KS3 Maths Subject Overview

In KS3 we use the concrete, pictorial, abstract method of teaching. All topics where possible should be taught with practical resources and apparatus. Once a pupil is fluent in the use of concrete apparatus then images should be introduced to represent the concrete before introducing pupils to abstract concepts.

Key

BOLD-essential quality first learning

FBV

SMSC

Life Skills

E-safety

Resources

Topic overview	Year 7	Year 8	Year 9
Autumn 1	Numbers and the number system Addition Subtraction Multiplication	Numbers and the number system Addition Subtraction Multiplication	Numbers and the number system Addition Subtraction Multiplication
Autumn 2	Division Shape Fractions	Division Shape Fractions	Division Shape Fractions and percentages
Spring 1	Money Time Position and Direction	Money Time Position and Direction	Money Time Position and Direction
Spring 2	Statistics Length	Statistics Mass	Statistics Capacity
Summer 1	Numbers and the number system Addition incl money Subtraction incl money	Numbers and the number system Addition incl money Subtraction incl money	Working towards EL1 (see KS4 overview)
Summer 2	Multiplication incl money Division incl money Shape incl fractions Time	Multiplication incl money Division incl money Shape incl fractions Time	Working towards EL1 (see KS4 overview)

X	Y	Z

Numbers and the enumbe	**Year 7**	**Understand place value and the importance of 0 as a placeholder** **Order (on a number line) and compare (using < and >) numbers beyond 1000** **Understand the place value of each digit (up to four digits)** **Identify, represent and estimate numbers in different contexts: concrete and pictorial** **Round any number to nearest 10, 100 or 1000** **Begin to extend the number system to include decimals, could include decimal representations of money and measures** **Solve number and practical problems that involve all of the above and increasingly large positive numbers** **Read, write, order and compare (using < and >) numbers to at least 1 000 000 and understand the value of each digit and how this is determined by its position: use these numbers in context including measures** **SMSC-Place Value and the enormity of number, the concept of nothingness and infinity** **Life Skills-applying learning to money and measures**	**Read/write numbers to at least 100 in numerals and words** **Introduce larger numbers to further develop recognition of patterns within the number system: represent them in different ways, including spatial representations** **Recognise the place value of each digit in a two-digit number (tens, ones)** **Begin to understand zero as a placeholder** **Identify, represent and estimate numbers using different representations, including the number line** **SMSC-Place Value and the enormity of number, the concept of nothingness and infinity**	**Read and write numbers from 1 to 20 in digits and** words **– order on a number line)** **number squares, numberlines, counters, blocks, dice**
	Year 8	**Extend and apply understanding of the number system to decimals and fractions (revising those that have been met thus far) up to 3 decimal places** **Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 or 1000 000** **Interpret negative numbers in context** **Solve number problems and practical problems that involve all of the above** **Recognise and describe linear number sequences e.g. 3, 3 ½, 4, 4 ½ … numbers, fractions and decimals and explain the rule- term to term e.g. add ½** **SMSC-Place Value and the enormity and minuteness of number, the concept of nothingness and infinity** **LS-Understanding what a negative balance** **Place value cards, HTU templates, dice, dienes, triad cards**	**Order numbers on a number line to at least 100 emphasise explanation and reasoning** **Compare numbers using the < and > and = signs – from 0 *up to 100*** **Identify odd and even numbers** **Use place value and number facts to solve problems** **SMSC-Place Value and the enormity of number, the concept of nothingness and infinity** **Understanding of more and less**	**Count, read and write number to 100 in numerals and order these on a number line – begin to discuss place value of digits**

r S y st e m	Y e a r 9	Read (say), write, order and compare (using < and > and/or Venn and Carroll diagrams) numbers to at least 10 000 000 and understand the place value of each digit Understand and use place value for decimals, measures and integers of any size Round any number up to 10 000 000 to a required degree of accuracy Use negative numbers in context, and calculate intervals across 0 Identify the value of each digit in numbers given to 3 decimal places Solve practical and number problems that involve all of the above SMSC-Place Value and the enormity of number, the concept of nothingness and infinity Understanding the concept of more and less. Life Skills-applying learning to money and measures Place value cards, HTU templates, dice, Venn hoops, dienes	Use larger numbers to at least 1000 Compare, using the < > signs, numbers up to at least 1000 and order these numbers to affirm fluency Identify, estimate and represent numbers using different representations: concrete and pictorial and in different contexts e.g. measures Read and write numbers in numerals up to 1000 Understand place value and the importance of 0 as a placeholder Partition three-digit numbers and know the value of each digit: hundreds, tens and units Become fluent in place value of numbers up to 1000 Solve number problems and practical problems involving these ideas SMSC-Place Value and the enormity of number, the concept of nothingness and infinity Understanding the concept of more and less. Place value cards, HTU templates, dice, Venn hoops, dienes	Compare numbers using <, > and = and the language equal to, more than, less than (fewer), most, least Identify and represent numbers using concrete objects and pictorial representations, including the number line Recognise odd and even numbers actively encourage children to become pattern spotters SMSC-Place Value and the enormity of number Understanding the concept of more and less. Recognising pattern in the natural world Place value cards, HTU templates, dice, Venn hoops, dienes, numicon
A d d it i o n	Y e a r 7	Know and use different words for addition to develop fluency Use practical apparatus such as Dienes alongside written algorithms to revise addition of two- and three-digit numbers. Progress to using an efficient written method e.g. columnar addition Estimate and use inverse operations to check answers to a calculation Life skills-calculation and managing money	Recall and use addition facts to 20 fluently, and derive and use related facts up to 100 Know and use different words for addition including sum Add numbers using concrete objects (e.g. Numicon), pictorial representations leading to an expanded method that reinforces place value: recording in columns. Understand/show that addition is commutative/can be done in any order (the term commutative does not need to be used) Solve problems involving addition using apparatus and pictorial representations describing/explaining strategies FBV-rule of law (commutativity)	Understand adding as increasing numbers by counting on Understand the effect of adding 0 Read, write and interpret number sentences using + and = Add numbers using concrete objects Life skills-calculation and managing money
	Y e a r 8	Solve problems using single or multi-step, in different contexts (including money) deciding which operations to use and showing/explaining working in an organised way, posing similar problems for others to solve Add whole numbers with more than four digits (two numbers or more) and decimals to one- or two-decimal places using an efficient written method, columnar addition, where appropriate Use rounding to check answers to calculations and determine, in the context of the problem, levels of accuracy Life skills-calculation and managing C	Partition numbers in different ways (for example 23 = 13 + 10 or 20 + 3) and know the value of each digit to at least 100 Build on previous knowledge to partition larger numbers e.g. 146 = 100 + 40 + 6 or 130 + 16 (could use Dienes and/or Numicon) Use understanding of place value & partitioning to practise using columnar addition (with/ without exchange) up to 3 digits to become fluent Add numbers with up to three digits leading to columnar addition do not rush this begin to record in columns but not necessarily formally at first Life skills-calculation and managing money	Begin to recognise place value in numbers beyond 20 Know multiples of 10 and what the digits mean in a two-digit number Work out and memorise addition facts up to 10 and then up to 20 e.g. 4 = 2 + 2, 13 = 12 + 1 Add numbers using concrete objects pictorial representations – one- and two-digit numbers up to 20 Life skills-calculation and managing money

