Year 8– Unit 12 - shape properties

Foundation Able to recall the names of quadrilaterals, types of triangles and other simple polygons and to identify their properties.
Secure Classify and name shapes Recognise lines of symmetry of regular and irregular shapes, special triangles and quadrilaterals. Recognise 3-D shapes
Extending Able to state the meaning and show by sketching/drawing accurately, lines, parallel lines, perpendicular lines, right angles. Able to identify properties of regular polygons i.e. number of sides, order of symmetry, lines of symmetry.
Challenge Able to label correctly and use correct notation i.e. "A" and "a" are used in different contexts on a shape. Draw triangles accurately from a written description.

Year 8 - Unit 13 - Algebra

Foundation Substitute integer values into simple expressions and simple formulae.
Secure Use input and output machines including those with two stage operations.
Extending Be able to substitute values into standard formulae including areas, volumes, suvat equations and compound measures. Be able to change the subject of a formula; not including powers, brackets, fractions or the subject appearing twice. Recognise the difference between an identity and an equation; i.e. $x(x + 2) = x^2 + 2x$ for all x.
Challenge Change the subject of a formula to include powers and roots. Be able to argue mathematically that algebraic expressions are equivalent; now to include difference of two squares and multiplication of two binomial terms; e.g. $(x + 2)(x - 3) = x^2 - x - 6$ for all x. Be able to understand an algebraic proof. Use input and output machines including two stage operations and fractions. Be able to construct function machines given a function and vice versa.

Year 8– Unit 14– Transformations

Secure and Extending Identify all the symmetries (rotation and reflection) of 2-D shapes. Know that if two 2-D shapes are congruent, corresponding sides and angles are equal. Enlargement of 2-D shapes, including given a centre of enlargement and a positive integer scale factor.
Challenge Transform and describe rotations. Transform and describe reflections, given a reflection line and equations of lines. Transform and describe enlargements with positive scale factors. Transform and describe translations.

Year 8 – Unit 15 – Probability

Foundation Be able to place events on a probability scale (0, 1/2 and 1); use key terminology
Secure Create some simple sample spaces (e.g. lists of different combinations) and be able to calculate the probability of an event from this list. Carry out simple experiments and record results. Begin to understand what the results show, e.g. does something have a high or low probability based on results?
Extending Be able to calculate missing probabilities by subtracting known probabilities from 1. Carry out experiments and record results. Understand what the results show, e.g. does something have a high or low probability based on results? Through carrying out different experiments and analysing results appreciate that the estimate of a probability will be more accurate the more results you have.

Year 8 – Unit 16 – Triangles and congruence

Foundation Understand the difference between congruence and similarity. Be able to identify congruent or similar shapes from a list. Be able to find and/or use missing lengths or scale factor in similar shapes
Secure Use a ruler and compass to construct a given triangle (3 lengths given).
Extending Use a ruler and compass in standard constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line
Challenge Apply standard ruler and compass constructions in problems involving loci. Be able to recall and apply Pythagoras' theorem.

Year 8 – Unit 17 – Interpreting Data

Secure and Extending P lot coordinates. Understand bivariate data. Describe the correlation. Describe the relationship between the two variables. Draw a line of best fit. Use the line of best fit to estimate values
Challenge D raw and interpret a stem and leaf diagram. Collect, record and group data. Calculate the mean, mode, median and range from a list, a frequency table and grouped data. Draw a bar chart and pie chart. .

Year 8 – Unit 18– Circles

Secure Identify and label parts of a circle. Construct circles given the radius or diameter
Extending Identify area of 2D shapes. Area and circumference of a circle. Be able to split a compound shape into 2 or more identified shapes and calculate their areas and perimeter
Challenge Be able to label a circle with all its properties. Area and circumference of a circle. Be able to split a compound shape into 2 or more identified shapes and calculate their areas and perimeter

Year 8 – Unit 19 – Proportion 2

Extending Be able to solve '3 line problems' using both direct and inverse proportion. Be able to solve a direct or inverse proportion problem when the information is given graphically. Be able to solve compound interest problems
Challenge Be able to solve a direct or inverse proportion problem when the information is given graphically. Be able to solve a direct or inverse proportion problem when the information is given as a formula. Be able to solve numerical problems which are direct or inverse proportion. Be able to solve compound interest problems. Be able to use percentage change for growth and decay problems

Year 8 – Unit 20 – Solving Equations and Inequalities

Extending Be able to solve one stage equations e.g. 2x = 10, x - 4 = 9 and x/2 = 10. Be able to solve two stage equations e.g. 2z + 1 = 11, x/2 + 8 = 10. Be able to solve equations involving brackets. Roots of equations should be positive and negative integers and simple fractions. Be able to create an equation given a worded problem and then solve it.
Challenge Be able to solve equations up to and including variable on both sides, both algebraically and by drawing a graph. Be able to solve linear inequalities in one variable and represent the solution set on a number line and by using set notation. Be able to create an equation from a worded problem and find the solution and interpret the answer. Be able to solve a quadratic equation graphically. .

Year 8 – Unit 21– Plotting and Sketching Graphs

Foundation and secure

Plot coordinates in all four quadrants.

Substitute into formulas with 2 variables.

Plot and recognise lines in the form x = a and y = b.

Recognise that lines in the form y = mx + c will always result in a straight line and that the c gives the y-intercept and m is the gradient.

Plot quadratic graphs and recognise that they will always result in a parabola.

Be able to draw a graph of a straight line given in the form y = mx + c by using a table of values.

Be able to draw a graph of a straight line given in the form ax + by = c by finding intercepts on both axes.

Be able to recognise that c is the y intercept and m is the gradient and that as m increases the gradient gets steeper.

Use conversion and other similar graphs.

Understand difference between a negative and positive gradient

Extending

Be able to draw the graph of y = mx + c by using intercept and then plotting other points by using gradient.

Be able to recognise that c is the y intercept and m is the gradient and that as m increases the gradient gets steeper.

Use conversion and other similar graphs.

Find the equation of a line given two points or one point and the gradient.

Be able to draw graphs of quadratic functions using a table of values and find the turning point and the roots graphically. Be able to find the line of symmetry.

Know that when mm' = -1 two lines are perpendicular.

Recognise that lines in the form y = mx + c will always result in a straight line and that the c gives the y-intercept and m is the gradient.

Plot quadratic graphs and recognise that they will always result in a parabola.

Calculate the gradient of a given straight line.

Calculate the gradient of a straight line given 2 coordinates.

Find the equation a straight line by calculating the gradient and y-intercept

Year 7 – Unit 11 – Ratio and Scale

Foundation and secure Interpret scales on a range of measuring instruments, and recognise the inaccuracy of measurements. Interpret scales on a range of measuring instruments including mm, cm, m, km, ml, cl, l, mg, g, kg, tonnes. Measure and draw lines with a ruler and measure and draw angles with a protractor. Construct scale drawings. Use and interpret scale drawings. Interpret map/model scales as a ratio. Identify the scale factor of an enlargement of a shape as the ratio of the lengths of two corresponding sides.
Extending Construct scale drawings. Use and interpret scale drawings, Interpret scales on a range of measuring instruments including mm, cm, m, km, ml, cl, l, mg, g, kg, tonnes, °C. Interpret map/model scales as a ratio and estimate lengths using a scale diagram. Give a bearing between the points on a map or scaled plan, interpret bearing and scaled drawings.