MATHEMATICS

Year 9

What are the aims and intentions of this curriculum?

The aim of our Year 9 Curriculum is to ensure that i) students become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. ii) reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language iii) 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. By the end, pupils are expected to know, apply and understand the matters, skills and processes required for Key Stage 3 Mathematics.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	**Using numbers and the number system:** • Fractions • Decimals • Percentages PSHE Link-Mental wellbeing- happiness linked to being connected to others • Percentage Increase/Decrease • PSHE link-Relationship between fractions, decimals and percentages. (Being safe) • Simple and Compound Interest • Percentage Change • Reverse Percentage Careers Link: Barclay's Bank Trip- *Different Careers in the bank*	• Review concepts relating to fractions • Read, write, order and compare decimals up to three decimal places • Add, subtract, multiply and divide decimals up to two decimal places. • Approximate by rounding to a whole number or to one or two decimal places. • Read, write, order and compare percentages in whole numbers • Recognise and calculate equivalences between common fractions, percentages and decimals. • Express one amount as a percentage of another. • Calculate percentages of quantities, including simple percentage increases and decreases by 5% and multiples thereof • Calculate Simple interest and discounts in multiples of 5% on amounts of money. • Calculate amounts of money, compound interest, percentage increases, decreases and discounts including tax and simple	• Carry out calculations with fractions • Carry out calculations with decimal numbers. • Approximate by rounding • Carry out calculations with percentages • estimate answers to calculations using fractions and decimals • recognise and calculate equivalences between common fractions, percentages and decimals. • work out simple interest on amounts of money • work out discount on amounts of money.	Link to PSHE: Online and Media- All use of online platforms 1. Worksheets 2. Summative Test 3. MathsWatch 4. Online Quiz 5. Teacher and peer assessment 6. Exam Style Questions 7. Mini White board Tasks 8. . Role-play- To demonstrate shopping experience with discount/interest.-(PSHElink: Respect) 9. Analysing store Receipts

		budgeting. (Career link -Store managers, careers in Finance) • Calculate percentage change (any size increase and decrease), and original value after percentage change. - Career link – Entrepreneurs, Store Managers) **Key words:** Decimals, Fractions, Equivalences, Percentage, Interest, Discount, VAT, Gross Pay, Net Pay		
Autumn 2	**Using common measures, shape and space:** • Conversion (Length. Weight/Capacity/Money and Time) • Scale and Map Drawings • Area and Perimeter Volume • Lines of Symmetry • 3D Shapes- Plans, Elevations and Nets • Angles • Simple Bearings • Compound Measures Career Talk- Thames Water Career Link: Maths Week- Careers Sessional Talk	• Conversion- Length, weight, capacity, money and time, in the same system. • Simple scales on maps and drawings. (Careers Link- Rural and Urban Planner, Architecture) • Perimeter and Area of simple shapes PSHE link: Respectful relationships including friendships. (boundaries-perimeter) (Careers Link: Integration- Interior Designer, Painters, Construction, Landscaper) • Volume of 3D shapes • Scale Drawings • Identifying and drawing lines of symmetry • Plans, elevations and nets of simple 3-D shapes. (Careers Link- Architecture) • Coordinates • Types of angles • Angle Relationships • Using angles to describe position and direction • Drawing and measuring angles. • Using simple Bearings • Compound Measures- Speed, Density and Rates of Pay **Keywords:** Conversion graph, conversion factor, cubic units, scale factor, key. Area, Perimeter, Volume, square meters, cubic meters, Edge, Vertices, Faces, 2-D and 3-D shapes, trapezium, cube, cuboid, line of symmetry, plan (top view),	• Convert between units of length, weight, capacity, money and time in the same system • Calculate the area and perimeter of simple shapes including those that are made up of a combination of rectangles. • Calculate perimeters and areas of 2-D shapes including triangles and circles and composite shapes including non-rectangular shapes. • Use formulae to find volumes and surface areas of 3-D shapes including cylinders. • Recognise and make use of simple scales on maps and drawings. • Calculate actual dimensions from scale drawings and create a scale diagram given actual measurements • Draw 2-D shapes and demonstrate an understanding of line symmetry and knowledge of the relative size of angles. • Interpret plans, elevations and nets of simple 3-D shapes. • Calculate values of angles and/or coordinates with 2-D and 3-D shapes. • Interpret their results and provide a valid conclusion.	1. Worksheets 2. Summative Test 3. MathsWatch Link to PSHE: Online and Media- All use of online platforms 4. Online Quiz 5. Teacher and peer assessment 6. Creating 3D Shapes 7. Self-Assessment 8. Practical assessment using materials in their environment (Area, Perimeter and Volume)

