Welton St Mary's Church of England Primary Academy

Mathematics Curriculum

‘*Mathematics is the language with which God wrote the universe’*- Galileo

Maths Intent

Mathematics is a journey and the foundation for helping us understand and change the world. We want all pupils to experience the beauty, power and enjoyment of mathematics and develop a sense of curiosity about the subject with a clear understanding. We want our children to know the purpose behind their learning and apply their knowledge to their everyday lives. This is achieved through providing a **safe, inspiring and creative learning environment for each person** to explore, clarify, practice and apply their leaning over time. We want them **to flourish** and become ‘deep thinkers’ acquiring maths skills that can be recalled quickly and transferred and applied in different contexts. We foster a positive can do attitude and **through challenge, support and care, we strive for excellence** promoting the fact that ‘We can all do maths!’ We believe all children can achieve **their full potential** in mathematics, and teach for secure and deep understanding of mathematical concepts through small manageable steps. We use mistakes and misconceptions as an essential part of learning and provide **challenge** through rich and sophisticated problems.

We aim for all pupils to:

- become fluent in the fundamentals of mathematics so that they develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- be able to solve problems by applying their mathematics to a variety of problems with increasing sophistication, including in unfamiliar contexts and to model real-life scenarios
- reason mathematically by following a line of enquiry and develop and present a justification, argument or proof using mathematical language.
- have an appreciation of number and number operations, which enables

Maths Overview

	Autumn term 1	Autumn term 2	Spring term 1	Spring term 2	Summer term 1	Summer term 2
Reception	**Number** Number & Place Value **Number** Addition & Subtraction	**Number** Addition & Subtraction **Measurement** Time	**Number** Number & Place Value **Number** Addition & Subtraction	**Number** Addition & Subtraction **Geometry** Properties of shape.	**Geometry** Properties of shape. **Number** Number & Place Value **Number** Addition & Subtraction	**Number** Multiplication & Division **Measurement** Length, height, distance, weight, volume & capacity
Year 1	**Number** Numbers to 10 **Number** The Part-whole within 10	**Number** Number & Place Value. **Number** Addition & Subtraction **Geometry** Properties of shape.	**Number** Number & Place Value. **Number** Addition & Subtraction	**Measurement** Length Height Weight Volume	**Number** Multiplication & Division. **Number** Fractions. **Number** Number & Place Value.	**Geometry** Position & Direction **Number** Number & Place Value **Measurement** Time Money
Year 2	**Number** Number & Place Value' **Number** Addition & Subtraction	**Mesurement** Money **Number** Multiplication & Division	**Number** Multiplication & Division **Statistics** **Measurement** Length Height	**Geometry** Position & Direction **Number** Fractions	**Geometry** Position & Direction **Number** Problem Solving Addition & Subtraction	**Measurement** Time Weight Volume Temperature.
Year 3	**Number** Number & Place Value **Number** Addition & Subtraction	**Number** Addition & Subtraction **Number** Multiplication & Division	**Number** Multiplication & Division **Mesurement** Money **Statistics**	**Measurement** Length **Number** Fractions.	**Number** Fractions. **Measurement** Time	**Geometry** Properties of shape **Measurement** Mass Capacity
Year 4	**Number** Number & Place Value **Number** Addition & Subtraction	**Number** Addition & Subtraction **Measurement** Perimeter **Number** Multiplication & Division	**Number** Multiplication & Division **Measurement** Area **Number** Fractions	**Number** Fractions Decimals	**Number** Decimals **Mesurement** Money Time	**Statistics** **Geometry** Properties of shape **Geometry** Position & Direction
Year 5	**Number** Number & Place Value' **Number** Addition & Subtraction	**Statistics** **Number** Multiplication & Division **Measurement** Perimeter Area	**Number** Multiplication & Division **Number** Fractions	**Number** Fractions Decimals Percentages	**Number** Decimals **Geometry** Properties of shape	**Geometry** Position & Direction **Measurement** Converting units Volume Capacity
Year 6	**Number** Number & Place Value' **Number** Addition & Subtraction **Number** Multiplication & Division	**Number** Fractions **Geometry** Position & Direction	**Number** Fractions Decimals Percentages **Algebra**	**Measurement** Perimeter Area Volume Imperial & metric units **Ratio & Proportion**	**Geometry** Properties of shape **Number** Problem solving **Statistics**	

Core Concepts

CONCEPT – Fluency / Arithmetic

- To develop number sense and be able to choose the most appropriate method for the task at hand
- To apply a skill to multiple contexts.
- To be able to recall and apply knowledge rapidly and accurately

CONCEPT - Reasoning

- to develop mathematically and think critically.
- To follow a line of enquiry and gather information
- To interpret information to solve problems, conjecture relationships and generalisations.
- To make an informed decision based on what is known and develop an argument, justification or proof
- To communicate ideas effectively using mathematical language

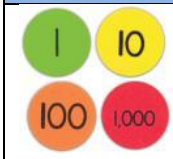
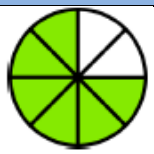
CONCEPT –Problem solving

- To apply mathematics to a variety of routine and non-routine problems with increasing sophistication.
- To identify key vocabulary to help indicate a mathematical operation.
- To break down problems into a series of simpler steps and persevering in seeking solutions.
- To decide on the correct method or procedure to solve problem

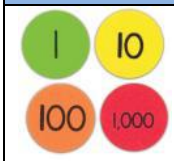
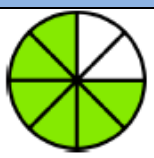
CONCEPT – Investigate

- To explore a mathematical situation /problem which is open ended.

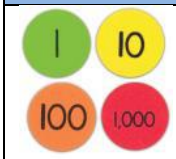
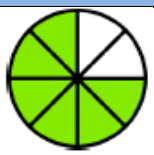
Coverage

RECEPTION							
Number and Place value	Addition and subtraction	Multiplication and division	Fractions	Measurement	Properties of Shape	Position and Direction	Statistics
							
Children count reliably with numbers from 1 to 2 Counting to 4 20, place them in order. Using quantities and objects, they add and subtract 2 single-digit numbers and count on or back to find the answer. Children explore characteristics of everyday objects.	Children explore characteristics of everyday objects. Say which number is one more or one less than a given number Using quantities and objects, they add and subtract 2 single-digit numbers and count on or back to find the answer.	They solve problems, including doubling, halving and sharing.		Children use everyday language to talk about time to solve problems. Children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems.	Children explore characteristics of everyday objects and shapes and use mathematical language to describe them Children recognise, create and describe 2 Exploring more patterns..		

YEAR ONE

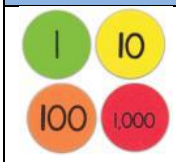
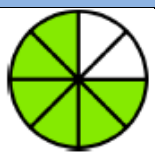
Number and Place value	Addition and subtraction	Multiplication and division	Fractions	Measurement	Properties of Shape	Position and Direction	Statistics
							
Identify and represent numbers using concrete objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens Read and write numbers from 1 to 20 in numerals and words Given a number, identify one more and one less Recognise the place value of each digit in a two-digit number (tens, ones) (year 2) Compare and order numbers from 0 up to 100; use <, > and = signs (year 2)	Represent and use number bonds and related subtraction facts within 20 Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = _ – 9. Add and subtract one-digit and two-digit numbers to 20, including zero Represent and use number bonds and related subtraction facts within 20 (Year 2) Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100	Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s 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 Non-statutory guidance: 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	Recognise, find and name a half as one of two equal parts of an object, shape or quantity Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity	Compare, describe and solve practical problems for: lengths and heights, mass/ weight, capacity and volume Measure and begin to record the following: lengths,heights, mass/weight, capacity and volume Sequence events in chronological order using language [for example, before and afer, next, first, today, Recognise and use language relating to dates, including days of the week, weeks, months and years Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times. Measure and begin to record the following: time (hours, minutes,seconds) Compare, describe and solve practical problems for time [for example, quicker, slower, earlier, later] Recognise and know the value of different denominations of coins and notes	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]. Recognise and create repeating patterns with objects and with shapes.	Describe position, direction and movement, including whole, half, quarter and three-quarter turns. Non-statutory guidance: Pupils use the language of position, direction and motion, including: le. 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.	

