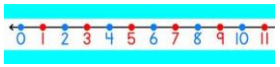
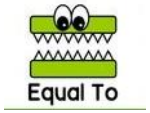
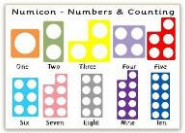
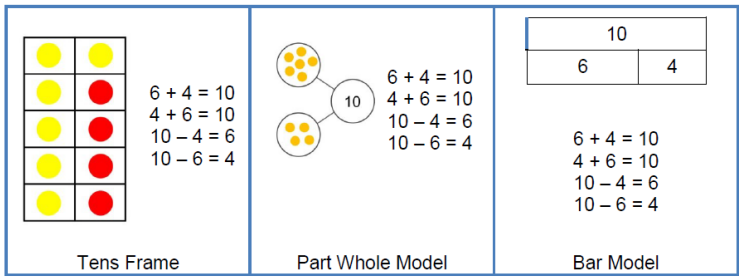
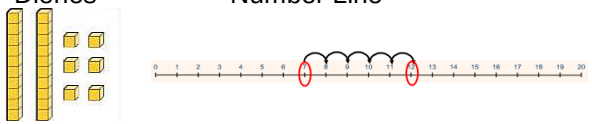
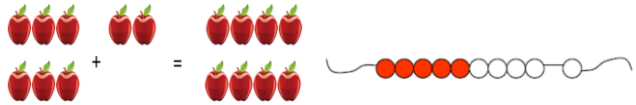
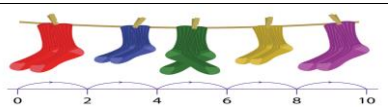
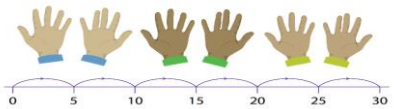
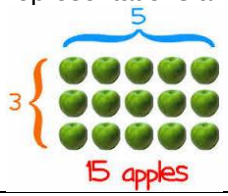
MATHS

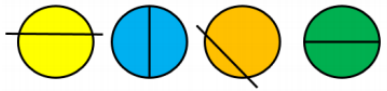
Significant people Aspire London will: • Develop pupils' knowledge and understanding of the world and people, past and present, who shape it • Provide identifiable role models to raise ambition and aspiration
Community Aspire London will: • Immerse the children in the historically rich and diverse nature of London • Give pupils an understanding of the positive impact of migration and a cultural appreciation of our community
Equality & Justice Aspire London will: • Empower pupils to be advocates who address issues of prejudice and discrimination • Ensure pupils value fairness and resolve differences through positive discussion
Environmental Responsibility Aspire London will: • Educate children of the need to protect God's planet from environmental damage • Create eco- friendly citizens who are aware of the impact of their individual actions and those of the wider world.

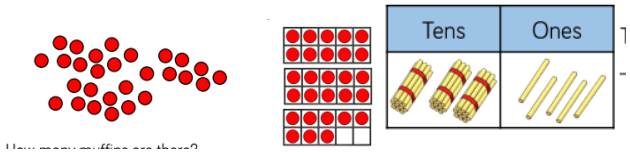
	Knowledge	Skills	Vocabulary
Year 1	**Number and Place Value** • count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens • given a number, identify one more and one less • 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 • read and write numbers from 1 to 20 in numerals and words.	• Use a number line, number square or number track to 100 to count one more/ one less .     Hundred square number line number track Rekenrek • Identify, compare, sort and order numbers up to 100. • Find a missing number in a number sequence. • Solve number problems that involves counting in ones. • Use numbers up to 100 and understand the meaning of each number by recognising and knowing their clusters.  • Use symbols (bigger than, smaller, equal to the same as) correctly.	equal to, more than, less than (fewer), most, least bigger than, greater than, smaller than, equal to, the same as tens, ones, hundred compare, sort, order Bus Numbers

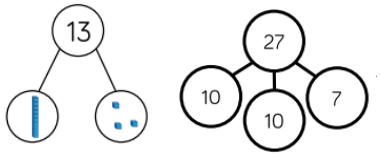
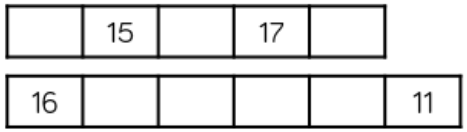
		   • Represent numbers using a variety of manipulatives Numicon Counters Coins Place Value and Dienes   	
	Addition and Subtraction • read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs	• Use a variety of ways to add and subtract numbers up to 100.	Addition, plus, make, sum, and, altogether, count on Number bonds

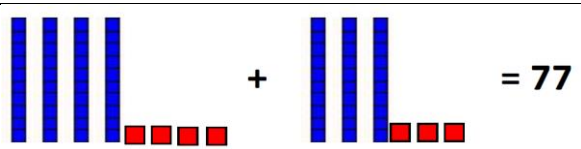
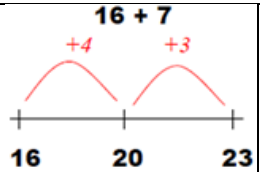
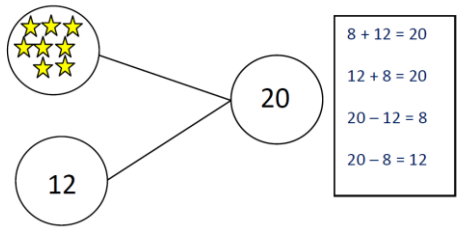
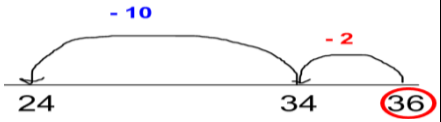
	• represent and use number bonds and related subtraction facts within 20 • add and subtract one-digit and two-digit numbers to 20, including zero	 Dienes Number Line  Concrete materials beads   2 + 5 = 7 Numicon • Use role play, stories and rhymes to add and subtract numbers up to 100. • Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ☐ – 9. • Begin to use the - and = signs to write calculations in a number sentence.	Part-whole Partition Count back, subtract, take away Bar model
	Multiplication and Division • To know the multiples of 2, 5 and 10s.	• Use concrete sources, role play, stories and songs to count in twos, fives and tens.	Doubles, grouping, sharing