	Year 9	Solve multi-step problems (all four operations) in context (including money) deciding which operations and methods to use showing working and explain why Add whole numbers with more than four digits (two numbers or more) and decimals to one- or two-decimal places using an efficient written method, columnar addition, where appropriate Add and subtract positive and negative integers using the number line in context such as temperature Revise formal written methods of addition/subtraction including with decimals up to three places and calculations that involve different numbers of digits Round answers to a specific degree of accuracy, e.g. to the nearest 10, 20, 50 etc. but not to a specified number of significant figures Life skills-calculation and managing money SMSC meaning of money/value to different items - does value only mean money? Place value cards, HTU templates, dice, Venn hoops, dienes, plastic money, thermometers	Solve problems using single or multi-step, in different contexts (including money) deciding which operations to use and showing/explaining working in an organised way, posing similar problems for others to solve Add whole numbers with more than four digits (two numbers or more) and decimals to one- or two-decimal places using an efficient written method, columnar addition, where appropriate Use rounding to check answers to calculations and determine, in the context of the problem, levels of accuracy Life skills-calculation and managing money Place value cards, HTU templates, dice, Venn hoops, dienes, numicon	Solve one-step practical problems U + U, TU + U, TU + multiple of 10 using and showing working with objects or pictures Life skills-calculation and managing money Place value cards, HTU templates, dice, Venn hoops, dienes, numicon

Subtraction	**Year 7**	Know and use different words for subtraction to develop fluency Use practical apparatus such as Dienes alongside written algorithms to revise subtraction of numbers with up to four digits using an efficient written method - columnar subtraction where appropriate DO NOT RUSH CHILDREN TO FORMAL METHOD – ENSURE UNDERSTANDING IS SECURE Life skills-calculation and working out change	Know and use different words for subtraction including difference Subtract numbers using concrete objects (e.g. Numicon which is great for finding the difference), pictorial representations leading to an expanded method that reinforces place value: recording in columns supports place value - two-digit number and ones, two-digit number and tens, two two-digit numbers, three one-digit numbers Understand that subtraction is NOT commutative (cannot be done in any order) FBV-rule of law (commutativity) Life skills-calculation and working out change	Understand subtracting as decreasing numbers by counting back Understand the effect of subtracting 0 Read, write and interpret number sentences using - and = Subtract numbers using concrete objects Life skills-calculation and working out change
	Year 8	Estimate and/or round and use inverse operations to check answers to a calculation Solve one and two-step problems addition and subtraction problems in different contexts (including money) deciding which operations to use and showing/explaining working in an organised way, posing similar problems for others to solve SMSC-Posing questions Life skills-calculation and working out change	Understand the inverse relationship between addition and subtraction and use this to check subtraction by adding Solve subtraction problems using apparatus and describing strategies Find 10 or 100 less than a given number Use understanding of place value and partitioning to practise using columnar subtraction – with and without exchange – up to three digits to become fluent Life skills-calculation and working out change	Work out and memorise subtraction facts up to 10 and then up to 20 e.g. 4 – 2 = 2, 13 - 12 = 1 Subtract numbers using concrete objects pictorial representations – one- and two-digit numbers up to 20 Life skills-calculation and working out change
	Year 9	Subtract whole numbers with more than four digits and decimals to one- or two-decimal places using an efficient written method, columnar subtraction, where appropriate Solve multi-step problems (all four operations) in context (including money) deciding which operations and methods to use showing working and explain why SMSC-questioning and explaining Life skills-calculation and working out change Place value cards, HTU templates, dice, dienes,	Subtract numbers with up to three digits leading to columnar subtraction – do not rush this begin to record in columns but not necessarily formally at first Subtract amounts of money using both pounds and pence including mixed units Solve one and two-step problems (including in the context of money) and pose similar problems for others to solve choosing a suitable method/equipment and checking results Life skills-calculation and working out change	Solve one-step practical problems U - U, TU - U, TU - multiple of 10 using and showing working with objects or pictures Life skills-calculation and working out change Place value cards, HTU templates, dice, Venn hoops, dienes, numicon

