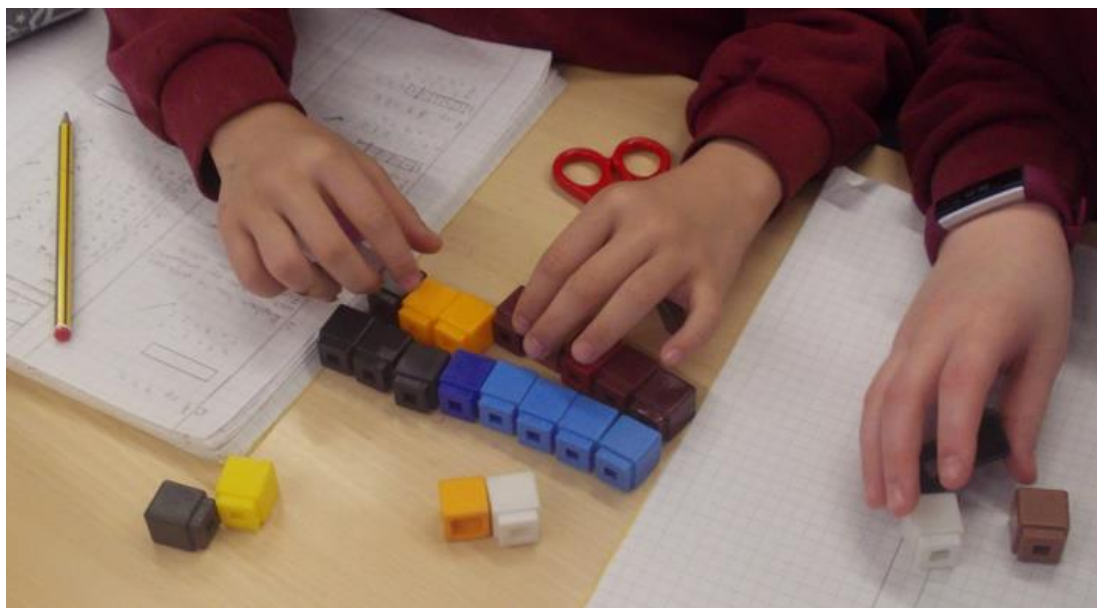




Maths at Parkgate Juniors



At Parkgate we promote a positive attitude towards maths. We want to instil resilience, independence and the ability to work collaboratively. We aim to encourage the children to develop key skills that will enable them to make sense of the world around them. There is a focus on calculating, reasoning and fluency as we believe they are important skills. Fluency enables the children to recall and apply efficiently and rapidly. We challenge higher levels of thinking through problem solving, questioning and justifying. We want all children to achieve to the best of their ability. Scaffolding resources are used to help those that need extra help whilst ensuring that they keep up with the curriculum for their year group.



Maths-policy on a page

Purpose and Aims

Purpose

To provide a foundation for understanding the world, the ability to reason mathematically and a sense of enjoyment and curiosity of about the subject.

Aims

To become fluent in the basics of mathematics, including through varied and frequent practice with increasingly complex problems over time.

To reason mathematically by following a line of enquiry.

To solve problems by applying their mathematics to a variety of problems.

To ask questions about mathematical concepts and find different possibilities.

Provision

Planning is based on the National curriculum 2014, with support from Hfl planning, adapting the plans to meet the needs of the children in the school.

The medium term plans for each year group give a more detailed breakdown.

Weekly plans include: Specific learning objectives for each lesson, whole class teaching, differentiated or scaffolded activities for each group of children, a key question to lead discussion, arithmetic focus, times table activity, provision for PP and EAL pupils, times table activity and STS ladder targets / Times table rock stars focus for the week.

Targeted booster sessions for children with gaps/areas of need due to Covid lockdown.

Progression

Progression in calculation is outlined in the school calculation policy. A parent version is available to enable parents to support children at home.

Hfl progression documents and essentials planning support teachers, provision could be amended to meet the needs of the children in the class.

Transition documents are completed by teachers at the end of each year and passed on to the next class to ensure that children have consolidated previous years learning before moving on.

Assessment and reporting

Times tables practise tests (TT rockstars) are completed weekly and times / scores recorded.

Assessment takes place on a daily basis-through daily marking, annotating planning and discussion with children.

Same day support is carried out by teachers / support staff to reinforce learning and move learning on. Next steps are also used to move learning on.

More formal assessments take place termly through group tasks and individual tests. (Hfl adapted diagnostic tests – part of recovery curriculum)

Maths

Intent	Aims/ Statement of Intent: Oat Parkgate we promote a positive attitude towards maths. We want to instil resilience, independence and the ability to work collaboratively. WE aim to encourage the children to develop key skills that will enable them to make sense of the world around them. There is a focus on calculating, reasoning and fluency as we believe they are important skills. Fluency enables the children to recall and apply effectively and rapidly. We challenge higher levels of thinking through problem solving, questioning and justifying. WE want all children to achieve to the best of their ability. Scaffolding resources are used to help those that need extra help whilst ensuring that they keep up with the curriculum for their year group.							
	Knowledge and skills: To have an understanding of place value, the 4 operations and the links between them. To have an understanding of fractions, including decimals, measurement, shape, position, direction and statistics. To be able to make connections to real life example. To be able to show their understanding through reasoning. To be able to work collaboratively.							
Implementation	Approaches to learning/How our pupils learn: Collaborative learning, investigating, reflecting including plenary questioning. Concrete, pictorial, abstract method; sequenced learning, links to other subjects, building independence, fluency sessions, range of questioning, explorative learning, worked examples, working wall, oral rehearsal, use of vocabulary, sentence starters, making connections, use of technology, use of Hfl adapted planning							
	Support: Scaffolding, use of manipulatives, pre-learning, over learning., Same Day support, targeted questioning, working wall, TA support, tutoring and 1 to 1 support							
	Enrichment (including link and opportunities): Fluency sessions, maths challenges, TT rockstar challenges, XC week, theme days, extension groups, homework groups							
Impact	Skills: Fluency, showing their understanding through reasoning, retrieval and application skills, reflective skills, fluent in the four operations. Fluent recall and use of times tables. Making connections and using real world examples, problem solving, application. Confident use of a range of vocabulary.				Attitudes/ wellbeing and personal development: Resilience, building confidence in maths to take on new challenge. Curiosity to explore new ideas. Enjoyment, love of learning. Self-motivation, building independence.			
	Book study method	Diagnostic	SDS	Learning walks	MTC check	Live marking	Pupil voice	AFL
	Google classroom	Journaling	Nfer	SATS	Numbots	TT rockstars	Pupil progress meetings	Homework