YEAR TWO

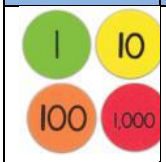
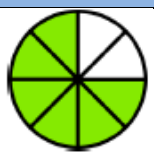
Number and Place value	Addition and subtraction	Multiplication and division	Fractions	Measurement	Properties of Shape	Position and Direction	Statistics
							
Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5sand 10s Identify, represent and Estimate numbers using different representations, including the number line Recognise the place value of each digit in a 2-digit number (10s, 1s) Compare and order numbers from 0 up to 100; use <, > and = signs Count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and Backward Use place value and number facts to solve problems	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot Solve problems with addition And subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures, and mentally, including: a 2-digit number and 1s and a 2-digit number and 10s, including: two 2-digit numbers Solve problems with addition and subtraction: applying their increasing knowledge of mental and written methods Use place value and number facts to solve problems	Solve one-step problems involving multiplication and division by calculating the answer using concrete objects, pictorial representations and arrays Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers	Recognise, find and name a half as one of two equal parts and a quarter as one of four equal parts of an object, shape or quantity Recognise, find, name and write fractions $\frac{1}{3}, \frac{1}{4}, \frac{2}{4}$ or $\frac{3}{4}$ of a length, shape, set of objects or quantity Write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$ Non-statutory guidelines: Pupils should count in fractions up to 10, starting from any number	Recognise & use signs for pounds (£) & pence (p); combine amounts to make a particular value Find different combinations of coins that equal the same amounts of money Solve simple problems in a practical context involving addition & subtraction of money of the same unit, including giving change 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 Compare & order lengths, mass, volume/ capacity and record the results using >, < and = Tell and write the time to five minutes,including quarter past/to the hour & draw the hands on a clock face to show these times	Compare and sort common 2D and 3D shapes and everyday objects Identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line Identify and describe the properties of 3D shapes, including the number of edges, vertices and faces	Order and arrange combinations of mathematical objects in patterns and sequences 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)	Interpret and construct simple pictograms, tally charts, block diagrams and simple tables Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity Ask and answer questions about totalling and comparing categorical data

				Know the number of minutes in an hour & the number of hours in a day Compare & sequence intervals of time			

YEAR THREE

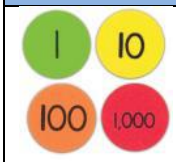
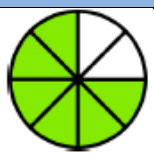
Number and Place value	Addition and subtraction	Multiplication and division	Fractions	Measurement	Properties of Shape	Position and Direction	Statistics
							
Recognise the place value of each digit in a three digit number (hundreds, tens, ones) Read and write numbers up to 1,000 in numerals and in words Identify, represent and Estimate numbers using different representations Compare and order numbers up to 1,000 Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number Solve number problems and practical problems involving these ideas	Add and subtract numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction Estimate the answer to a calculation and use inverse operations to check answers	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 Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables 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 Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators 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 Compare and order unit fractions, and fractions with the same denominators Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators Recognise and show, using diagrams, equivalent fractions with small denominators Add and subtract fractions with the same denominator within one whole (for example, $\frac{5}{7}+\frac{1}{7}=\frac{6}{7}$) Solve problems that involve all of the above	Add and subtract amounts of money to give change, using both £ and p in practical contexts Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) Measure the perimeter of simple 2-d shapes Know the number of seconds in a minute and the number of days in each month, year and leap year 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, am/pm, morning, afternoon, noon and midnight Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks Compare durations of events (for example to calculate the time taken by particular events or tasks)	Recognise angles as a property of shape or a description of a turn Identify right angles, recognise that two right angles make a halfturn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle Draw 2D shapes and make 3D shapes using modelling materials; recognise 3D shapes in different orientations and describe them Identify horizontal and vertical lines and pairs of perpendicular and parallel lines		Interpret and present data using bar charts, pictograms and tables 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

YEAR FOUR

Number and Place value	Addition and subtraction	Multiplication and division	Fractions	Measurement	Properties of Shape	Position and Direction	Statistics
							
Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) Round any number to the nearest 10, 100 or 1,000 Count in multiples of 6, 7, 9, 25 and 1,000 Identify, represent and estimate numbers using different representations Order and compare numbers beyond 1,000 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 Find 1,000 more or less than a given number Solve number and practical problems that involve all of the above and with increasingly large positive numbers Count backwards	Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate Solve number and practical problems that involve all of the above and with increasingly large positive numbers 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	Recall multiplication & division facts for multiplication tables up to 12 × 12 Use place value, known & derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers 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 Solve problems involving addition, subtraction, Multiplication and division and a combination of these, including understanding the meaning of the equals sign Multiply two-digit and three-digit numbers by a one-digit number using formal written layout Recognise and use factor pairs & commutativity in mental calculations Use place value, known & derived facts to multiply and divide	Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten Recognise and show, using diagrams, families of common equivalent fractions 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 Solve simple measure and money problems Involving fractions and decimals to two decimal places 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 Recognise and write decimal equivalents of	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 differentmeasures, including money in pounds and Pence Solve simple measure and money problems involving fractions and decimals to two decimal places	Identify acute and obtuse angles and compare and order angles up to two right angles by size Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes Identify lines of symmetry in 2D shapes presented in different orientations Complete a simple symmetric figure with respect to a specific line of symmetry	Describe positions on a 2D grid as coordinates in the first quadrant Plot specified points and draw sides to complete a given polygon Describe movements between positions as translations of a given unit to the left/right and up/down	Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

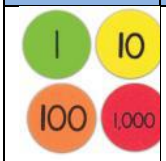
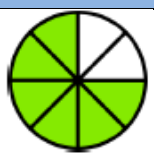
through zero to include negative numbers Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero		mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers	any number of tenths or hundredths Compare numbers with the same number of decimal places up to two decimal places Round decimals with one decimal place to the nearest whole number Recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{3}{4}$				

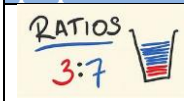
YEAR FIVE

Number and Place value	Addition and subtraction	Multiplication and division	Fractions	Measurement	Properties of Shape	Position and Direction	Statistics
							
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 Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000 Read roman numerals to 1,000 (m) and recognize years written in roman numerals Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero Solve number problems and practical problems that involve all of the above Read, write,order and compare numbers with up to three decimal places Round decimals with two decimal	Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy Add and subtract numbers mentally with increasingly large numbers Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why Estimate and use inverse perations to check answers to a calculation	Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes 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 Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates Multiply and divide whole numbers and those involving	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 formto the other and write mathematical statements > 1 as a mixed number [for example $\frac{2}{5}+\frac{4}{5}=\frac{6}{5}=1\frac{1}{5}$) Compare and order fractions whose denominators are all multiples of the same 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, write,order and compare numbers with up to three decimal places Read and write decimal numbers as fractions [for example, $\frac{71}{100}$ Recognise and use thousandths and relate them to tenths, hundredths and Decimal equivalents Recognise the per cent symbol (%) and understand that per cent relates to	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 (cm^2) and square metres (m^2) and estimate the area of irregular shapes Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using, including scaling Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints	Identify: angles at a point and one whole turn (total 360°) angles at a point on a straight line and <stacked fraction> ½ a turn (total 180°) –other multiples of 90° Use the properties of rectangles to deduce related facts and find missing lengths and angles Draw given angles, and measure them in degrees (o) Distinguish between regular and irregular polygons based on reasoning about equal sides and angles Identify 3D shapes, including cubes and other cuboids, from 2D representations	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	Complete, read and interpret information in tables, including timetables Solve comparison, sum and difference problems using information presented in a line graph

places to the nearest whole number and to one decimal place Solve problems involving number up to three decimal places		decimals by 10, 100 and 1,000 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	'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 of $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{2}{5}, \frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25 Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths Solve problems involving number up to three decimal places	Solve problems involving converting between units of time Estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water]			

YEAR SIX

Number and Place value	Addition and subtraction	Multiplication and division	Fractions	Measurement	Properties of Shape	Position and Direction	Statistics
							
Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit Round any whole number to a required degree of accuracy Use negative numbers in context, and calculate intervals across zero Solve number and practical problems that involve all of the above	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why Use their knowledge of the order of operations to carry out calculations involving the four operations Perform mental calculations, including with mixed operations and large numbers	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication 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 Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context Identify common factors, common multiples and prime numbers Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}) Use their knowledge of the order of operations to carry out	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination Compare and order fractions, including fractions > 1 Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams Multiply simple pairs of proper fractions, writing the answer in its simplest form (for example, $\frac{1}{4} x \frac{1}{2} = \frac{1}{8}$) Divide proper fractions by whole numbers (for example, $\frac{1}{3} \div 2 = \frac{1}{6}$) Use their Knowledge of the order of operations to carry out calculations involving the four operations	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 up to three decimal places Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate Convert between miles and kilometres Recognise that shapes with the same areas can have different perimeters and vice versa Recognise when it is possible to use formulae for area and volume of shapes Calculate the area of parallelograms and triangles Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units	Draw 2-D shapes using given dimensions and angles Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius Recognise, describe and build simple 3-D shapes, including making nets Identify 3-D shapes, including cubes and other cuboids, from 2-D representations	Describe positions on the full coordinate grid (all four quadrants) Draw and translate simple shapes on the coordinate plane, and reflect them in the axes	Calculate and interpret the mean as an average Interpret and construct pie charts and line graphs and use these to solve problems

	Algebra  Generate and describe linear number sequences Use simple formulae Express missing number problems algebraically Find pairs of numbers that satisfy an equation with two unknowns Enumerate possibilities of combinations of two variables	calculations involving the four operations Perform mental calculations, including with mixed operations and large numbers 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	Use written division methods in cases where the answer has up to two decimal places Associate a fraction with division and calculate decimal fraction equivalents [for example, 0375] for a simple fraction [for example, $\frac{3}{8}$) Multiply one-digit numbers with up to two decimal places by whole numbers Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison	for example, mm^3 and km^3]	**Ratio & proportion**  Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts Solve problems involving similar shapes where the scale factor is known or can be found		

