Year 8 Mathematics Curriculum

Numbers and the number system

- use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor and lowest common multiple
- use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5
- recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions

Counting and comparing

- order positive and negative integers, decimals and fractions
- use the symbols =, ≠, <, >, ≤, ≥

Calculating

- understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals)
- apply the four operations, including formal written methods, to integers and decimals
- use conventional notation for priority of operations, including brackets
- recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)

Visualising and constructing

- 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

Investigating properties Shapes

- identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres
- 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

Algebraic proficiency: tinkering

- understand and use the concepts and vocabulary of expressions, equations, formulae and terms
- use and interpret algebraic notation, including: ab in place of a × b, 3y in place of y + y + y and 3 × y, a^2 in place of a × a, a^3 in place of a × a × a, a/b in place of a ÷ b, brackets
- simplify and manipulate algebraic expressions by collecting like terms and multiplying a single term over a bracket
- where appropriate, interpret simple expressions as functions with inputs and outputs
- substitute numerical values into formulae and expressions
- use conventional notation for priority of operations, including brackets

Exploring fractions, decimals and percentages

- express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1
- define percentage as 'number of parts per hundred'
- express one quantity as a percentage of another

Proportional reasoning

- use ratio notation, including reduction to simplest form
- divide a given quantity into two parts in a given part:part or part:whole ratio

Pattern sniffing

- generate terms of a sequence from a term-to-term rule

Measuring space

- use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)
- use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate
- change freely between related standard units (e.g. time, length, area, volume/capacity, mass) in numerical contexts
- measure line segments and angles in geometric figures

Investigating angles

- apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles

Calculating fractions, decimals and percentages

- apply the four operations, including formal written methods, to simple fractions (proper and improper), and mixed numbers
- interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively
- compare two quantities using percentages
- solve problems involving percentage change, including percentage increase/decrease

Solving equations and inequalities

- recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)
- solve linear equations in one unknown algebraically

Calculating space

- use standard units of measure and related concepts (length, area, volume/capacity)
- calculate perimeters of 2D shapes
- know and apply formulae to calculate area of triangles, parallelograms, trapezia
- *calculate surface area of cuboids*
- know and apply formulae to calculate volume of cuboids
- understand and use standard mathematical formulae

Checking, approximating and estimating

- round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures)
- estimate answers; check calculations using approximation and estimation, including answers obtained using technology
- recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)

Mathematical movement

- work with coordinates in all four quadrants
- *understand and use lines parallel to the axes, $y = x$ and $y = -x$*
- solve geometrical problems on coordinate axes
- identify, describe and construct congruent shapes including on coordinate axes, by considering rotation, reflection and translation
- describe translations as 2D vectors

Presentation of data

- 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

Measuring data

- interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean and mode) and spread (range)