		Curriculum Overview - Maths							
		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2		
Lower Key Stage 2	Year 3	Place value & regrouping Counting on & back 1s, 10s, 100s Estimation, magnitude & rounding Mental fluency + & - Inverse Written + & -	Problem solving Statistics – bar charts & tables Angles Perpendicular, parallel, vertical, horizontal lines 2D shape Perimeter	$\times$ & $\div$ Statistics – scaled bar charts & pictograms Word problems $\times$ & $\div$ Fractions – discrete and continuous quantities Ordering & comparing fractions	+ & - fractions with the same denominators Problem solving – unit & non-unit fractions $\times$ multiples of 10 Formal written $\times$	Division Multiplication Scaling & correspondence problems Long division Time – Analogue & digital Problem solving + - $\times$ $\div$	Place value & decimals Measures problem solving 3D shape Identifying & addressing gaps	Year 3	Lower Key Stage 2
	Year 4	Place value – ordering a& comparing numbers + & - mental & written fluency Counting in multiples $\times$ & $\div$ facts (Times Tables) Factor pairs, scaling & correspondence problems	Problem solving $\times$ & $\div$ a 1 or 2-digit number by 10 & 100 Measures – conversion, compare, estimate, calculate Discrete & continuous data Division Perimeter	Properties of shape Symmetry Decimal numbers Money Decimal problem solving + & - fractions with the same denominator Fractions of quantities	Equivalent fractions Multiply & divide 2 & 3-digit numbers by a 1-digit number – formal written method	Time – digital, analogue converting time 12- & 24-hour clock Statistics Roman numerals Negative numbers Angles Properties of triangles Co-ordinates, position & directions	$\times$ & $\div$ review Area Fractions review Application & problem solving Identifying & addressing gaps	Year 4	
Upper Key Stage 2	Year 5	Place value – rounding Interpret negative numbers Place value – 3 decimal places $\times$ & $\div$ by 10, 100 & 1000 Properties of numbers Prime & composite numbers $\times$ & $\div$ mentally Key fact problem solving	+ & - using a range of strategies + & - $\times$ $\div$ formal written methods Equivalent fractions Order & compare fractions + & - fractions	Problem solving + - $\times$ $\div$ $\times$ fractions by whole numbers Fraction problem solving Converting units of measure Area Volume & capacity Percentages	Percentages problem solving 3D shape from 2D representations Reflection & translation Perimeter Estimate, compare, measure & draw angles Identify unknown angles	Formal methods $\times$ & $\div$ $\times$ & $\div$ strategies Scaling by simple fractions & rates Imperial & metric conversion Fractions, decimals, fractions problem solving Reading timetables calculating time	+ - $\times$ $\div$ problem solving Regular & irregular polygons Properties of rectangles Statistics – line graphs, interpreting & evaluating charts & tables Roman numerals Identifying & addressing gaps	Year 5	Upper Key Stage 2
	Year 6	Place value $\times$ & $\div$ by 10, 100 & 1000 Choosing effective calculation strategies + - $\times$ $\div$ problem solving Application of factors, multiples & primes Equivalent fractions comparing, ordering + & - fractions	Fraction & decimal equivalents Fractions, decimals & percentages Calculating percentages Formal written method of $\times$ & short $\div$ Area of parallelograms & triangles Properties of shape	Order of operations & algebra Formal written long division Area & perimeter Recognise & find angles Reflection & translation $\times$ & $\div$ fractions Fraction problem solving	Ratio & proportion Volume Measures Statistics – line graphs & pie charts Algebra & sequences	Statistics – calculate & interpret mean average Application of previous years' learning Application of known facts & calculation strategies	Constructing pie charts Statistical representations Further algebra Financial maths & enterprise Maths preparation for KS3	Year 6	

Parkgate adapted Year 3 programme of study (statutory requirements) Objectives in red are from the previous year group and notes in green show cross curricular links. Adapted to reflect catch up from covid.

Number and place value	Addition and subtraction	Multiplication and division	Fractions	Measurement	Geometry: properties of shapes	Statistics
Pupils should be taught to: - count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward - count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number - recognise the place value of each digit in a two-digit number (tens, ones) - recognise the place value of each digit in a three-digit number (hundreds, tens, ones) - compare and order numbers up to 1000 - identify, represent and estimate numbers using different representations - read and write numbers up to 1000 in numerals and in words - solve number problems and practical problems involving these ideas. XC counting in Spanish Music counting and beat	Pupils should be taught to: - add and subtract numbers mentally, - using concrete objects and pictorial representations 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 - 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. - Recall and use addition and subtraction facts to 10, 20 & 100	Pupils should be taught to: - recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables - recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables - 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 - 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.	Pupils should be taught to: - 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 - recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity - recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators - recognise and use fractions as numbers: 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, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$) - compare and order unit fractions, and fractions with the same denominators - solve problems that involve all of the above.	Pupils should be taught to: - Estimate, measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) - measure the perimeter of simple 2-D shapes - find different combinations of coins that equal the same amounts of money - add and subtract amounts of money to give change, using both £ and p in practical contexts - 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. - tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks (NOT DIGITAL) - 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 - know the number of seconds in a minute and the number of days in each month, year and leap year - compare durations of events [for example to calculate the time taken by particular events or tasks]. XC Science measurement of forces/light	Pupils should be taught to: - identify and describe the properties of 2-D shapes, including the number of sides and symmetry in a vertical line - 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 shape and everyday objects. - draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them - recognise that angles are a property of shape or a description of a turn $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ turns - 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. XC Art/DT – angles – structures	Pupils should be taught to: - interpret and present data using bar charts, pictograms and tables (tally charts/block diagrams). - 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. XC Science – charts and graphs ICT databases

Y3 Notes and Guidance (non-statutory)

