Programme of study for Year 7

Autumn (1st term)	Autumn (2nd term)	Spring (1st term)	Spring (2nd Term)	Summer (1st term)	Summer (2nd term)
Other timescale: From: September To: October	Other timescale: From: October To: December	Other timescale: From: January To: February	Other timescale: From: February To: April	Other timescale: From: April To: May	Other timescale: From: June To: July
Topic / Key Question: • **Place Value** • **Properties of number** • **Arithmetic with Numbers**	**Topic / Key Question:** • **Arithmetic Procedures (+, -, x and ÷)** • **Algebra - Simplifying and manipulating algebraic expressions**	**Topic / Key Question:** • **Graphical representation** • **Perimeter and area**	**Topic / Key Question:** • **Arithmetic (+, -, x and ÷) Procedures with fractions** • **BIDMAS** • **Calculator Skills**	**Topic / Key Question:** • **Understanding multiplicative relationship**	**Topic / Key Question:** • **Transformations** **Reflection** **Translation** **Rotation and enlargement**
Key Learning Outcomes: **Place Value:** **Learners will:** Understand and use place value for decimals, measures and integers of any size Understand place value in decimals, including recognising exponent and fractional representations of the column headings Understand place value in the context of measure	**Key Learning Outcomes:** **Arithmetic:** **Learners will:** Understand the mathematical structures that underpin addition and subtraction of positive and negative Generalise and fluently use written addition and subtraction strategies, including columnar formats, with decimals Understand the mathematical structures that underpin multiplication	**Key Learning Outcomes:** **Graphical Representation**: **Learners will:** Describe and plot coordinates, including non-integer values, in all four quadrants Solve a range of problems involving coordinates Know that a set of coordinates, constructed according to a mathematical rule, can be represented algebraically and graphically	**Key Learning Outcomes:** **Arithmetic Procedures with fractions** **Learners will:** Understand the mathematical structures that underpin the addition and subtraction of fractions Generalise and fluently use addition and subtraction strategies to calculate with fractions and mixed numbers Understand the mathematical structures	**Key Learning Outcomes:** **Multiplicative Relationship:** **Learners will:** Appreciate that any two numbers can be connected via a multiplicative relationship Understand that a multiplicative relationship can be expressed as a ratio and as a fraction Be able to calculate the multiplier for any given two numbers	**Key Learning Outcomes:** **Transformations:** **Learners will:** Understand the nature of a translation and appreciate what changes and what is invariant Understand the minimum information required to describe a translation (vertical and horizontal displacement) Translate objects from information given in a variety of forms

Order and compare numbers and measures using <, >, = **Properties of number:** **Learners will:** Understand what a multiple is and be able to list multiple of a number Understand the concept of square and cube Understand the concept of square root and cube root Understand how to use the keys for squares and other powers and square root on a calculator Understand what a factor is and be able to identify factors of positive integers Understand what a prime number is and be able to identify prime numbers Understand that a positive integer can be written uniquely as a product of its prime factors Use the prime factorisation of two or more positive integers to efficiently identify the highest common factor Use the prime factorisation of two or more positive integers to efficiently find their lowest common multiple	and division of positive and negative integers Generalise and fluently use written multiplication strategies to calculate accurately with decimals Generalise and fluently use written division strategies to calculate accurately with decimals **Algebraic Manipulation:** **Learners will:** Understand that a letter can be used to represent a generalised number Understand that algebraic notation follows particular conventions i.e. write the coefficient before the variable Know the meaning of and identity: term, coefficient, factor, product, expression, formula and equation Understand and recognise that a letter can be used to represent a specific unknown value or a variable Understand that relationships can be generalised using algebraic statements	Understand that a graphical representation shows all of the points (within a range) that satisfy a relationship **Area and perimeter:** **Learners will:** Use the properties of a range of polygons to deduce their perimeters Derive and use the formula for the area of a triangle and trapezium Recognise that there is constant multiplicative relationship (π) between the diameter and circumference of a circle Use the relationship C = πd to calculate unknown lengths in contexts involving the circumference of circles Understand the derivation of, and use the formula for, the area of a circle Understand that the areas of composite shapes can be found in different ways Solve area problems of composite shapes involving whole and/or part circles, including finding the radius or diameter given the area	that underpin the multiplication of fractions Understand how to multiply unit, non-unit and improper fractions Generalise and fluently use strategies to multiply with mixed numbers (e.g. $2\frac{3}{5}\ x\ 1\frac{1}{7}$) Understand the mathematical structures that underpin the division of fractions Divide a fraction by a whole number Divide a whole number by a fraction Divide a fraction by a fraction **BIDMAS:** **Learners will:** Calculate using priority of operations, including brackets, powers, exponents and reciprocals Use the associative, distributive and commutative laws to flexibly and efficiently solve problems	Appreciate that there are an infinite number of pairs of numbers for any given multiplicative relationship (equivalence) Use a double number line to represent a multiplicative relationship and connect to other known representations Understand the language and notation of ratio and use a ratio table to represent a multiplicative relationship and connect to other known representations Use a graph to represent a multiplicative relationship and connect to other known representations Use a scaling diagram to represent a multiplicative relationship and connect to other known representations	Understand the nature of rotations and appreciate what changes and what is invariant Understand the minimum information required to describe a rotation (centre of rotation, size and direction of rotation) Rotate objects using information about centre, size and direction of rotation Understand the nature of reflections and appreciate what changes and what is invariant Understand the minimum information required to describe a reflection (line of reflection) Reflect objects using a range of lines of reflection (including non- vertical and non-horizontal) Understand the nature of enlargements and appreciate what changes and what is invariant Understand the minimum information required to describe an enlargement (centre of enlargement and scale factor) Enlarge objects using information about the centre of enlargement and scale factor