Multiplication	**Year 7**	**Develop strategies to calculate multiplication facts to 10x10** **Use multiples of 2, 3, 4, 5, 8, 10, 50 and 100** **Use practical apparatus such as Dienes or Numicon alongside written algorithms (e.g. grid method) to multiply two-digit and three-digit numbers by a one-digit becoming fluent in the formal written method of short multiplication** **Solve multiplication problems in different contexts showing/explaining working and pose similar problems for others to solve** **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 e.g. number of choices of a meal on a menu (2 starters, 2 mains, 2 desserts – how many different menus?), or 3 cakes shared equally between 10 children** **FBV-rule of law (distributivity)** **Life skills-calculation**	**Count forwards in steps of 2, 3 and 5 from zero, and in tens from any number** **Use a variety of language to describe multiplication** **Understand multiplication as repeated addition using materials to form arrays, describe these and write corresponding number sentences** **Calculate and write mathematical statements for multiplication within the multiplication tables using the x and = signs** **Show that multiplication of two numbers can be done in any order (commutative)** **Solve problems involving multiplication using materials, arrays, repeated addition and mental methods including in the context of money** **FBV-rule of law (commutativity)** **Life skills-calculation**	**Understand multiplication as repeated addition (lots of, equal groups of) – could use the post box and Numicon plates to 'post' repeated amounts (counting in groups)** **Life skills-calculation**
	Year 8	**Identify multiples and factors, including all factor pairs of a number, and common factors of two numbers (use number track and multilink that can be re-formed in to a number square to highlight patterns)** **Practise and extend use of formal written methods of short multiplication** **Use long multiplication for ThHTU x TU numbers where appropriate** **Solve problems involving multiples and factors Solve multi-step problems involving multiplication choosing an appropriate method showing/explaining working** **Solve problems involving multiplication that involve scaling up by simple fractions and problems involving simple rates e.g. 3 times as much/more/further** **Life skills-calculation**	**Know and use words linked to multiplication** **Link representation of arrays to the grid method** **Multiply up to 2 digit x 2 digit numbers using grid method.** **Life skills-calculation**	**Understand multiplication as 'lots of' using concrete and pictorial methods.** **Begin to write number sentences such as 2 x 3 = 6** **Understand doubling numbers and quantities (e.g. double 4 = 8, double 4p = 8p, double 4cm = 8cm etc.)** **Life skills-calculation**
	Year 9	**Multiply multi-digit numbers up to 4-digits by a two-digit whole number using the formal written method of long multiplication** **Multiply decimal by whole numbers starting simply e.g. 0.4 x 2 in practical contexts** **Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places** **Multiply and divide one-digit numbers with up to 2 decimal places by one-digit and two-digit whole numbers including in context such as measure and money** **Solve multiplication and division multi-step problems in different contexts (including money), deciding which operations and methods to use and why** **Round answers to a specific degree of accuracy, e.g. to the nearest 10, 20, 50 etc. but not to a specified number of significant figures** Explore distributivity e.g. a (b + c) = ab + ac FBV-rule of law (distributivity) **Life skills-calculation, applying learning to money and measures**	**Solve simple multiplication problems in different contexts choosing and using an appropriate method, showing working and pose similar problems for others to solve** **Write and calculate mathematical statements for multiplication using knowledge of multiplication tables, including TU x U, progressing to more formal written methods such as the compact method** **Life skills-calculation**	**Solve one-step problems involving multiplication by working out the answer using concrete objects, pictorial representations and arrays with the support of the teacher** **2, 5, 10** **Life skills-calculation** **Place value cards, HTU templates, dice, Venn hoops, dienes, numicon, number lines, beadstrings**

Division	**Year 7**	Practise to become fluent in a written method for division (short division) - TU ÷ U including those with remainders Solve two-step problems in different contexts including those with remainders choosing the most appropriate method and showing/explaining working, pose similar problems for others to solve Understand remainders need to be rounded up or rounded down depending on the problem Solve problems involving multiples and factors Life skills-calculation	Use a variety of language to describe division Understand division as equal grouping describing and writing corresponding number sentences Calculate and write mathematical statements for division within the multiplication tables using the ÷ and = signs Show that division of two numbers cannot be done in any order (not commutative) Solve problems involving division using materials including in the context of money FBV-rule of law (commutativity) Life skills-calculation	Understand division as sharing using concrete resources SMSC-sharing Life skills-calculation
	Year 8	Know/use vocabulary of prime numbers, prime factors and composite (non-prime) numbers Establish whether a number up to 100 is a prime and recall prime numbers up to 19 Divide numbers with up to four-digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context Express remainders as fractions, decimals or by rounding depending on context of problem Life skills-calculation	Know and use words linked to division Write and calculate mathematical statements for division using knowledge of multiplication tables. Revise equal grouping – link to arrays e.g. how many equal groups of 4 are there in 16? Life skills-calculation	Understand division as grouping using both concrete and pictorial approach Solve one-step problems involving division by working out the answer using concrete objects, pictorial representations and arrays (how many equal groups of) with the support of the teacher Life skills-calculation SMSC-recognising pattern
	Year 9	Solve multi-step problems involving division, choosing an appropriate method showing/explaining working, including those where the answer needs to be rounded up or down depending on the context Solve problems involving division that involve scaling down by simple fractions & problems involving simple rates e.g. 3x shorter/less Divide numbers up to 4-digits by 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 Divide decimal numbers by one digit whole numbers initially in practical contexts involving money and measures recognizing division as the inverse of multiplication Use written division methods in cases where the answer has up to two decimal places Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy (reasonableness) Find the effect of dividing a one- or two-digit by 10 and 100; identifying the value of the digits in the answer as ones, tenths or hundredths Relate decimal notation to division of whole numbers by 10 and later 100 Life skills-calculation, applying learning to money and measures	Develop a reliable written method for division starting with division of TU ÷ U progressing to formal methods of short division Solve simple division problems in different contexts choosing and using an appropriate method, showing working and pose similar problems for others to solve Count backwards in steps of 2, 3 and 5 from zero, and in tens from any number Life skills-calculation	Find simple fractions e.g. half of objects, numbers and quantities (1/2 of 12, ½ of 12p, ½ of 12 cm, ½ of 12g) Life skills-calculation Fraction templates, 3D shapes split into fractions, numicon, fraction wall mat,