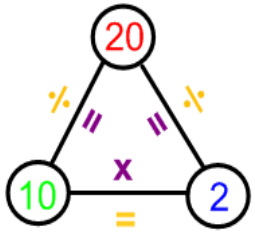
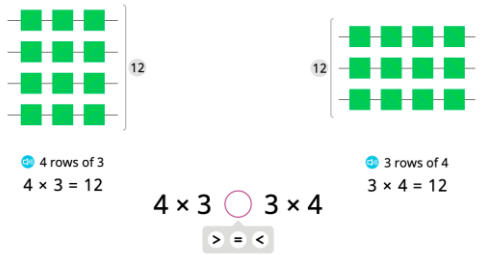
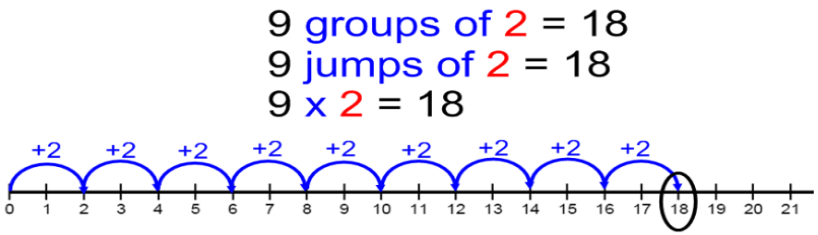
	• Understand multiplication as repeated addition – use concrete objects to support understanding. • To know that they can divide by grouping and sharing	   • Make and add equal groups by grouping and sharing  • Make doubles  • solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.  	

	Fractions (including decimals and percentages) • to know what a fraction is • to recognize and name a half as one of two equal parts of an object, shape or quantity • to recognize and name a quarter as one of four equal parts of an object, shape or quantity	• To find a half and a quarter of an object, shape or quantity using a variety of manipulatives. How can we cut these objects in half?  Can any of the objects be cut in half in more than one way? Which circles have been split into equal halves?  Match the halves to make 5 complete shapes. 	Whole, half and quarters
	Measurement • To know the appropriate language for different units of measure : lengths and heights , mass/weight , capacity and volume and time • To know and recognise the value of different denominations of coins and notes • To know and understand the language when sequencing events • To know and understand language relating to dates, including days of the week, weeks, months and years	• To measure and begin to record height, length, mass, weight, capacity and volume. • To compare, describe and solve practical problems for: lengths and heights, mass/weight, capacity and volume and time • To sequence events in chronological order using appropriate language • Tell the time to the hour and half past the hour, draw the hands on the clock face to show these times.	long/short, longer/shorter, tall/short, double/half heavy/light, heavier than, lighter than full/empty, half full, quarter full quicker, slower, earlier, later hours, minutes, seconds before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening o'clock, half past

			days of the week months of the year
	Geometry - properties of space • To recognise and name common 2-D shapes, including: rectangles, squares, circles and triangles • To recognise and name common 3-D shapes cuboids, cubes, pyramids and spheres.	• To sort, draw, compare and describe 2-D and 3-D shapes using the appropriate language.	rectangles, squares, circles and triangles cuboids, cubes, pyramids and spheres. Straight, curved Face, side, corners
	Geometry - position and direction • To know and understand position, direction and movement, including whole, half, quarter and three-quarter turns.	• To describe position, direction and movement, including whole, half, quarter and three-quarter turns using the appropriate language. • To follow instructions involving position, direction and movement.	in front of me, behind, to the left of me To the right of me whole, half, quarter and three-quarter turns.
Year 2	**Number and Place Value** • To know and recognise the place value of each digit in a two-digit number (tens, ones)	• To count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward • To identify, represent and estimate numbers (by rounding up to the nearest 10) using different representations, including the number line • Estimate numbers using counters, concrete materials  • To partition numbers to tens and ones in a variety of ways.	Hundreds, partition, Digits, 2-digit number, Round to the nearest 10.

		 part- whole model using Dienes/ numbers  Dienes counters place value card • To compare and order numbers from 0 up to 100; use <, > and = signs read and write numbers to at least 100 in numerals and in words • To use place value and number facts to solve problems. Fill in the missing numbers. 	
	Addition and Subtraction • To begin to know mental and written methods • To know and recall addition and subtraction facts to 20 fluently	• To compare, derive and use related facts up to 100 • To check calculations through discussions and strategy sharing • To add and subtract numbers using concrete objects, pictorial representations, and mentally, including: and a two-digit number and ones; a two-digit number and tens; two two-digit numbers and adding three one-digit numbers	Increase decrease, total, Minus, difference, difference between, Mentally, orally Column addition Column subtraction

	• To know that addition is commutative and subtraction is not. • To know that addition is the inverse of subtraction and vice versa. • To know and understand written method of column addition and subtraction.	  Jumps on an empty number line  • To find 10 more/less from a given number to 100. • To show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot  • Use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. • To work systematically to find and make number bonds to 100. • To solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures   	Estimate, inverse operation, commutative Addend, subtrahend, minuend.

	Multiplication and Division • To recall multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • To know that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. • To know that repeated addition and multiplication are linked together • To recognise the multiplication sign.	• To use multiplication and division facts for the 2, 5 and 10 multiplication table to derive further facts,  • To demonstrate that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot  • To solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. 	Odd, even, array, multiplication, times tables, repeated addtion
	Fractions (including decimals and percentages)	• To write simple fractions e.g. ½ of 6 = 3 and recognise the equivalence of two quarters and one half.	Third, fraction, out of, equal parts

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To recognise and name fractions ⅓, ¼,2/4 and ¾ of a length, shape, set of objects or quantity.
To know the difference between unit and non-unit fractions

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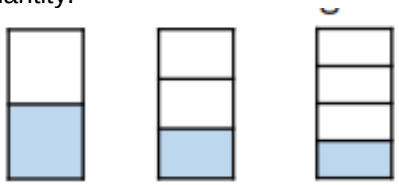
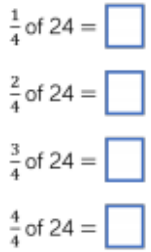
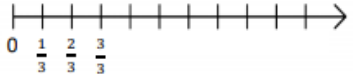
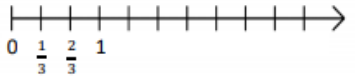
To find fractions ⅓, ¼,2/4 and ¾ of a length, shape, set of objects or quantity.

