

Year 1 Mathematics

Number: number and place value

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number.	<p>Pupils practise counting (1, 2, 3...), ordering (for example, first, second, third...), and to indicate a quantity (for example, 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent.</p>	<p>Link to handwriting: <i>Form digits 0-9 correctly.</i></p> <p>Link to spelling: <i>Practise spelling numbers from zero to twenty.</i></p>
Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens.		
Given a number, identify one more and one less.	<p>Pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100, supported by objects and pictorial representations.</p>	
Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least.	<p>They practise counting as reciting numbers and counting as enumerating objects, and counting in twos, fives and tens from different multiples to develop their recognition of patterns in the number system (for example, odd and even numbers), including varied and frequent practice through increasingly complex questions.</p>	
Read and write numbers from 1 to 20 in numerals and words	<p>They recognise and create repeating patterns with objects and with shapes.</p>	



Number: addition and subtraction

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs.</p>	<p>Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, $9 + 7 = 16$; $16 - 7 = 9$; $7 = 16 - 9$). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.</p>	<p>Children should be fluent when reciting number facts for any number up to 20.</p>
<p>Represent and use number bonds and related subtraction facts within 20.</p>	<p>Pupils combine and increase numbers, counting forwards and backwards.</p>	
<p>Add and subtract one-digit and two-digit numbers to 20, including zero.</p>	<p>They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly</p>	
<p>Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$.</p>		



Number: multiplication and division

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	<p>Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.</p> <p>They make connections between arrays, number patterns, and counting in twos, fives and tens.</p>	

Number: fractions

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Recognise, find and name a half as one of two equal parts of an object, shape or quantity.	<p>Pupils are taught half and quarter as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. For example, they could recognise and find half a length, quantity, set of objects or shape. Pupils connect halves and quarters to the equal sharing and grouping of sets of objects and to measures, as well as recognising and combining halves and quarters as parts of a whole.</p>	<p>It is important to find fractions of a range of different shapes.</p>
Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.		



Measurement

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Compare, describe and solve practical problems for: lengths and heights [for example, long/short, longer/shorter, tall/short, double/half] Mass/weight [for example, heavy/light, heavier than, lighter than]. Capacity and volume [for example, full/empty, more than, less than, half, half full, quarter] Time [for example, quicker, slower, earlier, later].</p>	<p>The pairs of terms: mass and weight, volume and capacity, are used interchangeably at this stage.</p> <p>Pupils move from using and comparing different types of quantities and measures using non-standard units, including discrete (for example, counting) and continuous (for example, liquid) measurement, to using manageable common standard units.</p> <p>In order to become familiar with standard measures, pupils begin to use measuring tools such as a ruler, weighing scales and containers.</p>	
<p>Measure and begin to record the following: lengths and heights mass/weight capacity and volume time (hours, minutes, seconds).</p>	<p>Pupils use the language of time, including telling the time throughout the day, first using o'clock and then half past.</p>	
<p>Recognise and know the value of different denominations of coins and notes.</p>		
<p>Sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening].</p>		



<p>Recognise and use language relating to dates, including days of the week, weeks, months and years.</p>		<p>Link to spelling: <i>Learning to spell the days of the week.</i></p> <p>Link to Science: <i>Observe changes across the four seasons</i> <i>Observe and describe weather associated with the seasons and how day length varies</i></p>
<p>Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.</p>		

Geometry: properties of shapes

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles] . 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].</p>	<p>Pupils handle common 2-D and 3-D shapes, naming these and related everyday objects fluently. They recognise these shapes in different orientations and sizes, and know that rectangles, triangles, cuboids and pyramids are not always similar to each other.</p>	



Geometry: position and direction

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Describe position, direction and movement, including whole, half, quarter and three-quarter turns.</p>	<p>Pupils use the language of position, direction and motion, including: left and right, top, middle and bottom, on top of, in front of, above, between, around, near, close and far, up and down, forwards and backwards, inside and outside.</p> <p>Pupils make whole, half, quarter and three-quarter turns in both directions and connect turning clockwise with movement on a clock face.</p>	<p>Link to Computing: <i>Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.</i> For example, using Beebots.</p> <p>Link to Geography (Geographical skills and fieldwork): <i>Use simple compass directions (North, South, East and West) and locational and directional language [for example, near and far; left and right], to describe the location of features and routes on a map</i> <i>Use aerial photographs and plan perspectives to recognise landmarks and basic human and physical features; devise a simple map; and use and construct basic symbols in a key</i></p>