Fractions, ratio and pe	**Year 7**	Extend the number system to include fractions (unitary e.g. 1/3 and non-unitary 2/3) and order these on a number line: connect to measures and decimal representations e.g. 1.5 metres = 1 ½ metre Recognise and show, using diagrams, families of common equivalent fractions Express fractions of different shapes 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 Understand that fractions are a way of expressing proportion Find fractions of numbers and measures Compare and order fractions whose denominators are all multiples of the same number **Life Skills-applying learning to measures**	Link unitary fractions to equal sharing and grouping Write simple fractions, for example ½ of 6 = 3 and recognise the equivalence of 2/4 and ½ Recognise, find, name and write fractions ½, ¼, 2/4, ¾, 1/3 of a length Recognise, find, name and write fractions ½, ¼, 2/4, ¾, 1/3 of a set of objects or quantity **SMSC-sharing**	Recognise, find and name as a half as one of two equal parts of an object, shape or quantity(measures) Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity(measures)
	Year 8	Understand the link between fractions and decimals and that equivalent fractions >1 simplify to integers e.g. 8/4 = 2 and 9/4 = 2 ¼ integers with remainders: identify as improper and mixed fractions (use models and images including the number line) Recognise mixed numbers and improper fractions and convert one form to another and write mathematical statements > 1 as mixed numbers e.g. 2/5 + 4/5 = 6/5 = 1 1/5 Add and subtract fractions with the same denominator, and denominators that are multiples of the same number Extend understanding of adding and subtracting fractions to calculations that exceed 1 as a mixed number Multiply proper fractions and mixed numbers by whole numbers Understand that decimals are a way of expressing proportion Read and write decimal numbers as fractions e.g. 0.71 = 71/100 Establish link between fractions and decimals Round decimals with 1 place to the nearest whole number Compare numbers with the same number of decimal places up to two decimal places	Recognise that tenths arise from dividing an object into ten equal parts and in dividing one-digit numbers or quantities by 10 Connect tenths to place value, decimal measures and division by 10 (explore magnifying the number line/ruler e.g. 1cm = 10mm) Begin to understand and compare unit and non-unit fractions (and fractions with the same denominator) as numbers on the number line, working out relations between them such as size and equivalence Continue to recognise fractions in the context of parts of a whole, numbers, measurements and shapes 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 **Life Skills-applying learning to measures**	Link finding half and a quarter to equal grouping/division Understand that two halves make a whole Understand that four quarters make a whole

rcentages	Year 9	Solve simple measure and money problems involving decimals to two places Recognise and use thousandths and relate them to hundredths, tenths and their decimal equivalents Recognise the % symbol and understand that per cent relates to the 'number of parts per 100' and write percentages as a fraction with denominator of 100, and as a decimal fraction Solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5 4/5 and those fractions with a denominator of a multiple of 10 or 25 Make connections between fractions, decimals and percentages Use common factors to simplify fractions; use common multiples to express fractions in the same denomination Compare and order fractions, including fractions > 1 Divide proper fractions by whole numbers e.g. 1/3 ÷ 2 = 1/6 Associate a fraction with division and calculate decimal fraction equivalents e.g. 0.375 = 3/8 including rounding recurring decimals to an appropriate degree of accuracy depending on the context Recall and use equivalences between simple fractions, decimal and percentages, including in different contexts Solve problems involving the calculation of percentages e.g. in the context of measures, 15% of 360 and the use of percentages for comparison Life skills-percentages working out VAT, Income Tax etc., **applying learning to money and measures**	Recognise and show, using diagrams, equivalent fractions with small denominators Recognise unit fractions as a division of a quantity e.g. ¼ of 16kg (3b/a) Practise adding and subtracting fractions with the same denominator within one whole e.g. 1/7 + 5/7 = 6/7 Solve a variety of increasingly complex problems that involve all of the above to improve fluency	Link unitary fractions to equal sharing and grouping Write simple fractions, for example ½ of 6 = 3 and recognise the equivalence of 2/4 and ½ **SMSC-sharing** Fraction templates, 3D shapes split into fractions, numicon, fraction wall mat,