Fluency / Arithmetic

	Addition	Subtraction	Multiplication	Division	Fractions	Percentages
Year One	Count forwards in ones to and across 100 from any given number. Add one digit and two digit numbers to 20 Add two digit and two digit numbers	Count backwards in ones to and across 100 from any given number. Subtract one digit and two digit numbers to 20 Subtract two digit number from a two digit number	Double a number Find lots of	Share a number into equal groups. Find groups of	Find half of a quantity. Find quarter of a quantity	
Year Two	Count forward in steps of 2,3,5 from 0 Count forward in tens from a given number Add a two-digit and one-digit number mentally up to 100 Add a two-digit and tens mentally up to 100 Add two two-digit numbers mentally up to 100 Add three one-digit number mentally up to 100	Count backwards in tens from any number Subtract a two-digit and one-digit number mentally up to 100 Subtract a two-digit number and tens mentally up to 100 Subtract two two-digit numbers mentally up to 100	Use multiplication facts for the 2, 5 and 10 multiplication tables	Use division facts for the 2, 5 and 10 multiplication tables	Find one third of a quantity. Find two quarters of a quantity. Find three quarters of a quanity.	
Year Three	Add multiples of 10 or 100 to a number up to 999 Add numbers up to three digits using formal methods of column addition.	Subtract multiples of 10 or 100 to a number up to 999 Subtract numbers up to three digits using formal methods of column subtraction.	Multiply a two-digit number by a one-digit number using mental methods and progressing to formal written methods (2,3,4,5 and 8) Multiply a whole number by 10 Multiply more than two numbers together (2,3,4,5 and 8)	Use known multiplication facts to create associated division facts. Divide one or two digit numbers by 10	Add and subtract fractions with the same denominator within one whole. Find fractions of quantities (up to 100) where the denominator is 2,3,4,5,8 or 10	
Year Four	Add multiples of 10, 100 and 1000 to a number (up to 9,999) Add numbers up to 4 digits using formal method of column addition Add decimals (up to tenths and hundredths)	Subtract multiples of 10, 100 and 1000 to a number (up to 9,999) Subtract numbers up to 4 digits using formal method of column subtraction Subtract decimals (up to tenths and hundredths	Multiply 2 and 3 digit numbers by a 1-digit number using a formal written method. Multiply a whole number by 100 Multiply more than two numbers together.	Use known multiplication facts to create associated division facts. Divide one or two digit numbers by 100 Divide multiples of 10, 100 and 1000 by a single number using associated division facts.	Add and subtract fractions where the answer may be an improper. Find fractions of quantities using known multiplication facts.	

	Addition	Subtraction	Multiplication	Division	Fractions	Percentages
Year Five	Add multiples of 10, 100, 1,000, 10,000 and 100,000 to a number (up to 999,999) Add numbers with more than four digits using formal methods of column addition. Add decimals (where two numbers have a different number of decimal places eg 14.7 + 8.65) Apply knowledge of partitioning with numbers up to 1,000,000	Subtract multiples of 10, 100, 1,000, 10,000 and 100,000 to a number (up to 999,999) Subtract numbers with more than four digits using formal methods of column subtraction. Subtract decimals (where two numbers have a different number of decimal places e.g. 14.7 - 8.65)	Multiply a 3-digit number by a 2-digit number using formal method of long multiplication. Multiply whole numbers by 10, 100 and 1000 (where the answer is no greater than 999,999) Multiply decimals by 10, 100 and 1000 where the quotient may be a decimal Recognise and use square and cube numbers Multiply multiples of 10 by 10, 100 or 1000 (e.g. 30 x 400)	Divide number up to a 4-digit number by a 1-digit number using the formal method of long division (recording with a remainder where required) Divide whole numbers by 10, 100 and 1000 (where the quotient contains a decimal and the dividend may contain a decimal)	Add fractions with the same denominators and convert the answer from improper fractions to mixed numbers. Add and subtract fractions where there are different denominator and one fractions is a multiple of the other (and one fractions may be a mixed number) Multiply proper fraction and mixed number fractions by whole numbers Find fractions of quantities using formal calculation strategies	Find 10% of a number Find a multiple of 10% of a number Find 5% of a number
Year Six	Add multiples of 10, 100, 1,000, 10,000, 100,000 and 1,000,000 to a number (up to 9, 999,999) Add and subtract negative numbers through zero Use BIDMAS to identify the correct order of operations	Subtract multiples of 10, 100, 1,000, 10,000, 100,000 and 1,000,000 to a number (up to 9, 999,999) Add and subtract negative numbers through zero Use BIDMAS to identify the correct order of operations	Multiply a 4-digit number by a 2-digit number using the formal method of multiplication. Multiply a one-digit number with up to two decimal places by whole numbers. Multiply a tenths umber by a multiple of 10 or 100 (e.g. 0.4 x 60) Multiply a number with decimals by a two digit number using the formal method of long multiplication (e.g. 5.1 x 28)	Divide numbers up to a 4 digits by a 2-digit number using the formal written method of long division (where the dividend may include a fraction) Divide number up to 4 digits by a 1-digit number using formal written method of short division (where the dividend may include a fraction)	Add and subtract fractions with different denominators (using two or three fractions) Add and subtract a mixed number to a fraction where there are different denominators. Multiply pairs of proper fractions writing the answer in its simplest form. Divide proper fractions by a whole number	Find a multiple of 5% of a number. Find 1% of a number. Find a mutliple of 1% of a number.

Knowledge Organisers

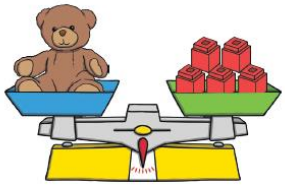
YEAR ONE- MEASURES: MASS

Weight and mass

We use different types of scales to measure mass.

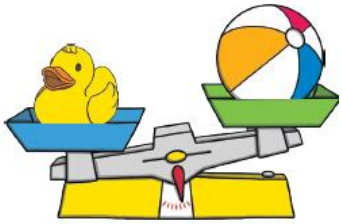
Measuring mass

The teddy **weighs** the same as 5 cubes.
They are **balanced.**



Comparing mass

The duck is **heavier** than the ball



The cherries are **lighter** than the apple.

The cube is **the same as** the cylinder.

MEASURES: VOLUME AND CAPACITY

We can use different containers to measure volume.

Capacity is the total amount of liquid a container can hold.

Volume is the amount of liquid that is in the container. This can vary.

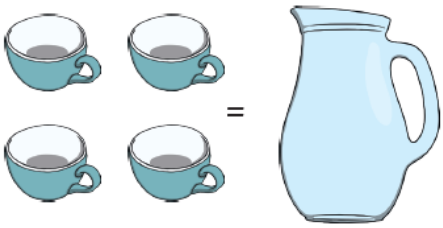
Empty and full

This glass is **full.**

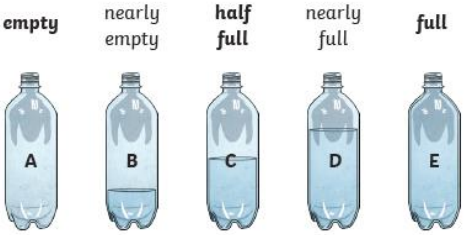
This glass is **empty.**

Measuring capacity

It takes 4 cups to fill the jug.

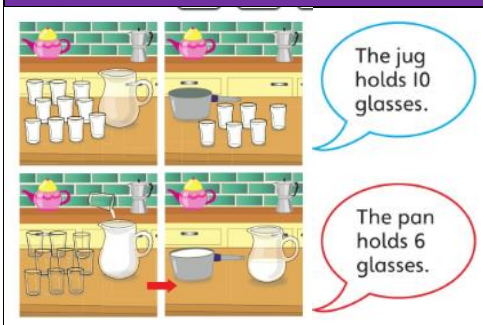


Comparing capacity



B has **more** water than A. D has **less** water than E

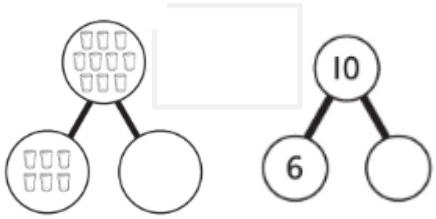
Problem Solving



How many glasses are left in the jug?

I know there are 10 in the jug when we start.
Then some were poured out.

This is a subtraction I will break the whole into two parts.



There were 10 in the jug.

6 glasses fill the .

10 – 6 = 4

There are 4 left in the jug.

Vocabulary

mass	Weight	weight	capacity	Volume
heavier	Heaviest	lighter	lightest	Balanced
full	Empty	measure	estimate	Compare

Vocabulary

YEAR TWO - FRACTIONS

Wholes and parts

The duck is the **whole.**
The beak is a **part**

The boat is the **whole.**
The sail is a **part.**

Equal parts

Equal means the same.

This cake has been cut into four **equal parts**

There are five **equal parts.**

Not equal parts

Unequal means not the same.

