MATHS - Geometry, Measure & Statistics - Performance Descriptors

	Geometry & Measure	Statistics	Probability
YEAR 9 41 40 39 (38)	• Mark on a diagram the position of point B given its bearing from the point A • Use accurate drawing to solve bearings problems • Use the sum of the interior angles of an n-sided polygon • Calculate the interior angles of polygons • Find the size of each interior angle or the size of each exterior angle or the number of sides of a regular polygon • Calculate volumes of shapes made from cuboids, for lengths given as whole numbers • Calculate the volume, the surface area and the lengths in right prisms • Calculate the lengths, areas and volumes in cylinders • Use the formulae for the circumference and area of a circle, given the circumference or area, to calculate the radius or diameter • Find the perimeters and areas of semicircles and quarter circles • Begin to use congruency to solve simple problems in triangles and quadrilaterals • Use the information given about the length of sides and sizes of angles to determine whether triangles are congruent, or similar • Use straight edge and compass to construct the perpendicular from or to a point on a line segment • Use straight edge and compasses to construct a triangle, given right angle, hypotenuse and side (RHS) • Draw the locus equidistant between 2 points or from a point • Produce shapes and paths by using descriptions of loci • Use construction to find the locus of a point that moves according to a rule • Understand loci about a point, line and corner. • Construct angles of 60°, 90°, 30°, 45° • Know the formula for Pythagoras' theorem and use to find the hypotenuse • Know that the perpendicular distance from a point to a line is the shortest distance to the line • Justify if a triangle is right-angled given its three lengths • Use vector and D vector notation for translations • Understand and use the language and notation associated with enlargement • Enlarge 2D shapes, given a fractional scale factor • Find the centre of rotation • Describe a transformation • Describe reflections on a coordinate grid • Colour in missing squares to complete a reflection / Recognise whether a reflection is correct • Express points as position vectors • Understand and use vector notation	• Use more complex two way tables • Construct on paper, and using ICT, frequency diagrams for grouped discrete data • Find the median, mode and range from a stem and leaf diagram • Estimate the mean of grouped data using the mid-interval value • Understand that the frequency represented by corresponding sectors in two pie charts is dependent upon the total populations represented by each of the pie charts • Recognise the advantages and disadvantages between measures of average • Criticise questions from a questionnaire • Understand how sources of data may be biased • Decide what data to collect and what analysis is needed • Write questionnaire questions to eliminate bias, on timing and location of survey to ensure sample is representative • Know the definition of random sampling • State how reliable their predictions are • Draw a line of best fit by eye and understand what they represent • Understand that correlation does not imply causality • Distinguish between positive, negative and zero correlation using lines of best fit • Appreciate that correlation is a measure of the strength of the association between two variables and that zero correlation does not necessarily imply 'no relationship' but merely 'no linear relationship' • Use a line of best fit, or otherwise, to predict values of one variable given values of the other variable • Intepret scatter graphs in terms of the relationship between two variables • Use the line of best fit to make predictions • Interpolate and extrapolate apparent trends whilst knowing the dangers of doing so • Interpret correlation in terms of the problem	• Record outcomes of events in a Venn Diagram • Use theoretical models to include outcomes using spinners, dice, coins etc.