Shape	**Year 7**	Identify regular and irregular polygons based upon the length of their sides and the size of angles Distinguish between regular and irregular polygons based on reasoning about equal sides and angles Calculate the perimeter of rectangles & related composite shapes (made of squares/rectangles) Relate area to arrays/multiplication Solve problems that include the relationship between perimeter and area to find unknown lengths. Compare and classify geometric shapes based on their properties and sizes Understand horizontal and vertical lines Identify lines of symmetry in 2-D shapes presented in different orientations Draw symmetric patterns using a variety of media to become familiar with different orientations of lines of symmetry Recognise lines of symmetry in a variety of shapes and diagrams, including where the line of symmetry does not dissect the original shape Complete a simple symmetric figure with respect to a specific line of symmetry Investigate a general statement about shapes e.g. lines of symmetry = number of sides SMSC-recognising shape and pattern in the natural world FBV-recognising the importance of shape and pattern in different cultures and religions	Visualise, handle and identify regular and irregular 2-D shapes including everyday objects that are that shape Read and write names of 2-D shapes (aiming for correct spelling) Draw lines and shapes using a ruler Describe common features of shapes Identify, compare and sort shapes based upon their properties – use accurate mathematical vocabulary e.g. number of sides, straight sides (could link to sorting diagrams e.g. Venn, Carroll) Know that if position or orientation of a shape is changed its features do not change Identify line symmetry (in a vertical line) Draw, in different orientations, regular and irregular 2-D shapes accurately using a ruler, describe and label lengths Measure, in cm, lengths of sides of 2-D shape accurately SMSC-recognising shape and pattern in the natural world FBV-recognising the importance of shape and pattern in different cultures and religions Life Skills- measuring skills	Recognise, handle and name <u>common</u> 2-D shapes and recognise everyday objects that are that shape (e.g. rectangle, square, triangle, circle, hexagon) Understand that orientation and size do not change the properties of a shape SMSC-recognising shape and pattern in the natural world FBV-recognising the importance of shape and pattern in different cultures and religions
	Year 8	Name, compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties (Venn/Carroll diagrams) Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres Understand that perimeter can be expressed as twice the length plus the width or 2(a + b) where a and b are in the same unit Know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles Draw given angles, and measure them in degrees (◦) Identify angles at a point and one whole turn (total 360◦), at a point on a straight line and a half turn (total 180◦) Use conventional markings for parallel lines and right angles Use the properties of rectangles to deduce related facts and missing angles and lengths Use the term diagonal & make conjectures about the angles formed between sides, & between diagonals & parallel lines, & other properties of quadrilaterals, e.g. using dynamic geometry ICT tools SMSC-recognising shape and pattern in the natural world FBV-recognising the importance of shape and pattern in different cultures and religions Life skills-measuring skills	Visualise, name and identify 3-D shapes including everyday objects which are that shape Describe common features of 3-D shapes including the number and shape of faces, then number of edges and vertices Read and write names of 3-D shapes (aiming for correct spelling) Identify, compare and sort shapes based upon their properties Order and arrange combinations of mathematical objects in patterns and sequences (including shapes in different orientations) Name (from objects, drawings and photos) 3-D shapes in different orientations Make 3-D shapes (e.g. using Clixi and/or modelling materials) including using ICT symmetrical and non-symmetrical polyhedra Describe the properties of 3-D shapes using accurate mathematical language (faces, shape of faces, vertices and edges) (could include sorting diagrams – Venn and Carroll) SMSC-recognising shape and pattern in the natural world FBV-recognising the importance of shape and pattern in different cultures and religions	Create, copy, describe, continue and reorganise shape patterns and talk about/describe them Limit number of shapes Recognise, handle and name common 3-D shapes and recognise everyday objects that are that shape (e.g. cube, cuboid, sphere, pyramid) Describe shapes: describe similarities and differences SMSC-recognising shape and pattern in the natural world FBV-recognising the importance of shape and pattern in different cultures and religions

	Year 9	Find unknown angles (and lengths where appropriate) in any triangle, quadrilateral or regular polygon Illustrate and name parts of a circle, including radius, diameter and circumference and know that the diameter is twice the radius (relationships might be expressed algebraically, for example d = 2 x r; a = 180 – (b + c) Recognise that shapes with the same area can have different perimeters and vice versa Calculate the area of parallelograms and triangles – understand and use associated formulae in words or symbols SMSC-recognising shape and pattern in the natural world FBV-recognising the importance of shape and pattern in different cultures and religions	Describe the properties of shapes using accurate language including types of angles, symmetry, regular and irregular Identify right angles, recognise that two right angles make a half-turn, 3 make three-quarters of a turn and 4 make a complete turn Identify whether angles are greater or less than a right angle Identify horizontal and vertical lines and pairs of perpendicular and parallel lines Measure and then calculate the perimeter of simple shapes To know what diagonal means Identify acute and obtuse angles and compare and order angles up to 180° by size Revise understanding of angles as a measure of turn and that they are measured in degrees: that a right angle is 90°, whole turn is 360°, 1/2 a right angle is 45°, 1/3 of a right angle is 30° SMSC-recognising shape and pattern in the natural world FBV-recognising the importance of shape and pattern in different cultures and religions **Life Skills-measuring skills**	Recognise, handle and name 2D shapes circle, triangle, square, rectangle, pentagon, hexagon, rhombus, parallelogram, and trapezium. Recognise, handle and name, cube, cuboid, sphere, tetrahedron, square based pyramid, cone, triangular prism, hexagonal prism. Describe shapes: describe similarities and differences Create, copy, describe, continue and reorganise patterns with 3-D objects and talk about/describe them SMSC-recognising shape and pattern in the natural world FBV-recognising the importance of shape and pattern in different cultures and religions

