Year 10 Maths Learning Map

- TERM 1 -

Similarities

Congruence, Similarities and Enlargement
Within this unit, students will study parallel line angle rules; these are revisited to support establishment of similarity. Congruency is introduced through considering what information is needed to produce a unique triangle. Higher level content extends enlargement to explore negative scale factors, and also looks at establishing that a pair of triangles are congruent through formal proof.

Trigonometry
This unit is introduced as a special case of similarity within right-angled triangles. Emphasis is placed throughout the steps on linking the trig functions to ratios, rather than just functions. This key topic is introduced early in year 10 to allow regular revisiting e.g. when looking at bearings. For Higher tier, calculation with trigonometry is covered now and graphical representation is covered in year 11.

Developing Algebra

Representing solutions of equations & inequalities
Looking at the difference between equations and inequalities, students will establish the difference between a solution and a solution set; they will explore how number lines and graphs can be used to represent the solutions to inequalities. As well as solving equations, emphasis needs to be placed on forming equations from given information. This provides an excellent opportunity to revisit other topics in the curriculum such as angles on a straight line/in shapes/parallel lines, probability, area and perimeter etc. Factorising quadratics to solve equations is covered in the Higher strand here and is revisited in the Core strand in year 11.

Simultaneous equations
Students now move onto the solution of simultaneous equations by both algebraic and graphical methods. The method of substitution will be dealt with before elimination, all types of equations will be considered, covering simple addition and subtraction up to complex pairs where both equations need adjustment. Links will be made to graphs and forming the equations will be explored as well as solving them. The Higher strand will include the solution of a pair of simultaneous equations where one is a quadratic, again dealing with factorisation only at this stage.

- TERM 2 -

Geometry

Angles and bearings
As well as the formal introduction of bearings, this block provides a great opportunity to revisit other materials to make links across the mathematics curriculum. Accurate drawing and use if scales, as in the use of parallel line angles rules.

Working with circles
This block introduces new content whilst making use of and extending prior learning. The formulae for arc length and sector arc are built up from students' understanding of fractions. They are also introduced to the formulae for surface area and volume of spheres and cones; here higher students can enhance their knowledge and skills of working with area and volume ratios.

Vectors
Describing vectors will be revisited and used as the basis for looking more formally at vectors, discovering the meaning of – a compared to a to make sense of operations such as addition, subtraction and multiplication of vectors

Proportions and Proportional Change

Ratio and fractions
The focus is on reasoning and understanding notation to support the solution of increasing complex problems that include information presented in a variety of forms. The bar model is a key tool used to support representing and solving these problems.

Percentages and Interest
Calculator methods are encouraged throughout and are essential for repeated percentage change/growth and decay problems. Use of financial contexts is central to this block, helping students to maintain familiarity with the vocabulary.

Probability
This block also builds on KS3 and provides a good context in which to revisit fraction arithmetic and conversion between fractions, decimals and percentages. Tables and Venn diagrams are revisited and understanding and use of tree diagrams is developed at both tiers, with conditional probability being a key focus for Higher tier students.

- TERM 3 -

Delving into data/Using Number

Collecting, representing and interpreting data
For students following Higher tier, there is additional content relating to continuous data including histograms, cumulative frequency diagrams, box plots and associated data including quartiles and the interquartile range. Again, the emphasis with these topics should be on interpretation (particularly in making comparisons) and not just construction.

Non-calculator methods
This block revises and builds on KS3 content for calculation. Mental methods and using number sense are to be encouraged alongside the formal methods for all four operations with integers, decimals and fractions. Where possible this should be covered through problems, particularly multi-step problems in preparation for GCSE. The limits of accuracy of truncation are explored and compared to rounding, and Higher tier students will look at all aspects of irrational numbers including surds.

Using Numbers/Expressions

Types of number sequences
This block mainly revises KS3 content, reviewing prime factorisation and associated number content such as HCF and LCM. Sequences is extended for Higher tier to include surds and finding the formula for a quadratic sequence.
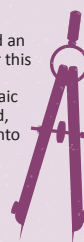
Indices and Roots
This block consolidates the previous two blocks focusing on understanding powers generally, and in particular in standard from. Negative and fractional indices are explored in detail.

Manipulating expressions
In this block we cover equations and inequalities, providing revision and reinforcement for foundation tier and an introduction to algebraic fractions for this following higher tier. All students will revise fraction arithmetic with algebraic argument and proof being considered, starting with identities and moving onto consider generalised number.

Revision of topics highlighted from the Trust Assessment.

LINKS TO PRIOR LEARNING

Building on the experience of enlargement and similarity in previous years, this unit extends students' experience and looks more formally at dealing with topics such as similar triangles. Students will have met vectors to describe translation during Key Stage 3.

LINKS TO PRIOR LEARNING

Although percentages are not specifically mentioned in the KS4 national curriculum, they feature heavily in GCSE papers and this block builds on the understanding gained in KS3.

LINKS TO PRIOR LEARNING

This block builds on KS3 work on the collection, representation and use of summary statistics to describe data. Much of the content is familiar, both from previous study within and beyond mathematics (including Geography and Science) and from everyday life.