Primary National Strategy

Learning objectives for mathematics poster pack

Guidance

Curriculum and standards

Primary headteachers, teachers and subject leaders

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department for children, schools and families

Primary National Strategy

Learning objectives for mathematics: Year 3 – Year 6 progression to Year 7

Level description

Level 5

MA1 In order to carry through tasks and solve mathematical problems, pupils identify and obtain necessary information. They check their results, considering whether they are sensible. Pupils show understanding of situations by describing them mathematically using symbols, words and diagrams. They draw simple conclusions of their own and give an explanation of their reasoning.

MA2 Pupils use their understanding of place value to multiply and divide whole numbers and decimals by 10, 100 and 1000. They order, add and subtract negative numbers in context. They use all four operations with decimals to two places. They reduce a fraction to its simplest form by cancelling common factors and solve simple problems involving ratio and direct proportion. They calculate fractional or percentage parts of quantities and measurements, using a calculator where appropriate. Pupils understand and use an appropriate non-calculator method for solving problems that involve multiplying and dividing any three-digit number by any two-digit number. They check their solutions by applying inverse operations or estimating using approximations. They construct, express in symbolic form, and use simple formulae involving one or two operations. They use brackets appropriately.

MA3 When constructing models and when drawing or using shapes, pupils measure and draw angles to the nearest degree, and use language associated with angles. Pupils know the angle sum of a triangle and that of angles at a point. They identify all the symmetries of 2-D shapes. They know the rough metric equivalents of imperial units still in daily use and convert one metric unit to another. They make sensible estimates of a range of measures in relation to everyday situations. Pupils understand and use the formula for the area of a rectangle.

Pupils use and interpret co-ordinates in all four quadrants.

MA4 Pupils understand and use the mean of discrete data. They compare two simple distributions, using the range and one of the mode, median or mean. They interpret graphs and diagrams, including pie charts, and draw conclusions. They understand and use the probability scale from 0 to 1. Pupils find and justify probabilities, and approximations to these, by selecting and using methods based on equally likely outcomes and experimental evidence, as appropriate. They understand that different outcomes may result from repeating an experiment.

Level 4

MA1 Pupils are developing their own strategies for solving problems and are using these strategies both in working within mathematics and in applying mathematics to practical contexts. They present information and results in a clear and organised way. They search for a solution by trying out ideas of their own.

MA2 Pupils use their understanding of place value to multiply and divide whole numbers by 10 or 100. In solving number problems, pupils use a range of mental methods of computation with the four operations, including mental recall of multiplication facts up to 10 x 10 and quick derivation of corresponding division facts. They use efficient written methods of addition and subtraction and of short multiplication and division. They add and subtract decimals to two places and order decimals to three places. In solving problems with or without a calculator, pupils check the reasonableness of their results by reference to their knowledge of the context or to the size of the numbers. They recognise approximate proportions of a whole and use simple fractions and percentages to describe these. Pupils recognise and describe number patterns, and relationships including multiple, factor and square. They begin to use simple formulae expressed in words. Pupils use and interpret co-ordinates in the first quadrant.

MA3 Pupils make 3-D mathematical models by linking given faces or edges and draw common 2-D shapes in different orientations on grids. They reflect simple shapes in a mirror line. They choose and use appropriate units and instruments, interpreting, with appropriate accuracy, numbers on a range of measuring instruments. They find perimeters of simple shapes and find areas by counting squares.

MA4 Pupils collect discrete data and record them using a frequency table. They understand and use the mode and range to describe sets of data. They group data, where appropriate, in equal class intervals, represent collected data in frequency diagrams and interpret such diagrams. They construct and interpret simple line graphs.

Level 3

MA1 Pupils try different approaches and find ways of overcoming difficulties that arise when they are solving problems. They are beginning to organise their work and check results. Pupils discuss their mathematical work and are beginning to explain their thinking. They use and interpret mathematical symbols and diagrams. Pupils show that they understand a general statement by finding particular examples that match it.

