# Hodgson Academy
# Mathematics
# KS3 Curriculum Overview

| Mathematics: Key Stage 3 Curriculum Overview | | | | | | |
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| | Autumn Term | | Spring Term | | Summer Term | |
| | Term 1 | | HT3 | HT4 | HT5 | HT6 |
| **Year 7** | - **Sequences:** Students will investigate linear and non-linear sequences, such as quadratics, geometric and Fibonacci.<br><br>- **Algebraic Notation and Substitution:** Students will investigate function machines, inverse functions, substitution and graphs.<br><br>- **Expressions and Equality:** Students will investigate the difference between equality and equivalence and utilise this to collect like terms and solve multi-step equations. | - **Place Value and Ordering and Rounding:** Students will consolidate their understand of the place value system. They will use this to help them to order different numbers and round to the nearest integer/ number of decimal places.<br><br>- **Four Operations:** Students will review formal and mental methods for addition, subtraction, multiplication and division. They will then use these to solve problems in the context of finances, shape, area and perimeter.<br><br>- **Averages and Range:** Students will learn how to analyse data by finding a suitable average: mean, median, mode or range.<br><br>- **Rounding and Estimation:** Students will learn how to estimate the result of | - **Graphing Data:** Students will investigate a range of statistical charts and diagrams used to analyse and interpret data. They will use these statistical diagrams to investigate lines of best fit and correlation, using this to make predictions about the data set.<br><br>- **Fractions, Decimals and Percentages:** Students will represent fractions, decimals and percentages on number lines and use to compare equivalent numbers, including percentages greater than 100%.<br><br>- | - **Directed Number –** In this module students will learn how to work with calculations that involve both positive and negative numbers. This will include addition, subtraction, multiplication and division. Later in the module, students will study how to apply order of operations to calculations involving negatives.<br><br>- **Fractions and Percentages of an Amounts:** Students will review prior knowledge of fractions and build on this. They will start by representing fractions pictorially and converting between mixed and improper fractions. Students will be able to add and subtract fractions with different denominators and mixed fractions.<br><br>- **Perimeter and Area:** Students will learn how to find the perimeter | - **Speed, Distance and Time:** Firstly, students will study how to convert between units of time and represent fractions of units of time, before studying problem-solving using time. Later in the module, students will be learning how to calculate speed, distance and time before applying this to distance-time graphs.<br><br>- **Properties of Numbers:** Students will study some key numerical concepts - factors, multiples, prime numbers, powers, and roots. They will be able to identify and define these concepts before learning how to find the highest common factor and lowest common multiple of two or more numbers. They will do this firstly by listing before looking at prime factorisation | - **Adding and Subtracting Fractions –** Students will review prior knowledge of fractions and build on this. They will start by representing fractions pictorially and converting between mixed and improper fractions. Students will be able to add and subtract fractions with different denominators and mixed fractions.<br><br>- **Angles and Polygons** Students will learn how to identify and use a variety of angle properties/ rules. They will explore the relationships between angles interior and exterior angles in polygons and the angles between parallel lines. |

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| | | complex calculations by rounding to key significant figures. They will also be introduced to using error interval notation. | | and area of a range of basic 2D shapes. Later in the module they will solve problems with area and perimeter to find missing lengths. | to tackle more challenging problems. | |

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| **Year 8** | - **Ratio and Scale**<br>Students will be able to express ratio in multiple forms including 1:n, compare ratios with related fractions and solve proportional problems<br><br>- **Proportion and Scale**<br>Students will be able to solve basic direct proportion problems, exploring the relationship between similar shapes as well as work with scale diagrams and maps. In this unit, students will also explore how conversion graphs work<br><br>- **Algebraic Manipulation**<br>Students will consolidate their understanding of equality and equivalence studied in year 7 by substituting different values into algebraic expressions. We will then build upon this, as students learn how to expand and factorise linear expressions. To conclude, students will learn how to | - **Coordinates and Graphs**<br>Students will learn about the cartesian plane and how to work with coordinates in all four quadrants. They will learn how to work with a variety of straight-line graphs, horizontal and vertical as well as in the form $y = mx + c$. They will learn to work with both positive and negative gradients, find midpoints of line segments and also explore some non-linear graphs<br><br>- **Multiplying and Dividing Fractions**<br>Students will learn how to multiply and divide fractions with integers and fractions. They will build on this later in the module by working with algebraic fractions.<br>- **Symmetry and Reflection**<br>- Students will learn how to identify lines symmetry and rotational symmetry of shapes. | - **Area, Volume and Density**<br>Students will learn how to identify 2D and 3D shapes, find the area of 2D shapes and the volume of cubes and cuboids. They will then build on this as they learn about density as well as solving area and volume problems in mathematically similar shapes.<br><br>- **Equations and Inequalities**<br>Students will learn how to form algebraic expressions and work with brackets in algebra, including factorisation and expansion. Students will also begin to learn about the expansion of binomials. They will transfer these skills into work with inequalities.<br><br>- **Percentages**<br>Students will study a variety of methods to solve problems with percentages and fractions, both with a calculator and without. In the later stages of this | - **Indices**<br>During this module students will explore how to multiply and divide indices as well as how to raise a index by another power. Towards the end of this module students will investigate fractional and negative powers.<br><br>- **Standard Form**<br>Students will be able to represent small or large numbers in standard form and perform basic arithmetic with these values. Students may also explore negative and fractional indices and their impact on numbers.<br><br>- **Interpret and Represent Data**<br>- In this module students will review how to find a variety of different averages from a list, studied previously in Year 7. Later in this module students will learn how to find averages and the range of data presented in a | - **Angles in Parallel Lines and Polygons**<br>Students will review previous content on angles and basic polygon construction. In this unit they will also explore facts about the angles between parallel lines including alternate, corresponding and co-interior angles. Students will be able to find interior and exterior angles of polygons.<br><br>- **Tables and Probability**<br>In this module students will learn about the probability scale and how to generate probabilities using sample spaces. Later in the module, students will look at how to find probabilities from a range of diagrams, including two-way tables and frequency trees. | - **Circles:**<br>In this module students will investigate the mathematical importance of the value – pi. Students will then learn how to use pi to find the circumference and area of a circle and parts of a circle.<br><br>- **Graphs and Charts:**<br>Students will investigate a variety of data representations, including bar charts; pictograms; line charts; and pie charts.<br><br>- **Sequences**<br>- Students will learn how to generate linear and non-linear sequences given an algebraic rule. Later in the module, students learn how to find the algebraic rule for a given linear sequence. |