Number and place value	Addition and subtraction	Multiplication and division	Fractions	Measurement	Geometry: properties of shapes	Statistics
Pupils now use multiples of 2, 3, 4, 5, 8, 10, 50 and 100. They use larger numbers to at least 1000, applying partitioning related to place value using varied and increasingly complex problems. Using a variety of representations, including those related to measure, pupils continue to count in ones, tens and hundreds, so that they become fluent in the order and place value of numbers to 1000.	Pupils practise solving varied addition and subtraction questions. Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent (see Appendix 1).	Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables. Pupils develop efficient mental methods, for example, using commutativity and associativity (for example, $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and multiplication and division facts (for example, using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts ($30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$). Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits? 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).	Pupils connect tenths to place value, decimal measures and to division by 10. They begin to understand unit and non-unit fractions as numbers on the number line, and deduce relations between them, such as size and equivalence. They should go beyond the [0] interval, including relating this to measure. Pupils understand the relation between unit fractions as operators (fractions of), and division by integers. They continue to recognise fractions in the context of parts of a whole, numbers, measurements, a shape, and unit fractions as a division of a quantity. Pupils practise adding and subtracting fractions with the same denominator through a variety of increasingly complex problems to improve fluency.	Pupils continue to measure using the appropriate tools and units, progressing to using a wider range of measures, including comparing and using mixed units (for example, 1 kg and 200g) and simple equivalents of mixed units (for example, 5m = 500cm). The comparison of measures should also include simple scaling by integers (for example, a given quantity or measure is twice as long or five times as high) and this connects to multiplication. Pupils continue to become fluent in recognising the value of coins, by adding and subtracting amounts, including mixed units, and giving change using manageable amounts. They record £ and p separately. The decimal recording of money is introduced formally in year 4. Pupils use both analogue and digital 12-hour clocks and record their times. In this way they become fluent in and prepared for using digital 24-hour clocks in year 4.	Pupils' knowledge of the properties of shapes is extended at this stage to symmetrical and non-symmetrical polygons and polyhedra. . They should be able to describe the properties of 2-D and 3-D shapes using accurate language, including lengths of lines and acute and obtuse for angles greater or lesser than a right angle.	Pupils understand and use simple scales (for example, 2, 5, 10 units per cm) in pictograms and bar charts with increasing accuracy. They continue to interpret data presented in many contexts.

Parkgate adapted Year 4 programme of study (statutory requirements)

Number and place value	Addition and subtraction	Multiplication and division	Fractions (including decimals)	Measurement	Geometry: properties of shapes	Geometry: position and direction	Statistics
Pupils should be taught to: ▪ count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number ▪ count in multiples of 6, 7, 9, 25 and 1000 ▪ find 10, 100, 1000 more or less than a given number ▪ count backwards through zero to include negative numbers ▪ recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) ▪ order and compare numbers beyond 1000 (4 digits only) ▪ identify, represent and estimate numbers using different representations ▪ round any number to the nearest 10, 100 or 1000 ▪ solve number and practical problems that involve all of the above and with increasingly large positive numbers ▪ read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value. Include to 1000 (M) XC history – Romans Music counting a beat	Pupils should be taught to: ▪ add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate ▪ estimate and use inverse operations to check answers to a calculation ▪ solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why. ▪ Apply number bonds to 10, 20 and 100 in a variety of contexts.	Pupils should be taught to: ▪ recall multiplication and division facts for multiplication tables up to 12×12 ▪ use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers ▪ recognise and use factor pairs and commutativity in mental calculations ▪ multiply two-digit and three-digit numbers by a one-digit number using formal written layout ▪ solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects	Pupils should be taught to: ▪ recognise and show, using diagrams, families of common equivalent fractions ▪ count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten. ▪ solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number ▪ add and subtract fractions with the same denominator ▪ recognise and write decimal equivalents of any number of tenths or hundredths ▪ recognise and write decimal equivalents to $\frac{1}{4}$; $\frac{1}{2}$; $\frac{3}{4}$ ▪ find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths ▪ round decimals with one decimal place to the nearest whole number ▪ compare numbers with the same number of decimal places up to two decimal places ▪ solve simple measure and money problems involving fractions and decimals to two decimal places. ▪ recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators	Pupils should be taught to: ▪ 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 ▪ read, write and convert time between analogue and digital 12 and 24-hour clocks ▪ solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days. ▪ compare durations of events [for example to calculate the time taken by particular events or tasks]. INTRODUCE DIGITAL 12/24 HOUR CLOCK XC PE - time	Pupils should be taught to: ▪ compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes ▪ identify acute and obtuse angles and compare and order angles up to two right angles by size ▪ identify lines of symmetry in 2-D shapes presented in different orientations ▪ complete a simple symmetric figure with respect to a specific line of symmetry.	Pupils should be taught to: ▪ describe positions on a 2-D grid as coordinates in the first quadrant ▪ describe movements between positions as translations of a given unit to the left/right and up/down ▪ plot specified points and draw sides to complete a given polygon. XC Geography map work	Pupils should be taught to: ▪ 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 XC science sound ICT spreadsheets and graphs

Y4 Notes and Guidance (non-statutory)

Number and place value	Addition and subtraction	Multiplication and division	Fractions (including decimals)	Measurement	Geometry: properties of shapes	Geometry: position, and direction	Statistics
Using a variety of representations, including measures, pupils become fluent in the order and place value of numbers beyond 1000, including counting in tens and hundreds, and maintaining fluency in other multiples through varied and frequent practice. They begin to extend their knowledge of the number system to include the decimal numbers and fractions that they have met so far. They connect estimation and rounding numbers to the use of measuring instruments. Roman numerals should be put in their historical context so pupils understand that there have been different ways to write whole numbers and that the important concepts of zero and place value were introduced over a period of time.	Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency (see Mathematics Appendix 1).	Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency. Pupils practise mental methods and extend this to three-digit numbers to derive facts (for example $600 \div 3 = 200$ can be derived from $2 \times 3 = 6$). Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers (see Mathematics Appendix 1). Pupils write statements about the equality of expressions (for example, use the distributive law $39 \times 7 = 30 \times 7 + 9 \times 7$ and associative law $(2 \times 3) \times 4 = 2 \times (3 \times 4)$). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations for example, $2 \times 6 \times 5 = 10 \times 6 = 60$. Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children.	Pupils should connect hundredths to tenths and place value and decimal measure. They extend the use of the number line to connect fractions, numbers and measures. Pupils understand the relation between non-unit fractions and multiplication and division of quantities, with particular emphasis on tenths and hundredths Pupils make connections between fractions of a length, of a shape and as a representation of one whole or set of quantities. Pupils use factors and multiples to recognise equivalent fractions and simplify where appropriate (for example, $\frac{6}{9} = \frac{2}{3}$ or $\frac{1}{4} = \frac{2}{8}$). Pupils continue to practice adding and subtracting fractions with the same denominator, to become fluent through a variety of increasingly complex problems beyond one whole. Pupils are taught throughout that decimals and fractions are different ways of expressing numbers and proportions. Pupils' understanding of the number system and decimal place value is extended at this stage to tenths and then hundredths. This includes relating the decimal notation to division of whole number by 10 and later 100. They practise counting using simple fractions and decimal fractions, both forwards and backwards. Pupils learn decimal notation and the language associated with it, including in the context of measurements. They make comparisons and order decimal amounts and quantities that are expressed to the same number of decimal places. They should be able to represent numbers with one or two decimal places in several ways, such as on number lines.	Pupils build on their understanding of place value and decimal notation to record metric measures, including money. They use multiplication to convert from larger to smaller units. Perimeter can be expressed algebraically as $2(a + b)$ where a and b are the dimensions in the same unit. They relate area to arrays and multiplication.	Pupils to classify shapes using geometrical properties, extending to classifying different triangles (for example, isosceles, equilateral, scalene) and quadrilaterals (for example, parallelogram, rhombus, trapezium). Pupils compare and order angles in preparation for using a protractor and compare lengths and angles to decide if a polygon is regular or irregular. Pupils draw symmetric patterns to become familiar with different orientations of lines of symmetry.	Pupils draw a pair of axes in one quadrant, with equal scales and integer labels. They read, write and use pairs of coordinates, for example (2, 5),	Pupils understand and use a greater range of scales in their representations. Pupils begin to relate the graphical representation of data to recording change over time.