Year 2 Mathematics

Number: number and place value

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward.	<p>Using materials and a range of representations, pupils practise counting, reading, writing and comparing numbers to at least 100 and solving a variety of related problems to develop fluency. They count in multiples of three to support their later understanding of a third.</p> <p>As they become more confident with numbers up to 100, pupils are introduced to larger numbers to develop further their recognition of patterns within the number system and represent them in different ways, including spatial representations.</p> <p>Pupils should partition numbers in different ways (for example, $23 = 20 + 3$ and $23 = 10 + 13$) to support subtraction. They become fluent and apply their knowledge of numbers to reason with, discuss and solve problems that emphasise the value of each digit in two-digit numbers. They begin to understand zero as a placeholder.</p>	
Recognise the place value of each digit in a two-digit number (tens, ones).		
Identify, represent and estimate numbers using different representations, including the number line.		
Compare and order numbers from 0 up to 100; use $<$, $>$ and $=$ signs		
Read and write numbers to at least 100 in numerals and in words.		
Use place value and number facts to solve problems.		



Number: addition and subtraction

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Solve problems with addition and subtraction, using concrete objects and pictorial representations, including those involving numbers, quantities and measures.</p> <p>Applying their increasing knowledge of mental and written methods.</p>	<p>Pupils extend their understanding of the language of addition and subtraction to include sum and difference.</p> <p>Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using $3 + 7 = 10$; $10 - 7 = 3$ and $7 = 10 - 3$ to calculate $30 + 70 = 100$; $100 - 70 = 30$ and $70 = 100 - 30$. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, $5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5$). This establishes commutativity and associativity of addition.</p> <p>Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.</p>	
<p>Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.</p>		
<p>Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <p>two-digit and one or two digit numbers, a two-digit number and a multiple of ten, and adding three one-digit numbers.</p>		
<p>Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.</p>		
<p>Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.</p>		



Number: multiplication and division

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.</p>	<p>Pupils use a variety of language to describe multiplication and division.</p>	
<p>Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs.</p>	<p>Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.</p>	
<p>Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.</p>	<p>Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example, $40 \div 2 = 20$, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, $4 \times 5 = 20$ and $20 \div 5 = 4$).</p>	
<p>Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.</p>		



Number: fractions

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity.	<p>Pupils use fractions as 'fraction of' discrete and continuous quantities by solving problems using shapes, objects and quantities. They connect unit fractions to equal sharing and grouping, to numbers when they can be calculate, and to measures, finding fractions of lengths, quantities, sets of objects or shapes. They meet $\frac{3}{4}$ as the first example of a non-unit fraction.</p> <p>Pupils should count in fractions up to 10, starting from any number and using the $\frac{1}{2}$ and $\frac{2}{4}$ equivalence on the numberline (for example, $1\frac{1}{4}$, $1\frac{2}{4}$ (or $1\frac{1}{2}$), $1\frac{3}{4}$, 2). This reinforces the concept of fractions as numbers and that they can add up to more than one.</p>	
Write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$.		



Measurement

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels.</p>	<p>Pupils use standard units of measurement with increasing accuracy, using their knowledge of the number system. They use the appropriate language and record using standard abbreviations.</p>	<p>Link to Science: <i>Observe and describe how seeds and bulbs grow into mature plants.</i></p>
<p>Compare and order lengths, mass, volume/capacity and record the results using >, < and =.</p>	<p>Comparing measures includes simple multiples such as 'half as high'; 'twice as wide'. They become fluent in telling the time on analogue clocks and recording it.</p>	
<p>Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value.</p>	<p>Pupils become fluent in counting and recognising coins. They read and say amounts of money confidently and use the symbols £ and p accurately, recording pounds and pence separately.</p>	
<p>Find different combinations of coins that equal the same amounts of money.</p>		
<p>Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.</p>		
<p>Compare and sequence intervals of time.</p>		
<p>Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times.</p>		



Know the number of minutes in an hour and the number of hours in a day.		
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Geometry: properties of space

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line.	<p>Pupils handle and name a wide variety of common 2-D and 3-D shapes including: quadrilaterals and polygons, and cuboids, prisms and cones, and identify the properties of each shape (for example, number of sides, number of faces). Pupils identify, compare and sort shapes on the basis of their properties and use vocabulary precisely, such as sides, edges, vertices and faces.</p> <p>Pupils read and write names for shapes that are appropriate for their word reading and spelling.</p> <p>Pupils draw lines and shapes using a straight edge.</p>	<p>Link to Design Technology: <i>Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology.</i></p>
Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces.		
Identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid].		
Compare and sort common 2-D and 3-D shapes and everyday objects.		



