	Find and interpret the mode of a set of data	Describe and interpret results and solutions to problems using the mode, range, median and mean