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**Year 5 Objectives**

**Place Value**

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| 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 1 000 000.
* Count on/back in equal steps (e.g. 25, 100, 0.1, 0.2), including beyond zero.
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| COMPARING NUMBERS * Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit.
* 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 <, =, >, ≥, £ .
* 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.
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| IDENTIFYING, REPRESENTING & ESTIMATING NUMBERS * Use vocabulary of estimation and approximation.
* Make and justify estimates of large numbers and estimate simple proportions.
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| READING & WRITING NUMBERS * Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit.
* Read and write whole numbers 100,000.
* Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.
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| ROUNDING * Round any number up to 1,000,000 to the nearest 10, 100, 1 000, 10000 and 100000.
* 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.
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| PROBLEM SOLVING * Solve number problems and practical problems that involve all of the above
* Solve mathematical problems or puzzles.
* Make and investigate a general statement about numbers, by finding examples that satisfy it.
* Explain a generalised relationship in words.
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**Addition and Subtraction**

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| 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.
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| MENTAL CALCULATION * Add and subtract numbers mentally with increasingly large numbers.
* Revision of mental strategies for adding and subtracting.
* 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.
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| 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.
* Extend written methods +/- of two integers less than 10000 and + and – a pair of decimals both with 1 or 2 decimal places.
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| 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.
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| 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.
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**Multiplication and Division**

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| MULTIPLICATION & DIVISION FACTS * Multiplication & Division facts e.g x18 by using x9 and multiplying.
* Recall facts in times tables up to x12 and derive division facts.
* Use known facts and place value to multiply and divide mentally.
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| MENTAL CALCULATION * Multiply and divide numbers mentally drawing upon known facts
* 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.
* 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.
* Identify near doubles e.g. 1.5 + 1.6.
* Halve any two-digit number.
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| 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.
* Extend written methods to HTU x U or U.t x U.
* Extend written methods to TU x TU (long multiplication).
* Multiply decimals.
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| 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.
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| PROBLEM SOLVING * Use all four operations to solve money or 'real life' word problems, including percentages.
* Use all four operations to solve measurement word problems, including time.
* Choose appropriate operations/calculation methods. Explain working.
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| INVERSE OPERATIONS, ESTIMATING & CHECKING ANSWERS * Approximate first.
* Check with inverse operation or equivalent calculation.
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**Algebra**

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| EQUATIONS * Solve problems, including **missing number** problems, using number facts, place value, and more complex addition and subtraction.
* Begin to use brackets.
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| FORMULAE * Perimeter can be expressed algebraically as 2(a + b) where a and b are the dimensions in the same unit.
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| SEQUENCES * Recognise and extend number sequences formed by counting from any number in steps of a constant size, extend beyond zero when counting back.
* Solve number puzzles, recognise patterns, generalise and predict.
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**Fractions including decimals and percentages**

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| COUNTING IN FRACTIONAL STEPS * Count up and down in hundredths.
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| 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.
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| 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 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.
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| 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.
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| 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.
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| 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 problems involving ratio (1 for every) and proportion (1 in every).
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| ADDITION & SUBTRACTION OF FRACTIONS * Add and subtract fractions with the same denominator.
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| MULTIPLICATION & DIVISION OF DECIMALS * Find the effect of dividinga one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.
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| 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.
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**Position and Direction**

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| 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.
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| PATTERN * Solve shape problems or puzzles.
* Explain reasoning and methods. Make patterns from rotating shapes.
* Recognise and explain patterns and relationships, generalise and predict.
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**Shape**

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| 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.
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| 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.
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| 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.
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| 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.
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**Measurement**

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| MEASURING & CALCULATING * Estimate, compare and calculate **different measures,** including **money in pounds and pence.**
* Record estimates/ measurements from scales to suitable degree of accuracy.

**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.
* 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.

**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.
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| TELLING THE TIME * Read, write and convert time between analogue and digital 12 and 24-hour clocks.
* 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.
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| 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.
* Know and use relationship between units of time.
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**Statistics**

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| INTERPRETING, CONSTRUCTING & PRESENTING DATA * Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.
* Identify the mode.
* Recognise when intermediate points have no meaning.
* Represent and interpret data in a line graph.
* Recognise when points can be joined to show trends.
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| 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.
* Solve a problem by representing and interpreting data in bar line charts: axis in 2s, 5s, 10s, 20s, 100s.
* Find the mode and calculate the range of a set of data.
* Use a computer to compare different presentations of the same data.
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