Geometry: position and direction

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Order and arrange combinations of mathematical objects in patterns and sequences.	Pupils should work with patterns of shapes, including those in different orientations.	Link to Computing: <i>use logical reasoning to predict the behaviour of simple programs.</i> <i>Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.</i> <i>Create and debug simple programs</i>
Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).	Pupils use the concept and language of angles to describe 'turn' by applying rotations, including in practical contexts (for example, pupils themselves moving in turns, giving instructions to other pupils to do so, and programming robots using instructions given in right angles).	

Statistics

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Interpret and construct simple pictograms, tally charts, block diagrams and simple tables.	Pupils record, interpret, collate, organise and compare information (for example, using many-to-one correspondence in pictograms with simple ratios 2, 5, 10).	Link to Computing: <i>use technology purposefully to create, organise, store, manipulate and retrieve digital content</i>
Of objects in each category and sorting the categories by quantity.		
Ask and answer simple questions by counting the number.		
Ask and answer questions about totalling and comparing categorical data.		



Year 3 Mathematics

Number: number and place value

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number.	Pupils now use multiples of 2, 3, 4, 5, 8, 10, 50 and 100.	
Recognise the place value of each digit in a three-digit number (hundreds, tens, ones).	They use larger numbers to at least 1000, applying partitioning related to place value using varied and increasingly complex problems, building on work in year 2 (for example, $146 = 100 + 40$ and $6, 146 = 130 + 16$).	
Compare and order numbers up to 1000.		
Identify, represent and estimate numbers using different representations.	Using a variety of representations, including those related to measure, pupils continue to count in ones, tens and hundreds, so that they become fluent in the order and place value of numbers to 1000.	
Read and write numbers up to 1000 in numerals and in words.		
Solve number problems and practical problems involving these ideas.		



Number: addition and subtraction

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Add and subtract numbers mentally, including:</p> <ul style="list-style-type: none"> a three-digit number and ones a three-digit number and tens a three-digit number and hundreds 	<p>Pupils practise solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100.</p> <p>Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent (see Mathematics Appendix 1).</p>	
<p>Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.</p>		
<p>Estimate the answer to a calculation and use inverse operations to check answers.</p>		
<p>Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.</p>		



Number: multiplication and division

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.</p>	<p>Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.</p>	
<p>Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.</p>	<p>Pupils develop efficient mental methods, for example, using commutativity and associativity (for example, $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and multiplication and division facts (for example, using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts (for example, $30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$).</p>	
<p>Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.</p>	<p>Pupils develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division.</p> <p>Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).</p>	



Number: fractions

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.</p>	<p>Pupils connect tenths to place value, decimal measures and to division by 10.</p>	
<p>Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.</p>	<p>They begin to understand unit and non-unit fractions as numbers on the number line, and deduce relations between them, such as size and equivalence. They should go beyond the $[0, 1]$ interval, including relating this to measure.</p>	
<p>Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators.</p>	<p>Pupils understand the relation between unit fractions as operators (fractions of), and division by integers.</p>	
<p>Recognise and show, using diagrams, equivalent fractions with small denominators.</p>	<p>They continue to recognise fractions in the context of parts of a whole, numbers, measurements, a shape, and unit fractions as a division of a quantity.</p>	
<p>Add and subtract fractions with the same denominator within one whole.</p>	<p>Pupils practise adding and subtracting fractions with the same denominator through a variety of increasingly complex problems to improve fluency.</p>	
<p>Compare and order unit fractions, and fractions with the same denominators.</p>		
<p>Solve problems that involve all of the above.</p>		