Position and direction	**Year 7**	**Position and direction** Describe positions on a 2-D grid as co-ordinates in the first quadrant: draw a pair of axes with equal scales and integer labels Read, write and use pairs of co-ordinates, for example (2,5), including using co-ordinate plotting ICT tools 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 Life skills-being able to describe position	**Position and direction** Order and arrange combinations of mathematical objects in pattern and sequences (ensure these include shapes in different orientations) – describe using accurate mathematical language Use mathematical vocabulary to describe position, direction and 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) – should include pupils giving and following instructions and programming robots Begin to describe positions on a 2D grid. Life skills-being able to describe position	**Position and direction** Use everyday language to describe where things are/their position – over, under above, below, top, bottom, side, on, in outside, inside, around, in front, behind front, back, before, after, beside, next to opposite, apart, between, middle, edge corner, direction, left, right, up, down forwards, backwards, sideways, across – Link with SALT close, far, near, along, through, to, from, towards, away from Life skills-being able to describe position
	Year 8	Recognise and use reflection (lines that are parallel to the axes) in a variety of diagrams, including continuing to use a 2-D grid and co-ordinates in the first quadrant describe what has happened using the appropriate language, and know that the shape has not changed Recognise and use translation in a variety of diagrams, including continuing to use a 2-D grid and co-ordinates in the first quadrant describe what has happened using the appropriate language, and know that the shape has not changed Life skills-being able to describe position	Describe positions on a 2-D grid as co-ordinates in the first quadrant: draw a pair of axes with equal scales and integer labels Read, write and use pairs of co-ordinates, for example (2,5), including using co-ordinate plotting ICT tools 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 Life skills-being able to describe position	Revisit vocabulary from Year 7 Describe items as to the left of, to the right of. Name left hand and right hand. Understand that left and right are not the same to someone we are facing. Life skills-recognising left and right
	Year 9	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 Continue to plot specified points and draw sides to complete a given polygon Draw and label a pair of axes in all four quadrants with equal scaling Describe positions on the full coordinate grid (all four quadrants) Draw and label rectangles (incl. squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates using the properties of shape Draw and translate simple shapes on the coordinate plane, and reflect them in the axes (might be expressed algebraically e.g. translating vertex (a,b) to (a-2, b +3); (a,) and (a ÷ d, b + d) being opposite vertices of a square of side d) Life skills-being able to describe position	Recognise and use reflection (lines that are parallel to the axes) in a variety of diagrams, including continuing to use a 2-D grid and co-ordinates in the first quadrant describe what has happened using the appropriate language, and know that the shape has not changed Recognise and use translation in a variety of diagrams, including continuing to use a 2-D grid and co-ordinates in the first quadrant describe what has happened using the appropriate language, and know that the shape has not changed Life skills-being able to describe position	Revisit vocabulary from Year 7 Talk about objects that turn – connect turning clockwise with movement on a clock face Use everyday language to describe movement e.g. slide, roll, turn, stretch, bend Make whole, half, quarter and three-quarter turns Begin to name points on a 2D grid Life skills-being able to describe position

Length	**Year 7**	Convert between different units of length e.g. mm to cm, cm to m, m to km and vice versa using knowledge of place value and multiplying and dividing by 10, 100 and 1000 Draw and measure lines to the nearest mm Use all four operations to solve problems using decimal notation (including conversions) involving length selecting the most appropriate method and showing/explaining method Solve problems involving scaling Have an understanding of metric and imperial units **Life Skills- measuring skill** **FBV-diversity in use of different units of measure**	Choose and use appropriate standard units to estimate and measure lengths/heights accurately (m and cm) and to the nearest unit using rulers and measuring tapes Read a numbered scale and the numbers in between – read relevant scales to the nearest numbered unit Use the language of length/height and record measurements using standard abbreviations Compare and order lengths/heights and record the results using < > = Compare lengths/heights including simple multiples such as 'half as high'; 'twice as wide' Solve problems involving length/height using apparatus, describing strategies and showing working out(2b/a) Measure, using the appropriate tools and units, and compare lengths (m/cm/mm) – use <, >, = Extend to mixed units e.g. 1 metre and 200 cm Know simple equivalents e.g. 5m = 500cm Use scaling to increase measures e.g. twice as long or twice as high (link this to multiplication) Solve addition and subtraction problems involving length **Life Skills-measuring skills**	Move from using non-standard units to measure to manageable standard units Understand the difference between standard and non-standard units – to measure accurately a standard unit must be used Estimate lengths, widths or heights Begin to use measuring tools such as a ruler Compare and describe lengths and heights e.g. long/short, longer/shorter, tall/short, double/half Measure and begin to record lengths and heights using pictures, symbols or numbers Solve simple practical problems involving length and height (addition and subtraction of numbers up to 20) **Life Skills-measuring skills**
Mass	**Year 8**	Use suitable units/measuring equipment to estimate and measure masses in kilograms and grams Record masses as whole numbers and decimals e.g. 4125g as 4kg 125g or 4.125kg Round masses to nearest 10, 100, 1000 depending on the units used Convert masses: kg to g and g to kg Compare and order masses (could use Venn and Carroll diagrams and/or < > and number line link to circular scale) Solve problems involving mass explaining/showing working out. Convert between different units of mass e.g. kg and g, g and kg and vice versa using knowledge of place value and multiplying and dividing by 1000 Have an understanding of common metric and imperial units Use all four operations to solve problems using decimal notation (including conversions) involving mass selecting the most appropriate method and showing/explaining method (including reading scales) Solve problems involving scaling **Life Skills-measuring skills**	Choose and use appropriate standard units to estimate and measure mass accurately (g and kg) and to the nearest unit using weighing scales Read a numbered scale and the numbers in between – read relevant scales to the nearest numbered unit Use the language of mass and record measurements using standard abbreviations Compare and order masses and record the results using < > = Compare masses including simple multiples such as 'half as heavy'; 'twice as heavy' Solve problems involving mass using apparatus, describing strategies and showing working out **Life Skills-measuring skills**	Move from using non-standard units to measure to manageable standard units Understand the difference between standard and non-standard units – to measure accurately a standard unit must be used Estimate masses/weight – in the context of comparison Begin to use measuring tools such as measuring scales Compare and describe mass/weight e.g. heavy/light, heavier than/lighter than (Compare mass/weight saying which are heavier/lighter than a kilogram Measure and begin to record mass/weight using pictures, symbols or numbers Solve simple practical problems involving mass/weight (addition and subtraction of numbers up to 20) **Life Skills-measuring skills**

