Year 5 Maths Objectives

Place Value

COUNTING	interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero count forwards or backwards in steps of powers of 10 for any given number up to 1000 000 Count on/back in equal steps (e.g. 25, 100, 0.1, 0.2), including beyond zero.
COMPARING NUMBERS	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers) Use the vocabulary of comparing and ordering numbers. Make general statements about odd and even numbers, including sums and differences. Give one or more numbers lying between two others. Use symbols $<$, $=$, $>$, $\geq$, $\leq$. Order a set of whole numbers less than 1 million. Order positive and negative integers (number line, temperature). Calculate a temperature rise or fall across 0*C.
IDENTIFYING, REPRESENTING & ESTIMATING NUMBERS	Use vocabulary of estimation and approximation. Make and justify estimates of large numbers and estimate simple proportions.
READING & WRITING NUMBERS	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Comparing Numbers) Read and write whole numbers 100 000 read Roman numerals to 1 000 (M) and recognise years written in Roman numerals.
UNDERSTANDING PLACE VALUE	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers) *recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents* (copied from Fractions)
ROUNDING	round any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000 and 100 000 Round any three or four digit number to the nearest 10, 100 or 1000. *round decimals with two decimal places to the nearest whole number and to one decimal place* (copied from Fractions)
PROBLEM SOLVING	solve number problems and practical problems that involve all of the above Solve mathematical problems or puzzles. Recognise patterns, generalise

	Make and investigate a general statement about numbers, by finding examples that satisfy it. Suggest extensions. Explain a generalised relationship in words.

Addition & Subtraction

NUMBER BONDS	Decimal complements within 1 and 10. Recall addition and subtraction facts for each number up to 20. Find pairs with sum of 100; derive multiples of 50 with a sum of 1000.
MENTAL CALCULATION	add and subtract numbers mentally with increasingly large numbers Revision of mental strategies for adding and subtracting - partitioning - - doubling - - adjusting - bonds Add / subtract any pair of 2-digit numbers, including crossing 100. Find difference by counting up through next multiple of 10, 100, 1000. Partition into HTU and add most significant digits first.
WRITTEN METHODS	add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) Also include + and – of money and time Use informal pencil and paper methods. Extend written methods +/- of two integers less than 10 000 and + and – of pair of decimals both with 1 or 2 decimal places.
INVERSE OPERATIONS, ESTIMATING & CHECKING ANSWERS	use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy Check calculations using inverse operation, including with calculator. Check by adding in reverse order, including with calculator. Check using sums/differences of odd or even numbers.
PROBLEM SOLVING	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why Develop calculator skills and use a calculator effectively. Use all four operations to solve money and 'real life' word problems. Choose appropriate operations/ calculation methods. Explain working.

Multiplication & Division

MULTIPLICATION & DIVISION FACTS	*count forwards or backwards in steps of powers of 10 for any given number up to* *1 000 000* (copied from Number and Place Value) Multiplication & Division facts e.g x18 by using x9 and multipying. Recall facts in x2, x3, x4, x5, x6, x10 tables and derive division facts. Begin to recall facts in x7, x8 and x9 tables, squares to 10 x 10. Partition to multiply by 2, 5 or 10, and use tests of divisibility. Use known facts and place value to multiply and divide mentally.