Parkgate updated Year 5 programme of study (statutory requirements)

Number and place value	Addition and subtraction	Multiplication and division	Fractions (including decimals and percentages)	Measurement	Geometry: properties of shapes	Geometry: position and direction	Statistics
Pupils should be taught to: - Understand the magnitude of numbers above 1,000,000 - read, write, order and compare 5 digit numbers and numbers to 1 000 000 and determine the value of each digit - count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 - interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero - round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 - solve number problems and practical problems that involve all of the above - read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	Pupils should be taught to: - add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) where appropriate - add and subtract numbers mentally with increasingly large numbers - use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy - solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.	Pupils should be taught to: - Recall multiplication and division facts up to 12×12 - identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. - know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers - establish whether a number up to 100 is prime and recall prime numbers up to 19 - multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers - multiply and divide numbers mentally drawing upon known facts - divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context - multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 - recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) - solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes - solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign - solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	Pupils should be taught to: - Recap add and subtract fractions with the same denominator. - compare and order fractions whose denominators are all multiples of the same number - identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths - recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$] - add and subtract fractions with the same denominator and multiples of the same number - multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams - read and write decimal numbers as fractions [for example, $0.71 = \frac{71}{100}$] - recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents - round decimals with two decimal places to the nearest whole number and to one decimal place - read, write, order and compare numbers with up to three decimal places - solve problems involving number up to three decimal places - recognise the per cent symbol (%) and understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with denominator 100, and as a decimal - solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and $\frac{3}{4}$ and those with a denominator of a multiple of 10 or 25. XC: Science-ratio (mixtures and solutions)	Pupils should be taught to: - convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) - understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints - measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres - calculate and compare the area of rectangles (including squares) using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes - estimate volume [for example, using 1 cm^3 blocks to build cuboids(including cubes)] and capacity[for example, using water] - solve problems involving converting between units of time - Read, write and convert time in a digital and analogue format. - use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation including scaling. XC:PE athletics XC:ICT images XC: Science: forces	Pupils should be taught to: - Compare and classify shapes. - 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 ($^\circ$) - identify: - angles at a point and one whole turn (total 360°) - angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°) - other multiples of 90° - use the properties of rectangles to deduce related facts and find missing lengths and angles - distinguish between regular and irregular polygons based on reasoning about equal sides and angles. XC: DT: moving toys	Pupils should be taught to: - 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. - show position on a 4 quadrant grid.	Pupils should be taught to: - solve comparison, sum and difference problems using information presented in a line graph - complete, read and interpret information in tables, including timetables XC: ICT, data

Y5 Notes and Guidance (non-statutory)

Number and place value	Addition and subtraction	Multiplication and division	Fractions (including decimals and percentages)	Measurement	Geometry: properties of shapes	Geometry: position and direction	Statistics
Pupils identify the place value in large whole numbers. They continue to use number in context, including measurement. Pupils extend and apply their understanding of the number system to the decimal numbers and fractions that they have met so far. They should recognise and describe linear number sequences (for example, 3, 3 ½, 4, 4 1/2 ...), including those involving fractions and decimals, and find the term-to-term rule in words (for example, add ½) To solve simple algebraic problems (from year 6)	Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency (see Mathematics Appendix 1). They practise mental calculations with increasingly large numbers to aid fluency (for example, 12 462 – 2 300 = 10 162).	Pupils practise and extend their use of the formal written methods of short multiplication and short division (see Mathematics Appendix 1). They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations. They use and understand the terms factor, multiple and prime, square and cube numbers. Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (for example, $98 \div 4 = 98/4 = 24 \text{ r } 2 = 24 \frac{1}{2} = 24.5 \approx 25$). Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres. Distributivity can be expressed as $a(b + c) = ab + ac$. They understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements (for example, $4 \times 35 = 2 \times 2 \times 35$; $3 \times 270 = 3 \times 3 \times 9 \times 10 = 9^2 \times 10$). Pupils use and explain the equals sign to indicate equivalence, including in missing number problems (for example, $13 + 24 = 12 + 25$; $33 = 5 \times \square$).	Pupils should be taught throughout that percentages, decimals and fractions are different ways of expressing proportions. They extend their knowledge of fractions to thousandths and connect to decimals and measures. Pupils connect equivalent fractions > 1 that simplify to integers with division and other fractions > 1 to division with remainders, using the number line and other models, and hence move from these to improper and mixed fractions. Pupils connect multiplication by a fraction to using fractions as operators (fractions of), and to division, building on work from previous years. This relates to scaling by simple fractions, including fractions > 1. Pupils practise adding and subtracting fractions to become fluent through a variety of increasingly complex problems. They extend their understanding of adding and subtracting fractions to calculations that exceed 1 as a mixed number. Pupils continue to practise counting forwards and backwards in simple fractions. Pupils continue to develop their understanding of fractions as numbers, measures and operators by finding fractions of numbers and quantities. Pupils extend counting from year 4, using decimals and fractions including bridging zero, for example on a number line. Pupils say, read and write decimal fractions and related tenths, hundredths and thousandths accurately and are confident in checking the reasonableness of their answers to problems. They mentally add and subtract tenths, and one-digit whole numbers and tenths. They practise adding and subtracting decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 (for example, $0.83 + 0.17 = 1$).	Pupils use their knowledge of place value and multiplication and division to convert between standard units. Pupils calculate the perimeter of rectangles and related composite shapes, including using the relations of perimeter or area to find unknown lengths. Missing measures questions such as these can be expressed algebraically, for example $4 + 2b = 20$ for a rectangle of sides 2 cm and b cm and perimeter of 20cm. Pupils calculate the area from scale drawings using given measurements. Pupils use all four operations in problems involving time and money, including conversions (for example, days to weeks, expressing the answer as weeks and days).	Pupils become accurate in drawing lines with a ruler to the nearest millimetre, and measuring with a protractor. They use conventional markings for parallel lines and right angles. Pupils use the term diagonal and make conjectures about the angles formed between sides, and between diagonals and parallel sides, and other properties of quadrilaterals, for example using dynamic geometry ICT tools. Pupils use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems.	Pupils recognise and use reflection and translation in a variety of diagrams, including continuing to use a 2-D grid and coordinates in the first quadrant. Reflection should be in lines that are parallel to the axes.	Pupils connect their work on coordinates and scales to their interpretation of time graphs. They begin to decide which representations of data are most appropriate and why.

