KS3 Maths

Team Leader: Mr Petry
Lead teachers: Ms Karimi (KS3 Lead)

Aim

- To develop, maintain and stimulate students' curiosity, interest and enjoyment in mathematics.
- We actively encourage students to develop a lively and enquiring mind, with an ability to think independently and mathematically, as well as extend their knowledge and skills creatively through practice, investigation and exploration.
- We emphasise the importance of maths in society and encourage students to appreciate the maths inherent in everyday, real-life situations and its applications in problem solving.

KS3 maths	Year 7	Year 8	Year 9
Lessons per two week cycle	8 Lessons	8 Lessons	8 Lessons
Assessment	September - Baseline assessment on KS2 topics. February - Assessment on the topics taught up until this point. June – assessment on content studied over the year. Topic Tests at the end of each unit – about every 2/3 weeks.	November - Assessment on the topics taught up until this point. February - Assessment on the topics taught up until this point. June – assessment on content studied over the year. Topic Tests at the end of each unit – about every 3 weeks.	November - Assessment on the topics taught up until this point. February – Assessment on topics taught up until this point. April – End of KS3 Assessments. Topic Tests at the end of each unit – about every 3 weeks.
	All assessments will have a topic list provided to students, linked to Sparx codes.		
Home learning	• The main home learning students should be doing is online on Sparxmaths.com. It is expected that students spend 30 minutes on their Sparx online learning, aiming for high completion between 80 and 100%. • The aim is that they spend 30 minutes thinking hard in order to embed long term learning. If the main homework is quick, they will use Personalised practice or Independent practice will provide challenge. • Sparx questions will be generated based on what they have been taught in lessons that week, but will also include questions to consolidate their learning from previous weeks. Sparx personalises each child's homework, creating a weekly set of questions tailored to their level of understanding and learning pace. The system becomes more accurate on this throughout the year. • Use of AI to answer questions will lead less thinking and learning, it will also lead to innapropriate pacing from the Sparx system.		
Remote learning	If a student is working from home, they must message their class teacher via TEAMS to ask for any work that they can complete at home. If they need extra work, students can complete any Sparx task at any time.		

USEFUL WEBSITES:

www.sparxmaths.com/
www.mathspad.co.uk/
https://mathsbot.com/puzzleMenu
https://ukmt.org.uk/competition-papers/jsf/jet-engine:free-past-papers/tax/challenge-type:67/

Scheme of Learning

All classes work through these topics at different paces and in different orders. Whenever the class has an assessment, the students will be given revision lists along with Sparx numbers to help then with their independent learning.

Year 7 Topic List

Numbers and the number systems	Factors		HCF and LCM	
	Multiples		Powers and Roots	
	Primes		Types of numbers	
Calculating	4 operations with integers		BIDMAS (Order of Operations)	
	+/-/x/÷ with decimals		x/÷ by 10,100,1000	
Checking, Approximating and Estimating	Rounding to the nearest 10,100,1000		Estimating calculations	
	Rounding to decimal places		Rounding to significant figures	
Counting and Comparing	Using inequality signs		Ordering fractions	
	Ordering integers		Ordering decimals	
Negative Numbers	+/-/x/÷ with negative numbers		Use of scientific calculator with negative numbers	
Measuring Space	Measuring lengths		Converting units of mass	
	Measuring angles		Converting units of volume	
	Converting units of length		Converting units of time and money	
Investigating Properties of Shapes	Vertices, edges and faces		Properties of triangles	
	Nets of 3D shapes		Properties of quadrilaterals	
Algebraic proficiency - tinkering	Language of algebra		Collecting like terms	
	Expressions, Equations and Formula		Expanding brackets	
	Simplifying expressions		Substitution	
Exploring Fractions, Decimals and Percentages	Writing quantities as fractions		Convert percentages to fractions	
	Convert decimals to percentages		Convert fractions to decimals	
Proportional Reasoning	Write ratios		Share in a ratio	
	Simplify Ratios		Problem solve with ratio and proportion	
Pattern Sniffing	Recognise arithmetic sequences		Term-to-term rule	
	Continue sequences		nth term rule	

Visualising and Constructing	Identifying Parallel and Perpendicular lines		Geometric Notation	
	Line and rotational symmetry		Constructing triangles	
Solving Equations and Inequalities	Solving one step equations		Solving Equations with negatives	
	Solving two step equations		Solving Equations with Fractions	
	Solving equations with brackets			
Investigating Angles	Acute, obtuse, reflex angles		Vertically opposite angles	
	Angles at a point and on a straight line		Angles in trianlges and quadrilaterals	
Calculating with Fractions, Decimals and Percentages	+/- proper and improper fractions		Using multipliers	
	x/÷ proper and improper fractions		Percentage change	
	% increase/decrease		% of amount	
Calculating Space	Perimeter		Surface area	
	Area of triangles, trapezium, parallelogram, compound shapes		Volume of cuboids	
Mathematical Movement	Axes and coordinates		Translation with vector notation	
	Equations of horizontal lines		Rotations	
	Equations of vertical lines		Reflections	
Presentation of Data	Frequency tables		Vertical line charts	
	Bar Charts		Pie Charts	
Measuring Data	Mode		Averages from a frequency table	
	Median		Comparing data sets using range and average	
	Mean		Range	