MENTAL CALCULATION	multiply and divide numbers mentally drawing upon known facts Multiply or divide whole numbers up to 10 000 by 10 or 100. multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 Multiply and divide any positive whole number up to 10 000 by 10 or 100 and understand the effect. Understand the effect of and relationships between the four operations, and the principles of arithmetic laws as they apply to multiplication. Know and apply tests of divisibility of 2, 4 , 5, 10 or 100. Express a quotient as a fraction, or as a decimal when dividing a whole number by 2, 4, 5, 10 or when dividing £ and pence. Round up or down depending on the context. Double or halve any number up to 100. Double any whole number to 100 and multiples of 10 to 1000. Use doubling to multiply two-digit numbers by 4. Identify near doubles e.g. 1.5 + 1.6. Halve any two-digit number. Use doubling/halving: double any two digit number. Halve an even number, double the other; multiply by 25 by x 100 then ÷ 4; Multiply by 16 by x 8, then double; find a $^{1}/_{6}$ by halving a $^{1/}{}_{3}$. Use closely related facts (derive x19 from x20, x12 from x10 add x2) Partition e.g. 47 x 6
WRITTEN CALCULATION	multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context Use informal pencil and paper methods to support, record or explain x and ÷. Extend written methods to HTU x U or U.t x U. (whole number remainder) Extend written methods to TU x TU (long multiplication). *Multiply decimals*
PROPERTIES OF NUMBERS: MULTIPLES, FACTORS, PRIMES, SQUARE & CUBE NUMBERS	Know square numbers to 10 x 10 Identify factors of two- digit numbers. Use factors. Find all the pairs of factors of any number up to 100. Recognise multiples of 6, 7, 8, 9 up to the 10th multiple.
PROBLEM SOLVING	Use all four operations to solve money or 'real life' word problems, including percentages. Choose appropriate operations/calculation methods. Use all four operations to solve measurement word problems, including time.

	Choose appropriate operations/calculation methods. Explain working.
INVERSE OPERATIONS, ESTIMATING & CHECKING ANSWERS	Approximate first. Check with inverse operation or equivalent calculation.

Algebra

EQUATIONS	solve problems, *including **missing number** problems, using number facts, place value, and more complex addition and subtraction.* Begin to use brackets. *solve problems, including **missing number** problems, involving multiplication and division, including integer scaling*
FORMULAE	*Perimeter can be expressed algebraically as 2(a + b) where a and b are the dimensions in the same unit.* *(Copied from NSG measurement)*
SEQUENCES	Recognise, extend number sequences formed by counting from any number in steps of constant size, e.g. 25 to 500. Recognise and extend number sequences formed by counting from any number in steps of a constant size, extend beyond zero when counting back. Recognise and extend sequences formed by adding 6,7,8,9…, starting from any number. Solve number puzzles, recognise patterns, generalise and predict.

Fractions (including decimals & percentages)

COUNTING IN FRACTIONAL STEPS	count up and down in hundredths
RECOGNISING FRACTIONS	recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten Recognise simple equivalent fractions, including tenths and hundredths. Know simple fractions as percentages. Relate fractions to decimal forms (including tenths, hundredths), and to percentages.
COMPARING FRACTIONS	compare and order unit fractions 1/3, ¼ and 1/2, and fractions with the same denominators Use fraction notation, including mixed numbers, and vocabulary numerator and denominator. Change an improper fraction to a mixed number. Order fractions. Order a set of fractions including mixed numbers, position on a number line. Relate fractions to division and find simple fractions, including 1/10 and 1/100, of numbers and quantities. Use a calculator effectively e.g. to convert fractions to decimals, to find fractions of numbers.

	Find fractions and simple percentages of whole number quantities.
COMPARING DECIMALS	compare numbers with the same number of decimal places up to two decimal places Use decimal notation for tenths and hundredths, know what each digit represents in numbers with up to two decimal places. Begin to understand percentage as the number of parts in every 100. Order a set of numbers or measurements with same number of decimal places.
ROUNDING INCLUDING DECIMALS	round decimals with one decimal place to the nearest whole number Round a number with one or two decimal places to the nearest integer.
EQUIVALENCE	recognise and show, using diagrams, families of common equivalent fractions recognise and write decimal equivalents of any number of tenths or hundredths recognise and write decimal equivalents to $^{1}/_{4}$; $^{1}/_{2}$; $^{3}/_{4}$ Solve simple problems involving ratio (one for every). Solve problems involving ratio (1 for every) and proportion (1 in every).
ADDITION & SUBTRACTION OF FRACTIONS	add and subtract fractions with the same denominator
MULTIPLICATION & DIVISION OF DECIMALS	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
PROBLEM SOLVING	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 solve simple measure and money problems involving fractions and decimals to two decimal places.