These pieces are **unequal.**

This shape has 3 parts but they are **unequal**

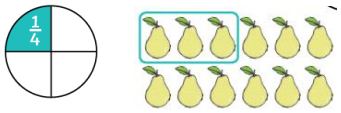
Half

A whole split into **2 equal parts**

$\frac{1}{2}$ of 8 = 4

Quarter

A whole split into **4 equal parts**



$\frac{1}{4}$ of 12 = 3

Third

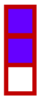
A whole split into **3 equal parts**

$\frac{1}{3}$ of 6 = 2

Recognising fractions

The top number is called the **numerator**. It represents the number of "parts" of something we have.

$$\frac{2}{3}$$

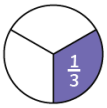


The bottom number is called the **denominator**. It represents the how many equal "parts" our whole has been split into.

In the above example,
we have split our shape into 3 pieces
and have **2 out of 3** of these pieces.

Unit fractions

A unit fraction has a **numerator** of **1.**



$$\frac{1}{3}$$

This flag has **4 equal parts.**
Each part is $\frac{1}{4}$

Non-unit fractions

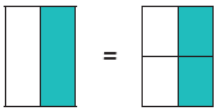
A non-unit fractions has a **numerator** that is not 1

$$\frac{2}{3}$$

This kite has **4 equal parts.**
3 parts are red = $\frac{3}{4}$

Equivalent fractions

$$\frac{1}{2} = \frac{2}{4}$$



Finding $\frac{3}{4}$

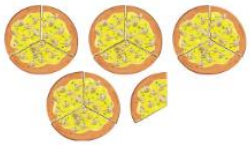
3 out of 4 of the **equal parts** have

3 out of 4 equal parts is written as $\frac{3}{4}$ or three quarters.

$\frac{3}{4}$ of the pizza has mushrooms

Wholes and parts

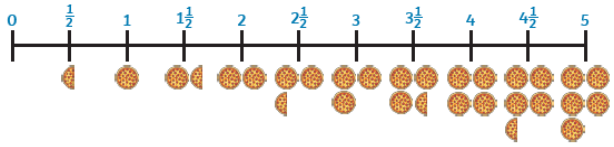
There are 3 whole chocolate bars.
There are also 3 out of 4 parts. This is $\frac{3}{4}$
In total, there are 3 and $\frac{3}{4}$ chocolate bars.



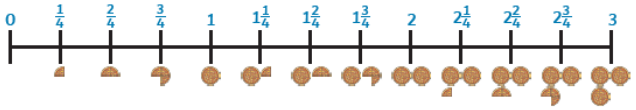
There are 4 and $\frac{1}{3}$ pizzas.
$\frac{2}{3}$ are needed to make 5 whole pizzas.

Counting in fractions

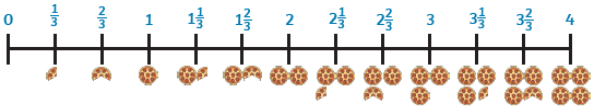
Halves



Quarters

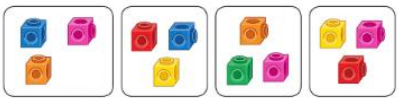


Thirds



Finding a fraction of an amount

Lucy has 12 cubes; she wants to find ¼ of them. She shares them into four groups.



$\frac{1}{4}$ of 12 = 3

Year Three - Fractions

Wholes

$\frac{3}{3}$ = 1 whole

$\frac{3}{5} + \frac{2}{5} = \frac{5}{5} = 1$

Recognising fractions

The top number is called the numerator. It represents the number of "parts" of something we have.

$\frac{2}{3}$

The bottom number is called the denominator. It represents the how many equal "parts" our whole has been split into.

In the above example, we have split our shape into 3 pieces and have 2 **out of** 3 of these pieces.

Unit and non unit fractions

A unit fraction has a numerator of **1.**

$\frac{1}{3}$

A non-unit fractions has a numerator that is not 1

$\frac{2}{3}$

Tenths

0 $\frac{1}{10}$ $\frac{2}{10}$ $\frac{3}{10}$ $\frac{4}{10}$ $\frac{5}{10}$ $\frac{6}{10}$ $\frac{7}{10}$ $\frac{8}{10}$ $\frac{9}{10}$ 1

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

Fraction on a number line

The whole number line has been split into 6 equal parts, so every step / interval is worth $\frac{1}{6}$

0 $\frac{1}{6}$ $\frac{2}{6}$ $\frac{3}{6}$ $\frac{4}{6}$ $\frac{5}{6}$ 1

Equivalent fractions

As long as we multiply or divide the numerator and denominator by the same number, our fraction will be equivalent.

$\frac{1}{3} = \frac{2}{6}$

Comparing fractions

$\frac{1}{3} < \frac{2}{3}$ (Less than)

$\frac{4}{5} > \frac{3}{5}$ (Greater than)

Unit fractions with larger **denominators** are smaller.

$\frac{1}{5} < \frac{1}{3}$

Like fractions with larger **numerators** are larger.

$\frac{3}{4} > \frac{1}{4}$

Equivalent fractions

1

$\frac{1}{2}$ $\frac{1}{2}$

$\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$

$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$

$\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{5}$

$\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$

$\frac{1}{7}$ $\frac{1}{7}$ $\frac{1}{7}$ $\frac{1}{7}$ $\frac{1}{7}$ $\frac{1}{7}$ $\frac{1}{7}$

$\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$

$\frac{1}{9}$ $\frac{1}{9}$ $\frac{1}{9}$ $\frac{1}{9}$ $\frac{1}{9}$ $\frac{1}{9}$ $\frac{1}{9}$ $\frac{1}{9}$ $\frac{1}{9}$

$\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$

$\frac{1}{11}$ $\frac{1}{11}$ $\frac{1}{11}$ $\frac{1}{11}$ $\frac{1}{11}$ $\frac{1}{11}$ $\frac{1}{11}$ $\frac{1}{11}$ $\frac{1}{11}$ $\frac{1}{11}$ $\frac{1}{11}$

$\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$ $\frac{1}{12}$

$\frac{1}{2}$ is equal to...

$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12}$

$\frac{1}{4}$ is equal to...

$\frac{1}{4} = \frac{2}{8} = \frac{3}{12} = \frac{4}{16} = \frac{5}{20}$

Adding & subtracting

$\frac{2}{5} + \frac{1}{5} = \frac{3}{5}$

$\frac{3}{7} + \frac{2}{7} = \frac{5}{7}$

$\frac{5}{6} - \frac{2}{6} = \frac{3}{6}$

Mixed Number

Mixed numbers are when there are **wholes** and **fractions**.

$2\frac{3}{4}$

Fractions of an amount

When finding fractions of amounts, remember the denominator is how many equal parts something has been split into and the numerator is how many parts you have.

$\frac{1}{6}$ of 24 = 24 ÷ 6 = 4

24

4

$\frac{5}{6}$ of 24 = 4 x 5 = 20

24

20

$\frac{1}{4}$ of 24 = 6

$\frac{1}{3}$ of 72 = 24

$\frac{2}{5}$ of 40 = 16

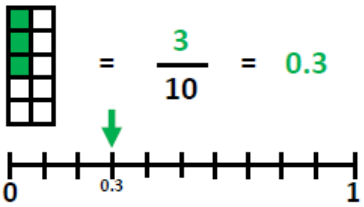
Vocabulary

numerator	denominator	unit fraction	non-unit fraction	equivalent	halves	thirds	quarters
fifths	sixths	Eighths	tenths	mixed number	whole	interval	parts

Year Four - Decimals

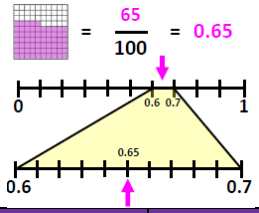
Tenths

Tenths are the next column down after the ones. Ten tenths = 1 one.

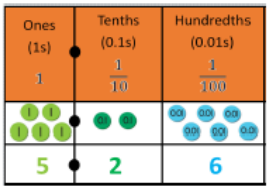


Hundredths

Hundredths are the next column down after the tenths. Ten hundredths = 1 tenth. One hundred hundredths = 1 one.

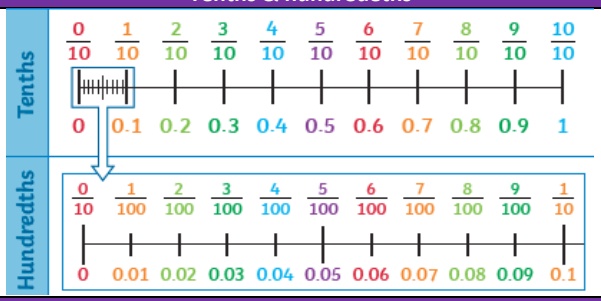


Decimal place value



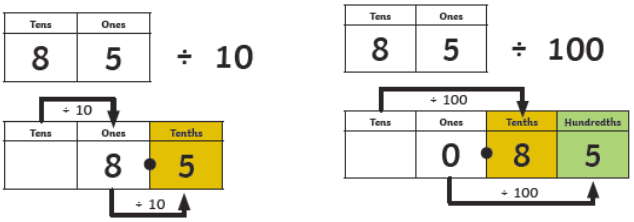
5.26 = 5 + 0.2 + 0.06

Tenths & hundredeths

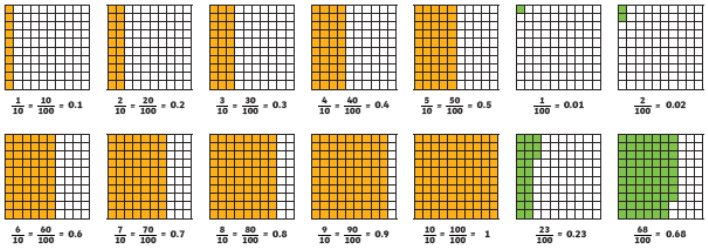


Dividing by 10 & 100

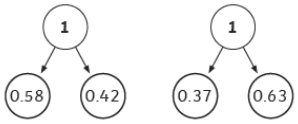
if you divide a number which does not end in 0 by 10 or 100, then the answer will be a decimal.