The focus in Key Stage 3 is on deeply understanding the structures underpinning the standard columnar format and generalising fully to decimals, i.e. not regarding calculation with decimals as a separate method. Build on students' Key Stage 2 experiences of positive and negative numbers to develop a full understanding and fluency with procedures for all four operations with directed numbers so they can use it in all other topics and subjects.	Understand that substituting particular values into a generalised algebraic statement gives a sense of how the value of the expression changes Identify like terms in an expression, generalising an understanding of unitising Simplify expressions by collecting like terms Understand how to use the distributive law to multiply an expression by a term such as 3(a + 4b) and 3p2(2p + 3b) Understand how to use the distributive law to factorise expressions where there is a common factor, such as 3a + 12b and 6p3 + 9p2b Understand how to use the distributive law to factorise expressions where there is a common factor, such as 3a + 12b and 6p3 + 9p2b		**Calculator Skills:** **Learners will:** Know how to fluently use certain calculator functions and use a calculator appropriately		

End of term 1 assessment to cover:		**End of term 2 assessment to cover**:		**End of year assessment to cover:**	
Rationale for sequence:	**Rationale for sequence:**	**Rationale for sequence:**	**Rationale for sequence:**	**Rationale for sequence:**	**Rationale for sequence:**
Whilst an understanding of our base-ten place-value system for integers and decimals should be well established at Key Stage 2 several important ideas emerge at Key Stage 3. Understanding place value is a fundamental skill and at the heart of a strong sense of number. Students will have been introduced to multiples and factors at Key Stage 2 and will have had the opportunity to find factor pairs for a given number. They should know that prime numbers have exactly two factors; and why, therefore, one is not prime. They should also be able to recall prime numbers up to 19 and identify others (possibly using the Sieve of Eratosthenes to find all the prime numbers up to 100). The shift at Key Stage 3 is to examine the structure of the numbers involved and explore ways of representing them, for example, by using factor trees and Venn diagrams. In particular, expressing numbers as the	The focus at Key Stage 3 is on examining the structure of numbers and being able to reason whether numbers are multiples of other numbers or not without the need for creating lists of multiples. For example, students should recognise that 176 is a multiple of eight because it is the sum of 160 and 16, both of which are multiples of eight. Connections can be made here to the rules for divisibility, with students exploring why the rules work and how they can help identify multiples of a number. The focus in Key Stage 3 is on deeply understanding the structures underpinning the standard columnar format and generalising fully to decimals, i.e. not regarding calculation with decimals as a separate method. A key feature of the standard algorithm for the multiplication of integers is that it involves sequences of multiplications of single-digit numbers; place-value considerations and the lining up of columns ensure that	In Key Stage 2, students should have become familiar with coordinates in all four quadrants. They should have made links with their work in geometry by both plotting points to form common 2D quadrilaterals and 'predicting missing coordinates using the properties of shapes' (Department for Education, 2013). These skills are developed further in Key Stage 3. A key focus will be thinking about x- and y-coordinates as the input and output respectively of a function or rule and appreciating that the set of coordinates generated and the line joining them can be thought of as a graphical representation of that function. The understanding of coordinate is a vital concept to understand perpendicular and parallel lines and curve graphs in KS4. At Key Stage 2, students will have had the opportunity to measure the perimeter of simple 2D shapes, find the area by counting squares,	At KS2 learners are taught four operations with fractions: conversions between different form of fractions. Linking this in year 7 they will not only recap the skills but will extend and apply in problem solving. Leaners should feel fluent, write correct reasons when dealing with fractions; and solve problems with fractions. It's imperative for learners to realise operations with fractions requires understanding of fractions as a proportion. It also requires knowledge of LCM. These can then be used in problem solving and probability. Understanding of improper fractions add complexity to this and methods can be learnt to convert between improper and mixed number. Fractions of quantities starts to provide a useful real-life context for fractions. Ratio work can consolidate work from primary school, be shown in relation to fractions and developed to demonstrate how it is used for sharing. Probability uses work on fractions and the concept	Multiplicative relationships underpin many aspects of mathematics at Key Stage 3, but students often experience them as distinct topics with no obvious connections. Percentages, fractions, proportionality and ratio, for example, can all be considered as contexts in which multiplicative relationships are used and explored. It is, therefore, important that the vocabulary and imagery used in all contexts is consistent, to support students in their understanding that the same mathematical principles are involved. While students will have met these topics in Key Stage 2, a key idea in Key Stage 3 is to connect these contexts through the overarching idea of multiplicative relationships. Students should have interpreted multiplication as scaling at Key Stage 2, but here it is developed in more depth. Students should recognise that it is possible to go from any number (except the specific case involving zero as one of the	At Key Stage 2, students will have encountered all four transformations – translation, reflection, rotation and enlargement – and learnt to distinguish between them. However, they may not have concentrated on specific features, such as the centre of rotation or the centre of enlargement Dynamic geometry software such as Geogebra and Desmos offers an effective tool to support the teaching of transformations. It enables students to see what happens when certain transformations are applied to objects; and to make conjectures, justify and test where, for example, the image of an object under a reflection will be. The order in which transformations have been introduced in this work– translation, rotation, reflection and, finally, enlargement – highlights how the degrees of freedom available, with regards to what can vary, are being increased. Translation