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| | expand double brackets to form quadratic expressions. | | module, students will study how to find the original amount given a percentage or fractional increase/ decrease as well as how to calculate repeated percentage changes. Students will have the opportunity to explore how these problems might appear in their future careers. e.g. looking at interest, growth and decay. | table (both grouped and ungrouped). | | |

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| **Year 9** | - **Properties of Number** Students will consolidate their understanding of factors, multiples and prime numbers. They will then use this knowledge to find the highest common factor and lowest common multiple of two or more numbers. Students will then move onto defining key types of number, such as integers, rational and real numbers.<br><br>- **Percentages** Students will problem solve with percentages, applying their knowledge to real life situations. They will further their knowledge on converting between fractions, decimals and percentages.<br><br>- **Area and Volume**: Students will investigate the properties of both 2D and 3D shapes. They | - **Equations Inequalities and Formulae:** In this module students will learn how to solve equations and inequalities including brackets, negative numbers and unknowns on both sides of the equation/ inequality. Later in the module they, will check their solutions by using substitution before applying their solving skills to rearrange algebraic formulae.<br><br>- **Fractions** In this module students will recap how to add, subtract, multiply and divide with fractions.<br><br>- **Rates** Students will learn how to solve problems involving speed, distance and time. They will also learn how to interpret speed-time graphs. | - **Maths and money:** Students will apply their mathematical knowledge to real life situations focusing on money, wages, taxes and budgeting. Students will understand bills and bank statements, preparing them for life beyond education.<br><br>- **Straight Line Graphs** Students will develop their understanding of line graphs by linking them to algebraic equations. They will explore gradients and $y$ - intercepts of different lines, linking these to the general equation $y = mx + c$. Students will then build on this to represent linear equalities graphically.<br><br>- **Ratio and Proportion** In this module students will develop their number skills and how to apply these to real life | - **Constructions and Congruence** In this module, students will revisit how to accurately construct triangles using a ruler, protractor and compass. Later in the module, students will learn how to construct angle and line bisectors using a pair of compasses as well as how identifying congruency in shapes.<br><br>- **Similarity** Students will learn how to recognise similarity and enlargement in shapes using a scale factor. They will then use a scale factor to find the missing lengths in 2D shapes.<br><br>- **Algebraic Manipulation** Students will revisit how to expand and | - **Pythagoras' Theorem:** Students will learn how to apply and use Pythagoras' Theorem to find the missing lengths of right-angled triangles in both 2 and 3 dimensions.<br><br>- **Non-Linear Graphs** In this module, students will learn how to plot a range of non-linear functions by using substitution, such as quadratic, cubic and reciprocal graphs.<br><br>- **Sets and Probability** Students will study set notation and how to calculate probabilities from tables and diagrams. Students will learn how to calculate single event probabilities as well as the probability of two or more events happening. | - **Transformations** In this module, students will learn how to perform different shape transformations including, rotations, reflections, enlargements and translations. Later, students will learn how to perform a series of transformations and describe transformations.<br><br>- **Simultaneous Equations** Students will build on algebraic techniques learnt throughout Year 9 to help them solve a pair of linear simultaneous equations by substitution and elimination.<br><br>- **Trigonometry** Students will learn how to use the sine, cosine and tangent ratios to find missing lengths and angles in right-angle |

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| | will be able to calculate the volume and surface area of a range of 3D shapes. | - **Standard Form** Students will revisit how to write large and small numbers using standard form. They will then learn how to apply the four operations to numbers in standard form. | problems of sharing and mixing. This topic will also develop understanding of the relationship between two variables and explains how these can be linked mathematically. | factorise into single brackets. Later in the module, students will learn how to expand double brackets and factorise quadratic expressions into double brackets. Students will also learn how to use factorisation to solve quadratic equations. | | triangles. Later in the module students will identify right-angled triangles within 3D shapes in order to find missing lengths and angles. |