Hodgson Academy

Mathematics

KS4 FOUNDATION

Curriculum Overview

At Hodgson anything is possible when we ***'Imagine, Believe, Achieve'***

Year 10

Autumn Term		Spring Term		Summer Term	
HT1	HT2	HT3	HT4	HT5	HT6
Algebraic Manipulation: Students will consolidate their understanding of key algebraic approaches including substitution; using laws of indices; and expanding and factorising into a single bracket. This recap module will form the foundation for new concepts studied in later modules. **Equations, Inequalities and Formulae:** In this module, students will learn how to solve more complex equations and inequalities, such as equations involving fractions or variables on both sides of the equation. Later in this module, students will use these skills to rearrange complex mathematical formulae. **Quadratic Expressions, and Equations:** Students will learn how to factorise quadratic expressions in order to	**Percentages:** This unit builds on students' understanding gained in KS3. Students will be reminded of non-calculator methods for finding percentage change as well as finding the original amount given a percentage change. Later, this module will mainly focus on using calculator methods to solve percentage problems, building towards repeated percentage change and solving problems involving simple and compound interest. **Ratio and Scale:** Students will learn how to solve a variety of problems involving ratio, including ratio problems with fractions, combining ratios and working with algebraic ratios. **Working with Fractions:** In this module, students will revisit how to find a	**Non-Calculator Methods:** Students will revisit how to complete calculations without the use of calculate and review how to use order of operations (BIDMAS) to complete calculations. They will then learn how to solve multi-step problems using these skills. **Straight Line Graphs:** Students will build on simple graphical analysis by being introduced to more algebraic methods to interpret graphs they have seen in previous years. Students will be able to represent linear equations and inequalities on a graph as well as finding the equation of a line from a graph of given information. **Probability:** In this module students will revisit key terminology associated with probability. They will be	**Perimeter, Area and Volume:** In this module students will revisit the key geometrical constructs of perimeter and area of 2D shapes, including area and circumference of a circle. Building on this, students will learn how to find the surface are and volume of a range of common 3D shapes. **Interpret and Represent Data:** During this module, students will revisit finding averages and range from a list as well as tables of data. They use these values to compare the distribution between two or more data sets. Later in the module students will learn how to use interpolation and extrapolation to make predictions beyond the data that they can see in front of them. **Non-Linear Graphs:** Students will learn how to	**Angles:** In this module students will review key angle rules studied at key stage 3, including angles in parallel lines and angles in polygons. They will look at wider problem solving using these rules. **Graphs and Diagrams:** Students will build upon the skills learnt in the HT4 module "Interpreting and representing data". They will learn how to represent data using a variety of graphs and diagrams including bar charts, pie charts, time-series graphs, frequency polygons and stem & leaf diagrams. **Vectors:** Students have met vectors to describe translations during Key Stage 3. They will revisit this to describe	**Factors, Powers and Surds:** In this module, students will review factors, multiples and prime numbers, including writing numbers as a product of prime factors. They will then look at the laws of indices, including negative indices. Later in the module, students will consider the difference between rational and irrational numbers. **Pythagoras' Theorem and Trigonometry:** In this module, students will review their understanding of using Pythagoras' Theorem to find missing lengths in right-angled triangles. Students will then explore the sine, cosine and tangent ratio between lengths in right-angled triangles. They will then use these ratios to find missing lengths

eventually be able to solve quadratic equations later in the module.	percentage of an amount and how to find the whole amount given a fraction of an amount. Later. Students will be review how to add, subtract, multiply and divide with fractions.	able to identify independent and dependent events and use tree diagrams to calculate the probability of more than one event happening. **Rounding and Estimation:** Students will recap how to round numbers to a given number of decimal places and significant figures before applying this to estimating calculations and finding the error interval for rounded calculations.	plot quadratic and cubic, before being able to find the key features of these graphs, such as the y-intercept, roots and any turning points. Later in this module, students will use these graphs to find approximate solutions to algebraic equations.	movement between points as a column vector. Students will then build on this knowledge to find resultant vectors by adding, subtracting and multiplying vectors by a scalar.	and angles in right-angled triangles. **Simultaneous Equations:** Students will explore how to find the solutions for a pair of linear simultaneous equations by both algebraic and graphical methods. The method of substitution will be dealt with before elimination, considering the substitution of a known value and then an expression.