Measurement

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml).</p>	<p>Pupils continue to measure using the appropriate tools and units, progressing to using a wider range of measures, including comparing and using mixed units (for example, 1 kg and 200g) and simple equivalents of mixed units (for example, 5m = 500cm).</p>	<p>Link with Science Light: <i>find patterns in the way that the size of shadows change.</i></p> <p>Link with Design Technology: <i>generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design</i></p>
<p>Measure the perimeter of simple 2-D shapes.</p>	<p>The comparison of measures includes simple scaling by integers (for example, a given quantity or measure is twice as long or five times as high) and this connects to multiplication.</p>	<p>Link with Science and Design Technology topic 'Healthy Eating' and look at costs of food and budget for this: <i>identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat understand and apply the principles of a healthy and varied diet</i></p>
<p>Add and subtract amounts of money to give change, using both £ and p in practical contexts.</p>	<p>The comparison of measures includes simple scaling by integers (for example, a given quantity or measure is twice as long or five times as high) and this connects to multiplication.</p>	<p>Link to History 'Roman Empire' topic to see how Romans used Roman Numerals.</p>
<p>Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks.</p>	<p>Pupils continue to become fluent in recognising the value of coins, by adding and subtracting amounts, including mixed units, and giving change using manageable amounts. They record £ and p separately. The decimal recording of money is introduced formally in year 4.</p>	<p><i>Link to Latin derivation of words such as millennium and century for M and C</i></p>
<p>Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight.</p>	<p>Pupils use both analogue and digital 12-hour clocks and record their times. In this way they become fluent in and prepared for using digital 24-hour clocks in year 4.</p>	
<p>Know the number of seconds in a minute and the number of days in each month, year and leap year.</p>		
<p>Compare durations of events [for example to calculate the time taken by particular events or tasks].</p>		



Geometry: properties of shapes

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them.</p>	<p>Pupils' knowledge of the properties of shapes is extended at this stage to symmetrical and non-symmetrical polygons and polyhedra. Pupils extend their use of the properties of shapes. They should be able to describe the properties of 2-D and 3-D shapes using accurate language, including lengths of lines and acute and obtuse for angles greater or lesser than a right angle.</p> <p>Pupils connect decimals and rounding to drawing and measuring straight lines in centimetres, in a variety of contexts.</p>	<p>Link with Design Technology and product design: <i>generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design</i></p> <p>Link to Computing and the use of programming: <i>design, write and debug programs that accomplish specific goals.</i></p>
<p>Recognise angles as a property of shape or a description of a turn.</p>		
<p>Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle.</p>		
<p>Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.</p>		



Statistics

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Interpret and present data using bar charts, pictograms and tables.</p> <p>Solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.</p>	<p>Pupils understand and use simple scales (for example, 2, 5, 10 units per cm) in pictograms and bar charts with increasing accuracy.</p> <p>They continue to interpret data presented in many contexts.</p>	<p>Present data collected in Science topics:</p> <p><i>explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant</i></p> <p><i>find patterns in the way that the size of shadows change.</i></p> <p>Link to Computing:</p> <p><i>select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information.</i></p>



Mathematics Year 4

Number: number and place value

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Count in multiples of 6, 7, 9, 25 and 1000.	<p>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.</p> <p>They begin to extend their knowledge of the number system to include the decimal numbers and fractions that they have met so far.</p> <p>They connect estimation and rounding numbers to the use of measuring instruments.</p> <p>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.</p>	
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.		



Number: addition and subtraction

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
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 (see Mathematics Appendix 1).	
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

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Recall multiplication and division facts for multiplication tables up to 12×12.	<p>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 $600 \div 3 = 200$ can be derived from $2 \times 3 = 6$). Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers (see Mathematics Appendix 1). Pupils write statements about the equality of expressions (for example, use the distributive law $39 \times 7 = 30 \times 7 + 9 \times 7$ and associative law $(2 \times 3) \times 4 = 2 \times (3 \times 4)$). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations for example, $2 \times 6 \times 5 = 10 \times 6 = 60$.</p> <p>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.</p>	
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.		



Number: fractions (including decimals)

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Recognise and show, using diagrams, families of common equivalent fractions.	Pupils should connect hundredths to tenths and place value and decimal measure.	
Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.	They extend the use of the number line to connect fractions, numbers and measures.	
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.	Pupils understand the relation between non-unit fractions and multiplication and division of quantities, with particular emphasis on tenths and hundredths.	
Add and subtract fractions with the same denominator.	Pupils make 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 $1/4 = 2/8$)	
Recognise and write decimal equivalents of any number of tenths or hundredths.	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.	
Recognise and write decimal equivalents to one quarter, one half, and three quarters.	Pupils are taught throughout that decimals and fractions are different ways of expressing numbers and proportions.	
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.	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.	
Round decimals with one decimal place to the nearest whole number.	They practise counting using simple fractions and	



<p>Compare numbers with the same number of decimal places up to two decimal places.</p>	<p>decimals, both forwards and backwards</p>	
<p>Solve simple measure and money problems involving fractions and decimals to two decimal places.</p>	<p>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.</p>	



Measurement

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Convert between different units of measure [for example, kilometre to metre; hour to minute].	Pupils build on their understanding of place value and decimal notation to record metric measures, including money.	
Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres.	They use multiplication to convert from larger to smaller units.	
Find the area of rectilinear shapes by counting squares.	Perimeter can be expressed algebraically as $2(a + b)$ where a and b are the dimensions in the same unit.	
Estimate, compare and calculate different measures, including money in pounds and pence.	They relate area to arrays and multiplication.	
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.		



