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MATHEMATICS DEPARTMENT

Learning Checklist

GCSE Mathematics (Units M1 & M2)

Topic 1: Working with number

You should be able to…

	use the four operations applied to positive and negative integers, including efficient written methods
	order positive and negative integers, decimals and fractions
	use symbols =, ≠, <, >, ≤, ≥
	use calculators effectively and efficiently
	understand and use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals (BIDMAS)
	recognise and use relationships between operations, including inverse operations
	use index notation for squares, cubes and powers of ten
	use the terms square, positive and negative square root, cube and cube root
	use index notation and index laws for positive, whole number powers
	use the concepts and vocabulary of factor, multiple, common factor, common multiple and prime
	use the concepts and vocabulary of divisor, highest common factor, least (lowest) common multiple and prime factor decomposition

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GCSE Mathematics (Units M1 & M2)

Topic 2: Working with decimals

You should be able to…

	understand place value and decimal places
	read, write and compare decimals up to three decimal places
	add, subtract, multiply and divide decimals of any size

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GCSE Mathematics (Units M1 & M2)

Topic 3: Accuracy

You should be able to…

	round to a specified or appropriate degree of accuracy, number of decimal places, or 1 significant figure, including a given power of 10
	round to a specified or appropriate number of significant figures

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GCSE Mathematics (Units M1 & M2)

Topic 4: Working with percentages

You should be able to…

	understand that percentage means number of parts per hundred
	calculate a percentage of a quantity
	express one quantity as a percentage of another
	calculate percentage increase/decrease
	use percentage and repeated proportional change
	calculate with money and solve problems in a financial context for example compound interest, insurance, taxation, mortgages and investments

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GCSE Mathematics (Units M1 & M2)

Topic 5: Working with algebra

You should be able to…

	distinguish the different roles that letter symbols play in algebra, using the correct notation
	understand and use the concepts and vocabulary of expressions, equations, formulae, inequalities, terms and factors
	simplify and manipulate algebraic expressions by collecting like terms and multiplying a constant over a bracket
	manipulate algebraic expressions by taking out common factors that are constants or terms
	interpret simple equations as functions with inputs and outputs
	solve linear equations in one unknown
	set up and solve linear equations in one unknown, including those with the unknown on both sides of the equation and equations of the form x/4 +3 = 7
	write simple formulae and expressions from real life contexts
	substitute numbers into formulae (which may be expressed in words or algebraically) and expressions
	use standard formulae

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GCSE Mathematics (Units M1 & M2)

Topic 6: Data collection and sampling

You should be able to…

	understand and use the handling data cycle to solve problems
	understand what is meant by a sample and a population
	understand simple random sampling and the effect of sample size on the reliability of conclusions
	design an experiment or survey to test hypotheses
	design data collection sheets, distinguishing between different types of data
	identify possible sources of bias
	sort, classify and tabulate qualitative (categorical) data and discrete or continuous quantitative data, including the use of 2 circle Venn diagrams to sort data
	extract data from printed tables and lists
	design and use two-way tables for discrete and grouped data
	Use 3 circle Venn diagrams to sort data

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GCSE Mathematics (Units M1 & M2)

Topic 7: Statistical diagrams

You should be able to…

	construct and interpret a wide range of graphs and diagrams including frequency tables and diagrams, pictograms, bar charts, pie charts, line graphs, frequency trees and flow charts, and draw conclusions, recognising that graphs maybe misleading
	look at data to find patterns and exceptions
	compare distributions and make inferences
	plot and interpret scatter diagrams and recognise correlation
	draw and/or use lines of best fit by eye, understanding what these lines represent
	draw conclusion from scatter diagrams
	use terms such as positive correlation, negative correlation and little or no correlation
	interpolate and extrapolate from data and know the dangers of doing so
	identify outliers

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GCSE Mathematics (Units M1 & M2)

Topic 8: Averages

You should be able to…

	find mean, median, mode and range for ungrouped data and understand their uses
	calculate mean from an ungrouped frequency table and identify the mode and median
	estimate mean from a grouped frequency distribution
	identify the modal class and the median class from a grouped frequency distribution

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GCSE Mathematics (Units M1 & M2)

Topic 9: Working with fractions

You should be able to…

	write a simple fraction as a terminating decimal
	understand and use equivalent fractions
	calculate a fraction of a quantity
	express one quantity as a fraction of another
	add, subtract, multiply and divide fractions, including mixed numbers
	recognise that recurring decimals are exact fractions and that some exact fractions are recurring decimals
	use equivalences between fractions, decimals and percentages in a variety of contexts

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GCSE Mathematics (Units M1 & M2)

Topic 10: Working with 2D and 3D Shapes

You should be able to…

	use conventional terms and notations such as points, lines, vertices, edges, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotational symmetries
	use the standard conventions for labelling and referring to the sides and angles of shapes
	apply the properties and definitions of triangles including, right-angled, scalene, isosceles and equilateral
	apply the properties and definitions of quadrilaterals, including square, rectangle, parallelogram, trapezium, triangles, kite and rhombus
	identify and apply circle definitions and properties, including centre, radius, chord, diameter and circumference
	identify properties of faces, surfaces, edges, and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres
	draw and interpret 2D representations of 3D shapes, for example nets, plans and elevations

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GCSE Mathematics (Units M1 & M2)

Topic 11: Angle properties

You should be able to…

	apply the properties of angles: at a point, at a point on a straight line and vertically opposite
	understand and use alternate and corresponding angles on parallel lines

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GCSE Mathematics (Units M1 & M2)

Topic 12: Working with measure

You should be able to…

	measure line segments and angles in geometric figures
	understand and use metric units of measurement
	make sensible estimates of a range of measures
	convert metric measurements from one unit to another

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GCSE Mathematics (Units M1 & M2)

Topic 13: Perimeter, area and volume

You should be able to…

	calculate perimeters of triangles and rectangles and simple compound shapes made from triangles and rectangles
	calculate perimeters of kite, parallelogram, rhombus and trapezium
	calculate perimeters of composite shapes
	calculate areas of triangles and rectangles and simple compound shapes made from triangles and rectangles
	calculate areas of kite, parallelogram, rhombus and trapezium
	calculate areas of composite shapes
	calculate circumferences of circles
	calculate areas of circles
	calculate surface area of cubes and cuboids
	calculate volumes of cubes and cuboids
	calculate volumes of right prisms
	solve problems involving length, area, volume/capacity, mass, time and temperature

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Topic 14: Pythagoras' Theorem

You should be able to…

	use Pythagoras' Theorem in 2D problems

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GCSE Mathematics (Units M1 & M2)

Topic 15: Working with money

You should be able to…

	use correct decimal notation when working with money
	calculate with money and solve simple problems in the context of finance, for example profit and loss, discount, wages and salaries, bank accounts, simple interest, budgeting, debt, APR and AER

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GCSE Mathematics (Units M1 & M2)

Topic 16: Co-ordinate geometry

You should be able to…

	work with co-ordinates in all four quadrants
	recognise and plot equations that correspond to straight line graphs in the co-ordinate plane
	construct and interpret linear graphs in real world contexts
	find and interpret gradients and intercepts of linear graphs, (for example plot and interpret the graph of hiring a car at £40 per day plus a cost of 20p per mile)
	find the midpoint and length of a line in 2D co-ordinates

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GCSE Mathematics (Units M1 & M2)

Topic 17: Compound measures

You should be able to…

	use compound measures and units such as speed, heart beats per minute and miles per gallon
	use compound measures and units such as density and kg/m^3

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