Year 11

Autumn Term		Spring Term		Summer Term
HT1	HT2	HT3	HT4	HT5
Simultaneous Equations: Students will explore how to find the solutions for a pair of linear simultaneous equations by both algebraic and graphical methods. The method of substitution will be dealt with before elimination, considering the substitution of a known value and then an expression. **Ratio and Proportion** This topic develops students' understanding of proportional reasoning and its use in everyday situations. Students solve ratio problems, work with direct and inverse proportion, compare value through best-buy calculations, interpret conversion graphs and exchange rates, and explore how quantities change in proportion to one another. **Area and Volume** This topic extends students' knowledge of 2D and 3D geometry. Students draw and interpret plans and elevations, and calculate the volume and surface area of cylinders,	**Sequences and Proof** This topic develops students' understanding of patterns and mathematical reasoning. Students explore arithmetic, geometric, Fibonacci and other number sequences, learn to generate sequences from algebraic rules, and find the nth term of linear sequences. They also begin to use algebra to represent numbers, investigate mathematical statements, and use arguments and counterexamples to test whether conjectures are true. **Standard Form** In this topic students review representing very large and very small numbers efficiently using standard form. Students learn to convert between ordinary numbers and standard form, compare and order numbers written in standard form, and adjust numbers into the correct format. They also develop confidence working with calculations involving standard form, including	**Functions and Graphs** This topic develops students' understanding of functions and graphical representations. Students use function machines, write expressions and formulae from function rules, and explore quadratic, cubic and reciprocal graphs. They learn to recognise key graph features, sketch different graph types, and use graphs to interpret relationships and solve mathematical problems. **Equations and Formulae** This topic strengthens students' algebraic problem-solving skills. Students solve and form equations and inequalities, interpret solutions in context, and apply algebra to a range of geometric and real-life situations. They also learn to solve simultaneous equations and use algebraic methods to solve increasingly complex mathematical problems. **Rates** This topic develops students' understanding of compound	**Angles, Bearings and Trigonometry** This topic builds students' confidence with geometric reasoning and navigation. Students use angle facts in lines, shapes and parallel lines, learn to read, measure and calculate bearings, and apply these skills to scale drawings. They also use Pythagoras' theorem and trigonometric ratios to solve problems involving right-angled triangles and real-life applications. **Constructions and Loci** This topic develops students' accuracy in geometric drawing and problem solving. Students learn to use rulers, protractors and compasses to construct triangles, polygons, angle bisectors and perpendicular bisectors. They then apply these construction skills to loci problems, investigating points that satisfy given conditions and solving problems involving distance, position and regions on diagrams.	**Revision** Following the January mock assessments, question level analysis will inform which topics are focused on during the final weeks of lesson time leading into the summer GCSE exams.

spheres, cones and pyramids. They also develop their understanding of metric unit conversions for area and volume and apply geometric formulae to solve practical problems. **Similarity and Congruence** This topic focuses on comparing shapes and understanding their geometric relationships. Students identify and use similar shapes and triangles, calculate unknown lengths and angles using scale factors, and solve problems involving similarity. They also learn the difference between similarity and congruence, identify congruent triangles using congruence conditions, and apply these concepts to solve geometric problems.	multiplication, division, addition and subtraction. **Working with Circles** This topic develops students' understanding of the properties and measurements of circles. Students calculate circumference and area, work with sectors and arcs, and find fractional parts of circles. They also solve problems involving compound shapes made from circles and apply their knowledge to real-life and multi-step mathematical problems involving area, perimeter and circle geometry. **Set Notation and Venn Diagrams** This topic introduces students to sets, Venn diagrams and their use in probability. Students learn to represent and interpret data using Venn diagrams, work with set notation including unions, intersections and complements, and calculate probabilities from Venn diagrams. They develop their ability to organise information logically and solve problems involving overlapping groups.	measures and their application in real-world contexts. Students work with speed, distance and time calculations, interpret and draw distance–time graphs, and solve problems involving density and pressure. They also learn to convert between different units, including compound units, and apply these skills to practical scenarios.	**Transformations** This topic develops students' understanding of geometric transformations and their effects on shapes. Students explore enlargements using positive and fractional scale factors, reflections, rotations and translations, and learn how to describe transformations accurately using mathematical language. They also investigate symmetry, identify transformation properties, and apply multiple transformations to solve geometric problems.	