Geometry: properties of shape

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.</p>	<p>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).</p>	
<p>Identify acute and obtuse angles and compare and order angles up to two right angles by size.</p>	<p>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.</p>	
<p>Identify lines of symmetry in 2-D shapes presented in different orientations.</p>	<p>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.</p>	
<p>Complete a simple symmetric figure with respect to a specific line of symmetry.</p>		



Geometry: position and direction

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Describe positions on a 2-D grid as coordinates in the first quadrant.</p>	<p>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.</p>	<p>Link to Geography: <i>use the eight points of a compass, four and six-figure grid references, symbols and key (including the use of Ordnance Survey maps) to build their knowledge of the United Kingdom and the wider world</i></p> <p>Link to Computing: <i>Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.</i> <i>Use sequence, selection, and repetition in programs; work with variables and various forms of input and output</i> <i>Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</i></p>
<p>Describe movements between positions as translations of a given unit to the left/right and up/down.</p>		
<p>Plot specified points and draw sides to complete a given polygon.</p>		



Statistics

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.</p>	<p>Pupils understand and use a greater range of scales in their representations.</p>	<p>Link to Geography: <i>use fieldwork to observe, measure, record and present the human and physical features in the local area using a range of methods, including sketch maps, plans and graphs, and digital technologies.</i></p>
<p>Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.</p>	<p>Pupils begin to relate the graphical representation of data to recording change over time.</p>	<p>Link to Computing: <i>select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information.</i></p> <p>Link to Computing: <i>select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information.</i></p>



Mathematics year 5

Number: number and place value

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit.</p>	<p>Pupils identify the place value in large whole numbers. They continue to use number in context, including measurement. Pupils extend and apply their understanding of the number system to the decimal numbers and fractions that they have met so far. They should recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule.</p> <p>They should recognise and describe linear number sequences (for example, 3, 3, 4, 4 ...), including those involving fractions and decimals, and find the term-to-term rule in words (for example, add). 2 1 2 1 2 1</p>	<p>Link to Science (Working Scientifically): <i>taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</i></p> <p>Note: <i>This will build on the Roman Numeral Objective in Year 3 and depending on what you choose to do in History could be linked with this.</i></p>
<p>Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000.</p>		
<p>Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero.</p>		
<p>Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000.</p>		
<p>Solve number problems and practical problems that involve all of the above.</p>		
<p>Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.</p>		



Number: addition and subtraction

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).</p>	<p>Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency (see Mathematics Appendix 1).</p> <p>They practise mental calculations with increasingly large numbers to aid fluency (for example, $12\,462 - 2300 = 10\,162$).</p>	<p>Note: <i>Solving problems can be linked across the Curriculum and can be subject specific. For example, children could be presented with what seems to be a DT based project but would require using addition and subtraction in order to make their product.</i></p>
<p>Add and subtract numbers mentally with increasingly large numbers.</p>		
<p>Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.</p>		
<p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</p>		



Number: multiplication and division

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.	Pupils practise and extend their use of the formal written methods of short multiplication and short division (see Mathematics Appendix 1). They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.	
Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.	They use and understand the terms factor, multiple and prime, square and cube numbers.	
Establish whether a number up to 100 is prime and recall prime numbers up to 19.	Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (for example, $98 \div 4 = 24 \text{ r } 2 = 24 = 24.5 \approx 25$).	
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.	$4 \begin{array}{r} 98 \\ \times 2 \\ \hline 196 \end{array}$ Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example,	
Multiply and divide numbers mentally drawing upon known facts.	by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres.	
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.	Distributivity can be expressed as $a(b + c) = ab + ac$. They understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements (for example, $4 \times 35 = 2 \times 2 \times 35$; $3 \times 270 = 3 \times 3 \times 9 \times 10 = 9^2 \times 10$).	
Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.	Pupils use and explain the equals sign to indicate equivalence, including in missing number problems (for example, $13 + 24 = 12 + 25$; $33 = 5 \times ?$)	
Recognise and use square numbers and cube numbers, and the notation for squared and cubed.		
Solve problems involving multiplication and division including		<p>Link to Mathematics (Measurement) with specific focus on area and volume: <i>calculate and compare the area of rectangles</i></p>



