Key Stage 2 Mathematics Programme of Study

Strands	Elements	Year 3 Learners are able to:	Year 4 Learners are able to:	Year 5 Learners are able to:	Year 6 Learners are able to:
Developing numerical reasoning	Identify processes and connections	• transfer mathematical skills to a variety of contexts and everyday situations • identify the appropriate steps and information needed to complete the task or reach a solution • select appropriate mathematics and techniques to use • select and use suitable instruments and units of measurement • choose an appropriate mental or written strategy and know when it is appropriate to use a calculator • estimate and visualise size when measuring and use the correct units			
	Represent and communicate	• explain results and procedures clearly using mathematical language • refine informal methods of recording written calculations, moving to formal methods of calculation when developmentally ready • use appropriate notation, symbols and units of measurement • select and construct appropriate charts, diagrams and graphs with suitable scales • **recognise, and generalise in words, patterns that arise in numerical, spatial or practical situations ❖** • **visualise and describe shapes, movements and transformations ❖**			
	Review	• select from an increasing range of checking strategies to decide if answers are reasonable • interpret answers within the context of the problem and consider whether answers, including calculator, analogue and digital displays, are sensible • draw conclusions from data and recognise that some conclusions may be misleading or uncertain			

Key

Within the table, text taken from the LNF will appear as non-bold. Text that has been extended from the LNF or that is a new skill will appear as bold. The text is further identified by the following icons.

Extended skill ▲ Programme of study skill ❖

N.B.

In order to comply with accessibility and ledgibility, these tables have been designed to be printed at their optimum size of A3.

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Strands	Elements	Year 3 Learners are able to:	Year 4 Learners are able to:	Year 5 Learners are able to:	Year 6 Learners are able to:
Using number skills	Use number facts and relationships	• read and write numbers to 1 000 • compare and estimate with numbers up to 100 • **explain the value of a digit in numbers up to 1 000 ❖** • use mental strategies to recall number facts within 20 • recall 2, 3, 4, 5 and 10 multiplication tables and use to solve multiplication and division problems • **identify multiples of 2, 3, 4, 5 and 10; use the term multiple ❖** • **identify odd and even numbers up to 1 000 ❖** • multiply numbers by 10	• read and write numbers to 10 000 • compare and estimate with numbers up to 1 000 • use mental strategies to recall multiplication tables for 2, 3, 4, 5, 6 and 10 and use to solve division problems • multiply and divide numbers by 10 and 100 • **identify multiples of 2, 3, 4, 5, 6 and 10; use the terms multiple and factor ❖**	• read and write numbers to 100 000 • compare numbers with 1 and 2 decimal places • use mental strategies to recall multiplication tables for 2, 3, 4, 5, 6, 8 and 10 and use to solve division problems • multiply and divide numbers and decimals by 10 and 100 • **identify multiples of 2, 3, 4, 5, 6, 8 and 10; use the terms multiple and factor ❖** • **identify a prime number as having two factors; recognise that 1 is not a prime number ❖** • **identify prime numbers below 10 ❖**	• read and write numbers to 1 million and numbers to 3 decimal places • use mental strategies to recall multiplication tables up to 10 x 10 and use to solve division problems • multiply numbers and decimals by a multiple of 10, *e.g. 15 x 30, 1.4cm x 20* • **identify multiples of numbers up to 10; use the terms multiple and factor ❖** • **identify common multiples of two numbers ❖** • **identify common factors of two numbers ❖** • **identify prime numbers below 20 ❖**
	Fractions, decimals, percentages and ratio	• use halves and quarters • halve 2-digit numbers in the context of number, money and measures • find fractional quantities linked to known multiplication facts, *e.g. $\frac{1}{3}$ of 18, $\frac{1}{5}$ of 15* • **recognise a quarter as a half of a half ❖**	• halve 3-digit numbers in the context of number, money and measures • find fractional quantities using known table facts, *e.g. $\frac{1}{6}$ of 30cm* • recognise fractions that are several parts of a whole, *e.g. $\frac{2}{3}$, $\frac{3}{10}$* • **recognise connections between fractions, e.g. *one-tenth is half of one-fifth* ❖**	• use understanding of simple fraction and decimal equivalences when measuring and calculating, *e.g. ½ = 0.5, $\frac{1}{10}$ = 0.1* • calculate fractional quantities, *e.g. $\frac{1}{8}$ of 24 = 3, so $\frac{5}{8}$ of 24 = 15* • use doubling and halving strategies when working with simple proportions • **share objects in a given ratio, *e.g. red blocks and blue blocks in a ratio of 1:2* ❖** • **add and subtract fractions with the same denominator ❖** • **add fractions to make a whole number ❖**	• use understanding of simple fraction, decimal and percentage equivalences, *e.g. find 25% of 60cm and know that this is equivalent to ¼ of 60cm* • calculate percentage quantities based on 10%, *e.g. 20%, 5%, 15%* • use simple ratio and proportion • **use ratio to express two or more quantities in words ❖** • **state the proportion of a whole that each share represents, *e.g. recognise that in a ratio of 1:3, 1 part represents a quarter of the total* ❖** • **find equivalent fractions ❖** • **simplify fractions ❖**