Parkgate adapted Year 6 programme of study (statutory requirements)

Number and place value Pupils should be taught to: - 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.	Addition, subtraction, multiplication and division Pupils should be taught to: - multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication where appropriate - 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 - 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. - identify common factors, common multiples and prime numbers - use their knowledge of the order of operations to carry out calculations involving the four operations - solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why - solve problems involving addition, subtraction, multiplication and division - use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.	Fractions (including decimals and percentages) Pupils should be taught to: Show fractions in a variety of representations - 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, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$] - divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$] - identify the value of each digit to three decimal places and 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 - recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.	Ratio and proportion Pupils should be taught to: - 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 such as 15% of 360] and the use of 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 Pupils should be taught to: - use simple formulae - generate and describe linear number sequences - express missing number problems algebraically - find pairs of numbers that satisfy an equation with two unknowns - enumerate possibilities of combinations of two variables	Measurement Pupils should be taught to: Understand and use approximate equivalences between metric and imperial units. - solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate - 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 up to three decimal places - 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 centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units [for example mm^3 and km^3]. XC-science	Geometry: properties of shapes Pupils should be taught to: Recap 2 quadrant coordinate grid - draw 2-D shapes using given dimensions and angles - recognise, describe and 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 circles, including radius, diameter and circumference and know that the diameter is twice the radius - recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. XC-Art Mosaics	Geometry: position, and direction Pupils should be taught to: - 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. XC-Geography Map work	Statistics Pupils should be taught to: - interpret and construct pie charts and line graphs and use these to solve problems - calculate and interpret the mean as an average. XC-Science
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Y6 Notes and Guidance (non-statutory)

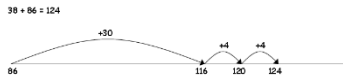
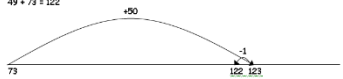
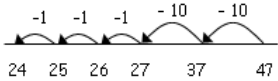
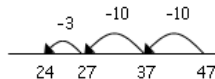
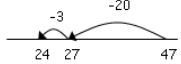
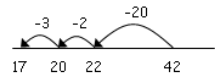
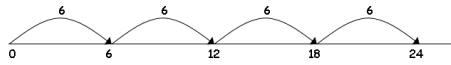
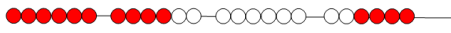
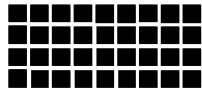
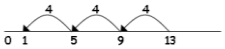
Number and place value	Addition, subtraction, multiplication and division	Fractions (including decimals and percentages)	Ratio and proportion	Algebra	Measurement	Geometry: properties of shapes	Geometry: position and direction	Statistics
Pupils use the whole number system, including saying, reading and writing numbers accurately.	Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division (see Mathematics Appendix 1). They undertake mental calculations with increasingly large numbers and more complex calculations. Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency. Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc, but not to a specified number of significant figures. Pupils explore the order of operations using brackets; for example, $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$. Bidmas Common factors can be related to finding equivalent fractions.	Pupils should practise, use and understand the addition and subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator. They should start with fractions where the denominator of one fraction is a multiple of the other (for example, $\frac{1}{2} + \frac{1}{8} = \frac{5}{8}$) and progress to varied and increasingly complex problems. Pupils should use a variety of images to support their understanding of multiplication with fractions. This follows earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, for example as parts of a rectangle. Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example, if $\frac{1}{4}$ of a length is 36cm, then the whole length is $36 \times 4 = 144\text{cm}$). They practise calculations with simple fractions and decimal fraction equivalents to aid fluency, including listing equivalent fractions to identify fractions with common denominators. Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction (for example, $3 \div 8 = 0.375$). For simple fractions with recurring decimal equivalents, pupils learn about rounding the decimal to three decimal places, or other appropriate approximations depending on the context. Pupils multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers. Pupils multiply decimals by whole numbers, starting with the simplest cases, such as $0.4 \times 2 = 0.8$, and in practical contexts, such as measures and money. Pupils are introduced to the division of decimal numbers by one-digit whole number, initially, in practical contexts involving measures and money. They recognise division calculations as the inverse of multiplication. Pupils also develop their skills of rounding and estimating as a means of predicting and checking the order of magnitude of their answers to decimal calculations. This includes rounding answers to a specified degree of accuracy and checking the reasonableness of their answers.	Pupils recognise proportionality in contexts when the relations between quantities are in the same ratio (for example, similar shapes, recipes). Pupils link percentages or 360° to calculating angles of pie charts. Pupils should consolidate their understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems. They might use the notation a:b to record their work. Pupils solve problems involving unequal quantities for example, 'for every egg you need three spoonfuls of flour', '$\frac{3}{5}$ of the class are boys'. These problems are the foundation for later formal approaches to ratio and proportion.	Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: - missing numbers, lengths, coordinates and angles - formulae in mathematics and science - equivalent expressions (for example, $a + b = b + a$) - generalisations of number patterns - number puzzles (for example, what two numbers can add up to).	Pupils connect conversion (for example, from kilometres to miles) to a graphical representation as preparation for understanding linear/proportional graphs. They know approximate conversions and are able to tell if an answer is sensible. Using the number line, pupils use, add and subtract positive and negative integers for measures such as temperature. They relate the area of rectangles to parallelograms and triangles, for example, by dissection, and calculate their areas, understanding and using the formulae (in words or symbols) to do this. Pupils could be introduced to compound units for speed, such as miles per hour, and apply their knowledge in science or other subjects as appropriate.	Pupils draw shapes and nets accurately, using measuring tools and conventional markings and labels for lines and angles. Pupils describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements. These relationships might be expressed algebraically for example, $d = 2 \times r$; $a = 180 - (b + c)$.	Pupils draw and label a pair of axes in all four quadrants with equal scaling. This extends their knowledge of one quadrant to all four quadrants, including the use of negative numbers. Pupils draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates using the properties of shapes. These might be expressed algebraically for example, translating vertex (a, b) to (a-2, b+3); (a, b) and (a+d, b+d) being opposite vertices of a square of side d.	Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts. Pupils both encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects. They should connect conversion from kilometres to miles in measurement to its graphical representation. Pupils know when it is appropriate to find the mean of a data set