Year 8 Topic List

Solving equations	Solve one-step equations with whole number or fraction answers		Solve two-step equations with whole number or fraction answers	
	Solve multi-step equations including brackets		Solve equations when the solution is positive, negative or a fraction	
Numbers and the number system	Understand the concepts and vocabulary of prime numbers		Find numbers as a product of their prime factors	
	Calculate the highest common factor, lowest common multiple		Calculate the highest common factor and lowest common multiple using prime factorisation	
	Round to decimal places		Round to significant figures	
	Write numbers in standard form		Convert a number from standard form	
Calculating	Add, subtract, multiply and divide integers		Add and subtract decimals	
	Multiply decimals		Divide decimals	
	Add and Subtract like fractions		Add and subtract unlike fractions	
	Multiply fractions (including mixed numbers)		Divide fractions (including mixed numbers)	
	Convert between improper fractions and mixed numbers		Calculate with negative numbers	
	BIDMAS			
Visualising and Constructing	Measuring Lines		Measuring Angles	
	Interpreting maps and scale drawings		Using bearings	
	Identifying and constructing similar shapes		Enlargement from a given point	
	Draw plans and elevations of 3D shapes		Draw a 3D shape from a given plan and elevation	

Understanding risk I	Relate relative expected frequencies to theoretical probability, using appropriate language and the 0 - 1 probability scale		Record, describe and analyse the frequency of outcomes of probability experiments using tables	
	Construct theoretical possibility spaces for single experiments with equally likely outcomes and use these to calculate theoretical probabilities		Apply the property that the probabilities of an exhaustive set of outcomes sum to one	
Algebraic proficiency	Use and interpret algebraic notation, including: a^2b in place of $a \times a \times b$		Write coefficients as fractions rather than as decimals	
	Understand and use the concepts and vocabulary of factors		Simplify and manipulate algebraic expressions by taking out common factors and simplifying expressions involving sums	
	Apply the laws of indices for multiplication, division and brackets		Substitute values into formulae	
	Rearrange a formula to change the subject			
Investigating Angles	Understand and use alternate and corresponding angles on parallel lines		Derive and use the sum of angles in a triangle	
	Calculate the angle sum of a given polygon		Derive properties of regular polygons (e.g. exterior and interior angles)	
Exploring fractions, decimals and percentages	Convert between decimals and percentages		Convert between fractions and decimals	
	Convert between percentages and fractions		Order a series of fractions, decimals and percentages	
Proportional Reasoning	Divide a quantity into two or more parts using a ratio		Apply ratio to real life contexts and problems e.g. mixing, conversion, scaling	

	Work with ratios and fractions - convert between ratios and fractions		Express a multiplicative relationship between two quantities as a ratio or fraction	
	Use and calculate compound units (speed, rates of change, density)		Relate ratios to linear functions	
Calculating Space	Compare lengths, areas and volumes using ratio notation		Calculate perimeters of 2D shapes	
	Identify and apply circle definitions and properties - centre, radius, chord, diameter, circumference		Know the formulae for circumference of a circle = $2\pi r = \pi d$ and use this to calculate perimeters	
	Know that the area of a circle = πr^2 and use this to calculate areas		Calculate areas of compound shapes	
	Calculate the volume of a cuboid		Calculate the volume of a prism (including cylinders)	
Pattern sniffing	Generate terms of a sequence from either a term-to-term or a position-to-term rule		Find the nth term of a linear sequence	
Calculating fractions, decimals and percentages	Interpret fractions and percentages as operators		Work with percentages greater than 100%	
	Solve problems involving percentage change e.g. financial problems, simple interest, shopping scenarios		Calculate exactly with fractions	
Solving equations and inequalities	Solve linear equations with the unknown on both sides		Find an approximate solution to a linear equation using a graph	
Presentation of Data	Understand the difference between discrete and continuous data		Interpret, analyse and compare the distribution of data by looking at graphs and charts	
	Construct and interpret scatter graphs		Recognise and interpret correlation on a scatter graph	
Algebraic Proficiency (visualising)	Plot graphs of equations that correspond to straight-line graphs		Identify and interpret gradients of linear functions graphically	

	Identify and interpret intercepts of linear functions graphically		Recognise, sketch and interpret graphs of linear functions and simple quadratic functions	
	Plot and interpret graphs and graphs of non-standard functions in real contexts,		Find approximate solutions to problems involving distance and speed	
Understanding risk II	Apply systematic listing strategies		Record, describe and analyse the frequency of outcomes of probability experiments using frequency trees	
	Use tables, grids and Venn Diagrams to order data and calculate probability		Calculate theoretical probabilities	
	Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of experiments			
Measuring Data	Calculate the mean, median and mode of a set of data		Calculate the range of a set of data	
	Consider the existence of outliers in a set of data		Apply statistics to describe a population	

