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Place value

- read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
- ♣ count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- ♣ interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- ♣ round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- ♣ solve number problems and practical problems that involve all of the above
- ♣ read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
Pre teaching key vocab Place value games using dice – justifying decisions	Using place value equipment to create numbers and compare. Reading thermometers and comparing temperature change. Making negative number lines to find differences in temperature and temperature changes Human number line	Negative number temperature changes and comparisons Money context to compare prices	• 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 ♣

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Explaining which digits have greatest, least value and why Reasoning discussions to compare and order numbers. Saying numbers Talking about the value of digits in money Explanation of HOW and WHY they calculated/solved	Using catalogues / online prices/ cheques to talk about values of digits and compare prices		• 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.

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Addition and Subtraction

- ♣ add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- ♣ add and subtract numbers mentally with increasingly large numbers
- ♣ use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- ♣ solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
Pre-teach key vocab including the range of possible vocab for each operation Explanation of HOW and WHY they calculated/solved Explain links to other areas of maths to consolidate learnt concepts	Use concrete resources to reinforce misconceptions of exchanging when adding, subtracting	Use money and measure contexts to calculate and solve problems. Use estimating to check and predict answers to problems.	• add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • ♣ 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.

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Multiplication and Division

- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- ♣ know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers
- ♣ establish whether a number up to 100 is prime and recall prime numbers up to 19
- ♣ 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
- ♣ multiply and divide numbers mentally drawing upon known facts
- ♣ 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
- ♣ multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)
- ♣ solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- ♣ solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- ♣ solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.
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Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
Pre-teach key vocab including the range of possible vocab for each operation Explanation of HOW and WHY they calculated/solved Explain links to other areas of maths to consolidate learnt concepts	Use concrete resources to reinforce misconceptions of exchanging when multiplying and dividing. Use arrays to show factors, prime numbers and composite numbers. Use number sliders and place value charts to multiply and divide by 10,100,1000 Human sliders – chn move when multiplied or divided Use squared paper and cm cubes to model squared and cubed numbers	Convert measures by multiplying and dividing by 10,100,1000 Use squared numbers to find areas of square diagrams or locations in the building or rectilinear shapes	• 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.

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Fractions , decimals and percentages

- ♣ compare and order fractions whose denominators are all multiples of the same number
- ♣ identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- ♣ recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number
- ♣ add and subtract fractions with the same denominator and denominators that are multiples of the same number
- ♣ multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams ♣ read and write decimal numbers as fractions [for example, 0.71 = 71/100] ♣ recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- ♣ round decimals with two decimal places to the nearest whole number and to one decimal place
- ♣ read, write, order and compare numbers with up to three decimal places
- ♣ solve problems involving number up to three decimal places
- ♣ recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal
- ♣ solve problems which require knowing percentage and decimal equivalents and those fractions with a denominator of a multiple of 10 or 25.

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
Pre-teach key vocab Explanation of HOW and WHY they calculated/solved Explain links to other areas of maths to	Using fraction bars, models, own drawn bars to represent / compare / order / find equivalent fractions. Use fraction bars to understand how we convert and simplify fractions to be able to calculate with them	Finding fractions of food – pizza, chocolate, cake etc Fraction of children that are in every day Money for decimals	• 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. • ♣ 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

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consolidate learnt concepts Sharing fraction models and talking about equivalence / conversions that they have made. Explaining fractions as parts and whole.	Using models and fraction bars to convert improper to mixed fractions and mixed fractions to improper fractions. Representing percentages, fractions on 100 grids. Using blank number lines to round numbers. Use place value charts and place value counters to represent decimal numbers. Using concrete resources to prove/support learning		• ♣ 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.

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Measure

convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)
♣ understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
♣ measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
♣ calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes
♣ estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water]
♣ solve problems involving converting between units of time
♣ use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
Pre-teach key vocab Explanation of HOW and WHY they calculated/solved Explain links to other areas of maths to consolidate learnt concepts Talk about the units of measure used in architect plans, model plans. Suggest which units are most suitable for measuring parts of the	Create 3d models using cm cubes to find volume Measure dimensions of parts of the school grounds and convert units / find perimeters / find areas. Make scaled models	Use recipes that have metric and imperial measures. Convert measures of models, diagrams and recipes. Make scaled models, diagrams Measure areas of the school Look at distances to places e.g. How far is your house? How far is	♣ 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 ♣ find the area of rectilinear shapes by counting squares ♣ estimate, compare and calculate different measures, including money in pounds and pence8 Mathematics – key stages 1 and 2 28 Statutory requirements ♣ read, write and convert time between analogue and digital 12- and 24-hour clock s ♣ solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.

school grounds and explain how to convert if different units are needed. Carry out investigations, justifying how they know that all possibilities have been found.		Hampton Court? How far is New York?	

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Geometry

identify 3-D shapes, including cubes and other cuboids, from 2-D representations

♣ know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles

♣ draw given angles, and measure them in degrees (o)

♣ identify: ♣ angles at a point and one whole turn (total 360o) ♣ angles at a point on a straight line and 2 1 a turn (total 180o)

♣ other multiples of 90o

♣ use the properties of rectangles to deduce related facts and find missing lengths and angles

♣ distinguish between regular and irregular polygons based on reasoning about equal sides and angles.

identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
Pre-teach key vocab Explanation of HOW and WHY they calculated/solved Explain links to other areas of maths to consolidate learnt concepts Talk about shapes, share properties.	Use nets when exploring properties of 3d shapes. Create own nets of 3d shapes. Handle and compare 3d shapes Sort shapes into sorting diagrams Use interactive programs to model and estimate angles. Use a protractor to measure and compare angles Learn turns by facing different directions using programs such as logo, make links to angles and degrees in turns. Use itp programs to model translations and reflections.	Use measuring equipment to draw designs. Complete drawings of objects and use known facts to calculate missing angles e.g. garden design competition	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. ♣ 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 ♣ plot specified points and draw sides to complete a given polygon

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Ask questions about a circle, what do we want to find out about it? Talk about plans of buildings and how calculating missing lengths and angles help constructors to complete a task.			

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Statistics

solve comparison, sum and difference problems using information presented in a line graph

♣ complete, read and interpret information in tables, including timetables

Language Enrichment	First Hand Experiences	Purpose / Life Skills	Previous Knowledge
Pre-teach key vocab Explanation of HOW and WHY they calculated/solved Explain links to other areas of maths to consolidate learnt concepts	Walk to local bus stop and read the timetable Plan a trip to UK destination using online timetable Look up cinematimes	Represent and compare information about different locations, temperatures, rainfall. Read timetables about journey in our locality and use them to plan events Walk to local bus stop and read the timetable Plan a trip to UK destination using online timetable Look up cinema times	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 prsented in bar charts, pictograms, tables and other graphs

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