Mathematics

We believe that all of our students can be mathematicians, who enjoy and excel in mathematics at all levels. All students, irrespective of ability, should be given the opportunity to achieve their full potential in mathematics.

We are aiming for all of our students to be:

- Fluent in the fundamentals of mathematics so they can master the subject
- Good communicators by clearly explaining their thoughts and giving reasons
- Resilient problem solvers who have the confidence to try and try again
- Committed to the 'why', not just the 'how'

At Cornwallis Academy, we teach the National Curriculum for mathematics, which aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Year 8 Mathematics

Term One

Content of study	Number, Statistics, Graphs and Charts
What are the aims and objectives of this term?	**Number** • Divisibility and division • Calculating with negative numbers • Powers and root • Powers, roots and brackets • powers, multiples and roots **Graphs and Charts** • Pie charts • Using tables • Stem and leaf diagrams • Comparing data • Scatter graphs • Misleading graphs
What previous knowledge is required?	**From Y7** **Number** • Mental Maths • Addition and Subtraction • Multiplication • Division • Money and Time • Negative Numbers • Factors, multiples and primes

	• Square numbers **From Y7** **Graphs and Charts** • Line graphs • Bar charts
How will this term's content help with future learning?	**Y9** Place Value Adding and Subtracting Integers and Decimals Multiplying Integers and Decimals Dividing Integers and Decimals Squares, Cubes and Roots Order of Operations **Y9** Coordinates Horizontal and Vertical Lines Plotting Linear Graphs
Links to the national curriculum/specification	Mathematics programmes of study: key stage 3 • understand and use place value for decimals, measures and integers of any size • order positive and negative integers, decimals and fractions; use the number line as a • model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥ • use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, • common factors, common multiples, highest common factor, lowest common multiple, • prime factorisation, including using product notation and the unique factorisation • property • use the four operations, including formal written methods, applied to integers, decimals, • use conventional notation for the priority of operations, including brackets, powers, • roots and reciprocals • recognise and use relationships between operations including inverse operations • use integer powers and associated real roots (square, cube and higher), recognise • powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations
Term Two	
Content of study	**Real-Life Graphs**, **Expressions and Equations**
What are the aims and objectives of this term?	**Real-Life Graphs** • Conversion graphs • Distance-time graphs • Line-graphs • More line graphs • Real-life graphs • Curved graphs

	Expressions and Equations • Algebraic powers • Expressions and Brackets • Factorising expressions • One-step equations • Two-step equations • The balancing method
What previous knowledge is required?	**From Y7** **Real-Life Graphs** • Straight line graphs • Coordinates **Expressions and Equations** • Functions • Simplifying expressions • Writing expressions • Substituting into formulae • Writing formulae
How will this term's content help with future learning?	**Yr9/10** **Real-Life Graphs** • Horizontal and Vertical Lines • Plotting Linear Graphs • Real-life graphs • Distance-time graphs • Water flow **Expressions and Equations** • Algebraic Notation • Collecting Like Terms • Multiplying Terms • Dividing Terms • Simplifying Expressions using the Index Laws • Expanding Single Brackets • Expanding and Simplifying Multiple Single Brackets • Factorising a Linear Expression • Factorisation • Expressions, Equations, Formulae and Identities • Writing Formulae • Substitution into Formulae
Links to the national curriculum/specification	Mathematics programmes of study: key stage 3 • use and interpret algebraic notation, including: ♣ ab in place of a × b ♣ 3y in place of y + y + y and 3 × y ♣ a2 in place of a × a, a3 in place of a × a × a; a2 b in place of a × a × b

	♣ b a in place of a ÷ b ♣ coefficients written as fractions rather than as decimals ♣ brackets • substitute numerical values into formulae and expressions, including scientific formulae • understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors • simplify and manipulate algebraic expressions to maintain equivalence by: ♣ collecting like terms ♣ multiplying a single term over a bracket ♣ taking out common factors ♣ expanding products of two or more binomials • Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) • Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data • Describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs
TERM 3	
Content of study	**Lines and Angles, Decimals and Ratio**
What are the aims and objectives of this term?	**Lines and Angles** • Quadrilaterals • Alternate angles and proof • Angles in parallel lines • Exterior and interior angles • Solving geometric problems **Decimals and Ratio** • Ordering decimals and rounding • Place-value calculations • Calculations with decimals Ratio and proportion with decimals
What previous knowledge is required?	**Lines and Angles** **From Yr7** • Measuring and drawing angles • Lines, angles and triangles • Drawing triangles accurately • Calculating angles • Angles in a triangle

	From Y7 **Decimals and Ratio** • Direct proportion • Writing ratios • Using ratios Ratios, proportions and fractions
How will this term's content help with future learning?	**Lines and Angles** **Yr9** • Basic Angle Rules • Angles in Triangles • Angles in Quadrilaterals • Angles in Parallel Lines • Angles in Polygons • Angles in Regular Polygons **Decimals and Ratio** • Simplifying ratios and proportions • Place value • Converting decimals and fractions
Links to the national curriculum/specification	Mathematics programmes of study: key stage 3 • Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles • Understand and use the relationship between parallel lines and alternate and corresponding angles • Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons
TERM 4	
Content of study	**Calculating With Fractions, Fractions Percentages and Decimals**
What are the aims and objectives of this term?	**Calculating With Fractions** • Ordering fractions • Adding and subtracting with fractions • Multiplying fractions • Dividing fractions • Calculating with mixed numbers **Fractions Percentages and Decimals** • Fractions and decimals • Equivalent proportions • Writing percentages • Percentages of amounts
What previous knowledge is required?	**Calculating With Fractions** From Yr7 • Comparing fractions

