

	<i>KS4 Maths Subject Overview Entry Levels 1-3</i>
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	In KS4 pupils continue to build on their successes in KS3 and access maths with real life applications. In addition, pupils will have the opportunity to gain maths functional skills accreditations enabling them to access
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1.1 Read and write positive numbers including large numbers.

1.2 Order and compare positive numbers including large numbers.

1.3 Recognise negative numbers in practical contexts, for example temperatures.

2.1 Read and write common fractions and mixed numbers.

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2.3 Express one number as a fraction of another, for

	further education courses. This subject overview is based on the requirements for the functional skills entry levels 1-3. Each class and pupil will study for their accreditations at their own pace covering the objectives listed below as and when they are ready. Key BOLD-essential quality first learning FBV SMSC Life Skills E-safety Resouces		
	Entry Level 1	Entry Level 2	Entry Level 3

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Making Calculations	Add single-digit numbers with totals to 10. Interpret + and =. Use related vocabulary, for example and, plus, equals. Subtract single-digit numbers from numbers up to 10. Interpret - and =. Use related vocabulary, for example take away, minus, equals. Identify and interpret symbols +, -, = in practical situations. Estimate number of items (up to 10). Be able to use primary functions of a calculator.	Add two-digit whole numbers. Subtract two-digit whole numbers. Round to the nearest 10. Recall addition and subtraction facts to 10. Multiply single-digit whole numbers. Use and interpret +, - and = in practical situations to solve problems. Use estimation in solving problems and to check if answers are sensible. Solve one step number and word problems. Life skills-calculation	Add using three-digit numbers. Subtract using three-digit numbers. Approximate by rounding numbers less than 1000 to the nearest 10 or 100. Recall addition and subtraction facts to 20. Estimate answers to addition and subtraction calculations. Multiply two-digit whole numbers by single-digit numbers. Recall simple multiplication tables 2, 3, 4, 5, 10. Divide two-digit whole numbers by single digit whole numbers. Interpret remainders in division operations. Estimate answers to multiplication and division calculations. Interpret +, -, x, ÷ and = in practical situations. Solve problems involving whole numbers and decimals. Use of the standard order of operations in practical situations to solve multi-step calculations. Solve two-step word problems. Life skills-calculation SMSC-Recognising pattern in the natural world
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Money, Time and Temperature	Recognise and select different coins. Recognise and select different notes. Identify prices expressed in whole numbers up to 10. Relate familiar events to different times, days, seasons. Demonstrate understanding of and use vocabulary related to time. Life Skills-being able to total prices and calculate change Life Skills-telling the time	Make amounts up to a pound using different coins. Calculate the cost in pence of more than one item. Calculate the cost in whole pounds of more than one item. Calculate the change from a transaction in pence and whole pounds. Read and record common date formats. Express time on analogue clocks in hours, half, and understand time on 12 hour digital clocks in hours, half hours and quarter hours. Read positive temperatures in everyday situations, for example from a weather chart. Identify the unit of measurement for temperature in the UK.	Add amounts of money using decimal notation. Subtract amounts of money using decimal notation. Round sums of money to the nearest £1 or 10p. Estimate and make approximate calculations relating to cost. Read time in common formats on analogue clocks and 12 and 24 hour digital clocks. Measure time in days, hours and minutes. Record time in common formats and using 12 and 24 hour formats, including am and pm. Read temperature using standard units. Measure temperature in standard units. Compare temperatures. Life Skills-being able to estimate, total prices and calculate change Life Skills-to understand how to measure temperature Life Skills-telling the time
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		Compare temperatures in simple terms. Life Skills-being able to total prices and calculate change Life Skills-to understand how to measure temperature Life Skills-telling the time	
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Using and Comm unicati ng Data	Identify simple numerical information from a list. Identify criteria to sort familiar objects. Sort and classify objects using a single criterion. Make simple lists. Use objects, simple images or whole numbers to present results. Use basic terms when identifying outcomes.	State the purpose of a table or graph and the associated labels. Extract information from lists, tables, simple diagrams and bar charts. Compare numerical information from a bar chart. Collect simple numerical information. Sort and classify objects using two criteria for example size, colour, and shape. Use straightforward means, such as tables, whole numbers, simple charts and diagrams to present results to others.	Extract numerical information from lists, tables, diagrams, bar and tally charts. Make numerical comparisons from bar charts and pictograms. Select categories before collecting data. Collect data in familiar situations. Record numerical data using a tally. Make observations about results. Use whole numbers, decimals and common fractions to present results. Present data in tables, charts and diagrams, using key elements appropriately. Use a simple scale to represent data in a bar chart or pictogram. Provide simple descriptions of outcomes.