Tenths, hundredths and decimal equivalents

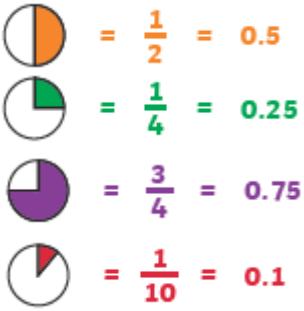


Making whole



Partitioning

Equivalent fractions & decimals

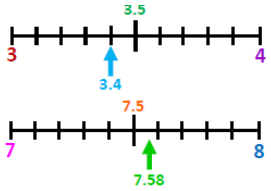


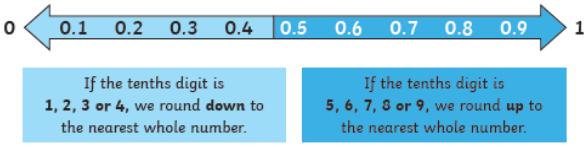
Rounding

Decimal numbers lie between whole values. 3.4 is between 3 and 4. Half way between 3 and 4 is 3.5.

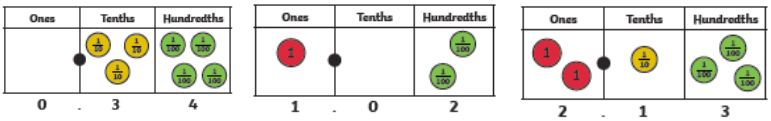
3.4 is closer to 3 than it is to 4.

7.58 is closer to 8 than it is to 7.





Comparing

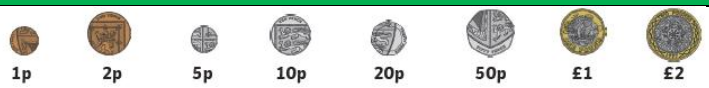


Vocabulary

tenths	hundredths	decimal
decimal point	decimal place	place value
compare	convert	equivalent
ascendin	descending	round /rounding

Money

Coins



Notes

Adding

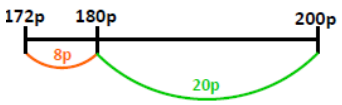
£1 and 35p + £3 and 85p = 135p + 385p

135p
+ 385p
520p

135p + 385p
= 520p
= £5 and 20p

Subtracting

£2 - £1 and 72p = 200p - 172p



200p - 172p = 28p

Multiplying & dividing

£3 x 5 = £15

50p ÷ 10 = 5p

Vocabulary

penny	pence
coin	note
pounds	Value
amount	Change
combinations	convert

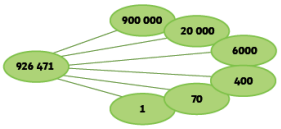
Year Five - Number & Place Value

Numbers to one million

926 471

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
9	2	6	4	7	1

nine hundred and twenty-six thousand, four hundred and seventy-one



Roman Numerals

	I – 1	II – 2	III – 3	
IV – 4	V – 5	VI – 6	VII – 7	VIII – 8
IX – 9	X – 10	XI – 11	XX – 20	XXX – 30
XL – 40	L – 50	LX – 60	LXX – 70	LXXX – 80
XC – 90	C – 100	CL – 150	CC – 200	CCC – 300
CD – 400	D – 500	DC – 600	DCC – 700	DCCC – 800
CM – 900	M – 1000	MC – 1100	MD – 1500	MM – 2000

Compare and order

Remember to start with the largest digit they have the most value.

54,353 < 60,210

If the digits are the same, move one place down to the next

542,478 < 542,502

Remember to check the column value

323,251 > 99,782

Equals

26 + 38 = 8 x 8

Greater than

23 873 > 8256

Less than

901 198 < 1 091 098

Rounding

Rounding to the nearest 10

20	21	22	23	24	25	26	27	28	29	30

round down — round up

Rounding to the nearest 1000

2000 — 2499 | 2500 — 3000

round down — round up

Rounding to the nearest 100 000

200 000 — 249 999 | 250 000 — 300,000

round down — round up

Negative Numbers

Counting in power of 10

Counting forwards (without bridging) eg. 43,534 + 1000 = 45,534

Counting backwards (no exchanging)

Eg. 745,643 – 100 = 745,543

Counting forward (bridging)

Eg. 5,593 + 10 = 5,603

Counting backwards (exchanging)

8,042,435 – 100,000 = 7,942,435

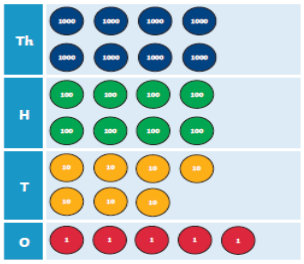
Vocabulary

million, **thousands,** hundreds, **tens,** ones, **zero,** digit, **negative number,** place value, **partition,** estimate, **round,** order, **compare,** equivalent, **greater than,** less than, **convert,** number line, **interval**, ascending, **descending,** sequence.

Addition and Subtraction

Addition

Place Value Grid: 3274 + 5601 = 8875



Written Addition

45,853
23,463 +
6

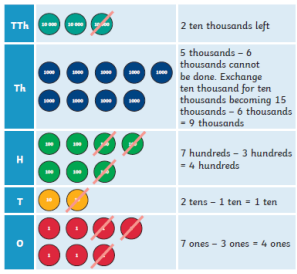
45,853
23,463 +
16

45,853
23,463 +
,316 → 9,316

45,853
23,463 +
69,316

Subtraction

Place Value Grid: 35 727 – 6313 = 29 414



Written Subtraction

80,134
33,241 –
3

80,134
33,241 –
93

80,134
33,241 –
,893 → 6,893

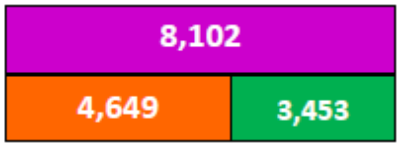
80,134
33,241 –
46,893

Inverse operations

3,453 + 4,649 = 8,102

8,102 - 4,649 = 3,453

8,102 - 3,453 = 4,649



Mental + / -

Consider if a mental strategy would be better 2,000 – 1,286 could be solved by using written subtraction. However, counting up could be quicker.

1,286 + 4 = **1,290**

1,290 + 10 = 1,300

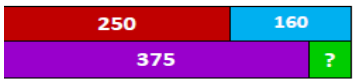
1,300 + 700 = **2,000**

2000 – 1286 = 700 + 10 + 4 = 714

Multi – step problems

Estimation & approximations

A milkman has **250 bottles of milk**. He collects **160 more** during the morning. During his shift, he **delivers 375 bottles.** **How many bottles are remaining?**



On **Monday,** Sophie ran **10km**. On **Wednesday,** she ran **13km fewer** than **Monday**. On **Friday,** she ran **17km more** than **Wednesday**. **How far did she run that week?**

30km + 17km + 24km = 71km

41 635 + 7386 = 49 021

Round to ten

41 630 + 7380 = 49 010

41 630 + 7390 = 49 020

41 640 + 7390 = 40 030

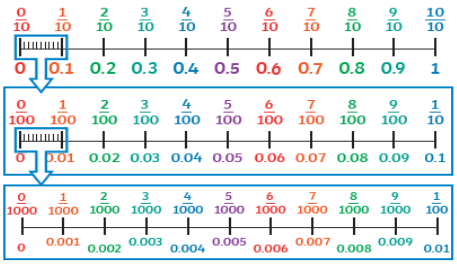
Rounding is not always accurate when both numbers are rounded up or down. **A better estimate** comes from rounding **one up** & **one down.**

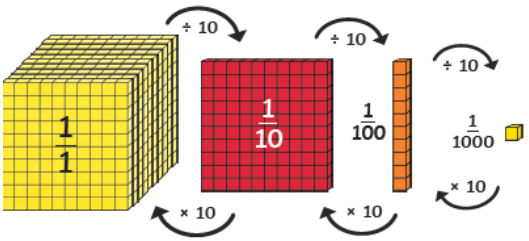
Vocabulary

Add, **total,** make, **plus,** sum, **more**, altogether, **subtract**, difference, **less**, minus**, takeaway,** column addition**, column subtraction**, estimate, **inverse** operation, **number facts**, complex, **mentally,** round, **distance chart.**

Year Five - Decimals and Percentages

Tenths, hundredths, thousandths





Decimals as fractions

$\frac{1}{10} = 0.1$ $\frac{1}{100} = 0.01$ $\frac{1}{1000} = 0.001$

$0.35 = \frac{3}{10} + \frac{5}{100} = \frac{35}{100}$

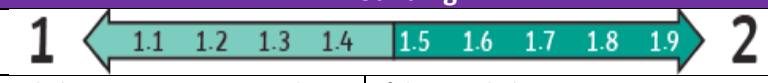
$0.741 = \frac{7}{10} + \frac{4}{100} + \frac{1}{1000} = \frac{741}{1000}$

$\frac{100}{100} = 100\%$ $\frac{1}{100} = 1\%$ $\frac{37}{100} = 37\%$

Ordering and comparing

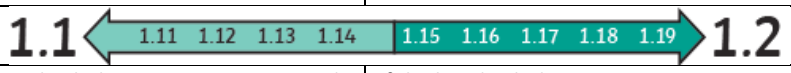
Start with the digits with the most value.	5.53 < 6.09
If the digits are the same move to the next .	7.781 > 7.769
Remember to check the column value.	3.7 > 3.302

Rounding



If the tenth digit is 1,3 or 4, we round down to th nearest whole number.