	• Simplifying fractions • Working with fractions • Fractions and decimals **Fractions Percentages and Decimals** From Yr7 • Fractions and decimals • Understanding percentages • Percentages of amounts
How will this term's content help with future learning?	**Calculating With Fractions** **Yr 9** • One Quantity as a Fraction of Another • Equivalent Fractions • Comparing and Ordering Fractions • Improper Fractions and Mixed Numbers • Add and Subtract Fractions and Mixed Numbers • Fractions of an Amount **Fractions Percentages and Decimals** • Equivalent Fractions • Comparing and Ordering Fractions • Improper Fractions and Mixed Numbers • Add and Subtract Fractions and Mixed Numbers • Fractions of an Amount • Multiplying Fractions and Mixed Numbers • Dividing Fractions and Mixed Numbers • Representing Percentages • One Quantity as a Percentage of Another • Converting Fractions to Decimals • Converting Decimals to Fractions • Converting Percentages to Fractions and vice versa • Converting Percentages to Decimals and vice versa • Ordering FDP • Percentage of an Amount • Representing Word Problems • Percentage Changes • Simple Interest • Calculating a Percentage Change • Repeated Percentage Change • Original Amounts (Reverse Percentages) • Compound Interest • Growth and Decay Problems
Links to the national curriculum/specification	Mathematics programmes of study: key stage 3 • Interpret fractions and percentages as operators • Solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics

TERM 5	
Content of study	**Straight Line Graphs Revision of Year 8 Topics**
What are the aims and objectives of this term?	**Straight-Line Graphs** • Direct proportion on graphs • Gradients • Equations of straight lines
What previous knowledge is required?	**Straight-Line Graphs** From Yr7 • Straight line graphs • Line graphs and more bar charts •
How will this term's content help with future learning?	**Straight-Line Graphs** • Plotting Linear Graphs • Gradient • Parallel Lines • Equation Through Given Point with Given Gradients • Equation through two points • Real-life graphs
Links to the national curriculum/specification	Mathematics programmes of study: key stage 3 • Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) • Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data • Describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.
TERM 6	
Content of study	**Expressions and Formulae Multiplicative Reasoning**
What are the aims and objectives of this term?	**Expressions and Formulae** • Solving equations • Substituting into expressions • Writing and using formulae • Using and rearranging formulae • Index laws and brackets • Expanding double brackets • **Multiplicative Reasoning** • Enlargement • Negative and fractional scale factors

	• Percentage change • Compound measures • Direct and inverse proportion
What previous knowledge is required?	**Expressions and Formulae** Yr8 previous terms • Algebraic powers • Expressions and Brackets • Factorising expressions • One-step equations • Two-step equations • The balancing method Yr7 • Functions • Simplifying expressions • Writing expressions • Substituting into formulae • Writing formulae **Multiplicative Reasoning** • Using ratios • Congruency and enlargement • Translations • Working with fractions • Calculating with decimals • Percentages of amounts • Proportion on graphs
How will this term's content help with future learning?	**Expressions and Formulae** • Algebraic Notation • Collecting Like Terms • Multiplying Terms • Dividing Terms • Simplifying Expressions using the Index Laws • Expanding Single Brackets • Expanding and Simplifying Multiple Single Brackets • Factorising a Linear Expression • Factorisation • Expressions, Equations, Formulae and Identities • Writing Formulae • Substitution into Formulae **Multiplicative Reasoning** • Percentage of an Amount • Representing Word Problems • Percentage Changes • Simple Interest • Calculating a Percentage Change • Repeated Percentage Change • Original Amounts (Reverse Percentages) • Compound Interest

	• Growth and Decay Problems • Enlargement • Scale Drawings
Links to the national curriculum/specification	Mathematics programmes of study: key stage 3 • Identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids • Solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics • Solve problems involving direct and inverse proportion, including graphical and algebraic representations • Use scale factors, scale diagrams and maps • Understand and use standard mathematical formulae; rearrange formulae to change the subject • Model situations or procedures by translating them into algebraic expressions or formulae and by using graphs • Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement

Resources

- Tutorial videos for all topics and interactive questions available at Sparx Maths - Home. All students are provided with an account.
- Additional revision resources available at www.bbc.co.uk/bitesize
- Key Stage 3 Revision Guides and Revision Workbooks available on Parent Pay

Assessments

At the end of each unit, there will be an end of unit assessment.
At the end of Term 1, there will be an Autumn assessment based on everything taught so far in Term 1.
At the end of Term 3, there will be a Spring assessment based on everything taught so far in Terms 1-3.
At the end of Term 5, there will be an End of Year assessment based on everything taught so far in Year 8.