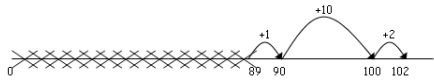
Mathematics Vocabulary Ladder

Year 2		Year 3		Year 4		Year 5		Year 6
Digit	Width	Hundreds	Polyhedra	Thousands	Equilateral	Million(s)	Quadrilateral	Interval
Numeral	Metre	Multiple(s)	Acute	Round	Parallelogram	Roman Numerals	Polygon	Long division
Multiple	Centimetre	Inverse	Obtuse	Rounding	Rhombus	to 1000 'M'	Polyhedron	Multi-step
Commutative	Millimetre	Operations	Reflex	Negative	Trapezium	Linear sequence	Polyhedra	Common factors
Place value	Litre	Integer(s)	Reflection	Factor	Protractor	Power(s)	Point	Common multiples
Step	Millilitre	Decimal(s)	Interpret	Factor pairs	Regular	Prime	Reflection	Simplify
Counting	Degrees	Remainder	Scale	Distributive	Irregular	Complement	180°	Degrees of accuracy
>Greater than	Celsius	Fifths		Associative	Coordinates	Composite	360°	mm3
<Less than	Thermometer	Sixths		Derive	Quadrant	Prime factor	X-axis	km3
Partition	Price	Sevenths		Remainder	Plot	Square(d)	Y-axis	Speed
Place holder	Cost	Eighths		Hundredth(s)	Grid	Cube(d)	Interpret	mph
Estimate	Amount	Tenths		Decimal	Translate	Equivalence	Data	m/s km/h
Estimation	Change	Numerator		Equivalents	Translation	Mixed number(s)	Category(ies)	Quadrant(s)
Inverse	Vertical	Denominator		Decimal places	Axis/axes	Thousandths	Scale	Dissect(ion)
Array	Horizontal	Order		Proportion	Scale	Percent		Net(s)
Calculate	Vertices	Unit fraction		Convert	Label	Percentage(s)		Radius
Multiplication	Edges	Non-unit fraction		Conversion	Graph	Metric		Diameter
Division	Quadrilateral	Millimetre		Rectilinear shape		Imperial		Circumference
Times tables	Polygon	Perimeter		Dimensions		Inch		Vertically opposite
Third(s)	Prism	Am/pm/Duration		Kilometre		Foot		Complementary
Sharing	Cone	Noon		24-hour clock		Yard		Angles
Grouping	Symmetry	Midnight		Roman numerals		Mile		Pie chart
Equivalent	Straight	Analogue		Classify		Pound (lb)		Mean
Half as much	Curved	Digital		Polygon		Pint		Average
Twice as much	Rotate	Orientation		Pentagon		cm2		Data set
Numerator	Rotation	Degree(s)		Hexagon		cm3		Ratio
Denominator	Angle	Right angle		Heptagon		m2		Proportion
Analogue	Right angle	Perpendicular		Octagon		m3		Relative size
Five/ten/ ¼	Pictogram	Parallel		Nonagon		Orientation		Scale factor
Past/to	Tally	Horizontal		Decagon		Degree(s)		Algebra
Clockwise	Chart	Vertical		Polyhedron		Right angle		Symbol
Anticlockwise	Block	Quadrilateral		Polyhedra		Perpendicular		Formula(e)
Gram	Diagram	Polygon		Acute		Parallel		Sequence
Kilogram	Table	Polyhedron		Obtuse		Diagonal		Algebraic
Height	Data			Isosceles		Horizontal		Equation
	Category			Scalene		Vertical		Variable
								Constant

Resources we use

- TT Rock stars / Numbots
- Google Classroom – Share documents with pupils, set assignments for pupils to complete, set weekly homework, share links to resources for pupils to use, Share lesson resources electronically.
- Google Drive – Class drives, Staff shared drives, personal file storage drives.
- Chromebooks – 4 Class sets upstairs, 1 class set downstairs – Pupils access to Google Classroom and the Internet.
- HfL planning suite – adapted to the needs of the children
- Collins SATs revision guides – given to Y6 students each year to aid their independent/ home revision
- SAM Learning – online resource to aid SATs revision at home.
- Purple Mash

	Addition	Subtraction	Multiplication	Division
Y3	Number line Children will continue to use empty number lines with increasingly large numbers, including compensation where appropriate. ✓ Count on from the largest number irrespective of the order of the calculation.  $86 + 86 = 172$ ✓ Compensation  $49 + 73 = 122$ Informal methods Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies. Adding by partitioning $67 + 24 = 91$ $60 + 20 = 80$ $7 + 4 = 11$ $80 + 11 = 91$ Partitioning can be demonstrated using arrow cards. Formal methods Adding the units first.	Number line Children will continue to use empty number lines with increasingly large numbers. Children will begin to use number lines to support calculations. Children will begin to use empty number lines to support calculations. Counting back: ✓ First counting back in tens and ones. $47 - 23 = 24$  ✓ Then helping children to become more efficient by subtracting the units in one jump (by using the known fact $7 - 3 = 4$). $47 - 23 = 24$  ✓ Subtracting the tens in one jump and the units in one jump. $47 - 23 = 24$  ✓ Bridging through ten can help children become more efficient. $42 - 25 = 17$  Counting on: The number line should still show 0 so children can cross out the section from 0 to the smallest number. They then associate this method with 'taking away'. Children will begin to use informal pencil and paper methods (jottings).	Informal methods Children will continue to use: ✓ Repeated addition 4 times 6 is $6 + 6 + 6 + 6 = 24$ or 4 lots of 6 or 6×4 Children should use number lines or bead bars to support their understanding.   ✓ Arrays Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.  $9 \times 4 = 36$ $9 \times 4 = 36$ ✓ Problem solving e.g. Find a ribbon that is 4 times as long as the blue ribbon  ✓ Using symbols to stand for unknown numbers to complete equations using inverse operations $\square \times 5 = 20$ $3 \times \triangle = 18$ $\square \times \bigcirc = 32$ ✓ Partitioning → $TU \times U$ $38 \times 5 = 190$	Informal methods Ensure that the emphasis in Y3 is on grouping rather than sharing. Children will continue to use: ✓ Repeated subtraction using a number line Children will use an empty number line to support their calculation. $24 \div 4 = 6$  Children should also move onto calculations involving remainders. $13 \div 4 = 3 \text{ r } 1$  ✓ Using symbols to stand for unknown numbers to complete equations using inverse operations $26 \div 2 = \square$ $24 \div \triangle = 12$ $\square \div$ $10 = 8$