Finding a half, a third and a quarter of a shape.

To count in fractions up to 10, starting from any number and using the ½ and 2/4 equivalence on the number line





To sort unit and non-unit fractions

<table>
<tr><th></th><th>Fractions equal to one whole</th><th>Fractions less than one whole</th></tr>
<tr><td>Unit fractions</td><td></td><td></td></tr>
<tr><td>Non-unit fractions</td><td></td><td></td></tr>
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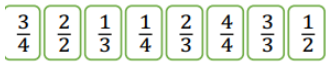

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Measurement

To know and recognise symbols for pounds (£) and pence (p);
To know and recognise 1p, 2p, 5p, 10p, 20p, 50p and £1 coins and £5 and £10 banknotes.

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To 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
To compare and order lengths, mass, volume/capacity and record the results using >, < and =
To use symbols for pounds (£) and pence (p); combine amounts to make a particular value.

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<td>Pence, pound, coin, notes, change, price, cost, amount, Meter, centimeter, gram, kilogram, Celsius, degrees, litre, mililitre, ruler, tape measure, meter stick, thermometer</td>
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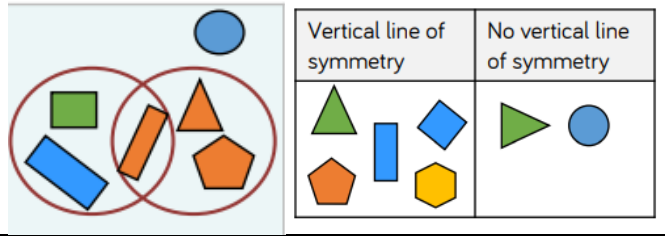
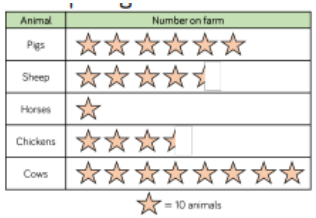
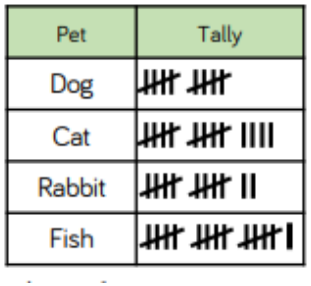
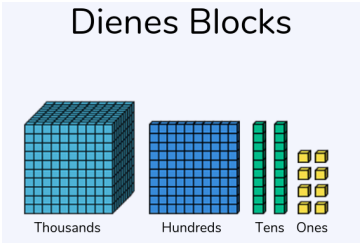
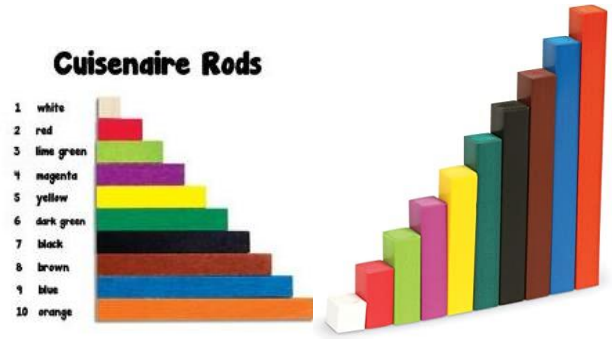
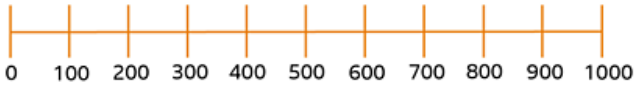
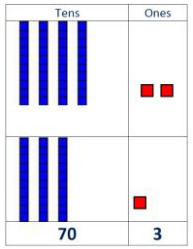
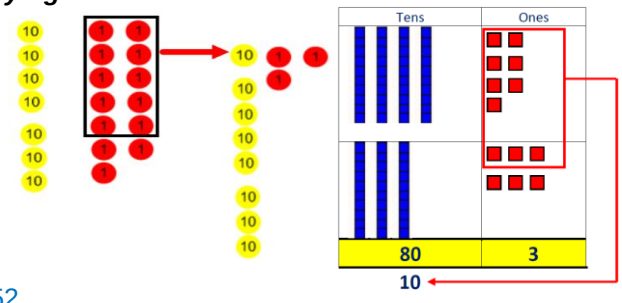
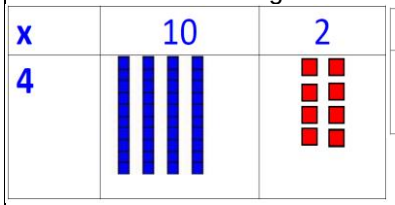
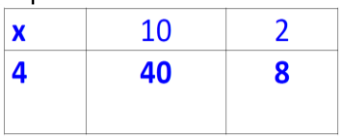
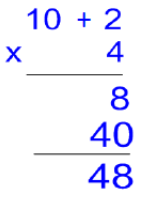
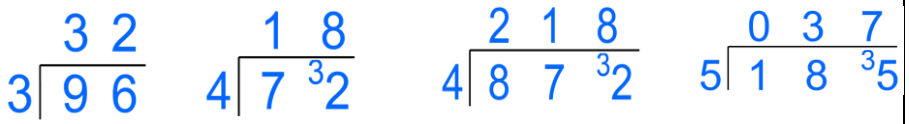
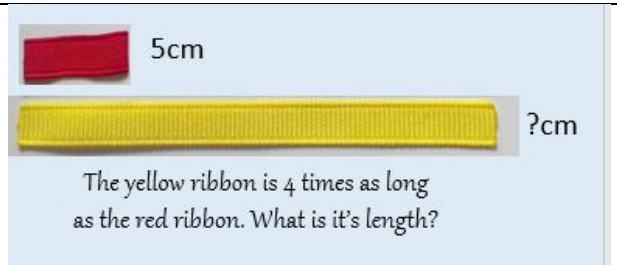
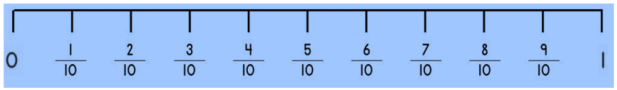
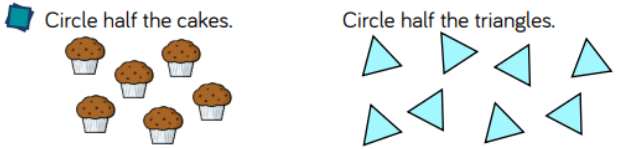
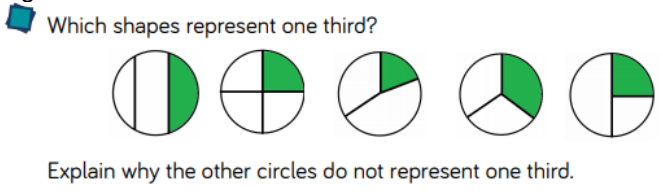
	• To know the number of minutes in an hour and the number of hours in a day.	• To find different combinations of coins that equal the same amounts of money • To solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change • To compare and sequence intervals of time • To 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	Quarter to, quarter past, duration
	Geometry - properties of space • To identify the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line. • To identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces • To identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]	• To describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line. • To describe the properties of 3-D shapes, including the number of edges, vertices and faces. • To compare and sort common 2-D and 3-D shapes and everyday objects, using Venn- or Carol-diagram or tables. 	Edge, vertex, vertices, line of symmetry, vertical, horizontal, solid
	Geometry - position and direction • To know the difference between clockwise and anti-clockwise. • To know about and recognise right angles.	• To order and arrange combinations of mathematical objects in patterns and sequences • To 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).	Clockwise, anti-clockwise, right angle, forwards, backwards Gladys West- inventor of GPS
	Statistics • To know that there are different ways representing data.	• To read, interpret and construct simple pictograms, tally charts, block diagrams and simple tables.	Data, tally chart pictogram, block diagram, interpret, table, symbol, results

