Lower Key Stage 2 – Years 3 and 4

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

This long term curriculum planning document includes:
- **pgs 2 – 6: programmes of study for the year group including statutory requirements and accompanying notes and guidance (non-statutory). Key objectives for the year group are written in bold.**
- **pg 7: appendix 1: table of key objectives for the year group taken from the National Curriculum and in a summarised form**
- **pg 8: appendix 2: overview of progression for the year group**

Year 4 programmes of study

The objectives highlighted in bold are considered by the school to be key objectives for the year group. The objectives have been selected either because they represent key content to be covered to allow access to the following year's curriculum, or because it is the only or main time an objective is taught.

Year 4 programme of study (statutory requirements)	Notes and guidance (non-statutory)
Number, place value and rounding Pupils should be taught to: ▪ count in multiples of 6, 7, 9, 25 and 1000 ▪ find 1000 more or less than a given number ▪ **count backwards through zero to include negative numbers** ▪ **recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)** ▪ order and compare numbers beyond 1000 ▪ identify, represent and estimate numbers using different representations ▪ **round any number to the nearest 10, 100 or 1000** ▪ solve number and practical problems that involve all of the above and with increasingly large positive numbers ▪ read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.	Using a variety of representations, including measures, pupils become fluent in the order and place value of numbers beyond 1000, including counting in tens and hundreds, and maintaining fluency in other multiples through varied and frequent practice. They begin to extend their knowledge of the number system to include the decimal numbers and fractions that they have met so far. They connect estimation and rounding numbers to the use of measuring instruments. Roman numerals should be put in their historical context so pupils understand that there have been different ways to write whole numbers and that the important concepts of zero and place value were introduced over a period of time.
Number - Addition and subtraction Pupils should be taught to: ▪ add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency.

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▪ estimate and use inverse operations to check answers to a calculation ▪ solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	
Number - Multiplication and division Pupils should be taught to: ▪ **recall multiplication and division facts for multiplication tables up to 12 × 12** ▪ **use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers** ▪ **recognise and use factor pairs and commutativity in mental calculations** ▪ **multiply two-digit and three-digit numbers by a one-digit number using formal written layout** ▪ solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.	Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency. Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example 600 ÷ 3 = 200 can be derived from 2 x 3 = 6). Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers. Pupils write statements about the equality of expressions (for example, use the distributive law 39 × 7 = 30 × 7 + 9 × 7 and associative law (2 × 3) × 4 = 2 × (3 × 4)). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations for example, 2 x 6 x 5 = 10 x 6 = 60. Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children.
Number - Fractions (including decimals) Pupils should be taught to: ▪ recognise and show, using diagrams, families of common equivalent fractions ▪ count up and down in hundredths; **recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.**	Pupils should connect hundredths to tenths and place value and decimal measure. They extend the use of the number line to connect fractions, numbers and measures. Pupils understand the relation between non-unit fractions and multiplication and division of quantities, with particular emphasis on tenths and hundredths. Pupils make

- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundredths
- **recognise and write decimal equivalents to 1/4, 1/2, 3/4**
- **find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths**
- **round decimals with one decimal place to the nearest whole number**
- **compare numbers with the same number of decimal places up to two decimal places**
- solve simple measure and money problems involving fractions and decimals to two decimal places.

connections between fractions of a length, of a shape and as a representation of one whole or set of quantities. Pupils use factors and multiples to recognise equivalent fractions and simplify where appropriate (for example, 6/9 = 2/3 or = 1/4 = 2/8).

Pupils continue to practise adding and subtracting fractions with the same denominator, to become fluent through a variety of increasingly complex problems beyond one whole.

Pupils are taught throughout that decimals and fractions are different ways of expressing numbers and proportions.

Pupils' understanding of the number system and decimal place value is extended at this stage to tenths and then hundredths. This includes relating the decimal notation to division of whole number by 10 and later 100.

They practise counting using simple fractions and decimals, both forwards and backwards.

Pupils learn decimal notation and the language associated with it, including in the context of measurements. They make comparisons and order decimal amounts and quantities that are expressed to the same number of decimal places. They should be able to represent numbers with one or two decimal places in several ways, such as on number lines.

Measurement

Pupils should be taught to:

- **Convert between different units of measure** [for example, kilometre to metre; hour to minute]
- measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres

Pupils build on their understanding of place value and decimal notation to record metric measures, including money.

They use multiplication to convert from larger to smaller units.

Perimeter can be expressed algebraically as $2(a + b)$ where a and b are the dimensions in the same unit.

▪ **find the area of rectilinear shapes by counting squares** ▪ **estimate, compare and calculate different measures, including money in pounds and pence** ▪ read, write and convert time between analogue and digital 12- and 24-hour clocks ▪ **solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.**	They relate area to arrays and multiplication.
Geometry - properties of shapes Pupils should be taught to: ▪ **compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes** ▪ identify acute and obtuse angles and compare and order angles up to two right angles by size ▪ identify lines of symmetry in 2-D shapes presented in different orientations ▪ **complete a simple symmetric figure with respect to a specific line of symmetry.**	Pupils continue to classify shapes using geometrical properties, extending to classifying different triangles (for example, isosceles, equilateral, scalene) and quadrilaterals (for example, parallelogram, rhombus, trapezium). Pupils compare and order angles in preparation for using a protractor and compare lengths and angles to decide if a polygon is regular or irregular. Pupils draw symmetric patterns using a variety of media to become familiar with different orientations of lines of symmetry; and recognise line symmetry in a variety of diagrams, including where the line of symmetry does not dissect the original shape.
Geometry – position and direction Pupils should be taught to: ▪ **describe positions on a 2-D grid as coordinates in the first quadrant** ☐ **describe movements between positions as translations of a given unit to the left/right and up/down**	Pupils draw a pair of axes in one quadrant, with equal scales and integer labels. They read, write and use pairs of coordinates, for example (2, 5), including using coordinate-plotting ICT tools.