If the tength digit is 5,6,7,8 or 9 we round up to th nearest whole number.



If the hundreth digit is 1,3 or 4, we round down to th nearest tenth.

If the hundreth digit is 5,6,7,8 or 9 we round up to th nearest tenth.

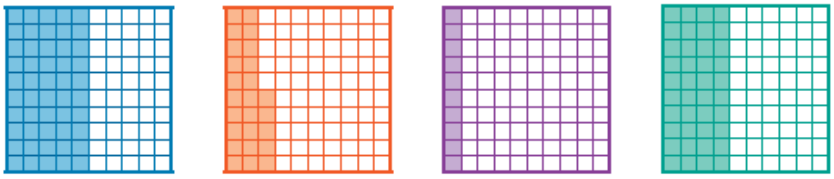
Percentage

Percent means out of 100, per 100 or /100

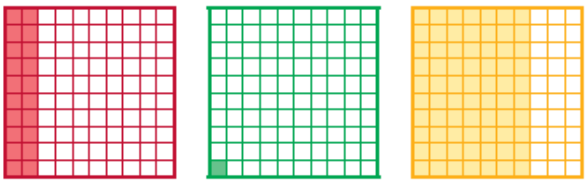
65%	17%	81%
65 out of 100	17 out of 100	81 out of 100

$\frac{65}{100}$ $\frac{17}{100}$ $\frac{81}{100}$

Percentage as fractions and decimals



$50\% = \frac{50}{100} = \frac{1}{2} = 0.5$ $25\% = \frac{25}{100} = \frac{1}{4} = 0.25$ $10\% = \frac{10}{100} = \frac{1}{10} = 0.1$ $40\% = \frac{40}{100} = \frac{2}{5} = 0.4$



$20\% = \frac{20}{100} = \frac{1}{5} = 0.2$ $1\% = \frac{1}{100} = 0.01$ $70\% = \frac{70}{100} = \frac{7}{10} = 0.7$

Adding & subtracting

0.8 + 0.001 = 0.801
1.031 – 0.23 = 0.801
0.4005 + 0.4005 = 0.801

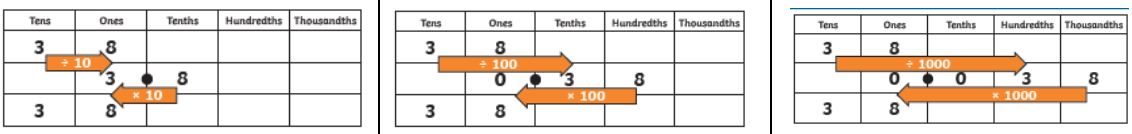
Common fraction, decimal, % equivalencies

$\frac{1}{10} = 0.1 = 10\%$	$\frac{1}{4} = 0.25 = 25\%$	$\frac{1}{5} = 0.2 = 20\%$
$\frac{1}{2} = 0.5 = 50\%$	$\frac{3}{4} = 0.75 = 75\%$	$\frac{1}{8} = 0.125 = 12.5\%$

Crossing the whole

0.82 + 0.63 = 1.45
2.531 - 0.6 = 1.93

Multiplying and diving by 10, 100 & 1000



Vocabulary

tenths	hundredths	thousandths	decimal	decimal point
decimal place	whole	place value	digits	rounding
column	fractions	per cent (%)	percentages	equivalent

Year Five - STATISTICS

Reading & understanding tables

A table to show ticket prices for a cinema. In order to understand the data presented in a table you must read the **table's title** and **headings.** Remember to always look at the heading **that each piece of information** falls under.

Ticket Type	Weekday Price	Weekend Price
Adult	£6	£7.50
Child	£4	£4.50
Student	£5.50	£6

Two-way tables

The table below shows how the number of dogs and cats owned by girls and boys.

	Boys	Girls	TOTAL
Dogs	87	44	131
Cats	38	76	114
TOTAL	125	120	245

Completing tables

Here is table showing the favourite drinks of some children.

	Boys	Girls	Total
Orange	8		18
Blackcurrant		6	
Total	15		

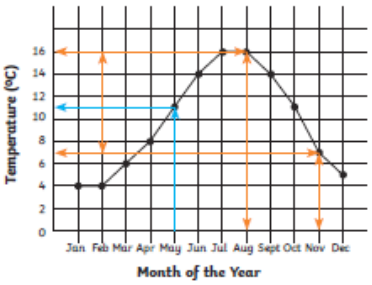
To find how many boys voted for blackcurrant, look at the total number of boys who voted and subtract the number of votes for orange.

To find how many girls voted for orange, look at the total number of votes for orange and subtract the number of votes from boys.

To find the total number of votes for blackcurrant, the total number of girls or the total number of voters, simply add up the values from the appropriate row or column.

Read and Interpret Line Graphs

Line graphs usually show us changes over time. They require us to read along the x and y axes.

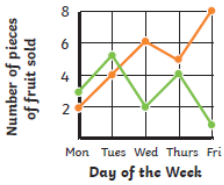


Drawing line graphs

Here is a table showing the number of different types of fruit sold each day.

	Bananas	Apples
Mon	2	3
Tues	4	5
Wed	6	2
Thurs	5	4
Fri	8	1

This graph can be used to represent the data from the table.



Mark each point for the number of bananas sold each day and join each point with a line.

Mark each point for the number of apples sold each day and join each point with a line.

Vocabulary

Graph, line graph, table, dual line table, two-way table, horizontal, vertical, axis/axes, data, scale, tally/tallies, plot/plotted, interpret, continuous data, label, pattern, predict, relationship, represent, survey, timetable, x-axis, y-axis, maximum value, minimum value.

MULTIPLICATION & DIVISION

Factors & Mulitples

Multiple: Can be divided evenly by **the number** eg. 8 / 32 / 64 / 800 are all **multiples** of **8**

Factor: Can be multiplied to create **the number** e.g. 1 / 2 / 3 / 4 / 6 / 12 are **factors** of **12**

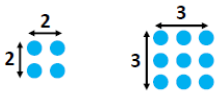
Prime Numbers

Prime numbers are numbers (larger than 1) with only 2 factors: themselves and 1. Numbers which are not prime are called **Composite Numbers.**

Sqaured ^{2} and cubed ^{3} Numbers

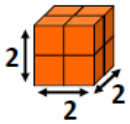
A **sqaure number** is the product of 2 numbers (when a number is multiplied by itself).

$2^2 = 2 \times 2 = 4$ $3^2 = 3 \times 3 = 9$



A **cube number** is the product of three numbers

$2^3 = 2 \times 2 \times 2 = 4 \times 2 = 8$



Related Facts

8 × 9 = 72	9 × 8 = 72
80 × 9 = 720	90 × 8 = 720

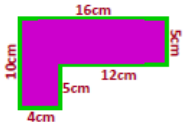
Vocabulary

prime number, **composite number**, square number, **cube** number, **square (x^2),** cube (x^3), **inverse operation,** multiply, **divide**, multiple**, factor**, prime factor, **product**

AREA AND PERIMETER

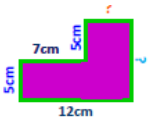
Perimeter

The perimeter of a shape is the distance around the outside



Perimeter = 5cm + 16cm + 10cm + 4cm + 5cm + 12cm = 52cm

Using the properties of shapes, we can find the length of missing sides.



? = 12cm - 7cm = 5cm

? = 5cm + 5cm = 10cm

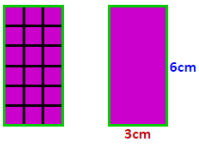
Area

The area of a shape is the amount of 2D space it takes up.

Perimeter

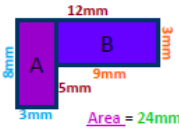
Area

Area of rectangle = b x h



Area = 3cm x 6cm = 18cm^2

To find the **area** of compound shapes, simply split them into shapes you can find the area of.



Area of A = 3mm x 8mm = 24mm^2

Area of B = 9mm x 3mm = 27mm^2

Area = 24mm^2 + 27mm^2 = 51mm^2

Vocabulary

perimeter, **distance,** area**, space,** length, **width**, centimetres, **square centimetres (cm^2)** , metres, **square metres (m^2),** scale, **compare,** estimate, **dimensions,** rectilinear.