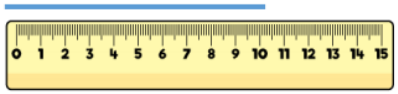
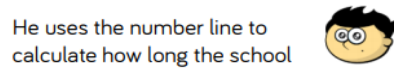
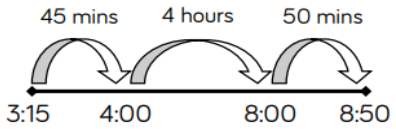
	• To know the difference between tally charts, pictograms, block diagrams and simple tables.	 Bar chart  Pictogram  tally chart • To ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity • To ask and answer questions about totalling and comparing categorical data.	
Year 3	**Number and Place Value** • recognise the place value of each digit in a three-digit number (hundreds, tens, ones) • identify numbers using different representations • read and write numbers up to 1000 in numerals and in words	• count from 0 in multiples of 4, 8, 50 and 100; • find 10 or 100 more or less than a given number, using a hundred square/ empty hundred square • compare and order numbers up to 1000 using the appropriate symbols and vocabulary. • partition to hundreds, tens and ones. • round numbers to the nearest 100. • represent and estimate numbers using different representations (Dienes, part-whole model, beads, numicon, Cuisenaire Rod, number lines)	Thousand, multiples, bridging, round to the nearest 100. Roman Numerals

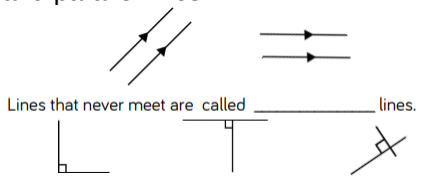
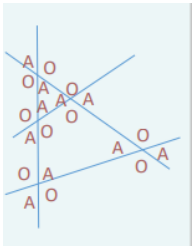
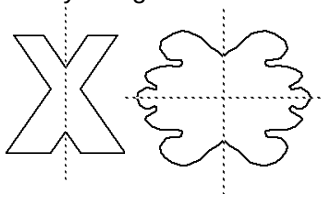
		  Number line to 1000.  • solve number problems and practical problems involving these ideas.	
	Addition and Subtraction • to know the standard written method for addition and subtraction • to know the number bonds up to 1000 (addition and subtraction facts) using multiples of 100. Eg: 100+900=1000, 1000-500=?	• 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	Exchanging, carrying, standard method, column addition, column subtraction

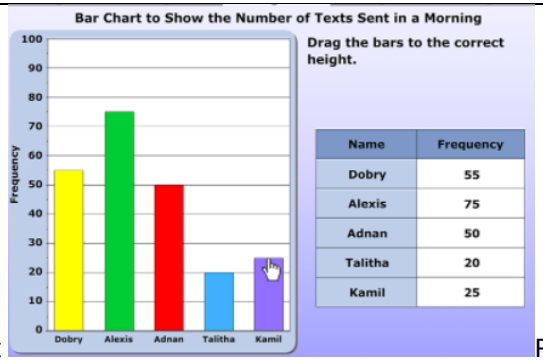
		• Use expanded column method with place value resources to support the conceptual understanding of adding numbers up to three digits ***with no carrying***. 42 + 31 = 73 **40 + 2** **30 + 1** **70 + 3**   • use the expanded column method with place value resources to support the conceptual understanding of adding numbers up to three digits ***with carrying***. 47 + 36 = 83 **40 + 7** **30 + 6** **80 + 3** **10**  367 + 185 = 552 **300 + 60 + 7** **100 + 80 + 5** **500 + 50 + 2** **100 10** • estimate the answer to a calculation and use inverse operations to check answers • solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	