MA2 Pupils show understanding of place value in numbers up to 1000 and use this to make approximations. They begin to use decimal notation and to recognise negative numbers, in contexts such as money and temperature. Pupils use mental recall of addition and subtraction facts to 20 in solving problems involving larger numbers. They add and subtract numbers with two digits mentally and numbers with three digits using written methods. They use mental recall of the 2, 3, 4, 5 and 10 multiplication tables and derive the associated division facts. They solve whole-number problems involving multiplication or division, including those that give rise to remainders. They use simple fractions that are several parts of a whole and recognise when two simple fractions are equivalent.

MA3 Pupils classify 3-D and 2-D shapes in various ways using mathematical properties such as reflective symmetry for 2-D shapes. They use non-standard units, standard metric units of length, capacity and mass, and standard units of time, in a range of contexts.

MA4 Pupils extract and interpret information presented in simple tables and lists. They construct bar charts and pictograms, where the symbol represents a group of units, to communicate information they have gathered, and they interpret information presented to them in these forms.

Кеу
MA1 Attainment target 1: using and applying mathematics
MA2 Attainment target 2: number and algebra
MA3 Attainment target 3: shape, space and measures
MA4 Attainment target 4: handling data

 $Statements \ in \ \textbf{bold} \ refer \ to \ key \ objectives.$

More detailed guidance on assessment for learning can be found on the Primary Framework website.