Key Stage 2 Mathematics Programme of Study

Strands	Elements	Year 3 Learners are able to:	Year 4 Learners are able to:	Year 5 Learners are able to:	Year 6 Learners are able to:
Using number skills	Calculate using mental and written methods	• find differences within 100 • use mental strategies to add and subtract 2-digit numbers • use partitioning to double and halve 2-digit numbers	• find differences within 1 000 • add a 2-digit number to, and subtract a 2-digit number from, a 3-digit number using an appropriate mental or written method • use mental strategies to multiply and divide 2-digit numbers by a single digit number • **identify negative whole numbers on a number line** ❖ • **order whole numbers between -10 and 10** ❖	• find differences between numbers with 1 decimal place • add and subtract 3-digit numbers using an appropriate mental or written method • multiply and divide 3-digit numbers by a single-digit number • **order negative and positive numbers, including decimals to 1 decimal place** ❖	• add and subtract numbers using whole numbers and decimals • multiply 2- and 3-digit numbers by a 2-digit number • divide 3-digit numbers by a 2-digit number • **add or subtract negative or positive numbers using a number line** ❖
	Estimate and check	• check subtraction using addition • check halving using doubling • check multiplication using repeated addition	• check answers using inverse operations • estimate by rounding to the nearest 10 or 100	• check answers using inverse operations • estimate by rounding to the nearest 10, 100 or 1 000	• check answers using inverse operations • estimate by rounding to the nearest 10, 100, 1 000 or whole number
	Manage money	• use different combinations of money to pay for items up to £2 and calculate the change • order and compare items up to £10 • record money spent and saved	• use money to pay for items up to £10 and calculate the change • order and compare items up to £100 • add and subtract totals less than £10 using correct notation, *e.g. £6.85 – £2.76* • manage money, compare costs from different retailers and determine what can be bought within a given budget	• order and compare the cost of items up to £1 000 • add and subtract totals less than £100 using correct notation, *e.g. £28.18 + £33.45* • plan and track money and savings by keeping accurate records • realise that budgeting is important	• use the terms profit and loss in buying and selling activities and make calculations for this • understand the advantages and disadvantages of using bank accounts • make comparisons between prices and understand which is best value for money