Year 9 Topic List				
Algebraic Proficiency (visualising)	Identify and interpret gradients of linear functions		Identify and interpret intercepts of linear functions	
	Use the form y = mx + c to identify parallel lines		Find the equation of the line through two given points	
	Find the equation of the line through one point with a given gradient		Interpret the gradient of a straight line graph as a rate of change	
	Recognise, sketch and interpret graphs of quadratic functions		Recognise, sketch and interpret graphs of simple cubic functions and the reciprocal function $y = 1/x$ with $x \neq 0$	
	Plot and interpret graphs (including reciprocal graphs)		Plot and interpret graphs of non-standard functions in real contexts, to find approximate solutions to problems involving distance, speed and acceleration	
Understanding risk II	Apply systematic listing strategies		Record, describe and analyse the frequency of outcomes of probability experiments using frequency trees	
	Use tables, grids and Venn Diagrams to order data and calculate probability		Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of experiments	
Calculating	Calculate with indices - use the index laws for multiplying, dividing and brackets		Calculate with roots and cube roots	

	Add and subtract with standard form		Multiply and divide with standard form	
	Use inequality notation to specify error intervals due to truncation or rounding		Apply and interpret limits of accuracy	
Visualising and Constructing	Construct a perpendicular bisector of a line segment		Construct a perpendicular to a given line from/at a given point	
	Bisect a given angle		Construct given shapes e.g. a triangle	
	Solve loci problems		Know that the perpendicular distance from a point to a line is the shortest distance to the line	
	Construct plans and elevations of 3D shapes		Draw 3D shapes from their plans and elevations	
Algebraic Proficiency - Tinkering	Understand what defines an identity		Know the difference between an equation and an identity	
	Simplify and manipulate algebraic expressions by expanding products of two pairs of brackets		Factorise quadratic expressions of the form $x^2 + bx + c$	
	Argue mathematically to show algebraic expressions are equivalent		Use algebra to support and construct arguments	
	Construct an algebraic expression from a given situation		Construct an algebraic equation or formula from a given situation	
Proportional reasoning	Solve problems involving direct proportion		Solve problems involving indirect proportion	
	Solve problems involving direct and inverse proportion represented algebraically		Solve problems involving direct and indirect proportion represented algebraically	

	Apply the concepts of congruence and similarity, including the relationships between lengths in similar figures (e.g. find a missing length on a pair of similar figures)		Change freely between compound units (e.g. density, pressure)	
	Calculate using compound units (e.g. speed, density, pressure, rates of change)			
Pattern sniffing	Generate a sequence from a given nth term		Find the nth term of a linear sequence	
	Find the nth term of a quadratic sequence		Recognise and use Fibonnaci sequences	
Solving Equations and inequalities I	Understand and use the concepts and vocabulary of inequalities		Solve linear inequalities in one variable	
	Represent the solution set to an inequality on a number line			
Calculating Space	Identify and apply circle definitions and properties, including radius, diameter, circumference, chord, tangent, arc, sector and segment		Calculate the area of a circle	
	Calculate the circumference of a circle		Calculate arc lengths of circles	
	Calculate areas of sectors of circles		Calculate surface area of right prisms (including cylinders)	
	Calculate exactly with multiples of π		Know the formulae for: Pythagoras' theorem, $a^2 + b^2 = c^2$, and apply it to find lengths in right-angled triangles in two dimensional figures	
Conjecturing	Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)		Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras' Theorem and the fact that the base angles of an isosceles triangle are equal, and	

			use known results to obtain simple proofs	
Presentation of Data	Interpret and construct tables for sets of data		Interpret and construct charts and diagrams (bar charts, compound bar charts, pie charts, pictograms, scatter graphs, stem and leaf, vertical line graph, time series)	
	Draw estimated lines of best fit and make predictions		Know correlation does not always imply causation	
	Interpolate and extrapolate apparent trends		Understand the problems with interpolation and extrapolation	
Solving equations and inequalities II	Solve two linear simultaneous equations in two variables algebraically		Derive an equation (or two simultaneous equations)	
	Solve the equation(s) and interpret the solution		Find approximate solutions to simultaneous equations using a graph	
Investigating properties of shapes	Solve questions involving similar triangles		Labelling a right angled triangle to get it set up for trigonometry	
	Finding the missing angle or length of a triangle using trigonometry		Set up and solve trigonometric equations	
Understanding risk	Calculate the probability of independent events		Calculate the probability of dependent events	
	Use tree diagrams and other representations to find the probability of independent and		Understand the assumptions made when calculating probability	

	dependent events			
	Enumerate sets and combinations of sets systematically		Understand that experimental probabilities tend towards theoretical probabilities when the larger the sample size	