department for children, schools and families

	Using and applying mathematics	Counting and understanding	Knowing and using number	Calculating	Understanding shape	Measuring	Handling data
Year 6 progression to Year 7	Solve problems by breaking down complex calculations into simpler steps; choose and use operations and calculation strategies appropriate to the numbers and context; try alternative approaches to overcome difficulties; present, interpret and compare solutions Represent information or unknown numbers in a problem, for example in a table, formula or equation; explain solutions in the context of the problem Develop and evaluate lines of enquiry; identify, collect, organise and analyse relevant information; decide how best to represent conclusions and what further questions to ask Generate sequences and describe the general term; use letters and symbols to represent unknown numbers or variables; represent simple relationships as graphs Explain and justify reasoning and conclusions, using notation, symbols and diagrams; find a counter-example to disprove a conjecture; use step-by-step deductions to solve problems involving shapes	Compare and order integers and decimals in different contexts Order a set of fractions by converting them to decimals Recognise approximate proportions of a whole and use fractions and percentages to describe and compare them, for example when interpreting pie charts Use ratio notation; reduce a ratio to its simplest form and divide a quantity into two parts in a given ratio; solve simple problems involving ratio and direct proportion (e.g. identify the quantities needed to make a fruit drink by mixing water and juice in a given ratio)	Consolidate rapid recall of number facts, including multiplication facts to 10 x 10 and the associated division facts Recognise the square roots of perfect squares to 12 x 12 Recognise and use multiples, factors, divisors, common factors, highest common factors and lowest common multiples in simple cases Make and justify estimates and approximations to calculations	Understand how the commutative, associative and distributive laws, and how the relationships between operations, including inverse operations, can be used to calculate more efficiently; use the order of operations, including brackets Consolidate and extend mental methods of calculation to include decimals, fractions and percentages Use standard column procedures to add and subtract integers and decimals, and to multiply two-digit and three- digit integers by a one-digit or two-digit integer; extend division to dividing three-digit integers by a two-digit integer Calculate percentage increases or decreases and fractions of quantities and measurements (integer answers) Use bracket keys and the memory of a calculator to carry out calculations with more than one step; use the square root key	Use correctly the vocabulary, notation and labelling conventions for lines, angles and shapes Extend knowledge of properties of triangles and quadrilaterals and use these to visualise and solve problems, explaining reasoning with diagrams Know the sum of angles on a straight line, in a triangle and at a point, and recognise vertically opposite angles Use all four quadrants to find co-ordinates of points determined by geometric information Identify all the symmetries of 2-D shapes; transform images using ICT Construct a triangle given two sides and the included angle	Convert between related metric units using decimals to three places (e.g. convert 1375 mm to 1.375 m, or vice versa) Solve problems by measuring, estimating and calculating; measure and calculate using imperial units still in everyday use; know their approximate metric values Calculate the area of right-angled triangles given the lengths of the two perpendicular sides, and the volume and surface area of cubes and cuboids	Understand and use the probability scale from 0 to 1; find and justify probabilities based on equally likely outcomes in simple contexts Explore hypotheses by planning surveys or experiments to collect small sets of discrete or continuous data; select, process, present and interpret the data, using ICT where appropriate; identify ways to extend the survey or experiment Construct, interpret and compare graphs and diagrams that represent data, for example compare proportions in two pie charts that represent different totals Write a short report of a statistical enquiry and illustrate with appropriate diagrams, graphs and charts, using ICT as appropriate; justify the choice of what is presented
Year 6	Solve multi-step problems, and problems involving fractions, decimals and percentages; choose and use appropriate calculation strategies at each stage, including calculator use 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, plan and develop lines of enquiry; collect, organise and represent information, interpret results and review methods; identify and answer related questions 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) Explain reasoning and conclusions, using words, symbols or diagrams as appropriate	 Find the difference between a positive and a negative integer, or two negative integers, in context 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 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 Express one quantity as a percentage of another (e.g. express £400 as a percentage of £1000); find equivalent percentages, decimals and fractions Solve simple problems involving direct proportion by scaling quantities up or down 	Use knowledge of place value and multiplication facts to 10 x 10 to derive related multiplication and division facts involving decimals (e.g. 0.8 x 7, 4.8 ÷ 6) Use knowledge of multiplication facts to derive quickly squares of numbers