Key Stage 2 Mathematics Programme of Study

Strands	Elements	Year 3 Learners are able to:	Year 4 Learners are able to:	Year 5 Learners are able to:	Year 6 Learners are able to:
Using measuring skills	Length, weight/ mass, capacity	• recognise that perimeter is the distance around a shape • use standard units **to estimate and** measure: – length: measure on a ruler to the nearest ½ cm – weight/mass: use 5g, 10g and 100g weights – capacity: use litres and half litres; measure to the nearest 100ml ▲ • **choose between metric units to measure a length** ❖	• measure and calculate the perimeter of squares and rectangles • **select and use appropriate standard units to estimate and measure length, weight/mass and capacity** ❖ • measure on a ruler to the nearest mm and record using a mix of units, *e.g. 1cm 3mm* • use weighing scales with divisions to weigh objects to the nearest 5g, 10g, 25g or 100g • measure capacities to the nearest 50ml or 100ml • convert metric units of length to smaller units, *e.g. cm to mm, m to cm, km to m* • **choose appropriate metric units to measure length, weight/mass and capacity** ❖	• measure perimeters • **make estimates of length, weight/mass and capacity based on knowledge of the size of real-life objects, recognising the appropriateness of units in different contexts** ❖ • use measuring instruments with 10 equal divisions between each major unit, and record using decimal notation, *e.g. 4.2cm, 1.3kg* • make use of conversions, *e.g. ¼ of a km = 250m* • **recognise the appropriateness of units in different contexts** ❖	• read and interpret scales or divisions on a range of measuring instruments • **make estimates of length, weight/mass and capacity based on knowledge of the size of real-life objects** ❖ • record measurements in different ways, *e.g. 1.3kg = 1kg 300g* • use the language of imperial units in daily use, *e.g. miles, pints*
	Time	• tell the time to the nearest 5 minutes on an analogue clock and calculate how long it is to the next hour • read hours and minutes on a 12-hour digital clock using am/pm conventions • **calculate start times, finish times and durations using hours, 30-minute intervals and 15-minute intervals** ❖	• tell the time to the nearest minute on analogue clocks • read hours and minutes on a 24-hour digital clock • **calculate start times, finish times and durations using 5-minute intervals** ❖ • **convert between 12- and 24-hour clock times** ❖ • time and order events in seconds • use calendars to plan events • **estimate the number of minutes everyday activities take to complete** ❖	• read and use analogue and digital clocks • time events in minutes and seconds, and order the results • **calculate start times, finish times and durations using hours and minutes** ❖ • carry out practical activities involving timed events and explain which unit of time is the most appropriate • **estimate the length of time everyday activities take to complete, extending to hours and quarters of hours** ❖	• use and interpret timetables and schedules to plan events and activities and make calculations as part of the planning process • estimate how long a journey takes • **convert between standard units of time** ❖ • time events in minutes and seconds to the nearest tenth of a second • **estimate the length of time everyday activities take to complete with increasing accuracy** ❖
	Temperature	• take temperature readings using thermometers and interpret readings above and below 0°C	• take temperature readings using thermometers and interpret readings above and below 0°C	• measure and record temperatures involving positive and negative readings • calculate temperature differences, including those involving temperature rise and fall across 0°C	• measure and record temperatures involving positive and negative readings • calculate temperature differences, including those involving temperature rise and fall across 0°C

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Strands	Elements	Year 3 Learners are able to:	Year 4 Learners are able to:	Year 5 Learners are able to:	Year 6 Learners are able to:
Using measuring skills	Area and volume Angle and position	• find areas by counting squares • use the four compass points to describe directions • **identify right angles ❖** • **recognise that two right angles make a half turn, and that four right angles make a full turn ❖**	• recognise volume in practical contexts • use eight compass points to describe direction • **describe an angle as more or less than a right angle ❖**	• calculate, estimate and compare the area of squares and rectangles using standard units • find volumes by counting and other practical methods • use coordinates to specify location • **draw and measure acute angles in multiples of 10 degrees ❖** • **recognise acute and obtuse angles ❖**	• calculate the area of squares and rectangles • use grid references to specify location • **draw and measure acute and obtuse angles in multiples of 5 degrees ❖** • **recognise reflex angles ❖** • **calculate a missing angle within a right angle ❖**
Using geometry skills	Shape	• **recognise and classify triangles, squares, rectangles, pentagons and hexagons, including irregular cases ❖** • **recognise 3D shapes, including prisms ❖** • **identify congruent shapes in the same orientation ❖**	• **recognise, classify and sketch polygons with up to eight sides, including irregular shapes ❖** • **recognise and classify 3D shapes, using their own criteria ❖**	• **recognise and classify triangles, using their own criteria ❖** • **identify congruent shapes in different orientations ❖**	• **recognise tetrahedra and square based pyramids ❖** • **recognise and sketch different types of quadrilaterals ❖** • **explore the tessellation of different shapes ❖** • **identify a net of a cube ❖**
	Construction	• **draw lines to the nearest half centimetre ❖**	• **draw lines to the nearest millimetre ❖** • **recognise and draw perpendicular and parallel lines ❖**	• **draw and label lines accurately, *e.g. AB* ❖** • **construct solids from given nets ❖** • **draw squares, rectangles and right angled triangles accurately ❖**	• **draw cubes and cuboids on isometric paper ❖** • **draw nets of cubes on square paper ❖**
	Movement	• **identify lines of symmetry in 2D shapes ❖**	• **draw lines of symmetry ❖**	• **translate a shape on squared paper horizontally or vertically ❖** • **draw the reflection of a shape in any line ❖** • **complete a partly drawn shape after rotation ❖**	• **find all the lines of symmetry for a given shape ❖** • **identify rotational symmetry of shapes ❖**