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Using Size, Shape, Space and Measure	Use simple terms to describe size. Use simple terms to describe dimensions. Use simple terms to describe weight. Use simple terms to describe capacity. Use direct comparisons for size weight and dimensions. Identify common 2-D and 3-D shapes. Follow directions using everyday positional vocabulary, for example, between, inside, near to. Life Skills-being able to give directions	Measure length, using common standard and non-standard units, for example metre, centimetre, paces, feet. Estimate lengths. Compare different lengths for example more than a metre, less than a metre. Read simple scales for length to the nearest labelled division. Choose and use appropriate units and measuring instruments. Measure weight, using common standard units for example grams, kilogrammes. Estimate weights. Compare weights, for example more than a kilogram, less than a kilogram. Read simple scales for weight to the nearest labelled division. Choose and use appropriate units and measuring instruments.	Estimate length and distance, using non-standard and standard units. Compare length and distance, using non-standard units and standard units. Select and use appropriate units for measuring length. Select and use appropriate instruments for measuring length. Read and measure length and distance, using standard and non-standard units, to the nearest labelled and unlabelled division e.g. with two or ten divisions between the numbered points on the scale. Estimate and compare weight, using non-standard and standard units. Select and use appropriate units for measuring weight. Select and use appropriate instruments for measuring weight. Read and measure weight using standard and nonstandard units to the nearest labelled and unlabelled division. Estimate and compare capacity. Select and use appropriate units for measuring capacity. Select and use appropriate instruments for measuring capacity. Read and measure capacity using standard and nonstandard units to the nearest labelled and unlabelled division.
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		Measure capacity, using common standard and nonstandard units, for example litre, cupful. Estimate capacity. Compare capacity for example more than a litre, less than a litre. Read simple scales for capacity to the nearest labelled division. Choose and use appropriate units and measuring instruments. Recognise and name common 2-D and 3-D shapes Describe key properties of common 2-D and 3-D shapes Recognise right angles in everyday objects. Follow directions using everyday positional vocabulary, including left and right, in front, behind Life Skills-to be able to estimate and measure length, weight and capacity	Sort 2-D and 3-D shapes according to their properties (side length, angle, line of symmetry). Identify perimeter of simple shapes. Understand and use straightforward vocabulary related to shape, for example, side, length, angle, line of symmetry. Follow directions using positional vocabulary, including the four compass points Life Skills-to be able to estimate and measure length, weight and capacity Life Skills- to be able to describe position
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Using Whole Numbers	Count reliably up to ten items. Order numbers up to ten. Recognise simple patterns and sequences. Solve missing number problems. Read whole numbers up to ten. Recognise numbers in different styles. Write whole numbers up to ten in words and figures. Show understanding of the vocabulary of comparing numbers. Use the vocabulary of comparing numbers.	Count reliably up to 100 items. Order numbers up to 100. Read whole numbers up to 100. Write whole numbers up to 100. Recognise and use the words half and quarter and symbols $\frac{1}{2}$ and $\frac{1}{4}$. Identify the relationship between a half and two quarters. Find halves and quarters of small numbers of items. Find halves and quarters of simple shapes.	Count up to 1000. Order numbers up to 1000. Compare numbers up to 1000. Read whole numbers up to 1000. Write whole numbers up to 1000. State the meaning of unit fractions, for example $\frac{1}{5}$, $\frac{1}{8}$, $\frac{1}{10}$. Write common fractions. Recognise and use fractions in equivalent forms, for example $\frac{5}{10} = \frac{1}{2}$. Recognise and use common percentages, for example 25%, 50%. Recognise and use common percentage/fraction/equivalences, for example $\frac{1}{2}$, 0.5, 50%. State the meaning of decimals up to two decimal places. Read up to two decimal places in practical contexts, for example measure to one place and money to two places. Write up to two decimal places in practical contexts, for example measure to one place and money to two places. Explain the use of a leading zero in contexts such as £0.35. Life Skills-calculating percentage increase and decrease of amounts
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(Decimals, Fractions and Percentages EL3)	Show understanding of ordinal numbers, for example first, second, third.		
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SMSC:

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Spiritual: Developing a logical approach and the ability to recall and reason, along with questioning the way in which the world works promotes the spiritual growth of our students. Mathematical patterns in the world around can evoke a sense of awe and wonder. The understanding of place value and the enormity of numbers and the concept of infinity

Moral: The statistics strand of Mathematics goes pupils the opportunity to make moral decisions on how best to collect and present data. Favours one type of average or type of graph over another is a moral decision based on what one wants to communicate. Mathematics also promotes an understanding of consequences through the application of different operations on number and the use of transformations.

Social: The social aspect of mathematics is developed through group and paired work. Many investigations lend themselves to discussion. Pupils apply their knowledge of Maths to real life problems.

Cultural: Mathematics is a universal language which is understood internationally.

Life Skills: Learning to calculate is imperative for acquiring good life skills. In addition to this understanding how to calculate with money, how to measure and tell the time are essential parts of everyday life.

E-safety-it is unlikely that pupils will need to access the internet during a Mathematics lesson except in the use of Mathletics. Mathletics is an internet based learning and teaching tool. Whilst accessing Mathletics whether in school or remotely pupils need to be reminded not to stray onto other websites and to alert a teacher should anything untoward appears on their screen. During Mathletics live only the pupils 1st name and initial of second name is shared. Pupils should be reminded not to share their logins and passwords.

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FBV-In statistics pupils are introduced to voting to collect data. Pupils are introduced to laws such as the commutative and distributive laws. Pupils exert their individual liberty in their choice of method to perform a calculation as well as in statistics choosing which data to collect and how to present that data. Through cross curricular links with R.E. and Art pupils are exposed to the use of shape and pattern in different cultures and religions. By working collaboratively on maths challenges pupils demonstrate mutual respect.