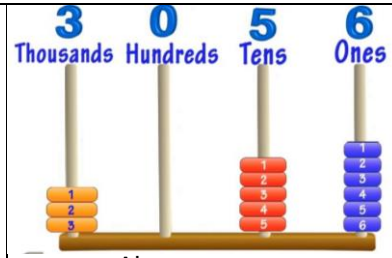
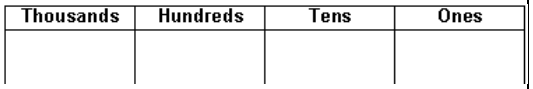
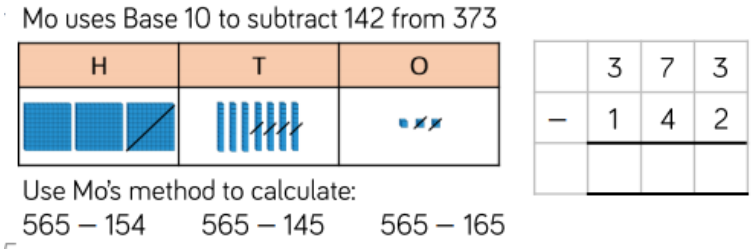
	Multiplication and Division • recall multiplication and division facts for the 3, 4 and 8 multiplication tables • write mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods • to understand multiplication as increasing number of equal groups. • To know the relation between sharing equally and division • To know the concept of the expanded method for multiplication • To know the standard written method (bus stop) for division to divide 2- and 3-digit numbers by 1-digit number without a remainder.	• use multiplication and division facts for the 3, 4 and 8 multiplication tables • 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 • To use the correct operator sign • Use concrete resources to introduce and to develop conceptual understanding of the compact method    • Use the bus stop method to divide 2- or 3-digit numbers by a 1-digit number limiting numbers to NO remainders in the final answer, but with remainders occurring within the calculation.  • 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.	Multiplicand, multiplier, factor, dividend, divisor, divisible, divisibility, remainder

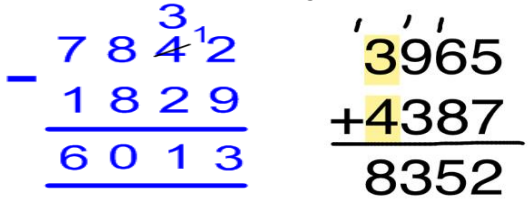
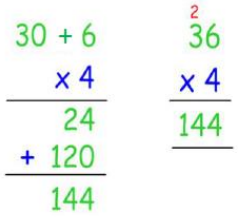
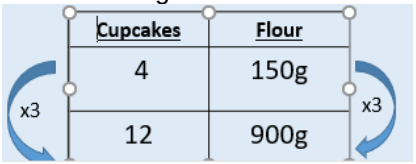
		 • to explain the method using the correct vocabulary	
	Fractions (including decimals and percentages) • To recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10. • To recognise fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators • To recognise fractions as numbers: unit fractions and non-unit fractions with small denominators • To recognise equivalent fractions with small denominators using diagrams • To know the method for addition and subtraction fractions with the same denominator. • To know the link between division and fractions Eg: 1/3 of 15= 15 divided by 3	• count up and down in tenths; • to find fractions on a number line  • find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators  • To use fractions as numbers: unit fractions and non-unit fractions with small denominators • To show and find equivalent fractions with small denominators using diagrams 	Unit-fraction, non-unit fractions, tenth, numerator, denominator

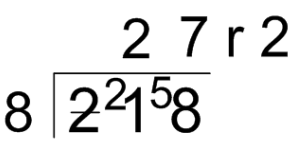
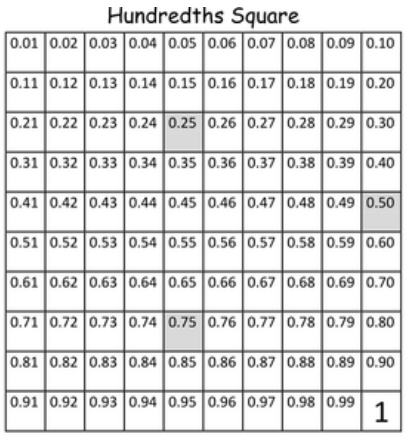
		• To add and subtract fractions with the same denominator within one whole [for example, 5⁄7 + 1⁄7 = 6⁄7] • compare and order unit fractions with the same denominator • solve problems that involve all of the above.	
	Measurement • to know units of measures (m, cm, mm, kg, g, L, ml) • to recognise Roman numerals up to 12. • To know the number of seconds in a minute and the number of days in each month, year and leap year	• measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) Alex measures the line.  • measure the perimeter of simple 2-D shapes • add and subtract amounts of money to give change, using both £ and p in practical contexts • tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks • 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 • compare durations of events [for example to calculate the time taken by particular events or tasks]. He uses the number line to calculate how long the school day is.  	Capacity, perimeter Digital clock, analogue clock, Mass, weight

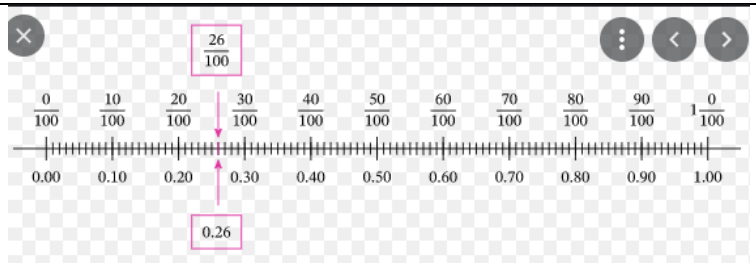
	Geometry - properties of shapes • recognise 3-D shapes in different orientations and describe them • recognise angles as a property of shape or a description of a turn • identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; • identify whether angles are greater than or less than a right angle • identify horizontal and vertical lines and pairs of perpendicular and parallel lines. 	• draw 2-D shapes • make 3-D shapes using modelling materials; • compare various sizes of angles to right angles (larger than, bigger than) using the correct vocabulary (obtuse, acute) • Label the acute angles (A) and obtuse and angles (O) on a diagram  • to draw lines of symmetry using vertical and horizontal lines. 	horizontal, obtuse, acute, vertical, pairs of parallel and perpendicular lines, polygon, regular, irregular shapes, quadrilateral, triangle
	Statistics • To know how to collect data and represent it in various ways (pictogram, tally, bar chart, frequency tables)	• Interpret, make and present data using bar charts, pictograms and tables	Frequency tables, collect data