Year Six - Ratio & Proportion

Ratio language & symbol

The ratio shows the relationship between values.
For every 2 **blue flowers** **there are 4 pink flowers.**

The ratio of **blue flowers** to **pink flowers** is **2:4**

Or

For every **blue flower** there are 2 **pink flowers.**
The ratio of **blue flowers** to **pink flowers** is **1:2**

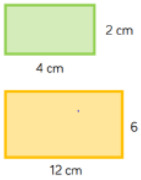
Ratio & fractions

Ratio and fraction are very closely linked.

The ratio of apples to oranges is 6:12 or 1:2.
There are 1/2 the number of apples compared to oranges **OR** there are twice as many oranges as apples.
The ratio of apples to the total number of fruit is 6:18 or 1:3.
1/3 of all the fruit are apples.

Scale factor

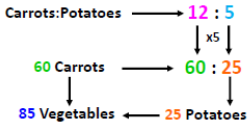
When a shape is increased by a scale factor, the length and width are multiplied by the scale factor.



The green rectangle has been increased by a scale factor of 3 to make the yellow rectangle.

Calculating ratio

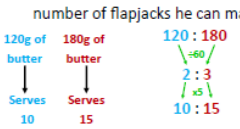
A farmer plants some crops in a field. For every **12 carrots**, she plants **5 potaotes.** She plants **60 carrots** in total. How many **potatoes** did she plant? How many **vegetables** did she plant in total?



Problem solving

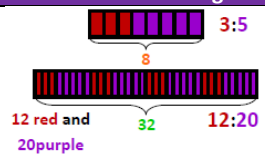
Flapjacks
Serves: 10
120 g butter
100 g dark brown soft sugar
4 tablespoons golden syrup
250 g rolled oats
40 g sultanas or raisins

John has 180g of butter. What is the largest number of flapjacks he can make?



Problem Solving

Emily has a packet of sweets. For every **3 red sweets** there are **5 purple sweets.** If there are **32 swweets in total,** how many of each colour are there?



If you had **3 red sweets,** you'd have **5 purple sweets so 8 sweets in total. 8** goes into **32 4 times** so you'd have **3** x **4 red sweets and 5** x **4 puuple.**

Properties of shape: Angles

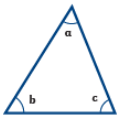
Types of angles

Acute Angles
Any angle that measures less than 90° is called an **acute** angle.

Obtuse Angles
Any angle that measures greater than 90° and less than 180° is called an **obtuse** angle.

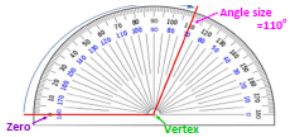
Reflex Angles
Any angle that measures greater than 180° is called a **reflex** angle.

Angles in a triangle



a + b + c = 180°

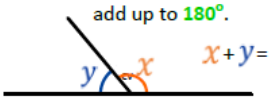
Measuring angles



When measuring angles, place the centre of the protractor on the vertex - with one line meeting a zero. Follow around from the 0 until you reach the next line to read the angle.

Angles on a straight line

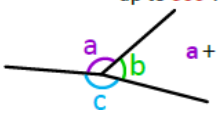
All the angles along a straight line will add up to 180°.



$x + y = 180°$

Angles around a point

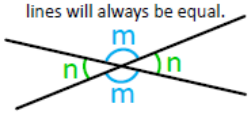
All the angles around a point will add up to 360°.



$a + b + c = 360°$

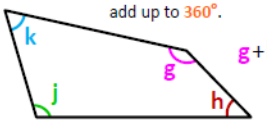
Vertically opposite angles

Opposite angles of two straight intersecting lines will always be equal.



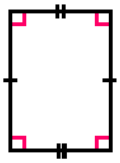
Angles in quadrilaterals

The interior angles in a quadrilateral always add up to 360°.

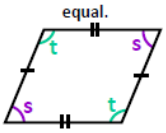


$g + h + j + k = 360°$

Rectangles
(including squares) have four 90° angles.



Parallelograms
(including rectangles and rhombuses) the opposite angles are equal.



Angles in polygons

Regular shapes have sideswith the same lengths and all equal angles. For each extra side on a polygon, the sum of the angles is 180° more.

Shape (no. of sides)	Sum of angles	Single angle in regular shape
Triangle (3)	180°	180° ÷ 3 = 60°
Quadrilateral (4)	360°	360° ÷ 4 = 90°
Pentagon (5)	540°	540° ÷ 5 = 108°
Hexagon (6)	720°	720° ÷ 6 = 120°

Sum of the interior angles = (n-2) x 180°

Pentagon
n = 5
(5 - 2) × 180° = 540°
540° ÷ 5 = 108°

Each angles = (n-2) x 180° / 6

Hexagon
n = 6
(6 - 2) × 180° = 720°
720° ÷ 6 = 120°

Assessment

How we track children's progress

- Teacher assessment
- Formal assessments
- Analysis grids
- School Tracker

Fluency / Arithmetic

- Through daily 'Fluent in Five' sessions at the start of every maths lesson.
- Daily fluency questions within the Power Maths scheme.
- AFL through live marking during the maths lesson
- Use of Headstart Assessments at the start and end of every unit to show pupils progress
- Formal termly assessment using the White Rose Arithmetic Paper

Reasoning

- Through daily opportunities to reflect at the end of every maths lesson.
- Through use of a Rapid Reasoning Question' at the start of every lesson.
- Daily reasoning questions within the Power Maths scheme.
- AFL through live marking during the maths lesson
- Use of Headstart Assessments at the start and end of every unit to show progress.
- Formal termly assessment using PUMA

Problem Solving

- Through use of a Rapid Reasoning Questions linked to everyday life at the start of every lesson.
- Daily problem solving questions within the Power Maths scheme.
- AFL through live marking during the maths lesson
- Use of Headstart Assessments at the start and end of every unit to show progress.
- Formal termly assessment using PUMA

Investigate

- Through the use of a termly open ended investigation linked to an area the children have covered that term.
- AFL during the maths lesson

Expectations		
Years 1 & 2	**Years 3 & 4**	**Years 5 & 6**
The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools]. At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.	The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number. By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work. Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.	The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages. Pupils should read, spell and pronounce mathematical vocabulary correctly.

End of Key Stage One Expectations		
Working towards the expected standard **The pupil can:**	**Working at the expected standard** **The pupil can:**	**Working at greater depth** **The pupil can:**
• read and write numbers in numerals up to 100 • partition a two-digit number into tens and ones to demonstrate an understanding of place value, though they may use structured resources1 to support them • add and subtract two-digit numbers and ones, and two-digit numbers and tens, where no regrouping is required, explaining their method verbally, in pictures or using apparatus (e.g. 23 + 5; 46 + 20; 16 – 5; 88 – 30) • recall at least four of the six2 number bonds for 10 and reason about associated facts (e.g. 6 + 4 = 10 , therefore 4 + 6 = 10 and 10 – 6 = 4) • count in twos, fives and tens from 0 and use this to solve problems • know the value of different coins • name some common 2-D and 3-D shapes from a group of shapes or from pictures of the shapes and describe some of their properties (e.g. triangles, rectangles, squares, circles, cuboids, cubes, pyramids and spheres).	• read scales* in divisions of ones, twos, fives and tens • partition any two-digit number into different combinations of tens and ones, explaining their thinking verbally, in pictures or using apparatus • add and subtract any 2 two-digit numbers using an efficient strategy, explaining their method verbally, in pictures or using apparatus (e.g. 48 + 35; 72 – 17) • recall all number bonds to and within 10 and use these to reason with and calculate bonds to and within 20, recognising other associated additive relationships (e.g. If 7 + 3 = 10, then 17 + 3 = 20; if 7 – 3 = 4, then 17 – 3 = 14; leading to if 14 + 3 = 17, then 3 + 14 = 17, 17 – 14 = 3 and 17 – 3 = 14) • recall multiplication and division facts for 2, 5 and 10 and use them to solve simple problems, demonstrating an understanding of commutativity as necessary • identify 1/4, 1/3 , 1/2 , 2/4, 3/4, of a number or shape, and know that all parts must be equal parts of the whole • use different coins to make the same amount • read the time on a clock to the nearest 15 minutes • name and describe properties of 2-D and 3-D shapes, including number of sides, vertices, edges, faces and lines of symmetry	• read scales* where not all numbers on the scale are given and estimate points in between • recall and use multiplication and division facts for 2, 5 and 10 and make deductions outside known multiplication facts • use reasoning about numbers and relationships to solve more complex problems and explain their thinking (e.g. 29 + 17 = 15 + 4 + ⍰; 'together Jack and Sam have £14. Jack has £2 more than Sam. How much money does Sam have? etc.) • solve unfamiliar word problems that involve more than one step (e.g. 'which has the most biscuits, 4 packets of biscuits with 5 in each packet or 3 packets of biscuits with 10 in each packet?') • read the time on a clock to the nearest 5 minutes • describe similarities and differences of 2-D and 3-D shapes, using their properties (e.g. that two different 2-D shapes both have only one line of symmetry; that a cube and a cuboid have the same number of edges, faces and vertices, but different dimensions).