to 12 x 12 and the corresponding squares of multiples of 10 Recognise that prime numbers have only two factors and identify prime numbers less than 100; find the prime factors of two-digit numbers Use approximations, inverse operations and tests of divisibility to estimate and check results	Calculate mentally with integers and decimals: U.t \pm U.t, TU x U, TU \pm U, U.t x U, U.t \pm U 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 Relate fractions to multiplication and division (e.g. $6 \pm 2 =$ $\frac{1}{2}$ of $6 = 6 \times \frac{1}{2}$); express a quotient as a fraction or decimal (e.g. $67 \pm 5 = 13.4$ or $13 \frac{2}{5}$); find fractions and percentages of whole-number quantities (e.g. $\frac{5}{8}$ of 96, 65% of £260) Use a calculator to solve problems involving multi-step calculations	 Describe, identify and visualise parallel and perpendicular edges or faces; use these properties to classify 2-D shapes and 3-D solids Make and draw shapes with increasing accuracy and apply knowledge of their properties 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 Use co-ordinates 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 	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) 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 Calculate the perimeter and area of rectilinear shapes; estimate the area of an irregular shape by counting squares	Describe and predict outcomes from data using the language of chance or likelihood Solve problems by collecting, selecting, processing, presenting and interpreting data, using ICT where appropriate; draw conclusions and identify further questions to ask Construct and interpret frequency tables, bar charts with grouped discrete data, and line graphs; interpret pie charts Describe and interpret results and solutions to problems using the mode, range, median and mean
Year 5	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 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 Plan and pursue an enquiry; present evidence by collecting, organising and interpreting information; suggest extensions to the enquiry Explore patterns, properties and relationships and propose a general statement involving numbers or shapes; identify examples for which the statement is true or false Explain reasoning using diagrams, graphs and text; refine ways of recording using images and symbols	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 Explain what each digit represents in whole numbers and decimals with up to two places and partition, round and order these numbers 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 $19/_{10} = 19/_{10}$); relate fractions to their decimal representations Understand percentage as the number of parts in every 100 and express tenths and hundredths as percentages 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)	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) Recall quickly multiplication facts up to 10 x 10 and use them to multiply pairs of multiples of 10 and 100; derive quickly corresponding division facts Identify pairs of factors of two-digit whole numbers and find common multiples (e.g. for 6 and 9) Use knowledge of rounding, place value, number facts and inverse operations to estimate and check calculations	 Extend mental methods for whole-number calculations, for example to multiply a two-digit by a one-digit number (e.g. 12 x 9), to multiply by 25 (e.g. 16 x 25), to subtract one near-multiple of 1000 from another (e.g. 6070 - 4097) Use efficient written methods to add and subtract whole numbers and decimals with up to two places Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 or 1000 Refine and use efficient written methods to multiply and divide HTU x U, TU x TU, U.t x U and HTU ÷ U Find fractions using division (e.g. 1/100 of 5 kg), and percentages of numbers and quantities (e.g. 10%, 5% and 15% of £80) Use a calculator to solve problems, including those involving decimals or fractions (e.g. find ³/₄ of 150g); interpret the display correctly in the context of measurement 	Identify, visualise and describe properties of rectangles, triangles, regular polygons and 3-D solids; use knowledge of properties to draw 2-D shapes, and to identify and draw nets of 3-D shapes Read and plot co-ordinates 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 Complete patterns with up to two lines of symmetry; draw the position of a shape after a reflection or translation 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	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) Interpret a reading that lies between two unnumbered divisions on a scale 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 Read timetables and time using 24-hour clock notation; use a calendar to calculate time intervals	Describe the occurrence of familiar events using the language of chance or likelihood 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 Construct frequency tables, pictograms and bar and line graphs to represent the frequencies of events and changes over time Find and interpret the mode of a set of data