		Bar chart  Frequency table • To compare different set of data presented in different ways. • 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 4	**Number and Place Value** • recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) • to know and identify 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. • to read and write number up to 10000.	• count in multiples of 6, 7, 9, 25 and 1000 • find 1000 more or less than a given number • to partition numbers to thousands, hundreds, tens and ones. • count backwards through zero to include negative numbers • order and compare numbers up to 10000 • identify, represent and estimate numbers using different representations 	Thousands, 4-digit place value grid, rounding to the nearest 1000, positive and negative numbers

		 Abacus  Place value grid- 4-digit numbers • round any number to the nearest 10, 100 or 1000 • round decimal with 1-decimal place to the nearest whole number. • compare numbers with the same number of decimal places up to two decimal places. • solve number and practical problems that involve all of the above and with increasingly large positive numbers	
	Addition and Subtraction • to know number bonds (addition and subtraction facts) with multiples of 10. Eg: 230+ ?= 1000; 1000-820= ? • to know the compact written method for addition and subtraction 4-digit numbers.	• add and subtract up to 4-digit numbers using manipulatives to develop conceptual understanding of exchanging and carrying.  • add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	Exchange, no exchange, more than one exchange

		• to carry out calculations using formal written methods.  • 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.	
	Multiplication and Division • to know and recall multiplication and division facts for multiplication tables up to 12 × 12 • recognise factor pairs and commutativity in mental calculations • to know a formal written method to multiply two-digit and three-digit numbers by a one-digit number	• 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 • use factor pairs and commutativity in mental calculations • to multiply two-digit and three-digit numbers by a one-digit number using formal written layout  • Use knowledge of times tables to solve scaling problems  • to use the law of distribution to carry out an efficient multiplication eg: 99x13= (100x13)- (1x13)	Law of distribution, efficient multiplication, distribute, compact method, integer, scaling, scaling up and down

		13x12= (12x12)+ (1x12) • to divide 2- and 3-digit number by a 1-digit number with remainders using a formal method. • 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. 	
	Fractions (including decimals and percentages) • recognise using diagrams, families of common equivalent fractions • recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. • recognise and write decimal equivalents of any number of tenths or hundredths • recognise and write decimal equivalents to ¼, ½, ¾	• show using diagrams, families of common equivalent fractions count up and down in hundredths; • Count in hundredths forward and backwards 	European Currencies

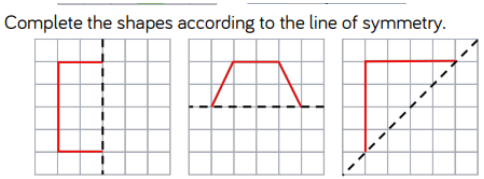


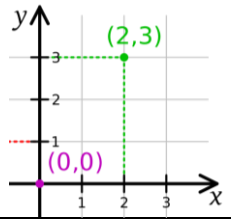
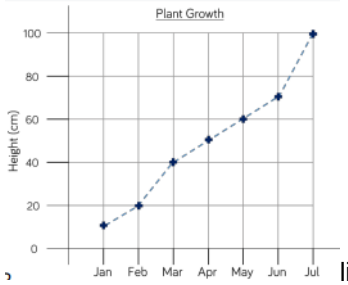
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- add and subtract fractions with the same denominator
- subtract fractions from whole amounts
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths

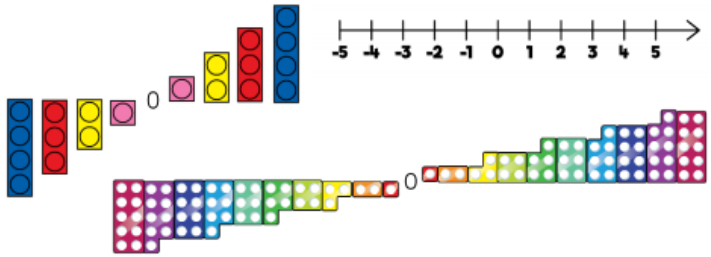
  Place value grid, multiplication and division by 10, 100, 1000.

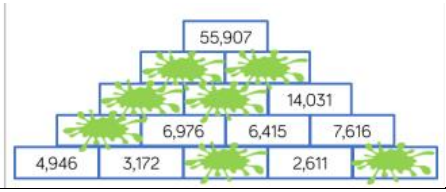
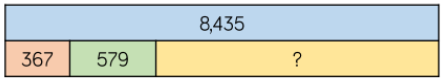
10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009

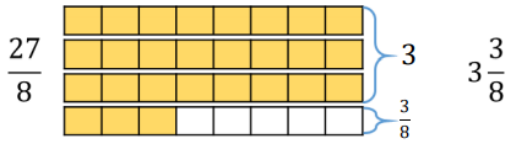
- round decimals with one decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to two decimal places
- solve simple measure and money problems involving fractions and decimals to two decimal places.

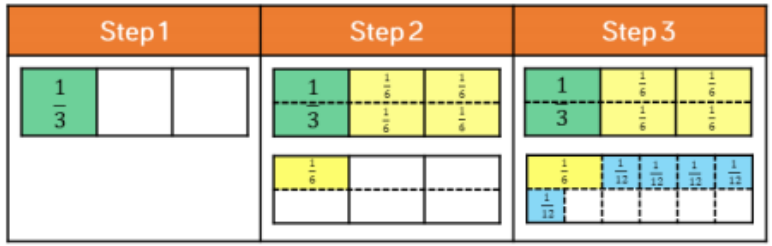
	Measurement • read and write time between analogue and digital 12- and 24-hour clocks	• Convert between different units of measure [for example, kilometre to metre; hour to minute] • measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres • find the area of rectilinear shapes by counting squares • estimate, compare and calculate different measures, including money in pounds and pence • convert time between analogue and digital 12- and 24-hour clocks • solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	Area, rectilinear shapes
	Geometry - properties of space • to know and identify acute and obtuse angles • to know and identify lines of symmetry in 2-D shapes presented in different orientations	• compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes • compare and order angles up to two right angles by size • complete a simple symmetric figure with respect to a specific line of symmetry. 	Diagonal lines of symmetry, isosceles, scalene, equilateral triangles.
	Geometry - position and direction • to know that the first quadrant consists of a pair of perpendicular lines, labelled x (horizontal) and y (vertical) • to identify, read and write co-ordinates	• describe positions on a 2-D grid as co-ordinates in the first quadrant • describe movements between positions as translations of a given unit to the left/right and up/down • plot and label specified points and draw sides to complete a given polygon.	Co-ordinates, quadrants, translation, plot, plotting, x- axis, y-axis