Geometry: Position & Direction

POSITION, DIRECTION & MOVEMENT	describe positions on a 2-D grid as coordinates in the first quadrant Recognise positions, read and plot co-ordinates in the first quadrant. describe movements between positions as translations of a given unit to the left/right and up/down Recognise directions, and perpendicular and parallel lines. plot specified points and draw sides to complete a given polygon
PATTERN	Solve shape problems or puzzles. Explain reasoning and methods. Make patterns from rotating shapes. Recognise and explain patterns and relationships, generalise and predict.

Geometry: Properties of shape

IDENTIFYING SHAPES & THEIR PROPERTIES	identify lines of symmetry in 2-D shapes presented in different orientations Identify and recognise properties of rectangles. Classify triangles: isosceles, equilateral, scalene, lines of symmetry. Visualise 3-D shapes from 2-D drawings and identify nets of open cube. Make and investigate a general statement about shapes.
DRAWING & CONSTRUCTING	complete a simple symmetric figure with respect to a specific line of symmetry Recognise reflective symmetry in regular polygons. Complete symmetrical patterns with two lines of symmetry at right angles. Reflect shapes in mirror parallel to one side. Recognise where shape will be after translation.
COMPARING & CLASSIFYING	compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes Solve shape puzzles. Explain methods and reasoning orally and in writing.
ANGLES	identify acute and obtuse angles and compare and order angles up to two right angles by size Understand and use degrees. Identify, estimate and order acute and obtuse angles. Use protractor to measure and draw acute and obtuse angles to 5*. Calculate angles in a straight line.

Measurement

COMPARING & ESTIMATING	estimate, compare and calculate different measures, including money in pounds and pence (also included in Measuring)
MEASURING & CALCULATING	estimate, compare and calculate **different measures,** including **money in pounds and pence** (appears also in Comparing) **Length:** Measure and draw lines to the nearest mm. Use, read and write standard metric units of length, abbreviations and relationships. Convert larger to smaller units of length. Know mile. Suggest suitable units/equipment to estimate or measure length. **Mass:** Use, read and write standard metric units of mass, abbreviations. Know relationships between them. Convert larger to smaller units of mass. Suggest suitable units and equipment to estimate or measure mass. **Capacity:** Use, read and write standard metric units of capacity, including abbreviations and pint, gallon.

	Know and use relationships between them. Convert larger to smaller units of capacity, including gallons to pints. Suggest suitable units and equipment to estimate or measure capacity. Record estimates/ measurements from scales to suitable degree of accuracy. measure and calculate the **perimeter** of a rectilinear figure (including squares) in centimetres and metres Understand, measure and calculate perimeter of rectangles, regular polygons. find the area of rectilinear shapes by counting squares Understand area measured in square centimetres. Use formula in words for area of rectangle.
TELLING THE TIME	read, write and convert time between analogue and digital 12 and 24-hour clocks (appears also in Converting) Read the time on 24-hour digital clock, e.g. 19:53. Use timetables. solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days (appears also in Converting)
CONVERTING	convert between different units of measure (e.g. kilometre to metre; hour to minute) Convert metres to centimetres and £ to pence, and vice versa. Convert kg to g. read, write and convert time between analogue and digital 12 and 24-hour clocks (appears also in Converting) solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days (appears also in Telling the Time) Know and use relationship between units of time.

Statistics

INTERPRETING, CONSTRUCTING & PRESENTING DATA	interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs Discuss chance or likelihood. Identify the mode. Recognise when intermediate points have no meaning. Represent and interpret data in a line graph (e.g. weight of a baby at monthly intervals from birth to one year). Recognise when points can be joined to show trends.
SOLVING PROBLEMS	solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs. Present and interpret data on a bar chart and bar line graph: axis in 2s, 5s, 10s, 20s, 100s.

	Make a simple database on paper. Solve a problem by representing and interpreting data in bar line charts: axis in 2s, 5s, 10s, 20s, 100s. Discuss cases where intermediate points have no meaning and cases where points may be joined to show trend. Find the mode and calculate the range of a set of data. Use a computer to compare different presentations of the same data.