Year 4	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 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 Suggest a line of enquiry and the strategy needed to follow it; collect, organise and interpret selected information to find answers Identify and use patterns, relationships and properties of numbers or shapes; investigate a statement involving numbers and test it with examples Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols	Recognise and continue number sequences formed by counting on or back in steps of constant size 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. $-3 > -5$, $-1 < +1$) 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 Recognise the equivalence between decimal and fraction forms of one half, quarters, tenths and hundredths 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. $3 \frac{1}{2}$) 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 beads are red'); estimate a proportion (e.g. 'About one quarter of the apples in the box are green')	Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000 Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves Derive and recall multiplication facts up to 10 x 10, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple Use knowledge of rounding, number operations and inverses to estimate and check calculations Identify pairs of fractions that total 1	Add or subtract mentally pairs of two-digit whole numbers (e.g. $47 + 58$, $91 - 35$) Refine and use efficient written methods to add and subtract two-digit and three-digit whole numbers and $\mathfrak{L}.p$ Multiply and divide numbers to 1000 by 10 and then 100 (whole-number answers), understanding the effect; relate to scaling up or down 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. $15 \times 9, 98 \div 6$) Find fractions of numbers, quantities or shapes (e.g. $1/_5$ of 30 plums, $3/_8$ of a 6 by 4 rectangle) 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	Draw polygons and classify them by identifying their properties, including their line symmetry Visualise 3-D objects from 2-D drawings; make nets of common solids 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 Know that angles are measured in degrees and that one whole turn is 360°; compare and order angles less than 180°	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) Interpret intervals and divisions on partially numbered scales and record readings accurately, where appropriate to the nearest tenth of a unit Draw rectangles and measure and calculate their perimeters; find the area of rectilinear shapes drawn on a square grid 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	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 Compare the impact of representations where scales have intervals of differing step size
Year 3	Solve one-step and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations Represent the information in a puzzle or problem using numbers, images or diagrams; use these to find a solution and present it in context, where appropriate using £.p notation or units of measure Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information Identify patterns and relationships involving numbers or shapes, and use these to solve problems Describe and explain methods, choices and solutions to puzzles and problems, orally and in writing, using pictures and diagrams	 Read, write and order whole numbers to at least 1000 and position them on a number line; count on from and back to zero in single-digit steps or multiples of 10 Partition three-digit numbers into multiples of 100, 10 and 1 in different ways Round two-digit or three-digit numbers to the nearest 10 or 100 and give estimates for their sums and differences Read and write proper fractions (e.g. ³/₇, ⁹/₁₀), interpreting the denominator as the parts of a whole and the numerator as the number of parts; identify and estimate fractions of shapes; use diagrams to compare fractions and establish equivalents 	Derive and recall all addition and subtraction facts for each number to 20, sums and differences of multiples of 10 and number pairs that total 100 Derive and recall multiplication facts for the 2, 3, 4, 5, 6 and 10 times-tables and the corresponding division facts; recognise multiples of 2, 5 or 10 up to 1000 Use knowledge of number operations and corresponding inverses, including doubling and halving, to estimate and check calculations	Add or subtract mentally combinations of one-digit and two-digit numbers Develop and use written methods to record, support or explain addition and subtraction of two-digit and three-digit numbers Multiply one-digit and two-digit numbers by 10 or 100, and describe the effect Use practical and informal written methods to multiply and divide two-digit numbers (e.g. 13×3 , $50 \div 4$); round remainders up or down, depending on the context Understand that division is the inverse of multiplication and vice versa; use this to derive and record related multiplication and division number sentences Find unit fractions of numbers and quantities (e.g. $1/2$, $1/3$, $1/4$ and $1/6$ of 12 litres)	 Relate 2-D shapes and 3-D solids to drawings of them; describe, visualise, classify, draw and make the shapes Draw and complete shapes with reflective symmetry; draw the reflection of a shape in a mirror line along one side Read and record the vocabulary of position, direction and movement, using the four compass directions to describe movement about a grid Use a set-square to draw right angles and to identify right angles in 2-D shapes; compare angles with a right angle; recognise that a straight line is equivalent to two right angles 	Know the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres; choose and use appropriate units to estimate, measure and record measurements Read, to the nearest division and half-division, scales that are numbered or partially numbered; use the information to measure and draw to a suitable degree of accuracy Read the time on a 12-hour digital clock and to the nearest 5 minutes on an analogue clock; calculate time intervals and find start or end times for a given time interval	Answer a question by collecting, organising and interpreting data; use tally charts, frequency tables, pictograms and bar charts to represent results and illustrate observations; use ICT to create a simple bar chart Use Venn diagrams or Carroll diagrams to sort data and objects using more than one criterion