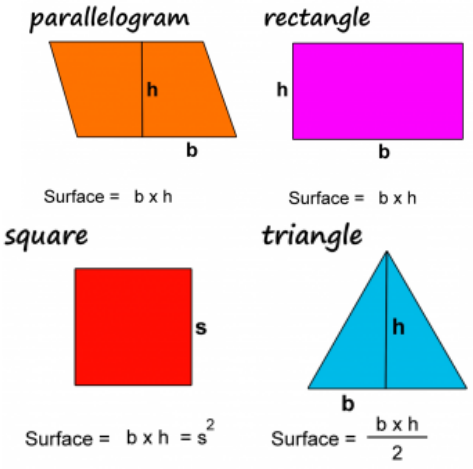
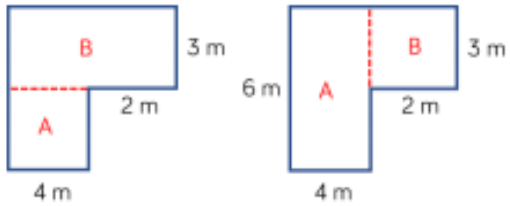
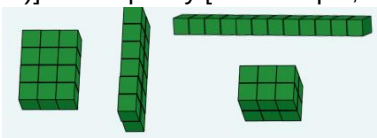
			
	Statistics • to recognise various representations of data including line graphs	• interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.  line graph presenting continuous data • solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	Discrete data, continuous data Line graph
Year 5	**Number and Place Value** • to read and write numbers to at least 1 000 000 and determine the value of each digit • to read and write decimal numbers up to 2-decimal points. • To know and identify Roman numerals to 1000 (M) and recognise years written in Roman numerals.	• to order and compare numbers to at least 1 000 000 and determine the value of each digit. • round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 • count forwards or backwards in steps of powers of 10 from any given number up to 1 000 000 • interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero	Million, rounding to the nearest 10 00, 100 000 and 1 000 000, Temperature drop, temperature rise Ascending, descending

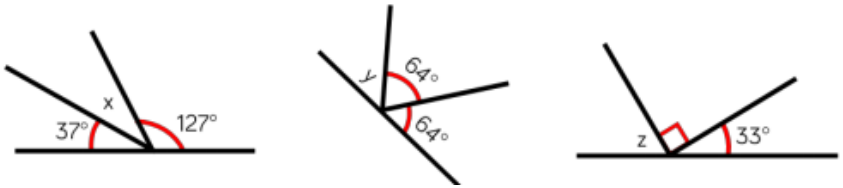
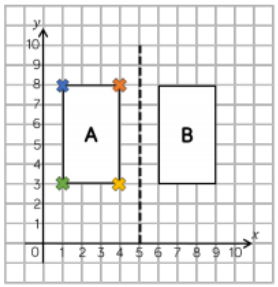
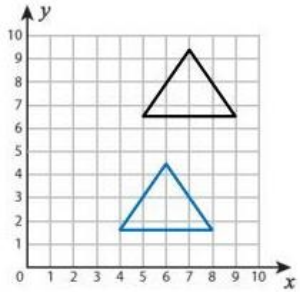
		Here are three representations for negative numbers.   Thermometer with positive and negative values measuring in Celsius and Fahrenheit. • solve number problems and practical problems that involve all of the above	
	Addition and Subtraction • to know a standard written method for addition and subtraction of decimal numbers up to 2-places.	• add and subtract numbers mentally with increasingly large numbers • add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) with 1 and more than one exchange. • add and subtract numbers up to 2-decimal place.	Level of accuracy approximate

		4 1 5.~~1~~3 7 - 2.5 4 2.8 3 • use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.   	
	Multiplication and Division • identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers • know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers • recall prime numbers up to 19 • recognise square numbers and cube numbers, and the notation for squared (²) and cubed (³)	• 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 including decimals 2 1 1 1 643 x 54 1 2572 +32150 34722 2 3 7.6 8 x 4 30.7 2 • establish whether a number up to 100 is prime • 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	Prime number, prime factor, composite number, square numbers, cube numbers All factor pairs Common factor Power of 2, power of 3, squared, cubed Chika Ofili- former student, divisibility rules

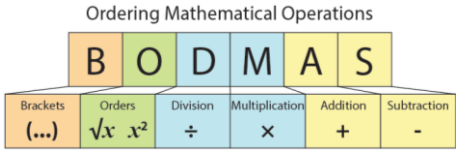
		Extend to expressing results in different ways according to the context, including with remainders as fractions, as decimals or by rounding. For example: • Whole number remainder = 27 r 2 • Fraction remainder = $27\frac{2}{8} = 27\frac{1}{4}$ • Decimal remainder = $27\frac{1}{4} = 27\frac{25}{100} = 27.25$ • multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 • use square numbers and cube numbers, and the notation for squared (²) and cubed (³) • solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes • solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign • solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates	
	Fractions (including decimals and percentages) • identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths • recognise mixed numbers and improper fractions	• compare and order fractions whose denominators are all multiples of the same number • convert mixed numbers and improper fractions and write mathematical statements >1 as a mixed number [for example, 2/5+4/5=6/5= 1 1/5] 	Mixed number fractions, proper fraction, common denominator, simplest form, simplify improper fractions Percentages, per cent