<p>using their knowledge of factors and multiples, squares and cubes.</p>		
<p>Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.</p>		<p><i>(including squares), and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water]</i></p>
<p>Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.</p>		<p>Link to Mathematics (Measurement): <i>use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.</i></p>



Number: fractions (Including Decimals and Percentages)

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Compare and order fractions whose denominators are all multiples of the same number.	Pupils should be taught throughout that percentages, decimals and fractions are different ways of expressing proportions.	
Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.	They extend their knowledge of fractions to thousandths and connect to decimals and measures.	
Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number.	Pupils connect equivalent fractions > 1 that simplify to integers with division and other fractions > 1 to division with remainders, using the number line and other models, and hence move from these to improper and mixed fractions.	
Add and subtract fractions with the same denominator and denominators that are multiples of the same number.	Pupils connect multiplication by a fraction to using fractions as operators (fractions of), and to division, building on work from previous years. This relates to scaling by simple fractions, including fractions > 1 .	
Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.	Pupils practise adding and subtracting fractions to become fluent through a variety of increasingly complex problems. They extend their understanding of adding and subtracting fractions to calculations that exceed 1 as a mixed number.	
Read and write decimal numbers as fractions.	Pupils continue to practise counting forwards and backwards in simple fractions.	
Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.	Pupils continue to develop their understanding of fractions as numbers, measures and operators by finding fractions of numbers and quantities.	
Round decimals with two decimal places to the nearest whole number and to one decimal place.	Pupils extend counting from year 4, using decimals and fractions including bridging zero, for example on a number line.	
Read, write, order and compare numbers with up to three decimal	Pupils say, read and write decimal fractions and related tenths, hundredths and thousandths accurately and are confident in checking the reasonableness of their	



places.	answers to problems. They mentally add and subtract tenths, and one-digit whole numbers and tenths.	
Solve problems involving number up to three decimal places.	They practise adding and subtracting decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 (for example, $0.83 + 0.17 = 1$).	
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.	Pupils should go beyond the measurement and money models of decimals, for example, by solving puzzles involving decimals. Pupils should make connections between percentages, fractions and decimals (for example, 100% represents a whole quantity and 1% is one hundredth, 50% is a fifty hundredths, 25% is twenty five hundredths) and relate this to finding 'fractions of'.	
Solve problems which require knowing percentage and decimal equivalents of a half, a quarter, one fifth, two fifths and 4 fifths, and those fractions with a denominator of a multiple of 10 or 25.		



Measurement

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre).</p>	<p>Pupils use their knowledge of place value and multiplication and division to convert between standard units.</p> <p>Pupils calculate the perimeter of rectangles and related composite shapes, including using the relations of perimeter or area to find unknown lengths. Missing measures questions such as these can be expressed algebraically, for example $4 + 2b = 20$ for a rectangle of sides 2 cm and b cm and perimeter of 20cm.</p> <p>Pupils calculate the area from scale drawings using given measurements.</p> <p>Pupils use all four operations in problems involving time and money, including conversions (for example, days to weeks, expressing the answer as weeks and days).</p>	<p>Link to Science (Working Scientifically): <i>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision</i></p> <p>Link to Design Technology (Making): <i>A project could be based upon designing a product that requires specific measurements and a need to convert those to ensure the product meets the requirements.</i></p> <p>Link to the understanding of objectives within Mathematics (Multiplication and Division): <i>recognise and use square numbers and cube numbers, and the notation for squared and cubed.</i></p> <p>Link to Science (Earth and Space) Link to Design and Technology within the making of products.</p>
<p>Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.</p>		
<p>Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.</p>		
<p>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.</p>		
<p>Estimate volume [for example, using 1 cm³ blocks to build cuboids (including cubes)] and capacity [for example, using water].</p>		
<p>Solve problems involving converting between units of time.</p>		
<p>Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.</p>		