Capacity	**Year 9**	Use suitable units/measuring equipment to estimate and measure capacity in litres and millilitres Record capacities as whole numbers and decimals e.g. 4125ml as 4l 125ml or 4.125l Round capacities to nearest 10, 100, 1000 depending on the units used Convert capacities: ml to l and l to ml Compare and order capacities Work out and read a numbered and partially numbered measuring scale (3b/a) Solve problems involving capacity explaining/showing working out Use suitable units/measuring equipment to estimate and measure capacity in litres and millilitres Record capacities as whole numbers and decimals e.g. 4125ml as 4l 125ml or 4.125l Round capacities to nearest 10, 100, 1000 depending on the units used Convert capacities: ml to l and l to ml Compare capacities Work out and read a numbered and partially numbered measuring scale Solve problems involving capacity explaining/showing working out **Life Skills-measuring skills**	Choose and use appropriate standard units to estimate and measure capacity accurately (l and ml) and to the nearest unit using jugs and measuring cylinders Read a numbered scale and the numbers in between – read relevant scales to the nearest numbered unit Use the language of capacity/volume and record measurements using standard abbreviations Compare and order capacity/volume and record the results using < > = Compare lengths/heights including simple multiples such as 'half as full'; 'twice as full' Solve problems involving length/height using apparatus, describing strategies and showing working out(2b/a) Measure, using the appropriate equipment and units, and compare volume/ capacities (ml/l) – use <, >, = Extend to mixed units e.g. 1 litre and 200 millilitres Know simple equivalents e.g. 5l = 5000ml Choose and use appropriate units to estimate and measure temperature using thermometers Solve addition and subtraction problems involving capacity **Life Skills-measuring skills**	Move from using non-standard units to measure to manageable standard units Understand the difference between standard and non-standard units – to measure accurately a standard unit must be used Estimate capacities and volumes – context of comparison Begin to use measuring tools such as measuring cylinders and jugs Compare and describe capacity and volume e.g. full/empty, more than/less than, half, half full, quarter Compare capacities (bottles when they are full) and volumes saying which more than/less than a litre Measure and begin to record capacities and volumes using pictures, symbols or numbers e.g. full, ½ full/empty Solve simple practical problems involving capacities and volumes (addition and subtraction of numbers up to 20) **Life Skills-measuring skills**

Money	**Year 7** **Year 7**	Confidently/fluently recognise all coins and know their values Recognise and use symbols for pounds (£) and pence (p) Add money using concrete objects (e.g. Numicon with coins stuck to it), pictorial representations leading to an expanded method that reinforces place value - Record pounds and pence separately Life Skills-using money in practical situations	Confidently/fluently recognise all coins and know their values Recognise and use symbols for pounds (£) and pence (p) Add money using concrete objects (e.g. Numicon with coins stuck to it), pictorial representations leading to an expanded method that reinforces place value - Record pounds and pence separately Solve puzzles involving money e.g. how many 2p coins are needed to make 12p? Combine amounts to make a particular value and match different combinations of coins to an equivalent amount Life Skills-using money in practical situations	Recognise all coins and know their values, starting with 1p, 10p, £1, 2p, £2, and relationship between coins e.g. 2p = 2 lots of 1p Make amounts of money such as 13p by adding 10p and three 1ps Life Skills-using money in practical situations
	Year 8	Convert between pounds and pence and vice versa e.g. 150p = £1 and 50p = £1.50 Record money as decimals Compare amounts of money Estimate and calculate quantities of money (e.g. coins in a purse, money in a jar, orders from menus, shopping basket) Calculate additions and subtractions (e.g. giving change) using money notations Life Skills-using money in practical situations	Revise values of all coins recognising these with fluency Add amounts of money (two or more) using both pounds and pence including mixed units (record pounds and pence separately Solve problems involving addition (incl. in context of money) & pose similar problems for others to solve choosing a suitable method/equipment, showing working and checking results Recognise and use symbols for pounds (£) and pence (p) Record pounds and pence separately Life Skills-using money in practical situations	Compare coin values using <, > and = and the language equal to, more than, less than (fewer), most, least Subtract money using concrete pictorial representations – one- and two-digit numbers up to 20p Life Skills-using money in practical situations
	Year 9	Use all four operations in the context of money Solve multi-step problems including questions where conversion between £ and p is necessary. Life Skills-using money in practical situations	Subtract money (including giving change) using concrete objects (e.g. Numicon with coins stuck to it which is great for finding the difference), pictorial representations leading to an expanded method that reinforces place value: recording in columns to help understanding of place value - two-digit number and ones, two-digit number and tens, two two-digit numbers, three one-digit numbers Solve problems involving money using apparatus, describing strategies and showing working out Life Skills-using money in practical situations	Solve one-step problems involving money in practical contexts – one- and two-digit numbers up to 20p – using concrete objects and pictorial representations Life skills – handling money, budgeting, value of everyday items.