		elevation (front and side view), net, faces, vertices, edges, angle, protractor, bearings, clockwise, anti-clockwise, speed, density.	• Use memorization skills to recall formulas. • Interpret the structure of 3-D models. • Able to sketch a model • Describe position or direction using angles, including bearings • Measure and draw angles using a protractor. • Calculate using compound measures including speed, density and rates of pay	
Spring 1	**Data Handling** • Averages- Mean, mode, median and range. **Handling information and data:** • Charts and Tables • Probability • Scatter Diagram Career Link: Number Day Career Link: Pi Day- Career options for Mathematicians Career Link: LifeSkills session- Financial Planning/ Budgeting **AQA Functional Skills Mathematics Examination**	• Find the mean, mode, median and range of a set of quantities. • Represent discrete data in tables, diagrams and charts including pie charts, bar charts and line graphs. • Use the mean, median, mode and range to compare two sets of data. • Estimate the mean of a grouped frequency distribution from discrete data. • Group discrete data and represent grouped data graphically. • Understand probability on a scale from 0 (impossible) to 1 (certain) and use probabilities to compare the likelihood of events • Use equally likely outcomes to find the probabilities of simple events and express them as fractions. • Work out the probability of combined events including the use of diagrams and tables, including two-way tables • Express probabilities as fractions, decimals and percentages • Draw and interpret scatter diagrams and recognise positive and negative correlations.	1. Extract and interpret information from tables, diagrams, charts and graphs 2. Recognise features of charts to summarise and compare sets of data 3. Group discrete data and represent grouped data graphically. 4. To understand the likelihood of an event. 5. Interpret their results and provide a valid conclusion 6. Identify correlations from Scatter Diagrams.	1. Worksheets 2. Summative Test 3. MathsWatch 4. Mini White board tasks 5. Online Quiz 6. Teacher and peer assessment 7. Self-Assessment 8. Mini Project on Collection, Presentation and organisation of Data

		(PSHE link: Respectful Relationships- Relationship between Cyberbullying and Performance) **Key words:** Discrete data, two-way table, diagram, pie chart, bar chart, line graph, scale, labels, plotting, axes, sectors, criteria.		
Spring 2	• **Prime Factorisation** • **Roots/Powers** • **Laws of Indices** • **Approximation** • **Standard Form** • **Error Interval**	• Use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation. • Use positive integer powers and associated real roots. • Calculate with roots and with integer and with integer indices. **Key words:** Highest Common Factor, Lowest Common Multiple, Square, Cube, Power, Base, Roots, Integer, Number, Digit, Multiplication, Division, Remainder, Prime, Square. **Key words:** Inequality, Represent, Linear, Accuracy, Truncate, Rounding, Error Interval, Upper, Lower, Bounds, Limit, Expression, Identity, Equation, Formula, Substitute, Term, Index, Power (Career Integration- Computer programming, epidemiologist) PSHE- Being safe (Exploring Laws)	• Recognise odd, even and prime (two digit) numbers; • Identify factors and multiples and list all factors and multiples of a number systematically; • Find the prime factor decomposition of positive integers and write as a product using index notation; • Find common factors and common multiples of two numbers; • Use index notation for squares and cubes. • Carry out operations using laws of indices. • Round to a given number of significant figures and decimal places. • To interpret and compare numbers in standard form $A\times$ $1\leq A<10$ • Recall inequality notations. • Write error intervals. • Apply and interpret limits of accuracy, including upper and lower bounds.	1. Worksheets 2. Summative Test 3. MathsWatch 4. Self-Assessment 5. 3-2-1 6. Exam Questions Carousel
Summer 1	• **Operations with Integers Algebra** • Translating phrases to Algebraic Expression • Substitution • Function Machine	• Operations with integers • To use and interpret algebraic notation (Word problems including relationships in Families)	• To perform all four operations with integers. • Manipulate and simplify algebraic expressions. • To simplify algebraic expressions by collecting like terms and	1. Worksheets 2. Summative Test 3. MathsWatch Completion

	• Collecting Like Terms • Simplifying Algebraic Expressions • Expand Brackets • Factorise linear expressions **International Women in Maths- 12/05** **Numeracy Day- Sessional Talks about Careers**	• To substitute numerical values into formulae and expressions, including scientific formulae. • To understand and use a function machine. • To understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors. • To simplify and manipulate algebraic expressions. • Expand double and triple brackets • Factorise linear expressions Career Integration- chemist, nuclear engineer, physicist, radiologist	substitution, including function machine. • Expand double and triple brackets. • Factorise linear expressions using HCF.	4. Teacher and Peer Assessment 4. MWB activities 5. Scavenger Hunt 6. Detect the error Activities 7. Tarsia Jigsaw Puzzles
Summer 2	• **Algebra Continued**	• Factorising Quadratic Expressions • Factorising as the Difference of two squares • Algebraic Fractions • Solving linear equations • Solving Linear Inequalities **Key words**: factorise, quadratic, coefficient, squares, function, input, output, equations, brackets, inequalities, least, no greater than, less than, greater than.	• Factorising quadratic expressions of the form $ax^2 + bx + c$. • Factorise as the difference of two squares. • Simplify and manipulate algebraic fractions. • Calculate input and output values using a function machine. • Solve linear equations in one unknown	Differentiated worksheets Topic Based Exam Questions Mini Whiteboard Activities Teacher and Peer Assessment

		PSHE link: (Relationships, including friendships- Equality Act)	• Solve linear inequalities in one unknown. • Solve word problems relating to equations and inequalities.	Targeted Questioning Kahoot Exit Cards