Geometry: properties of shapes

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Identify 3-D shapes, including cubes and other cuboids, from 2-D representations.	<p>Pupils become accurate in drawing lines with a ruler to the nearest millimetre, and measuring with a protractor. They use conventional markings for parallel lines and right angles.</p> <p>Pupils use the term diagonal and make conjectures about the angles formed between sides, and between diagonals and parallel sides, and other properties of quadrilaterals, for example using dynamic geometry ICT tools.</p> <p>Pupils use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems.</p>	<p>Link to Design Technology (Making) in direct correlation with the assembling of nets.</p> <p>Link to Computing:</p> <p><i>use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</i></p> <p><i>use sequence, selection, and repetition in programs; work with variables and various forms of input and output</i></p> <p><i>design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</i></p>
Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles.		
Draw given angles, and measure them in degrees ($^{\circ}$).		
Identify: angles at a point and one whole turn (total 360°), angles at a point on a straight line and half a turn (total 180°) other multiples of 90° .		
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.		



Geometry: position and direction

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>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.</p>	<p>Pupils recognise and use reflection and translation in a variety of diagrams, including continuing to use a 2-D grid and coordinates in the first quadrant. Reflection should be in lines that are parallel to the axes.</p>	<p>Link to Computing: <i>use sequence, selection, and repetition in programs; work with variables and various forms of input and output</i> <i>use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</i></p> <p>Link to Geography: <i>use the eight points of a compass, four and six-figure grid references, symbols and key (including the use of Ordnance Survey maps) to build their knowledge of the United Kingdom and the wider world</i></p>



Statistics

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Solve comparison, sum and difference problems using information presented in a line graph.</p>	<p>Pupils connect their work on coordinates and scales to their interpretation of time graphs. They begin to decide which representations of data are most appropriate and why.</p>	<p>Link to Computing: <i>select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information.</i></p> <p>Link to Science: <i>observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</i></p> <p>Link to Science: <i>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary using test results to make predictions to set up further comparative and fair tests recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations</i></p>
<p>Complete, read and interpret information in tables, including timetables.</p>		



Mathematics Year 6

Number: number, place value

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit.	Pupils should use the whole number system, including saying, reading and writing numbers accurately.	
Round any whole number to a required degree of accuracy.		
Use negative numbers in context, and calculate intervals across zero.		
Solve number problems and practical problems that involve all of the above.		



Number: addition, subtraction, multiplication and division

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the efficient written method of long multiplication.</p>	<p>Pupils should practice addition, subtraction, multiplication and division for larger numbers, using the efficient written methods of columnar addition and subtraction, short and long multiplication, and short and long division.</p> <p>They should undertake mental calculations with increasingly large numbers and more complex calculations.</p> <p>Pupils should continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.</p> <p>Pupils should round answers to a specified degree of accuracy.</p> <p>Pupils explore the order of operations using brackets; for example, $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$.</p> <p>Common factors can be related to finding equivalent fractions.</p>	
<p>Divide numbers up to 4 digits by a two-digit whole number using the efficient written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.</p> <p>Divide numbers up to 4 digits by a two digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.</p>		
<p>Perform mental calculations, including with mixed operations and large numbers.</p>		
<p>Identify common factors, common multiples and prime numbers.</p>		
<p>Use their knowledge of the order of operations to carry out calculations involving the four operations.</p>		
<p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and</p>		



methods to use and why.		
Solve problems involving addition, subtraction, multiplication and division.		
Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.		



Number: fractions (including decimals and percentages)

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.</p> <p>Compare and order fractions, including fractions >1.</p>	<p>Pupils should practise, use and understand the addition and subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator. They should start with fractions where the denominator of one fraction is a multiple of the other and progress to varied and increasingly complex problems.</p> <p>Pupils should use a variety of images to support their understanding of multiplication with fractions. This follows earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, for example as parts of a rectangle.</p>	
<p>Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.</p> <p>Multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$).</p> <p>Divide proper fractions by whole numbers.</p> <p>Associate a fraction with division and calculate decimal fraction equivalents (for example, 0.375) for a simple fraction $\frac{3}{8}$).</p> <p>Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10,100 and 1000 giving answers up to three decimal places.</p>	<p>Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example, if $\frac{1}{4}$ of a length is 36cm, then the whole length is $36 \times 4 = 144\text{cm}$).</p> <p>They practise calculations with simple fractions and decimal fraction equivalents to aid fluency, including listing equivalent fractions to identify fractions with common denominators.</p> <p>Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction (for example, $3 \div 8 = 0.375$). For simple fractions with recurring decimal equivalents, pupils learn about rounding the decimal to three decimal places, or other appropriate approximations depending on the context.</p> <p>Pupils multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers. Pupils multiply decimals by whole numbers,</p>	