Year One	Number and place value	Addition and Subtraction	Multiplication and Division	Fractions	Measurement	Geometry properties of shape
	count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number	read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.	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.	recognise, find and name a half as one of two equal parts of an object, shape or quantity .	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]	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].
	count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens	represent and use number bonds and related subtraction facts within 20		recognise, find and name a quarter as one of four equal parts of an object, shape or quantity	measure and begin to record the following: lengths and heights mass/weight capacity and volume time (hours, minutes, seconds)	**Geometry Position and direction**
	given a number, identify one more and one less	add and subtract one-digit and two-digit numbers to 20, including zero			recognise and know the value of different denominations of coins and notes	describe position, direction and movement, including whole, half, quarter and three-quarter turns
	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	solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? – 9			sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]	
	read and write numbers from 1 to 20 in numerals and words				recognise and use language relating to dates, including days of the week, weeks, months and years	
					tell the time to the hour and half past the hour and draw the hands on a clock face to show these times	

Year Two	Number and place value	Addition and Subtraction	Multiplication and Division	Fractions	Measurement	Geometry properties of shape
	count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward	solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their increasing knowledge of mental and written methods	recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers	recognise, find, name and write fractions 1/3 1 / 4 2/ 4 and 3/4 of a length, shape, set of objects or quantity	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	identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces
	recognise the place value of each digit in a two-digit number (tens, ones)	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100	calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs	write simple fractions for example, 1/2 of 6 = 3 and recognise the equivalence of 2/4 and 1/2	compare and order lengths, mass, volume/capacity and record the results using >, < and =	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.
	identify, represent and estimate numbers using different representations, including the number line	add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones a two-digit number and tens two two-digit numbers adding three one-digit numbers	show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot	**Statistics**	recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value	**Geometry Position and direction**
	compare and order numbers from 0 up to 100; use <, > and = signs	show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot	solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts	interpret and construct simple pictograms, tally charts, block diagrams and simple tables	find different combinations of coins that equal the same amounts of money	order and arrange combinations of mathematical objects in patterns and sequences
	read and write numbers to at least 100 in numerals and in words	recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.		ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity	solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change	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).
	use place value and number facts to solve problems			ask and answer questions about totalling and comparing categorical data.	compare and sequence intervals of time 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 know the number of minutes in an hour and the number of hours in a day.	

Year Three	Number and place value	Addition and Subtraction	Multiplication and Division	Fractions	Measurement	Geometry properties of shape
	count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number	add and subtract numbers mentally, including: a three-digit number and ones a three-digit number and tens a three-digit number and hundreds	recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	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	measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)	draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them ;
	recognise the place value of each digit in a three-digit number (hundreds, tens, ones)	add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	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	recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators	measure the perimeter of simple 2-D shapes	recognise angles as a property of shape or a description of a turn 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
	compare and order numbers up to 1000	estimate the answer to a calculation and use inverse operations to check answers	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.	recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators	add and subtract amounts of money to give change, using both £ and p in practical contexts ⍰	identify horizontal and vertical lines and pairs of perpendicular and parallel lines.
	identify, represent and estimate numbers using different representations	solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction		recognise and show, using diagrams, equivalent fractions with small denominators	tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks	**Statistics**
	read and write numbers up to 1000 in numerals and in words			add and subtract fractions with the same denominator within one whole [for example,5/ 7 + 1/7 = 6/7 .	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	interpret and present data using bar charts, pictograms and tables
	solve number problems and practical problems involving these ideas			compare and order unit fractions, and fractions with the same denominators	know the number of seconds in a minute and the number of days in each month, year and leap year	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
				solve problems that involve all of the above	compare durations of events [for example to calculate the time taken by particular events or tasks].	

Year Four	Number and place value	Addition and Subtraction	Multiplication and Division	Fractions	Measurement	Geometry properties of shape
	count in multiples of 6, 7, 9, 25 and 1000	add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	recall multiplication and division facts for multiplication tables up to 12 × 12	recognise and show, using diagrams, families of common equivalent fractions	Convert between different units of measure [for example, kilometre to metre; hour to minute]	compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes
	find 1000 more or less than a given number	estimate and use inverse operations to check answers to a calculation	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	count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. ⍰	measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres	identify acute and obtuse angles and compare and order angles up to two right angles by size
	count backwards through zero to include negative numbers .	solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	recognise and use factor pairs and commutativity in mental calculations ⍰	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	find the area of rectilinear shapes by counting squares	identify lines of symmetry in 2-D shapes presented in different orientations
	order and compare numbers beyond 1000 identify, represent and estimate numbers using different representations		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.	recognise and write decimal equivalents of any number of tenths or hundredths	read, write and convert time between analogue and digital 12- and 24-hour clocks	**Geometry Position and direction**
	round any number to the nearest 10, 100 or 1000			recognise and write decimal equivalents to 1/4 ½ 3/4	solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	describe positions on a 2-D grid as coordinates in the first quadrant
	solve number and practical problems that involve all of the above and with increasingly large positive numbers			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	**Statistics**	describe movements between positions as translations of a given unit to the left/right and up/down
	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			round decimals with one decimal place to the nearest whole number	interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.	plot specified points and draw sides to complete a given polygon.
				compare numbers with the same number of decimal places up to two decimal places	solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	
				solve simple measure and money problems involving fractions and decimals to two decimal places		

	Number and place value	Addition and Subtraction	Multiplication and Division	Fractions	Measurement	Geometry properties of shape
Year Five	write, order and compare numbers to at least 1 000 000 and determine the value of each digit	add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)	identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers	compare and order fractions whose denominators are all multiples of the same number	convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)	identify 3-D shapes, including cubes and other cuboids, from 2-D representations
	count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000	add and subtract numbers mentally with increasingly large numbers .	know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers	identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints	know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
	interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero	use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	establish whether a number up to 100 is prime and recall prime numbers up to 19	recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, 2/5 + 4/5 = 6/5 = 1 1/5	measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres	draw given angles, and measure them in degrees (o)
	round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	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	add and subtract fractions with the same denominator and denominators that are multiples of the same number	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	identify: angles at a point and one whole turn (total 360o) angles at a point on a straight line and ½ a turn (total 180o) other multiples of 90o
	solve number problems and practical problems that involve all of the above		multiply and divide numbers mentally drawing upon known facts	multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water]	use the properties of rectangles to deduce related facts and find missing lengths and angles
	read Roman numerals to 1000 (M) and recognise years written in Roman numerals		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	read and write decimal numbers as fractions [for example, 0.71 = 71/ 100 71]	solve problems involving converting between units of time	distinguish between regular and irregular polygons based on reasoning about equal sides and angles.
			multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents	use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.	**Geometry Position and direction**
			recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)	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		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.
			solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes	solve problems involving number up to three decimal places		**Statistics**
			solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	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 comparison, sum and difference problems using information presented in a line graph
			solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates	solve problems which require knowing percentage and decimal equivalents of ½ ¼ 2/5 1/5 4/5 and those fractions with a denominator of a multiple of 10 or 25.		complete, read and interpret information in tables, including timetables

Year Six	Number and place value	Addition and Subtraction	Multiplication and Division	Fractions	Measurement	Geometry properties of shape
	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit	multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication	use common factors to simplify fractions; use common multiples to express fractions in the same denomination	solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts	solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate	draw 2-D shapes using given dimensions and angles recognise, describe and build simple 3-D shapes, including making nets
	round any whole number to a required degree of accuracy	divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context	compare and order fractions, including fractions > 1	solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison	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 up to three decimal places	compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
	use negative numbers in context, and calculate intervals across zero	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	add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions	solve problems involving similar shapes where the scale factor is known or can be found	convert between miles and kilometres	illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
	solve number and practical problems that involve all of the above	perform mental calculations, including with mixed operations and large numbers	multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, 1/4 × 2 1/ 8	solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.	recognise that shapes with the same areas can have different perimeters and vice versa	recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.
		identify common factors, common multiples and prime numbers	divide proper fractions by whole numbers [for example, 1/3 1 ÷ 2 = 1/6		recognise when it is possible to use formulae for area and volume of shapes	**Geometry Position and direction**
		use their knowledge of the order of operations to carry out calculations involving the four operations	associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8		calculate the area of parallelograms and triangles	describe positions on the full coordinate grid (all four quadrants)
	Algebra use simple formulae	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	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		calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].	draw and translate simple shapes on the coordinate plane, and reflect them in the axes.
	generate and describe linear number sequences	solve problems involving addition, subtraction, multiplication and division.	multiply one-digit numbers with up to two decimal places by whole numbers			
	express missing number problems algebraically	use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy	use written division methods in cases where the answer has up to two decimal places			**Statistics**
	find pairs of numbers that satisfy an equation with two unknowns		solve problems which require answers to be rounded to specified degrees of accuracy			interpret and construct pie charts and line graphs and use these to solve problems
	enumerate possibilities of combinations of two variables		recall and use equivalences between simple fractions, decimals and percentages, including in different contexts			calculate and interpret the mean as an average