Time	**Year 7**	Tell the time to the nearest minute on analogue (am/pm) and digital clocks Use the 12-hour clock, am and pm. I know that 2:45pm = quarter 3 in the afternoon Compare times Life skills-reading time	Know, use and sequence the days of the week and months of the year. Know the important times in a day/year Know the seasons/months of the year and order them Tell the time to the nearest quarter of an hour Life skills-reading time	Know the days of the week and put them in order Recognise and use language related to time: days, weeks, months, years Use language to compare and describe time e.g. quicker/slower, earlier/later – link with SALT Life skills-expressing periods of time
	Year 8	Read, write and convert time between analogue and digital 12- and 24-hour clocks Estimate and measure time intervals Solve problems involving time Solve problems that involve converting between units of time Use all four operations in problems involving time, including conversions e.g. days to weeks, expressing the answer as weeks and days Read timetables and use these to solve problems Life skills-reading time, reading timetables	Compare and sequence intervals of time Tell and write the time to five minutes, including quarter part/to the hour and move, and then draw, the hands on a clock face to show these times Know the number of minutes in an hour and the number of hours in a day Life skills-reading time	Sequence events in chronological order using language such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening – link with SALT Begin to use the language of o'clock Know, use and sequence the months of the year Life skills-sequencing time
	Year 9	Revise 12- and 24-hour clock and conversions between these Use, read, write and convert units of time: smaller to larger units and vice versa Solve problems involving time (including reading and using information from tables and timetables) Children could be introduced to compound units for speed such as miles per hour, and apply their knowledge in science or other subjects Life skills-reading time, converting time	Become fluent in telling the time on an analogue clock and recording it Convert times from analogue to digital Convert times from 12 hour clock to 24 hour clock and vice versa Solve problems calculating time intervals Life skills-reading time, converting time	Use the language of time, including telling the time first to the hour using o'clock and then half hour using half past Measure and begin to record hours, minutes and seconds Recognise times on the class clock such as lunchtime and hometime Life skills-reading and recognising time

Statistics	Year 7	Interpret and present discrete data using appropriate graphical methods including bar charts Answer questions/solve problems involving comparison (how many more …/how many fewer …), sum and difference problems using information presented in bar charts, pictograms, tables and other graphs Solve comparison, sum and difference problems using information presented in a scaled graphs displaying discrete data (link this to work on scales) Complete, read and interpret information in tables SMSC-moral decision on how to collect and present data FBV-voting	To read and construct tallies and frequency tables. To read pictograms where 1 picture = 2 units Ask and answer questions about pictograms Read block graphs and bar charts. SMSC-moral decision on how to collect and present data FBV-voting	Draw a tally knowing to cross the tally at 5. To begin to count in 5s
	Year 8	Interpret and present continuous data using a line graph (involving time) Understand and use a greater range of scales Begin to relate the graphical representation of data to recording change over time (could link to science e.g. rainfall/temperature) Solve comparison, sum and difference problems using information presented in a line graph (link this to work on co-ordinates) Begin to decide which representations of data are the most appropriate SMSC-moral decision on how to collect and present data FBV-voting, individual liberty	Understand and use simple scales e.g. 2s, 5s and 10s Interpret and present data using scaled bar charts, pictograms and tables in different contexts Solve one-step and two-step questions (for example 'how many more … ?' and 'how many fewer … ?' using scaled bar charts and pictograms, and tables SMSC-moral decision on how to collect and present data FBV-voting, individual liberty	To draw and read tallies To compare the length of tallies and knowing that the more groups of 5 there are the larger the tally is To read pictograms where 1 picture = 1 unit
	Year 9	Connect work on angles, fractions and percentages to Interpret and construct pie charts and use these to solve problems Encounter and draw graphs relating two variables arising from enquiry and other subjects Interpret and construct line graphs and use these to solve problems Calculate and interpret the mean as an average (know when it is appropriate to find the mean of a data set and why. Understand the term mode and median SMSC-moral decision on how to collect and present data, making decision on which average to use FBV-voting, individual liberty Life skills-percentages working out VAT, Income Tax etc.	Read data from line graphs and pie charts Begin to decide which representations of data are the most appropriate SMSC-moral decision on how to collect and present data FBV-voting, individual liberty	To revisit tallies To read pictograms where 1 picture = 2 units Ask and answer questions about pictograms Read block graphs and bar charts.

SMSC:

Spiritual: Developing a logical approach and the ability to recall and reason, along with questioning the way in which the world works promotes the spiritual growth of our students. Mathematical patterns in the world around can evoke a sense of awe and wonder. The understanding of place value and the enormity of numbers and the concept of infinity

Moral: The statistics strand of Mathematics goes pupils the opportunity to make moral decisions on how best to collect and present data. Favouring one type of average or type of graph over another is a moral decision based on what one wants to communicate. Mathematics also promotes an understanding of consequences through the application of different operations on number and the use of transformations.

Social: The social aspect of mathematics is developed through group and paired work. Many investigations lend themselves to discussion. Pupils apply their knowledge of Maths to real life problems.

Cultural: Mathematics is a universal language which is understood internationally.

Life Skills:
Learning to calculate is imperative for acquiring good live skills. In addition to this understanding how to calculate with money, how to measure and tell the time are essential parts of everyday life.

E-safety-it is unlikely that pupils will need to access the internet during a Mathematics lesson except in the use of Mathletics. Mathletics is an internet based learning and teaching tool. Whilst accessing Mathletics whether in school or remotely pupils need to be reminded not to stray onto other websites and to alert a teacher should anything untoward appears on their screen. During Mathletics live only the pupils 1st name and initial of second name is shared. Pupils should be reminded not to share their logins and passwords.

FBV-In statistics pupils are introduced to voting to collect data. Pupils are introduced to laws such as the commutative and distributive laws. Pupils exert their individual liberty in their choice of method to perform a calculation as well as in statistics choosing which data to collect and how to present that data. Through cross curricular links with R.E. and Art pupils are exposed to the use of shape and pattern in different cultures and religions. By working collaboratively on maths challenges pupils demonstrate mutual respect.