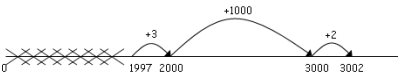
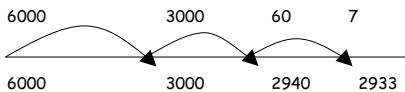
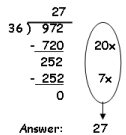
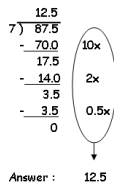
	Addition	Subtraction	Multiplication	Division
	$\begin{array}{r} 67 \\ + 24 \\ \hline 11 \text{ (7 + 4)} \\ \underline{80} \text{ (60 + 20)} \\ 91 \end{array}$ $\begin{array}{r} 267 \\ + 85 \\ \hline 12 \text{ (7 + 5)} \\ 140 \text{ (60 + 80)} \\ \underline{200} \\ 352 \end{array}$ 24 - refer to as 60 + 20	Informal methods ✓ Partitioning Partitioning - demonstrated using arrow cards 67 - 24 = 43 67 - 20 = 47 47 - 4 = 43 Formal methods Column method <u>no</u> exchange 67 <u>- 24</u> Refer to as 60 - 20 <u>43</u> Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used. Finding the difference. 102 - 89 = 13 	30 x 5 = 150 8 x 5 = 40 150 x 40 = 190	

	Addition	Subtraction	Multiplication	Division
Y4	✓ Carry below the line. $\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ 1 \end{array}$ $\begin{array}{r} 783 \\ + 42 \\ \hline 825 \\ 1 \end{array}$ Using similar methods, children will: ✓ add several numbers with different numbers of digits; ✓ begin to add two or more three-digit sums of money, with or without adjustment from the pence to the pounds; ✓ know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. £3.59 + 78p. $38 + 86 = 124$ $\begin{array}{r} +30 \quad +4 \quad +4 \\ 86 \quad 116 \quad 120 \quad 124 \end{array}$ $49 + 73 = 122$ +50 $\begin{array}{r} \\ \\ \hline -1 \end{array}$ 73 122 123	$102 - 89 = 13$ $\begin{array}{r} +1 \quad +10 \quad +2 \\ 89 \quad 90 \quad 100 \quad 102 \end{array}$ $102 - 89 = 13$ $\begin{array}{r} +1 \\ 12 \quad -90 \quad 102 \end{array}$ ✓ Partitioning and decomposition $\begin{array}{r} 754 \\ - 86 \\ \hline \end{array}$ Step 1 $700 + 50 + 4$ $- \quad 80 + 6$ Step 2 $700 + 40 + 14$ (adjust from T to U) $- \quad 80 + 6$ Step 3 $600 + 140 + 14$ (adjust from H to T) $- \quad 80 + 6$ $600 + 60 + 8 = 668$ This would be recorded by the children as $\begin{array}{r} 600 \quad + \quad 140 \quad + \quad 14 \\ 754 \\ - 86 \\ \hline 600 \quad + \quad 60 \quad + \quad 8 = 668 \end{array}$ ✓ Decomposition $\begin{array}{r} 6141 \\ 754 \\ - 86 \\ \hline 668 \end{array}$ Children should: ✓ be able to subtract numbers with different numbers of digits; ✓ using this method, children should also begin to find the difference between two three-digit sums of money, with or without 'adjustment' from the pence to the pounds; ✓ know that decimal points should line up under each other.	Children will continue to use arrays where appropriate leading into the grid method of multiplication. ✓ Grid method TU x U (Short multiplication - multiplication by a single digit) 23×8 Children will approximate first 23×8 is approximately $25 \times 8 = 200$ $\begin{array}{r} \times \quad 20 \quad 3 \\ 8 \quad \boxed{160} \quad \boxed{24} \\ \hline 160 \\ + 24 \\ \hline 184 \end{array}$	Children will develop their use of repeated subtraction to be able to subtract multiples of the divisor. Initially, these should be multiples of 10s, 5s, 2s and 1s - numbers with which the children are more familiar. $72 \div 6$ Moving onto: Then onto the vertical method: Short division TU ÷ U $72 \div 3$ Leading to subtraction of other multiples. $96 \div 6$ Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2. Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division.

	Addition	Subtraction	Multiplication	Division
	Use place value headings initially.	$ \begin{array}{r} \text{£}8.95 = 8 + 0.9 + 0.05 \\ \text{£}4.38 = 4 + 0.3 + 0.08 \\ \hline = 8 + 0.8 + 0.15 \quad (\text{adjust from T to U}) \\ \text{£}4.38 = 4 + 0.3 + 0.08 \\ \hline = \text{£}4.67 \end{array} $ leading to $ \begin{array}{r} 8.95 \\ - 4.38 \\ \hline 4.57 \end{array} $		
		Use place value headings initially.		

For all + - x operations we will continue to use number line method alongside.