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Coverage	GCSE		Functional Skills Level 1
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Numbers and the Number System	N1 order positive and negative integers, decimals and fractions, use the symbols =, $\neq$, $<$, $>$, $\leq$, $\geq$ N2 apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals) N3 recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)	M a k i n g c a l c u l a t	
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	use conventional notation for priority of operations, including brackets, powers, roots and reciprocals N4 use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem N5 apply systematic listing strategies N6 use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 N8 calculate exactly with fractions	i o n s	1.1 Add numbers and decimals up to 2 places using efficient written and mental methods. 1.2 Subtract numbers and decimals up to 2 places using efficient written and mental methods. 1.3 Approximate by rounding. 1.4 Estimate answers to addition and subtraction calculations. 2.1 Multiply and divide whole numbers and decimals by 10, 100 and 1000. 2.2 Multiply whole numbers and decimals up to 2 places using efficient written and mental methods. 2.3 Divide whole numbers and decimals up to 2 places using efficient written methods
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	N9 calculate with and interpret standard form $A \times 10^n$, where $1 \leq A < 10$ and n is an integer N10 work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 72 or 0.375 and 38) N14 estimate answers check calculations using approximation and estimation, including answers obtained using technology N15 round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures)	2.4 Recall tables up to 10X10 and make connections with division facts 2.5 Estimate answers to multiplication and divisions calculations. 3.1 Solve problems involving positive numbers using the standard order of operations to solve multi-step calculations. 3.2 Solve problems involving whole numbers, fractions decimals and percentages. 3.3 Use an electronic or mechanical aid to calculate efficiently using whole numbers fractions, decimals and percentages. 3.4 Check calculations using an electronic or mechanical aid.
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Algebra	A1 Use and interpret algebraic notation A2 Substitute numerical values into formulae and expressions A3 understand and use the concepts and vocabulary of expressions, equations, formulae, inequalities, terms and factors A4 Simplify and manipulate algebraic expressions A5 understand and use standard mathematical formulae rearrange formulae to change the subject A7 where appropriate, interpret simple expressions as functions with inputs and outputs	Numerical Relationships	1.1 Recognise multiples of 2 to 9, up to 100. 1.2 Recognise multiples of 10, 50, 100, 1000. 1.3 Know square numbers up to 10×10. 1.4 Identify factors of numbers. 1.5 Recall multiplication facts up to 10×10 and make connections with division facts. 2.1 Form word expressions from simple expressions in symbols 2.2 Evaluate simple expressions and formulae. 2.3 Translate simple word problems into symbols, +, -, $\div$, $\times$ and numbers 3.1 Work out simple ratio as the number of parts.
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	A8 work with coordinates in all four quadrants A9 plot graphs of equations that correspond to straight-line graphs in the coordinate plane A10 identify and interpret gradients and intercepts of linear functions graphically and algebraically A12 recognise, sketch and interpret graphs of linear functions and quadratic functions A14 plot and interpret graphs, and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration	b r a a n d R a t i o s	3.2 Explain direct proportion as the same rate of increase or decrease. 3.3 Use understanding of direct proportion to make simple calculations.
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	A17 solve linear equations in one unknown algebraically find approximate solutions using a graph A23 generate terms of a sequence from either a term-to-term or a position-to-term rule A24 recognise and use sequences of triangular, square and cube numbers and simple arithmetic progressions A25 deduce expressions to calculate the nth term of linear sequences		
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Fractions, Ratio, Percentages	R2 use scale factors, scale diagrams and maps R3 express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1 R4 use ratio notation, including reduction to simplest form R5 divide a given quantity into two parts in a given part : part or part : whole ratio, express the division of a quantity into two parts as a ratio apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations)	Numbers, Decimals, Fractions	
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	R6 express a multiplicative relationship between two quantities as a ratio or a fraction R7 understand and use proportion as equality of ratios R8 relate ratios to fractions and to linear functions R9 define percentage as 'number of parts per hundred' interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively, express one quantity as a percentage of another. compare two quantities using percentages work with percentages greater than 100%	a n d P e r c e n t a g e s	
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	solve problems involving percentage change, including percentage increase/decrease and original value problems, and simple interest including in financial mathematics R10 solve problems involving direct and inverse proportion, including graphical and algebraic representations R11 use compound units such as speed, rates of pay, unit pricing R12 compare lengths, areas and volumes using ratio notation scale factors N11 identify and work with fractions in ratio problems		
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	N12 interpret fractions and percentages as operators		
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Geometry	G1 use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries use the standard conventions for labelling and referring to the sides and angles of triangles draw diagrams from written description G3 apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles understand and use alternate and corresponding angles on parallel lines derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)	Use shape space and solid geometry	4.1 Solve problems using the mathematical properties of regular 2-D shapes. 4.2 Draw 2-D shapes in different orientations using grids, for example in diagrams or plans. 4.3 Work out the perimeter of simple shapes. 4.4 Work out the area of rectangles. 4.5 Work out the volume of shapes, for example cuboids. 4.6 Work out dimensions from drawings with simple shapes, for example 1cm represents 1m. 4.7 Follow directions using appropriate positional vocabulary, including the eight compass points.
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	G4 derive and apply the properties and definitions of: special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus and triangles and other plane figures using appropriate language G7 identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargement G9 identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference G 11 solve geometrical problems on coordinate axes		
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	G12 identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres G13 interpret plans and elevations of 3D shapes G15 measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings		
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	G16 know and apply formulae to calculate: area of triangles, parallelograms, trapezia; volume of cuboids and other right prisms (including cylinders) G17 know the formulae: circumference of a circle = $2\pi r = \pi d$ area of a circle = πr^2 calculate perimeters of 2D shapes, including circles areas of circles and composite shapes G24 describe translations as 2D vectors		
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Measure	G14 use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money etc.), R1 change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices) in numerical contexts N13 use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate	M o n e y , t i m e a n d t	1.1 Add and subtract sums of money including through use of columns with decimal point aligned. 1.2 Multiply and divide sums of money. 1.3 Record sums of money, using appropriate conventions. 2.1 Read time in common formats, on analogue clocks and 12 and 24 hour digital clocks and timetables.. 2.2 Use different instruments to measure time in days, hours, minutes and seconds 2.3 Record time in common formats and using 12 and 24 hour formats. 2.4 Add and subtract times in hours and minutes. 2.5 Convert units of time 3.1 Read, estimate, measure and compare temperature using common units and instruments. 3.2 Read temperature scales to the nearest labelled and unlabelled division.
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		e m p e r a t u r e	1.1 Choose and use appropriate instruments for measuring length and distance. 1.2 Choose and use appropriate units for measuring length and distance. 1.3 Read scales to the nearest labelled and unlabelled division. 1.4 Add and subtract units of measure for length and distance. 1.5 Convert units of measure in the same system. 2.1 Choose and use appropriate instruments for measuring weight. 2.2 Choose and use appropriate units for measuring weight. 2.3 Read scales to the nearest labelled and unlabelled division. 2.4 Add and subtract units of measure for weight. 2.5 Convert units of measure in the same system. 3.1 Choose and use appropriate instruments for measuring capacity. 3.2 Choose and use appropriate units for measuring capacity
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			3.3 Read scales to the nearest labelled and unlabelled division.	
			3.4 Add and subtract units of measure for capacity.	
			3.5 Convert units of measure in the same system.	