<p>Multiply one-digit numbers with up to two decimal places by whole numbers.</p>	<p>starting with the simplest cases, such as $0.4 \times 2 = 0.8$, and in practical contexts, such as measures and money.</p>	
<p>Use written division methods in cases where the answer has up to two decimal places.</p>	<p>Pupils are introduced to the division of decimal numbers by one-digit whole number, initially, in practical contexts involving measures and money. They recognise division calculations as the inverse of multiplication.</p>	
<p>Solve problems which require answers to be rounded to specified degrees of accuracy.</p>	<p>Pupils also develop their skills of rounding and estimating as a means of predicting and checking the order of magnitude of their answers to decimal calculations. This includes rounding answers to a specified degree of accuracy and checking the reasonableness of their answers.</p>	
<p>Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.</p>		



Ratio and proportion

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
<p>Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.</p>	<p>Pupils recognise proportionality in contexts when the relations between quantities are in the same ratio (for example, similar shapes and recipes). Pupils link percentages or 360° to calculating angles of pie charts.</p>	
<p>Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison.</p>	<p>Pupils should consolidate their understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems. They might use the notation $a:b$ to record their work.</p>	
<p>Solve problems involving similar shapes where the scale factor is known or can be found.</p>	<p>Pupils solve problems involving unequal quantities, for example, 'for every egg you need three spoonfuls of flour', 'of the class are boys'. These problems are the foundation for later formal approaches to ratio and proportion.</p>	
<p>Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.</p>	<p>5 3</p>	



Algebra

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Use simple formulae.	Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: <ul style="list-style-type: none"> missing numbers, lengths, coordinates and angles formulae in mathematics and science arithmetical rules (e.g. $a + b = b + a$) generalisations of number patterns number puzzles (e.g. what two numbers can add up to). 	
Express missing number problems algebraically.		
Generate and describe linear number sequences.		
Find pairs of numbers that satisfy number sentences involving two unknowns.		
Enumerate possibilities of combinations of two variables.		



Measurement

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Solve problems involving the calculation and conversion of units of measure, using decimal notation to three decimal places where appropriate.	Using the number line, pupils should use, add and subtract positive and negative integers for measures such as temperature.	This could be linked to Physical Education sessions and cooking and nutrition units of work
Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to three decimal places.	They should know approximate conversions and be able to tell if an answer is sensible.	
Convert between miles and kilometres.	They should relate the area of rectangles to parallelograms and triangles, and be able to calculate their areas, understanding and using the formula to do this.	
Recognise that shapes with the same areas can have different perimeters and vice versa.	Pupils could be introduced to other compound units for speed, such as miles per hour, and apply their knowledge in science or other subjects as appropriate.	
Calculate the area of parallelograms and triangles.		
Recognise when it is necessary to use the formulae for area and volume of shapes.		
Calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3) and extending to other units, such as mm^3 and km^3 .		



Geometry: properties of shapes

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Draw 2-D shapes using given dimensions and angles.	Pupils should draw shapes and nets accurately, using measuring tools and conventional markings and labels for lines and angles.	Link to Design Technology: <i>select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately</i>
Recognise, describe and build simple 3-D shapes, including making nets.	Pupils describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements.	
Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.	These relationships might be expressed algebraically for example, $d=2 \times r$, $a= 180 - (b +c)$	
Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.		
Recognize angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.		



Geometry: position and direction

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Describe positions on the full coordinate grid (all four quadrants).	Pupils draw and label a pair of axes in all four quadrants with equal scaling. This extends their knowledge of one quadrant to all four quadrants, including the use of negative numbers.	Link to Computing: <i>use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</i> <i>design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</i>
Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.	Pupils draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates using the properties of shapes. These might be expressed algebraically for example, translating vertex (a, b) to $(a - 2, b + 3)$; (a, b) and $(a + d, b + d)$ being opposite vertices of a square of side d .	

Statistics

Statutory Objectives	Non Statutory Examples/Advice	Links and Notes
Interpret and construct pie charts and line graphs and use these to solve problems.	Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts.	Link to Computing: <i>select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information.</i>
Calculate and interpret the mean as an average.	Pupils both encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects. They should connect conversion from kilometres to miles in measurement to its graphical representation. Pupils know when it is appropriate to find the mean of a data set.	

