Curriculum Map Year 8 - Maths

Topic Name	Term	Content / skills developed with link to NC / exam board subject content (if applicable)	Reflection on previous learning	Progress to future learning	Global Citizenship links	Qatar National Identity links
1 Factors and powers	1	• Find the prime factor decomposition of a number • Know the prime factorisation of numbers up to 30, giving answers as powers • Use prime factor decomposition to find the HCF or LCM of 2 numbers • Establish index laws for positive powers where the answer is a positive power • Apply the index laws for multiplication and division of positive integer powers • Show that any number to the power of zero is 1 • Understand that each of the headings in the place value system, to the right of the tens column, can be written as a power of ten • Know the prefixes associated with 109, 106, 103 (giga, mega and kilo) • Understand the effect of multiplying or dividing by any integer power of 10 • Understand the order in which to calculate expressions that contain powers and brackets in both the numerator and denominator of a fraction • Round numbers to a given number of significant figures • Use numbers of any size rounded to 1 significant figure 1to make standardized estimates for calculations with 1 step.	• Common factors • Square numbers and cube numbers • Rounding any integer	• Working with fraction • Surds • Factorising expressions • Standard form	PRIDE values Prepare for challenge. Developing skills for the future	Sustainability: self esteem and participation Sustainability: responsibility and creativity

2 Working with powers	1	• Simplify simple expressions involving powers, but not brackets, by collecting like terms • Simplify simple expressions involving index notation, i.e. $x^2 + 2x^2$, $p \times p^2$, $r5 \div r^2$ • Know and understand the meaning of an identity and use the identity sign • Simplify expressions involving brackets and powers e.g. x(x2 + x + 4), 3(a + 2b) – 2(a + b) • Establish index laws for positive powers of variables where the answer is a positive power • Apply the index laws for multiplication and division of small integer powers, e.g. $a^3 \times a^2$, $x^3 \div x^2$ • Know and use the general forms of the index laws for multiplication and division of positive integer powers. (e.g. pa × pb, pa ÷ pb, (pa)b) • Multiply a single term over a bracket e.g. x(x + 4), 3x(2x – 3) • Use the distributive law to take out single term algebraic factors, e.g. $x^3 + x^2 + x = x(x^2 + x + 1)$ • Substitute positive and negative integers into linear expressions and expressions involving powers • Construct and solve equations that involve multiplying out brackets by a negative number and collecting like terms (e.g. 4(2a – 1) = 32 – 3(2a – 2))	• Comparing and ordering any integers • Powers of 10 • Substitution • Collecting like terms	• Simplifying expressions. • Vectors • Substitution into formula • Higher level maths problem solving	PRIDE values Prepare for challenge. Developing skills for the future	Sustainability: self esteem and participation Sustainability: responsibility and creativity
3 2D shapes and 3D solids	1+2	• Begin to use plans and elevations • Visualise and use a wide range of 2D representations of 3D objects	• Circles-radius, diameter, circumference • Drawing shapes accurately,	• Volume of 3D objects. • Similar shapes • Calculating area's of	PRIDE values Prepare for challenge.	Sustainability: self esteem and participation

		• Analyse 3D shapes informally and through cross-sections, plans and elevations • Calculate the volume and surface area of right prisms • Calculate the lengths, areas and volumes in cylinders • Convert between larger volume measures to smaller ones (e.g. m^3 to cm^3) • Calculate the lengths and areas given the volumes in right prisms • Use the formula for the circumference of a circle • Know the names of parts of a circle • Use the formulae to find area of a circle, given the radius or diameter • Use the formulae for the area of a circle, given area, to calculate the radius or diameter • Be able to correctly identify the hypotenuse • Know the formula for Pythagoras' theorem and how to substitute in values from a diagram • Use and apply Pythagoras' theorem to solve problems • Given the coordinates of points A and B, calculate the length of AB	• Shapes with the same area • Area and perimeter- counting squares • Area and perimeter - rectilinear shapes • Area of triangles • Area of parallelograms • Volume- counting cubes • Volume of a cuboid	shapes linked to circles. • Problem solving using right angled triangles	Developing skills for the future	Sustainability: responsibility and creativity
4 Real-life graphs	2	• Extend a proportion or relationship beyond known values (given proportion graphically or in words) • Recognise graphs that show direct proportion • Solve problems involving direct proportion with a graph • Discuss and interpret real-life graphs	• Reading coordinates • Plotting coordinates • Scaled drawings • Scale factors •	• Speed, distance, time problems. • Estimations from graphs.	PRIDE values Prepare for challenge. Developing skills for the future	Sustainability: self esteem and participation Sustainability: responsibility and creativity