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Statistics	P1 record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees P2 apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments P3 relate relative expected frequencies to theoretical probability, using appropriate language and the 0 to 1 probability scale P4 apply the property that the probabilities of an exhaustive set of outcomes sum to 1 apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to 1	U s i n g a n d C o m m u n i c a t i n g D a	
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1.1 Read and write positive numbers including large numbers.

1.2 Order and compare positive numbers including large numbers.

1.3 Recognise negative numbers in practical contexts, for example temperatures.

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	p6 enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams p7 construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities S2 interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, and know their appropriate use S4 interpret, analyse and compare the distributions of data sets from univariate empirical distributions through:	t a U si n g P r o b a b ili t y	1.1 Use understanding of title, labels and simple scales to extract information from lists, tables, diagrams, charts and line graphs. 1.2 Use understanding of title, labels and simple scales to interpret information from lists, tables, diagrams, charts and line graphs. 2.1 Identify appropriate methods for collecting data. 2.2 Collect discrete data in tests and from observations. 2.3 Organise discrete data so that it can be easily transferred into a suitable format for sharing. 2.4 Find the arithmetical average (mean) for a set of data 2.5 Find the arithmetical range for a set of data. 2.6 State how very high or low figures can distort the average (mean). 3.1 Use whole numbers, decimals and fractions and percentages to present 3.2 Represent data in tables, charts, diagrams and line graphs, to support the understanding of others.
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	appropriate graphical representation involving discrete, continuous and grouped data appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers) S5 apply statistics to describe a population S6 use and interpret scatter graphs of bivariate data recognise correlation		3.3 Select suitable methods, format and scale to present and describe outcomes. 1.1 Use the vocabulary of probability to talk about the likelihood of events and possible outcomes. 1.2 Show understanding that some events are certain to happen and some impossible. 2.1 Calculate probability by the number of ways the event can happen divided by the total number of possible outcomes. 2.2 Express probability using fractions, decimals and percentages with the probability scale of 0 to 1.
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