	• read and write decimal numbers as fractions [for example, 0.71 =71⁄100] • recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents • read and write numbers with up to three decimal places • recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal	• add and subtract fractions with the same denominator and denominators that are multiples of the same number  $\frac{1}{3}+\frac{5}{6}+\frac{5}{12}=1\frac{7}{12}$ • multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams Work out $\frac{1}{6}\times 4$ by counting in sixths. $\frac{1}{6}\times 4=\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=\frac{4}{6}=\frac{2}{3}$  • use thousandths and relate them to tenths, hundredths and decimal equivalents • round decimals with two decimal places to the nearest whole number and to one decimal place • order and compare numbers with up to three decimal places • solve problems involving number up to three decimal places • solve problems which require knowing percentage and decimal equivalents of 1⁄2, 1⁄4,1⁄5, 2⁄5 and those fractions with a denominator of a multiple of 10 or 25.	
	Measurement • to know the vocabulary relating to imperial units (pints, inches, pounds)	• convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)	Metric units, imperial units, pints, inches, pounds

	• to know miles to km ratio is 5:8 and vice versa • to know the equivalent measures between the metric and imperial system (1 pint= 568ml, 1 inch= 2.54cm, 1 lbs= 453g) • to know the formula for calculating the area of rectangles, squares, parallelograms and triangles.  	• understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints • measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes • to calculate the area of compound shapes, made of two or more rectangles.  • estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water]  • solve problems involving converting between units of time • use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.	Ratio, compound shapes, formula Cubic metre
	Geometry - properties of space • identify 3-D shapes, including cubes and other cuboids, from 2-D representations • know angles are measured in degrees	• estimate and compare acute, obtuse and reflex angles • draw given angles, and measure them in degrees (°) • use the properties of rectangles to deduce related facts and find missing lengths and angles • measure angles with a protractor • estimate and calculate the missing angles.	Protractor, reflex angle

	• identify: angles at a point and one whole turn (total 360°) ; angles at a point on a straight line and ½ a turn (total 180°) ; other multiples of 90° • distinguish between regular and irregular polygons based on reasoning about equal sides and angles.		
	Geometry - position and direction • identify, describe the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.	• represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed • to complete a symmetric figure • translate and reflect 2-D shapes with co-ordinates.  Reflection  Translation (original shape in black)	reflection
	Statistics • to recognise various representations of data including timetables	• solve comparison, sum and difference problems using information presented in a line graph • complete, read and interpret information in tables, including timetables.	Two-way table

<table>
<tr>
<td></td>
<td></td>
<td>Use the timetable to answer the questions.
<table><tr><td></td><td colspan="5">Bus Timetable</td></tr><tr><td>Halifax</td><td>06:05</td><td>06:35</td><td>07:10</td><td>07:43</td><td>08:15</td></tr><tr><td>Shelf</td><td>06:15</td><td>06:45</td><td></td><td>07:59</td><td>08:31</td></tr><tr><td>Shelf Village</td><td>06:16</td><td>06:46</td><td>07:23</td><td>08:00</td><td>08:32</td></tr><tr><td>Woodside</td><td>06:21</td><td>06:50</td><td>07:28</td><td></td><td></td></tr><tr><td>Odsal</td><td>06:26</td><td>06:55</td><td>07:33</td><td>08:15</td><td>08:45</td></tr><tr><td>Bradford</td><td>06:40</td><td>07:10</td><td>07:48</td><td>08:30</td><td>09:00</td></tr></table>
On the 06:35 bus, how long does it take to get from Shelf to Bradford?
Can you travel to Woodside on the 07:43 bus from Halifax?
Which journey takes the longest time between Shelf Village and Bradford?</td>
<td></td>
</tr>
<tr>
<td>Year 6</td>
<td>Number – number and place value
• read and write numbers up to 10 000 000 and determine the value of each digit
• to read and write decimal numbers up to 3-decimal points.</td>
<td>• 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 problems and practical problems that involve all of the above.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number - addition, subtraction, multiplication and division
• identify common factors, common multiples and prime numbers</td>
<td>• 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 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</td>
<td>0 2 4 r 1 2
2 4) 5 8 8
- 4 8
1 0 8
- 9 6
1 2</td>
</tr>
</table>

	• to know the order of operations to carry out calculations involving the four operations (BODMAS)	• to use the order of operations to carry out calculations involving the four operations (BODMAS)  • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • • 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 • perform mental calculations, including with mixed operations and large numbers • solve problems involving addition, subtraction, multiplication and division • use estimation to check answers to calculations and determine,	
	Number - fractions (including decimals and percentages) • to know that fractions and division are associated • identify the value of each digit in numbers given to three decimal places • recall equivalences between simple fractions, decimals and percentages including in different contexts.	• 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 simple pairs of proper fractions, writing the answer in its simplest form [for example, ¼ × ½ = 1⁄8] • divide proper fractions by whole numbers [for example, 1⁄3 ÷ 2 = 1⁄6] • calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3⁄8] • multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places • multiply one-digit numbers with up to two decimal places by whole numbers • use written division methods in cases where the answer has up to two decimal places.	

		• solve problems which require answers to be rounded to specified degrees of accuracy • use equivalences between simple fractions, decimals and percentages including in different contexts.	
	Ratio and Proportion	• 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 of percentages [for example, of measures, and such as 15% of 360] and use percentages for comparison • solve problems involving similar shapes where the scale factor is known or can be found • solve problems involving unequal sharing and grouping using knowledge of fractions and multiples	
	Algebra • describe linear number sequences	• use simple formulae • generate linear number sequences • express missing number problems algebraically • find pairs of numbers that satisfy number sentences involving two unknowns • enumerate possibilities of combinations of two variables	Variable, linear number sequence Brahmagupta- father of algebra Fibonacci sequence and the Golden Ratio Alan Turing- father of computing
	Measurement • read and write 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 • recognise that shapes with the same areas can have different perimeters and vice versa	• 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] • solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate • use 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 • convert between miles and kilometres • calculate the area of parallelograms and triangles	

	• recognise when it is possible to use the formulae for area and volume of shapes •		
	Geometry - properties of shapes • recognise, describe simple 3-D shapes including making nets • recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.	• draw 2-D shapes using given dimensions and angles • build simple 3-D shapes including making nets • compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • illustrate and name parts of circle, including radius, diameter and circumference and know that the diameter is twice the radius	Diameter, radius, circumference
	Geometry - position and direction • 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.	
	Statistics	• interpret and construct pie charts and line graphs and use these to solve problems • calculate and interpret the mean as an average	