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YEAR 8 38 37 36 (35)	• Given the bearing of point A from point B, work out the bearing of B from A • Identify co-interior angles and their values. • Use the sum of the exterior angles of any polygon is 360° • Calculate the interior angles of regular polygons • Use the sum of angles in a triangle to deduce and use the angle sum in any polygon • Deduce and use the formula for the area of a parallelogram • Use a formula to calculate the area of trapezia • Deduce and use formula for the area of a trapezium • Calculate surface areas of shapes made from cuboids, for lengths given as whole numbers • Know the formulae for the circumference and area of a circle • Use the formula for the circumference of a circle • Use the formulae for area of a circle, given the radius or diameter • Identify congruent shapes • Identify 2-D shapes that are congruent or similar by reference to sides and angles • Identify shapes which are similar, including all regular polygons with equal number of sides • Recognise that all corresponding angles in similar shapes are equal in size when the corresponding lengths of sides are not equal in size • Identify more complex nets of 3D shapes • Deduce properties of simple 3D shapes from their 2D representations • Analyse 3-D shapes through cross-sections, plans and elevations • Use straight edge and compasses to construct the bisector of an angle • Use straight edge and compasses to construct a triangle given three sides (SSS) • Construct an equilateral triangle • Construct a regular hexagon inside a circle • Begin to use the trigonometric ratios to find the size of an angle in a right-angled triangle • Solve geometric problems using side and angle properties of equilateral, isosceles and right-angled triangles • Know the names of parts of a circle • Draw circles and arcs to a given radius • Enlarge 2-D shapes, given a centre of enlargement and a positive whole number scale factor • Enlarge a given shape and find the centre of enlargement	• Identify which graphs are the most useful in the context of the problem • Interpret and discuss data • Produce ordered back-to-back stem and leaf diagrams • Make inferences about data through extracting information from a two way table • Recognise when modal class is the most appropriate statistic for grouped data • Identify and explain anomalies (outliers) in a data set • Understand that the expression 'estimate' will be used where appropriate, when finding the mean of grouped data using mid-interval values • Understand how different sample sizes may not be representative of a whole population • Identify what primary data to collect and in what format including grouped data • Recognise quantitative and qualitative data • Identify possible sources of bias and plan to minimise it • Understand what is meant by a sample and a population	• Draw a probability tree diagram based on given information (no more than 3 branches per event) • Apply probabilities from experimental data to a different experiment in applying to two step outcomes, e.g. spin a spinner twice and total the two numbers. Which total is the most likely? • Identify conditions for a fair game – from a small set of options • Calculate the probability of the final event of a set of mutually exclusive events. • Use and draw sample space diagrams • Draw a frequency tree based on given information and use this to find probability and expected outcome • Record outcomes of probability experiments in tables • Use tree diagrams to calculate the probability of two independent events

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	Geometry & Measure	Statistics	Probability
YEAR 7 35 34 33 (32)	• Solve harder problems using properties of angles, of parallel and intersecting lines, and of triangles and other polygons – by looking at several shapes together • Identify alternate and corresponding angles on parallel lines and their values. • Find the area of triangles by counting i.e. adding full and partial squares • Know the formulae for the volume of cube and a cuboid • Use a formula to calculate the area of parallelograms • Use a formula to calculate the area of triangles • Deduce and use formulae for the area of a triangle • Calculate areas of compound shapes made from rectangles and triangles • Know and understand the term 'congruent' • Know that triangles given SSS, SAS, ASA or RHS are unique, but that triangles given SSA or AAA are not. • Know that translations, rotations and reflections map objects on to congruent images • Identify simple nets of 3D shapes • Use straight edge and compasses to construct the mid point and perpendicular bisector of a line segment • Draw a circle given the radius or diameter • Know that translations, rotations and reflections preserve length and angle • Recognise that enlargements preserve angle but not length	• Interpret and/or compare bar graphs and frequency diagrams which are misleading (with false origins, different scales etc.) • Interpret pie charts and line graphs taking into account different sized samples • Construct a simple (no boundary data) frequency table with given equal class intervals for continuous data. • Construct a frequency table with given equal class intervals for continuous data (boundary data