☐ plot specified points and draw sides to complete a given polygon.	
Statistics Pupils should be taught to: ▪ **interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs**. ▪ solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	Pupils understand and use a greater range of scales in their representations. Pupils begin to relate the graphical representation of data to recording change over time.

Appendix 1: Year 4 Key Objectives

Taken from the National Curriculum	Summarised form
1. count backwards through zero to include negative numbers	1. count backwards through zero, including negative numbers
2. recognise the place value of each digit in a four-digit number	2. recognise place value in four-digit numbers
3. round any number to the nearest 10, 100 or 1000	3. round any number to the nearest 10, 100 or 1000
4. recall multiplication and division facts for multiplication tables up to 12 × 12	4. know tables up to 12 x 12
5. use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers	5. use place value and number facts to carry out mental calculations
6. recognise and use factor pairs and commutativity in mental calculations	6. use factor pairs and commutativity in mental calculations
7. multiply two-digit and three-digit numbers by a one-digit number using formal written layout	7. use short multiplication method
8. recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.	8. recognise and use hundredths
9. recognise and write decimal equivalents to 1/4, 1/2, 3/4	9. recognise and write decimal equivalents to 1/4, 1/2 and 3/4
10. find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths	10. divide one- or two- digit numbers by 10 and 100, using tenths and hundredths
11. round decimals with one decimal place to the nearest whole number	11. round decimals with one decimal place to the nearest whole number
12. compare numbers with the same number of decimal places up to two decimal places	12. compare numbers up to two decimal places
13. Convert between different units of measure; estimate, compare and calculate different measures, including money in pounds and pence	13. convert between different units of metric measurements, including money
14. find the area of rectilinear shapes by counting squares	14. find the area of rectilinear shapes by counting squares
15. solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	15. solve problems converting units of time
16. compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes	16. compare and classify shapes, including quadrilaterals and triangles
17. complete a simple symmetric figure with respect to a specific line of symmetry.	17. complete a simple symmetrical figure with respect to a specific line of symmetry
18. describe positions on a 2-D grid as coordinates in the first quadrant	18. describe positions on a 2D grid using co-ordinates
19. describe movements between positions as translations of a given unit to the left/right and up/down	19. describe translations using a given unit to the left/right and up/down
20. interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.	20. interpret and present discrete and continuous data on appropriate graphs

Appendix 2: Overview of Progression in Year 4

Number and place value
In Year 4, children use place value in four-digit numbers, such as 3742 is three thousands, seven hundreds, four tens and two ones. They learn to count in 6s, 7s, 9s, 25s and 1000s, and say 1000 more or less than a specific number. They encounter negative numbers by counting back past zero on number lines, and continue work on rounding (to the nearest 10, 100 or 1000) and estimation. Children are introduced to Roman numerals to 100 and find out how the number system has changed over time.

Addition and subtraction
Children extend previous years' work by adding and subtracting numbers with up to four digits, using mental and written methods, including columnar addition and subtraction. They keep practising mental methods of addition and subtraction as well as written methods, performing calculations increasingly quickly and confidently. They continue using estimation as well as inverse operations to help check answers.

Multiplication and division
Children learn the remaining multiplication tables up to the 12 multiplication table, and use facts from the tables to solve increasingly complex multiplication and division problems. They build on their work with mental methods of calculation in Year 3, using their knowledge of place value and number facts to multiply and divide confidently. They begin to use a formal written layout for multiplication when multiplying two-digit and three-digit numbers by one-digit numbers.

Fractions (including decimals)
Developing ideas from Year 3, children confidently count up and down in hundredths. They learn about and recognise equivalent fractions, simplifying them when necessary (for example, understanding that $1/3 = 2/6 = 4/12$). They move on to understand and show families of equivalent fractions. They build on earlier work, practising adding and subtracting fractions with the same denominator ($2/3 + 7/9 = 11/9$). Children also work with decimal equivalents of tenths and hundredths and of 1/2, 1/4, 3/4, understanding that decimals and fractions are different ways of expressing numbers. They round numbers with one decimal place to the nearest whole number, and compare numbers with the same number of decimal places, up to two decimal places. They use fractions and decimals to solve straightforward money and measure problems.

Measurement
In Year 3, children learned to measure the perimeter of 2D shapes; they now extend this, calculating the perimeter of rectilinear shapes including squares. They work out the area of rectilinear shapes by counting. Children compare digital clocks and analogue clocks, reading, writing and converting time between the two systems. They begin using £ and p notation to record money.

Geometry: properties of shapes
Children learn about a wider range of geometric shapes, including different types of triangles and quadrilaterals. They develop work on acute and obtuse angles from Year 3, comparing and ordering angles up to two right angles. They work with lines of symmetry in 2D shapes.

Geometry: position and direction
Children begin to work with a coordinate grid (first quadrant only), using coordinates to describe positions on a grid.

Statistics Children are introduced to the difference between discrete and continuous data, using bar charts for discrete data (numbers of children travelling to school by different methods) and line graphs for continuous data (children's heights). Children will build further on their work with line graphs in Year 5.