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Strands	Elements	Year 3 Learners are able to:	Year 4 Learners are able to:	Year 5 Learners are able to:	Year 6 Learners are able to:
Using algebra skills	Number sequences	• explore sequences of whole numbers involving addition and subtraction, *e.g. counting in 2s, 3s and 4s from different starting points* ❖	• explore sequences of positive whole numbers involving addition and subtraction in 2s, 3s, 4s, 5s, 6s, 8s and 10s from different starting points ❖	• recognise and state the difference in sequences that involve adding or subtracting ❖ • write the next two (or more) terms in sequences that involve addition or subtraction ❖ • show that a number is in the sequence and/or find the position number by continuing the sequence or otherwise ❖	• find the term to term rule for ascending and descending sequences, *e.g. 3, 7, 11, 15 add 4* ❖ • generate a sequence given the first term and the term to term rule ❖ • consider spatial patterns, *e.g. square numbers* ❖
	Expressions and formulae				• explore general statements through practical activities, *e.g. that a + a + a = 3a, 3 x a = 3a and a + a + a + b + b = 3a + 2b* ❖ • simplify expressions involving the addition of one variable, *e.g. 5t + 3t = 8t* ❖
	Functions and graphs	• use one and two step function machines to generate input and output involving addition and subtraction within 100; express, in words, the operations from function machines ❖	• use one and two step function machines to generate input and output using all four operations; express, in words, the operations from function machines ❖	• use multistep function machines to generate input and output using all four operations; express, in words, the operations from function machines ❖ • read, plot and write coordinates in one quadrant, *e.g. (2, 4)* ❖	• express output generated from one step function machines using algebra ❖ • identify the coordinates of a missing point from a regular shape ❖ • refer to the x axis and the y axis ❖
	Equations and inequalities	• be able to list numbers that are 'greater than' or 'less than' another number ❖	• use > to describe whether a number is greater than another ❖ • find an 'unknown' in one step equations, *e.g. 6 + □ = 10* ❖	• use < to describe whether a number is less than another ❖ • solve one step equations using letters to present 'unknowns' with integer solutions, *e.g. 6 + a = 10 and b + b = 8* ❖	• construct and solve one step equations with whole number solutions ❖ • be able to list numbers between two points using the terminology 'less than or equal to' and 'greater than or equal to' ❖

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Strands	Elements	Year 3 Learners are able to:	Year 4 Learners are able to:	Year 5 Learners are able to:	Year 6 Learners are able to:
Using data skills	Collect and record data Present and analyse data Interpret results	• represent data using: – lists, tally charts, tables and diagrams – bar charts and bar line graphs labelled in 2s, 5s and 10s – pictograms where one symbol represents more than one unit using a key – Venn and Carroll diagrams • extract and interpret information from charts, timetables, diagrams and graphs.	• represent data using: – lists, tally charts, tables and diagrams – bar charts and bar line graphs labelled in 2s, 5s and 10s – pictograms where one symbol represents more than one unit using a key – Venn and Carroll diagrams • extract and interpret information from charts, timetables, diagrams and graphs.	• represent data using: – lists, tally charts, tables, diagrams and frequency tables – bar charts, grouped data charts, line graphs and conversion graphs • extract and interpret information from an increasing range of diagrams, timetables and graphs (including pie charts) • use mean, median, mode and range to describe a data set	• represent data using: – lists, tally charts, tables, diagrams and frequency tables – bar charts, grouped data charts, line graphs and conversion graphs • extract and interpret information from an increasing range of diagrams, timetables and graphs (including pie charts) • use mean, median, mode and range to describe a data set
	Probability			**• use the words 'certain' and 'impossible' to describe the likelihood of an event occurring ❖** **• recognise that some events are impossible and some events are certain ❖** **• recognise that some events are more likely than others ❖** **• use the words 'likely', 'unlikely' and 'even chance'. ❖**	**• use numbers to describe the likelihood of an event, *e.g. a one-in-six chance* ❖** **• recognise that some events are equally likely ❖** **• identify the outcomes of simple events, *e.g. flipping a coin, rolling a dice.* ❖**

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