		• Interpret information from a complex real life graph, read values and discuss trends • Plot the graphs of a function derived from a real life problem • Discuss and interpret linear and non linear graphs from a range of sources • Recognise graphs showing constant rates of change, average rates of change and variable rates of change • Plot a simple straight line graph (distance-time) • Draw and use graphs to solve distance-time problems • Identify misleading graphs and statistics – choosing the appropriate reasons from a small choice of options • Identify misleading graphs and statistics – choosing the appropriate reasons from a wide choice of options, or writing their own reasons				
5 Transformations	2	• Describe a reflection, giving the equation of the line of reflection • Show reflection on a coordinate grid in y = x, y = –x • Describe and carry out translations using column vectors • Describe a rotation on a coordinate grid • Know that translations, rotations and reflections preserve length and angle • Know that translations, rotations and reflections map objects on to congruent images • Enlarge 2D shapes, given a centre of enlargement and a positive whole number scale factor	• Translation on a grid • Reflection	• Rotation • Enlargement including fractional scale factors.	PRIDE values Prepare for challenge. Developing skills for the future	Sustainability: self esteem and participation Sustainability: responsibility and creativity

		• Describe 2D enlargements • Enlarge 2D shapes, given a centre of enlargement outside the shape and a negative whole-number scale factor • Enlarge 2D shapes, given a fractional scale factor • Recognise that enlargements preserve angle but not length • Enlarge 2D shapes and recognise the similarity of resulting shapes • Transform 2D shapes by simple combinations of rotations, reflections and translations, using ICT • Transform 2D shapes by more complex combinations of rotations, reflections and translations • Identify reflection symmetry in 3D shapes • Understand the implications of enlargement for perimeter • Identify the scale factor of an enlargement as the ratio of the lengths of any two corresponding line segments • Calculate areas and volumes of shapes after enlargement				
6 Fractions, decimals and percentages	3	• Know fractional equivalents to key recurring decimals e.g. 0.333333..., 0.66666666..., 0.11111… • Know the denominators of simple fractions that produce recurring decimals, and those that do not • Convert a recurring decimal to a fraction • Use an inverse operation • Use the unitary method for an inverse operation	• Decimal and fraction equivalents • Fractions as division • Understanding what percentage are • Converting fractions to percentages	• Moving onto worded questions linked to fractions, decimals and percentages	PRIDE values Prepare for challenge. Developing skills for the future	Sustainability: self esteem and participation Sustainability: responsibility and creativity

		• Calculate percentage change, using the formula 'actual change/original amount × 100' – where formula is given • Calculate percentage change, using the formula 'actual change/original amount × 100' – where formula is recalled • Calculate compound interest and repeated percentage change	• Finding equivalent fractions, decimal and percentages; • Ordering fractions, decimals and percentages • Percentages of an amount • Percentages with missing values.			
7 Constructions	3+4	• Construct a triangle given two sides and included angle (SAS) • Construct a triangle given two angles and the included side (ASA) • Use straight edge and compass to construct a triangle, given three sides (SSS) • Use ruler and protractor to draw accurate nets of 3-D shapes, using squares, rectangles and triangles e.g. regular tetrahedron, square-based pyramid, triangular prism • Use straight edge and compass to construct the mid-point and perpendicular bisector of a line segment • Use straight edge and compass to construct the bisector of an angle • Use straight edge and compass to construct the perpendicular from a point on a line segment • Use straight edge and compass to construct a triangle, given	• Measuring and classifying angles • Drawing shapes accurately, • Nets of 3D shapes	• Pie charts • Bearings	PRIDE values Prepare for challenge. Developing skills for the future	Sustainability: self esteem and participation Sustainability: responsibility and creativity

		right angle, hypotenuse and side (RHS) • Use straight edge and compass to construct the perpendicular from a point to a line segment • recognise and use the perpendicular distance from a point to a line as the shortest distance to the line				
8 Probability	4	• Understand and use the probability scale from 0 to 1 • Identify all possible mutually exclusive outcomes of a single event • Find and justify probabilities based on equally likely outcomes in simple contexts • Calculate the probability of a combination of events or single missing events of a set of mutually exclusive events using 'sum of outcomes = 1' • Calculate the probability of the final event of a set of mutually exclusive events • Know that if probability of event is p, probability of not occurring is 1 – p • Understand relative frequency as an estimate of probability and know when to add or multiply probabilities • Know how to calculate relative frequency • Use relative frequency to make estimates • Apply estimated probabilities to future data • Estimate probabilities based on these data (collected from a simple experiment) • Plot and use relative frequency diagrams, and recognise that	Reading and writing fractions. Listing outcomes	Venn Diagrams	PRIDE values Prepare for challenge. Developing skills for the future	Sustainability: self esteem and participation Sustainability: responsibility and creativity