given) • Identify where boundary data would go for different use of inequalities. Discrete and continuous data. • Design tables recording discrete and continuous data • Construct complex bar graphs (should be compound) • Construct with ICT simple line graphs for time series • Design a question for a questionnaire • Criticise questions for a questionnaire • Produce grouped frequency tables for continuous data • Compare two distributions given summary statistics in simple cases. • Compare two distributions given summary statistics in more complex cases. • Compare two distributions using the range of data • Interpret data from compound and comparative bar charts • Interpret a scatter graph • Draw scatter graphs	• Know that if the probability of an event is p, the probability of it not occurring is 1-p • Identify different mutually exclusive outcomes and know that the sum of probabilities of all outcomes is 1 • Estimate the number of times an event will occur, given the probability and the number of trials • Compare experimental and theoretical 3probabilities • Compare relative frequencies from samples of different sizes • Identify all mutually exclusive outcomes for two successive events with two and three outcomes in each event • Record outcomes of events in tables and grids • Apply probabilities from experimental data to a different experiment (a combination of two outcomes) • Use vocabulary of probability • Find the probability of an event happening using relative frequency • Write probabilities in words, fractions, decimals and percentages • Work out probabilities from frequency and two-way tables

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YEAR 6 32 31 30 (29)	• Identify interior and exterior angles in a shape • Know the definition of a set of lines which are perpendicular to each other • Calculate angles around a point, recognise and use vertically opposite angles • Derive and use the sum of angles in a triangle and a quadrilateral • Calculate the area of simple shapes made from rectangles • Calculate the area of more complex shapes made from rectangles • Calculate the surface area of cubes, without a net • Calculate the perimeter and area of shapes made from rectangles • Calculate the surface area of simple cuboids (without use of nets) • Use ruler and protractor to construct simple nets of 3D shapes, using squares, rectangles and triangles, e.g. regular tetrahedron, square-based pyramid, triangular prism • Identify regular and irregular polygons • Draw or complete diagrams with a given number of lines of symmetry • Draw or complete diagrams with a given order of rotational symmetry • Recognise and visualise the rotational symmetry of a 2-D shape • Find co-ordinates of points determined by geometric information • Solve geometric problems using side and angle properties of equilateral and isosceles triangles • List the properties of each, or identify (name) a given shape • Name all quadrilaterals that have a specific property • Use a protractor to draw obtuse angles to the nearest degree • Use a protractor to draw reflex angles to the nearest degree • Solve simple problems involving units of measurement in the context of length and area • Solve simple geometrical problems using properties of triangles and quadrilaterals	• Interpret simple diagrams and charts • Understand which representation is most appropriate for the data being presented • Extract data and interpret frequency tables • Interpret simple pie charts • Group data, where appropriate in equal class intervals • Design and use data collection sheets for grouped, discrete and continuous data • Use information provided to complete a two-way table • Produce pie-charts for categorical data and discrete/continuous numerical data • Calculate the mean of a set of data • Compare two simple distributions using the range and the median • Calculate the mean from a simple frequency table • Compare two simple distributions using the range and the mean • Recognise when it is appropriate to use range, mean ,median or mode in simple cases (nice data, with no extreme values) • Interpret data from simple compound and comparative bar charts • From a pie chart find the mode; total frequency	• Apply the property that the probabilities of an exhaustive set of outcomes sum to 1 • Identify all possible mutually exclusive outcomes of a single event • Apply probabilities from experimental data to a different experiment in simple situations (only looking at one outcome) - how many successes would you expect? • Understand and use experimental and theoretical measures of probability, including relative frequency to include outcomes using dice, spinners, coins etc. • Use the vocabulary of probability • Understand and use the probability scale from 0 to 1 • Find and justify probabilities based on equally likely outcomes in simple contexts