Primary National Strategy

Learning objectives for mathematics: Foundation Stage – Year 4

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Level description		Using and applying mathematics	Counting and understanding number	Knowing and using number facts	Calculating	Understanding shape	Measuring	Handling data
 Level 3 MA1 Pupils try different approaches and find ways of overcoming difficulties that arise when they are solving problems. They are beginning to organise their work and check results. Pupils discuss their mathematical work and are beginning to explain their thinking. They use and interpret mathematical symbols and diagrams. Pupils show that they understand a general statement by finding particular examples that match it. MA2 Pupils show understanding of place value in numbers up to 1000 and use this to make approximations. They begin to use decimal notation and to recognise negative numbers, in contexts such as money and temperature. Pupils use mental recall of addition and subtraction facts to 20 in solving problems involving larger numbers. They add and subtract numbers with two digits mentally and numbers with three digits using written methods. They use mental recall of the 2, 3, 4, 5 and 10 multiplication tables and derive the associated division facts. They solve whole-number problems involving multiplication or division, including those that give rise to remainders. They use simple fractions that are several parts of a whole and recognise when two simple fractions are equivalent. MA3 Pupils classify 3-D and 2-D shapes in various ways using mathematical properties such as reflective symmetry for 2-D shapes. They use non-standard units, standard metric units of length, capacity and mass, and standard units of time, in a range of contexts. MA4 Pupils extract and interpret information presented in simple tables and lists. They construct bar charts and pictograms, where the symbol represents a group of units, to communicate information 	Year 4	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 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 Suggest a line of enquiry and the strategy needed to follow it; collect, organise and interpret selected information to find answers Identify and use patterns, relationships and properties of numbers or shapes; investigate a statement involving numbers and test it with examples Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols	Recognise and continue number sequences formed by counting on or back in steps of constant size 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. $-3 > -5$, $-1 < +1$) 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 Recognise the equivalence between decimal and fraction forms of one half, quarters, tenths and hundredths 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. $3 1/_2$) 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 beads are red'); estimate a proportion (e.g. 'About one quarter of the apples in the box are green')	Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000 Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves Derive and recall multiplication facts up to 10 x 10, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple Use knowledge of rounding, number operations and inverses to estimate and check calculations Identify pairs of fractions that total 1	Add or subtract mentally pairs of two-digit whole numbers (e.g. 47 + 58, 91 - 35) Refine and use efficient written methods to add and subtract two-digit and three-digit whole numbers and $\mathfrak{L}.p$ Multiply and divide numbers to 1000 by 10 and then 100 (whole-number answers), understanding the effect; relate to scaling up or down 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 x 9, 98 ÷6) Find fractions of numbers, quantities or shapes (e.g. $1/_5$ of 30 plums, $3/_8$ of a 6 by 4 rectangle) 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	Draw polygons and classify them by identifying their properties, including their line symmetry Visualise 3-D objects from 2-D drawings; make nets of common solids 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 Know that angles are measured in degrees and that one whole turn is 360°; compare and order angles less than 180°	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) Interpret intervals and divisions on partially numbered scales and record readings accurately, where appropriate to the nearest tenth of a unit Draw rectangles and measure and calculate their perimeters; find the area of rectilinear shapes drawn on a square grid 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	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 Compare the impact of representations where scales have intervals of differing step size
 they have gathered, and they interpret information presented to them in these forms. Level 2 MA1 Pupils select the mathematics they use in some classroom activities. They discuss their work using mathematical language and are beginning to represent it using symbols and simple diagrams. They explain why an answer is correct. MA2 Pupils count sets of objects reliably, and use mental recall of addition and subtraction facts to 10. They begin to understand the place value of each digit in a number and use this to order numbers up to 100. They choose the appropriate operation when solving addition and subtraction problems. They use the knowledge that subtraction is the inverse of addition. They use mental calculation strategies to solve number problems involving money and measures. They recognise sequences of numbers, including odd and even numbers. MA3 Pupils use mathematical names for common 3-D and 2-D shapes and describe their properties, including numbers of sides and corners. They distinguish between straight and turning movements, understand angle as a measurement of turn, and recognise right angles in turns. They begin to use everyday non-standard and standard units to measure length and mass. 	