



Maths - Year 7

Autumn 1

During this half term we begin with order of operations. We look to explore and reinforce the understanding of number laws and numeracy that students will have gained at KS2. We consider the 4 number operations and will extend this to include use of brackets and index notation. We begin with this topic making use of associative, distributive and commutative laws as they are fundamental to mathematical thinking.

We move onto algebra. This is deliberately placed early in the scheme of learning to introduce students to a topic that they are less familiar with – to engage their interest, stimulate their mathematical thinking and enable us to interleave algebra throughout subsequent units to build students' fluency with the concept. We look at recognising and continuing sequences. We also consider substitution of numerical values into formulae and expressions, collecting like terms and simplifying expressions.

Throughout this half term, higher attaining students will be stretched through depth. For example, we will consider such problems as four fours, generalisation of patterns and questions around algebraic means.

Autumn 2

The topics covered this half term will be familiar to all students, but we are looking to improve the fluency and confidence with which they apply number operations. Bar modelling is introduced at this point, with students encouraged to illustrate problems and thus support their problem solving skills. The work on place value, addition and subtraction is intended to reinforce KS1/KS2 topics and to improve students' numeracy to support their learning through the rest of the year thus reducing cognitive load and freeing up working memory. We place emphasis on applying efficient mental strategies. Place value will include the effects on a number of multiplying and dividing by powers of 10. As well as working with integers we will consider decimals and we will target students' number sense through looking at estimation – hence rounding is studied at this juncture. Work on perimeter is included in this unit to underline the additive property of the concept.

Higher attaining students will be stretched by the consideration of addition and subtraction in different bases and the exploration of different number systems. We will also challenge the widely held misconceptions about multiplication always making numbers larger and division making numbers smaller.

Spring 1

We continue our study of number operations – looking to embed our students understanding of and ability to accurately multiply and divide integers and decimals. Once again we are looking to promote mental strategies and the concept of efficient practice. There is a focus on applying and understanding the correct language. Within this unit we apply multiplicative skills to study the area of triangles and rectangles. We will also consider calculations involving time.

Students present at KS3 with a range of different methods of multiplication. We will encourage and support the accurate and efficient application of whichever method is preferred by the individual.

Higher attaining students will be encouraged to explore multiplication and division within different number systems to help them generalise and deepen their understanding. They will also be encouraged to practise and assess the efficacy of a range of different multiplication methods and will be challenged to explain the rationale behind Gelosia to deepen their understanding of the concepts involved.

Spring 2

At this stage we take a deeper look at the properties of 2-d shapes. We initially consider estimating and measuring length, mass and volume using the relevant metric units and applying our multiplicative/divisive skills to convert units as appropriate. As a natural progression from the work on measuring and units, we look at measuring, estimating and classifying angles. This is extended to study the accurate construction of triangles from given data. We move on to consider the angle properties of triangles and quadrilaterals. We consider symmetry – both line and rotational and finally we investigate and create tessellations.

Within this unit we are able to interleave all of our previous work on algebra and number operations as we solve problems involving angles.

Higher attaining students are challenged to produce more complex constructions. They are also expected to formalise the laws governing the tessellation of triangles and quadrilaterals.

Summer 1

Work covered earlier in the year on factors and multiples, tenths, hundredths and area help support this half term's focus on fractions. Generally speaking, students show a weakness in their understanding of this topic. They may be familiar with process, but they often lack a real grasp of the fundamental concepts involved. A strong initial emphasis is placed on identifying exactly what a fraction can represent and addressing common misconceptions – for instance, to establish that fractions do not have to be less than one and also that equivalent fractions do have to be equal in size, but not necessarily identical. Bar models and manipulatives are widely used to scaffold the introduction of this topic and students employ their number skills and fluency to manipulate equivalent fractions and to compare and order fractions. As a natural extension of this work, we look at converting between mixed numbers and improper fractions. Using bar models and manipulatives students are taught how to find fractions of amounts. Students are introduced via widespread use of diagrams and manipulatives to the rationale behind multiplying and dividing fractions.

Higher attaining students are encouraged to produce multiple representations of fractions and the processes of multiplication and division to exhibit understanding. They will be expected to generalise using algebraic notation. Students will be introduced to terminating and recurring decimals and they will be given pattern shape and tangram challenges.

Summer 2

The final half term of the year initially adapts the work on fractions to consider percentages – identifying that a percentage is a specific type of fraction. This topic heavily relies on and interleaves prior work on decimals to support finding percentages of an amount and fraction/ decimal/ percentage conversions. Students also look at finding the whole, when given a part. Once again bar modelling is used to support understanding throughout.

The final topic of the year is data handling. Students consider the classification of different types of data and are expected to construct and interpret a wide range of various different data representations, using the mathematical language and confidence they have gained through the year to express and support their decisions.

Higher attaining students will be introduced to the concept of reverse percentages and encouraged to show fluency in comparing and converting between different representations. They will also be expected to rationalise why say, 50% of 86 is equivalent to 86% of 50 – and to generalise their findings. These students will be challenged to construct arguments over the discrete/ continuous classification of time and money and to develop guidelines regarding this.