	Addition	Subtraction	Multiplication	Division
Y5	Children should extend the carrying method to numbers with at least four digits. $\begin{array}{r} 587 \\ + 475 \\ \hline 1062 \\ 11 \end{array}$ $\begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 111 \end{array}$ Using similar methods, children will: ✓ add several numbers with different numbers of digits; ✓ begin to add two or more decimal fractions with up to three digits and the same number of decimal places; ✓ know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m - 280 cm. Go lower for SEN or BA.	Partitioning and decomposition Children who are using exchanging answers should start with: Step 1 $754 = 700 + 50 + 4$ $- 286 \quad - 200 + 80 + 6$ Step 2 $700 + 40 + 14$ (adjust from T to U) $- 200 + 80 + 6$ Step 3 $600 + 140 + 14$ (adjust from H to T) $- 200 + 80 + 6$ $400 + 60 + 8 = 468$ This would be recorded by the children as $\begin{array}{r} 600 + 140 + 14 \\ - 200 + 80 + 6 \\ \hline 400 + 60 + 8 = 468 \end{array}$ Decomposition $\begin{array}{r} 6141 \\ - 286 \\ \hline 468 \end{array}$ Children should: ✓ be able to subtract numbers with different numbers of digits; ✓ begin to find the difference between two decimal fractions with up to three digits and the same number of decimal places; know that decimal points should line up under each other Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used or for time. 1209 - 388 = 821	Grid method HTU x U (Short multiplication - multiplication by a single digit) 346×9 Children will approximate first 346×9 is approximately $350 \times 10 = 3500$ $\begin{array}{r} \times \quad 300 \quad 40 \quad 6 \\ 9 \quad \boxed{2700} \quad \boxed{360} \quad \boxed{54} \\ \hline 2700 \\ + 360 \\ + 54 \\ \hline 3114 \\ 11 \end{array}$ TU x TU (Long multiplication - multiplication by more than a single digit) 72×38 Children will approximate first 72×38 is approximately $70 \times 40 = 2800$ $\begin{array}{r} \times \quad 70 \quad 2 \\ 30 \quad \boxed{2100} \quad \boxed{60} \\ 8 \quad \boxed{560} \quad \boxed{16} \\ \hline 2100 \\ + 560 \\ + 60 \\ + 16 \\ \hline 2736 \\ 1 \end{array}$ Using similar methods, they will be able to multiply decimals with one decimal place by a single digit number, approximating first. They should know that the decimal points line up under each other. e.g. 4.9×3 Children will approximate first 4.9×3 is approximately $5 \times 3 = 15$ $\begin{array}{r} \times \quad 4 \quad 0.9 \\ 3 \quad \boxed{12} \quad \boxed{2.7} \\ \hline 12 \\ + 2.7 \\ \hline 14.7 \end{array}$ Move on to recording without grid eg. $\begin{array}{r} 72 \times 38 \quad 72 \\ \times 38 \\ \hline 2100 \\ 560 \\ 60 \\ 16 \\ \hline 2736 \end{array} \rightarrow \text{AA traditional long x check Y6.}$	Children will continue to use written methods to solve short division $TU \div U$. Children can start to subtract larger multiples of the divisor, e.g. $30x$ Chunking division HTU $\div$ U by short bus stop method: $\begin{array}{r} 032 \text{ r } 4 \\ 6 \overline{) 196} \\ \underline{6} \\ 196 \\ \underline{180} \\ 160 \\ \underline{150} \\ 100 \\ \underline{90} \\ 10 \end{array}$ 196 $\div$ 6 $\rightarrow$ 32 r 4 Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2. Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. Also express remainder as fraction eg. $32 \frac{4}{6}$.

	Addition	Subtraction	Multiplication	Division
Y6	Children should extend the carrying method to number with any number of digits. $\begin{array}{r} 7648 \\ + 1486 \\ \hline 9134 \\ 111 \end{array}$ $\begin{array}{r} 6584 \\ + 5848 \\ \hline 12432 \\ 111 \end{array}$ $\begin{array}{r} 42 \\ 6432 \\ 786 \\ 3 \\ + 4681 \\ \hline 11944 \\ 121 \end{array}$ Using similar methods, children will ✓ add several numbers with different numbers of digits; ✓ begin to add two or more decimal fractions with up to four digits and either one or two decimal places; ✓ know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. $401.2 + 26.85 + 0.71$.	Decomposition $\begin{array}{r} 3131 \\ 0467 \\ - 2684 \\ \hline 3783 \end{array}$ Children should: ✓ be able to subtract numbers with different numbers of digits; ✓ be able to subtract two or more decimal fractions with up to three digits and either one or two decimal places; ✓ know that decimal points should line up under each other. Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on or back using a number line should be used. $3002 - 1997 = 1005$  $6000 - 3067 =$ 	See Y5 for previous steps ThHTU x U (Short multiplication - multiplication by a single digit) 4346×8 Children will approximate first 4346×8 is approximately $4346 \times 10 = 43460$ $\begin{array}{r} \times \quad 4000 \quad 300 \quad 40 \quad 6 \\ 8 \quad 32000 \quad 2400 \quad 320 \quad 48 \\ \hline 32000 \\ + 2400 \\ + 320 \\ + 48 \\ \hline 34768 \end{array}$ HTU x TU (Long multiplication - multiplication by more than a single digit) 372×24 Children will approximate first 372×24 is approximately $400 \times 25 = 10000$ $\begin{array}{r} \times \quad 300 \quad 70 \quad 2 \\ 20 \quad 6000 \quad 1400 \quad 40 \\ 4 \quad 1200 \quad 280 \quad 8 \\ \hline 6000 \\ + 1400 \\ + 1200 \\ + 280 \\ + 40 \\ + 8 \\ \hline 8928 \end{array}$ Multiplying Decimals Using similar methods, they will be able to multiply decimals with up to two decimal places by a single digit number and then two digit numbers, approximating first. They should know that the decimal points line up under each other. For example: 4.92×3 Children will approximate first 4.92×3 is approximately $5 \times 3 = 15$ $\begin{array}{r} \times \quad 4 \quad 0.9 \quad 0.02 \\ 3 \quad 12 \quad 2.7 \quad 0.06 \\ \hline 12 \\ + 0.7 \\ + 0.06 \\ \hline 12.76 \end{array}$ EXTN - Compact Method $\begin{array}{r} 72 \\ \times 38 \\ \hline 176 \\ 2560 \\ \hline 2736 \end{array}$	Children will continue to use written methods to solve short division $TU \div U$ and $HTU \div U$. Long division HTU $\div$ TU $972 \div 36$  Any remainders should be shown as fractions, i.e. if the children were dividing 32 by 10, the answer should be shown as $3 \frac{2}{10}$ which could then be written as $3 \frac{1}{5}$ in it's lowest terms. Some children need the short division method: $\begin{array}{r} 16 \text{ r } 3 \\ 7 \overline{) 1145} \end{array}$ Extesion Extend to decimals with up to two decimal places. Children should know that decimal points line up under each other. $87.5 \div 7$ 

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should not be made to go onto the next stage if:

they are not ready.

they are not confident.

Children should be encouraged to approximate their answers before calculating.

Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

Year 6/7 Using and applying four operations through multi-step problems, including decimals, percentages and fractions.

Choose and use appropriate calculation strategies, including calculator use.

KS2 Maths Endpoints

Number and place value

Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit.

Round any whole number accurately.

Use negative numbers in context, and calculate intervals across zero.

Addition, subtraction, multiplication and division

Solve number and practical problems that involve all of the above.

Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.

Compare and order fractions.

Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.

Multiply simple pairs of proper fractions.

Divide proper fractions by whole numbers.

Associate a fraction with division and calculate decimal fraction equivalents for a simple fraction.

Identify the value of each digit in numbers given to three decimal places, and multiply and divide numbers by 10, 100 and 1000.

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.

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

Use simple formulae.

Generate and describe linear number sequences.

Express missing number problems algebraically.

Find pairs of numbers that satisfy an equation with two unknowns.

Enumerate possibilities of combinations of two variables.

Measurement

Solve problems involving the calculation and conversion of units of measure, up to three decimal places.

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.

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 and cubic metres.

Geometry

Draw 2D shapes using given dimensions and angles.

Recognise, describe and build simple 3D 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 circles, including radius, diameter and circumference and know that the diameter is twice the radius.

Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

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.