Year 3	Solve one-step and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations Represent the information in a puzzle or problem using numbers, images or diagrams; use these to find a solution and present it in context, where appropriate using £.p notation or units of measure Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information Identify patterns and relationships involving numbers or shapes, and use these to solve problems Describe and explain methods, choices and solutions to puzzles and problems, orally and in writing, using pictures and diagrams	 Read, write and order whole numbers to at least 1000 and position them on a number line; count on from and back to zero in single-digit steps or multiples of 10 Partition three-digit numbers into multiples of 100, 10 and 1 in different ways Round two-digit or three-digit numbers to the nearest 10 or 100 and give estimates for their sums and differences Read and write proper fractions (e.g. ³/₇, ⁹/₁₀), interpreting the denominator as the parts of a whole and the numerator as the number of parts; identify and estimate fractions of shapes; use diagrams to compare fractions and establish equivalents 	Derive and recall all addition and subtraction facts for each number to 20, sums and differences of multiples of 10 and number pairs that total 100 Derive and recall multiplication facts for the 2, 3, 4, 5, 6 and 10 times-tables and the corresponding division facts; recognise multiples of 2, 5 or 10 up to 1000 Use knowledge of number operations and corresponding inverses, including doubling and halving, to estimate and check calculations	Add or subtract mentally combinations of one-digit and two-digit numbersDevelop and use written methods to record, support or explain addition and subtraction of two-digit and three-digit numbersMultiply one-digit and two-digit numbers by 10 or 100, and describe the effectUse practical and informal written methods to multiply and divide two-digit numbers (e.g. $13 \times 3, 50 \div 4$); round remainders up or down, depending on the contextUnderstand that division is the inverse of multiplication and vice versa; use this to derive and record related multiplication and division number sentencesFind unit fractions of numbers and quantities (e.g. $1/2$, $1/3$, $1/4$ and $1/6$ of 12 litres)	 Relate 2-D shapes and 3-D solids to drawings of them; describe, visualise, classify, draw and make the shapes Draw and complete shapes with reflective symmetry; draw the reflection of a shape in a mirror line along one side Read and record the vocabulary of position, direction and movement, using the four compass directions to describe movement about a grid Use a set-square to draw right angles and to identify right angles in 2-D shapes; compare angles with a right angle; recognise that a straight line is equivalent to two right angles 	 Know the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres; choose and use appropriate units to estimate, measure and record measurements Read, to the nearest division and half-division, scales that are numbered or partially numbered; use the information to measure and draw to a suitable degree of accuracy Read the time on a 12-hour digital clock and to the nearest 5 minutes on an analogue clock; calculate time intervals and find start or end times for a given time interval 	Answer a question by collecting, organising and interpreting data; use tally charts, frequency tables, pictograms and bar charts to represent results and illustrate observations; use ICT to create a simple bar chart Use Venn diagrams or Carroll diagrams to sort data and objects using more than one criterion
 MA4 Pupils sort objects and classify them using more than one criterion. When they have gathered information, pupils record results in simple lists, tables and block graphs, in order to communicate their findings. Level 1 MA1 Pupils use mathematics as an integral part of classroom activities. They represent their work with objects or pictures and discuss it. They recognise and use a simple pattern or relationship. MA2 Pupils count, order, add and subtract numbers when solving problems involving up to 10 objects. They read and write the numbers involved. MA3 When working with 2-D and 3-D shapes, pupils use everyday language to describe properties and positions. They measure and order objects using direct comparison, and order events. MA4 Pupils sort objects and classify them, demonstrating the criterion they have used. 	Year 2	Solve problems involving addition, subtraction, multiplication or division in contexts of numbers, measures or pounds and pence Identify and record the information or calculation needed to solve a puzzle or problem; carry out the steps or calculations and check the solution in the context of the problem Follow a line of enquiry; answer questions by choosing and using suitable equipment and selecting, organising and presenting information in lists, tables and simple diagrams Describe patterns and relationships involving numbers or shapes, make predictions and test these with examples Present solutions to puzzles and problems in an organised way; explain decisions, methods and results in pictorial, spoken or written form, using mathematical language and number sentences	Read and write two-digit and three-digit numbers in figures and words; describe and extend number sequences and recognise odd and even numbers Count up to 100 objects by grouping them and counting in tens, fives or twos; explain what each digit in a two- digit number represents, including numbers where 0 is a place holder; partition two-digit numbers in different ways, including into multiples of 10 and 1 Order two-digit numbers and position them on a number line; use the greater than (>) and less than (<) signs Estimate a number of objects; round two-digit numbers to the nearest 10 Find one half, one quarter and three-quarters of shapes and sets of objects	 Derive and recall all addition and subtraction facts for each number to at least 10, all pairs with totals to 20 and all pairs of multiples of 10 with totals up to 100 Understand that halving is the inverse of doubling and derive and recall doubles of all numbers to 20, and the corresponding halves Derive and recall multiplication facts for the 2, 5 and 10 times-tables and the related division facts; recognise multiples of 2, 5 and 10 Use knowledge of number facts and operations to estimate and check answers to calculations 	Add or subtract mentally a one-digit number or a multiple of 10 to or from any two-digit number; use practical and informal written methods to add and subtract two-digit numbers Understand that subtraction is the inverse of addition and vice versa; use this to derive and record related addition and subtraction number sentences Represent repeated addition and arrays as multiplication, and sharing and repeated subtraction (grouping) as division; use practical and informal written methods and related vocabulary to support multiplication and division, including calculations with remainders Use the symbols +, -, x, \div and = to record and interpret number sentences involving all four operations; calculate the value of an unknown in a number sentence (e.g. $\square \div 2 = 6, 30 - \square = 24$)	Visualise common 2-D shapes and 3-D solids; identify shapes from pictures of them in different positions and orientations; sort, make and describe shapes, referring to their