product of prime factors will enable students to reason about and identify highest common factors and lowest common multiples, and to appreciate this as a more efficient method than listing in some situations. The focus at Key Stage 3 is on examining the structure of numbers and being able to reason whether numbers are multiples of other numbers or not without the need for creating lists of multiples. At Key Stage 3, they will build on this by using other positive integer exponents greater than three, and associated real roots (square, cube and higher). Work on exponents and roots in Key Stage 3 provides the foundation for future learning when exploring negative integer and fractional exponents in Key Stage 4.	the product is of the correct order of magnitude. When using the method with decimals, it is important that the underlying mathematical structure is thoroughly understood. At the heart of algebra and algebraic thinking is the expression of generality. Algebraic notation and techniques for its manipulation, including conventions governing its use, should naturally arise from exploring the structure of the number system and operations on number. For this reason, algebra is not a separate theme in these materials but is linked to the two themes associated with number: 'The structure of the number system' and 'Operating on number'. In Year 6, a key focus in relation to algebra is that students 'should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand'. This work continues into Key Stage 3, with the important development that students use algebraic notation to examine and analyse number structure, and to deepen their understanding.	and estimate volume by counting blocks. At Key Stage 3, when calculating perimeters, students will use the properties of parallelograms, isosceles triangles and trapezia, as well as non-standard shapes, and reason mathematically to deduce missing information. In this unit Students should fully understand the concepts involved, appreciate how the various formulae are derived and connected, and reason mathematically to solve a wide range of problems, including those in new and unfamiliar situations.	can be extended to more complex scenarios. BIDMAS will build on primary ordering of operations and include brackets and indices. Students are required to use calculators affectively and be able to use some important functions on calculator to check their answers especially when working with fractions. They need test and conjecture and explore different format of calculations on a calculator and understand how BIDMAS is used in calculator.	factors but not the product) to any other number by multiplying.	maintains congruence and orientation. Rotation produces a change in orientation but maintains the 'sense' of the image – a feature which is able to change only under reflection. Translation, rotation and reflection produce congruent shapes in an increasing range of orientations and senses. Enlargement is the only transformation that does not maintain congruence (other than when the scale factor is ±1) but does maintain similarity in any orientation and sense.

Reading / literacy: Key words/ problem solving questions/ Los/ retention and recall and promoting cultural capital	**Reading / literacy:** Key words/ problem solving questions/ Los/ retention and recall and promoting cultural capital	**Reading / literacy:** Key words/ problem solving questions/ Los/ retention and recall and promoting cultural capital	**Reading / literacy:** Key words/ problem solving questions/ Los/ retention and recall and promoting cultural capital	**Reading / literacy:** Key words/ problem solving questions/ Los/ retention and recall and promoting cultural capital	**Reading / literacy:** Key words/ problem solving questions/ Los/ retention and recall and promoting cultural capital
Numeracy: Assessed throughout the lesson	**Numeracy:** Assessed throughout the lesson	**Numeracy:** Assessed throughout the lesson	**Numeracy:** Assessed throughout the lesson	**Numeracy:** Assessed throughout the lesson	**Numeracy:** Assessed throughout the lesson

Enrichment / opportunities to develop cultural capital (including careers, WRL and SMSC):

In maths lessons:

Spiritual growth is encouraged by students reflecting on their answers, reasoning and in class discussions

Learners are made aware of choices they make may results to different outcomes and consequences. Their **Moral** duty is to be able to make the right choices in terms of behaviour and to reach the correct answers/conclusions

Leaners **Social** developments is encouraged through discussions, sharing ideas, peer marking, articulating their thinking and group work

Leaners are exposed to different topics and their links to different **Culture** throughout the curriculum. This includes different multiplication methods from Egypt, Russia and China, Pythagoras' Theorem from Greece, algebra from the Middle East and debates as to where Trigonometry was first used. We try to develop an awareness of both the history of maths alongside the realisation that many topics we still learn today have travelled across the world and are used international