		with repeated trials experimental probability tends to a limit • Use experimentation to complete a data collection sheet, e.g. throwing a die or data-logging • Identify all mutually exclusive outcomes for two successive events with two or three outcomes in each event • Use the vocabulary of probability to assign probability to events. • Identify conditions for a fair game • Draw and use tree diagrams to represent outcomes of two independent events and calculate probabilities • Calculate the probability of independent and dependent events				
9 Scale drawings and measures	5	• Use scales in maps and plans • Use and interpret maps, using proper map scales (1:25 000) • Draw diagrams to scale • Use and interpret scale drawings, where scales use mixed units, and drawings aren't done on squared paper, but have measurements marked on them. • Solve simple geometrical problems showing reasoning • Distinguish between conventions, definitions and derived properties • Solve geometric problems using side and angle properties of equilateral, isosceles and right-angled triangles and special quadrilaterals • Solve problems using properties of angles, of parallel and intersecting lines, and of triangles and other polygons	• Scaled drawings • Scale factors • Similar shapes	• Reading maps • Similar shapes in context of 2D and 3D shapes	PRIDE values Prepare for challenge. Developing skills for the future	Sustainability: self esteem and participation Sustainability: responsibility and creativity

		• Make simple drawings, demonstrating accurate measurement of length and angle • Use bearings to specify direction • Solve angle problems involving bearings • Begin to use congruency to solve simple problems in triangles and quadrilaterals • Know the criteria for congruence of triangles • Identify 2D shapes that are congruent or similar by reference to sides and angles • Use the information given about the length of sides and size of angles to determine whether triangles are congruent, or similar • Find points that divide a line in a given ratio, using the properties of similar triangles • Use similarity to solve problems in 2-D shapes				
10 Graphs	5	• Plot the graphs of linear functions in the form y = mx + c and recognise and compare their features • Recognise that linear functions can be rearranged to give y explicitly in terms if x e.g. rearrange y + 3x – 2 = 0 in the form y = 2 – 3x • Recognise that straight line graphs can be written in the form y = mx + c • Be able to work out when a point is on a line • Begin to consider the features of graphs of simple linear functions, where y is given explicitly in terms of x	• 1 step function machines • 2 step function machines • Form expressions • Substitution • Formula • Form equations • Solving step 1 equations • Solving step 2 equations • Finding pairs of values	• Solving simultaneous equations. • Application of proportions	PRIDE values Prepare for challenge. Developing skills for the future	Sustainability: self esteem and participation Sustainability: responsibility and creativity

		• Without drawing the graphs, compare and contrast features of graphs such as y = 4x, y = 4x + 6, y = x + 6, y = –4x, y= x – 6 • Know and use y = mx + c for any straight line • Know for a straight line y = mx + c, m is the gradient and m = (change in y)/(change in x) • Recognise that any line parallel to a given line will have the same gradient. • Know that a line perpendicular to the line y = mx + c, will have a gradient of –1/m • Recognise when lines are parallel or perpendicular from their equations • Recognise when lines are parallel and where a line crosses the y-axis from the equation of the line • Find the inverse of a linear function such as $x \rightarrow 2x + 5$, $x \rightarrow 2(x – 3)$, $x \rightarrow (x + 2)/4$, $x \rightarrow 5x – 4$ • Recognise the graph of the inverse of simple linear functions • Recognise that when the linear and inverse of a linear function such as y = 2x, y = 3x are plotted, they are a reflection in the line y = x • Recognise geometric sequences and appreciate other sequences that arise • Find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear , exponential and reciprocal graphs • Solve problems involving direct and inverse proportion, including				

		graphical and algebraic representations				
Introduction to trigonometry	5	• Understand that the ratio of any two sides is constant in similar right-angles triangles • Use the sine, cosine and tangent ratios to find the lengths of unknown sides in a right-angled triangle, using straight-forward algebraic manipulation, e.g. calculate the adjacent (using cosine), or the opposite (using sine or tangent ratios) • Use the sine, cosine and tangent ratios to find the lengths of unknown sides in a right-angled triangle, using more complex algebraic manipulation, e.g. the hypotenuse (using cosine or sine), or adjacent (using the tangent ratio) • Begin to use the trigonometric ratios to find the size of an angle in a right-angled triangle • Use the appropriate ratio to find a length, or angle, and hence solve a two-dimensional problem • Use sine / cosine / tangent of any size of angle and Pythagoras' theorem when solving problems in 3D	• Measuring and classifying angles • Calculating angles	• Application of the trigonometric ratio's • Getting used to using the calculator functions.	PRIDE values Prepare for challenge. Developing skills for the future	Sustainability: self esteem and participation Sustainability: responsibility and creativity
Simultaneous equations	5	• Solving simple simultaneous equations.	• 1 step function machines • 2 step function machines • Form expressions • Substitution • Formula • Form equations • Solving step 1 equations	Solving simultaneous equations with different constants	PRIDE values Prepare for challenge. Developing skills for the future	Sustainability: self esteem and participation Sustainability: responsibility and creativity

			• Solving step 2 equations • Finding pairs of values • Reading coordinates. • Plotting coordinates			