properties Identify reflective symmetry in patterns and 2-D shapes and draw lines of symmetry in shapes Follow and give instructions involving position, direction and movement Recognise and use whole, half and quarter turns, both clockwise and anticlockwise; know that a right angle represents a quarter turn	Estimate, compare and measure lengths, weights and capacities, choosing and using standard units (m, cm, kg, litre) and suitable measuring instruments Read the numbered divisions on a scale, and interpret the divisions between them (e.g. on a scale from 0 to 25 with intervals of 1 shown but only the divisions 0, 5, 10, 15 and 20 numbered); use a ruler to draw and measure lines to the nearest centimetre Use units of time (seconds, minutes, hours, days) and know the relationships between them; read the time to the quarter hour; identify time intervals, including those that cross the hour	Answer a question by collecting and recording data in lists and tables; represent the data as block graphs or pictograms to show results; use ICT to organise and present data Use lists, tables and diagrams to sort objects; explain choices using appropriate language, including 'not'
Key MA1 Attainment target 1: using and applying mathematics MA2 Attainment target 2: number and algebra MA3 Attainment target 3: shape, space and measures MA4 Attainment target 4: handling data	Year 1	Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money, for example to 'pay' and 'give change' Describe a puzzle or problem using numbers, practical materials and diagrams; use these to solve the problem and set the solution in the original context Answer a question by selecting and using suitable equipment, and sorting information, shapes or objects; display results using tables and pictures Describe simple patterns and relationships involving numbers or shapes; decide whether examples satisfy given conditions Describe ways of solving puzzles and problems, explaining choices and decisions orally or using pictures	Count reliably at least 20 objects, recognising that when rearranged the number of objects stays the same; estimate a number of objects that can be checked by counting Compare and order numbers, using the related vocabulary; use the equals (=) sign Read and write numerals from 0 to 20, then beyond; use knowledge of place value to position these numbers on a number track and number line Say the number that is 1 more or less than any given number, and 10 more or less for multiples of 10 Use the vocabulary of halves and quarters in context	Derive and recall all pairs of numbers with a total of 10 and addition facts for totals to at least 5; work out the corresponding subtraction facts Count on or back in ones, twos, fives and tens and use this knowledge to derive the multiples of 2, 5 and 10 to the tenth multiple Recall the doubles of all numbers to at least 10	Relate addition to counting on; recognise that addition can be done in any order; use practical and informal written methods to support the addition of a one-digit number or a multiple of 10 to a one-digit or two-digit number Understand subtraction as 'take away' and find a 'difference' by counting up; use practical and informal written methods to support the subtraction of a one-digit number from a one-digit or two-digit number and a multiple of 10 from a two-digit number Use the vocabulary related to addition and subtraction and symbols to describe and record addition and subtraction number sentences Solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups	Visualise and name common 2-D shapes and 3-D solids and describe their features; use them to make patterns, pictures and models Identify objects that turn about a point (e.g. scissors) or about a line (e.g. a door); recognise and make whole, half and quarter turns Visualise and use everyday language to describe the position of objects and direction and distance when moving them, for example when placing or moving objects on a game board	Estimate, measure, weigh and compare objects, choosing and using suitable uniform non-standard or standard units and measuring instruments (e.g. a lever balance, metre stick or measuring jug) Use vocabulary related to time; order days of the week and months; read the time to the hour and half hour	Answer a question by recording information in lists and tables; present outcomes using practical resources, pictures, block graphs or pictograms Use diagrams to sort objects into groups according to a given criterion; suggest a different criterion for grouping the same objects
	Foundation Stage	Use developing mathematical ideas and methods to solve practical problems Match sets of objects to numerals that represent the number of objects Sort objects, making choices and justifying decisions Talk about, recognise and recreate simple patterns Describe solutions to practical problems, drawing on experience, talking about their own ideas, methods and choices	Say and use number names in order in familiar contexts Know that numbers identify how many objects are in a set Count reliably up to 10 everyday objects Estimate how many objects they can see and check by counting Count aloud in ones, twos, fives and tens Use language such as 'more' or 'less' to compare two numbers Use ordinal numbers in different contexts Recognise numerals 1 to 9	Observe number relationships and patterns in the environment and use these to derive facts Find one more or one less than a number from 1 to 10 Select two groups of objects to make a given total of objects	Begin to relate addition to combining two groups of objects and subtraction to 'taking away' In practical activities and discussion begin to use the vocabulary involved in adding and subtracting Count repeated groups of the same size Share objects into equal groups and count how many there are in each group	Use familiar objects and common shapes to create and recreate patterns and build models Use language such as 'circle' or 'bigger' to describe the shape and size of solids and flat shapes Use everyday words to describe position	Use language such as 'greater', 'smaller', 'heavier' or 'lighter' to compare quantities Use everyday language related to time; order and sequence familiar events and measure short periods of time	Sort familiar objects to identify their similarities and differences Count how many objects share a particular property, presenting results using pictures, drawings or numerals

Statements in **bold** refer to the early learning goals in the Foundation Stage or to key objectives.

More detailed guidance on assessment for learning can be found on the Primary Framework website.

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