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YEAR 5 29 28 27 (26)	• Identify perpendicular lines • Use the formula for the area of a rectangle/square • Calculate the surface area of cubes with a net • Use nets to calculate the surface area of simple cuboids • Calculate perimeter and area of compound shapes made from triangles, rectangles and other shapes • Identify different nets of a cuboid • Know and use geometric properties of shapes made from cuboids • Record estimates to a suitable degree of accuracy • Know that measurements using real numbers depend upon the choice of unit • Use correct notation for labelling triangles • Mark perpendicular lines on a diagram • Recognise and visualise the symmetry of a 2-D shape: line symmetry • Calculate angles in a triangle • Identify simple angle, side and symmetry properties of triangles • Identify angle, side and symmetry properties of simple quadrilaterals • Recognise and visualise - rotation about a given point (rotation point must be outside the shape)	• Begin to estimate the size of angles • Use a protractor to measure obtuse angles to the nearest degree • Use a protractor to draw acute angles to the nearest degree • Use a protractor to measure reflex angles to the nearest degree • Measure shapes to find (perimeters and) areas • Use correct notation for labelling angles • Distinguish between acute and obtuse angles • Distinguish between acute, obtuse and reflex angles • Use units of measurement to estimate and solve problems in everyday contexts involving length, area, volume, mass, time and angle	• Choose and justify appropriate diagrams, graphs and charts, using ICT as appropriate, to illustrate a short report of a statistical enquiry • Draw conclusions based on the shape of line graphs • Find mode from a discrete data bar chart • Extract data and interpret line graphs • Find mode group from a discrete data grouped bar chart • Construct on paper, and using ICT simple bar graphs to represent discrete data • Answer simple questions about 'most likely' from a simple bar chart • Find the mode from any bar chart • Construct on paper, and using ICT, bar charts; line graphs to represent data • Produce bar charts including dual bar charts • Find the mode and range for a small set of discrete data • Calculate the median of a set of data • Find the modal class for a small set of grouped discrete data • Compare two simple distributions using the range and the mode • Draw conclusions from simple statistics for a single distribution • Calculate the mean, median, mode and range for discrete data • Find the mode and range from a bar chart • Interpret simple pie charts using simple fractions and percentages and multiples of 10% sections

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YEAR 4 26 25 24 (23)	• Identify parallel lines • Know the sum of angles round a point • Find the perimeter of a square/rectangle • *Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes* • Know and use geometric properties of cuboids • Construct diagrams of everyday 2-D situations involving rectangles, triangles, perpendicular and parallel lines • Understand that area is measured in square centimetres • Mark parallel lines on a diagram • Draw parallel lines • Recognise reflection symmetry • Use correct notation for labelling lines • Know the sum of angles in a triangle is 180° • *Identify acute and obtuse angles and compare and order angles up to two right angles by size* • Identify quadrilaterals from everyday usage • Recognise and visualise the reflection in a mirror line of a 2-D shape • identify lines of symmetry in 2-D shapes presented in different orientations Translate a shape on a square/coordinate grid • *Complete a simple symmetric figure with respect to a specific line of symmetry.* • Recognise where a shape will be after translation • Understand and use the language associated with rotations • *Find the area of rectilinear shapes by counting squares*	• Use a protractor to measure acute angles to the nearest degree • Choose suitable metric units to estimate length and area. • *Measure lines to the nearest millimetre* • *Convert between different units of measure [for example, kilometre to metre; hour to minute]* • *Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres* • *Estimate, compare and calculate different measures, including money in pounds and pence* • Read, write and convert time between analogue and digital 12- and 24-hour clocks • Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	• Find the range of a small set of data. • Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. • Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.
YEAR 3 23 22 21 (20)	• Draw 2d shapes and make 3d shapes using modelling materials • Recognise and describe 3d shapes • Recognise angles as a property of shape or a description of turn • Identify right angles, recognise 2 right angles make a half turn, 3 make 3 quarters of a turn and 4 a complete turn • Identify angles greater than and less than a right angle • Identify horizontal and vertical lines, pairs of perpendicular and parallel lines.	• Measure, compare, add and subtract lengths, mass, volume and capacity • Measure the perimeter of simple 2d shapes • Add and subtract amounts of money to give change, using both £ and p. • Tell and write the time from an analogue clock, including using Roman Numerals, 12 hour and 24 hour clocks • Estimate and read time with increasing accuracy • Know the number of seconds in a minute and number of days in each month, year and leap year and compare duration of events	• Interpret and present data using bar charts, pictograms and tables • Solve one step and two step questions using information presented in bar charts, pictograms and tables