St John's CE Middle School
Key Performance Indicators

Pupils who are working at age related expectations at the end of the year will have a secure knowledge of these Key Performance Indicators.

KS3 Year 8 Maths

Number – calculations and place value
interpret standard form A x 10n, where 1 ≤ A < 10 and n is an integer
round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures)
use the concepts and vocabulary of prime numbers, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem
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
apply systematic listing strategies
use conventional notation for priority of operations, including brackets, powers, roots and reciprocals
Algebra – expressions and equations
understand and use the concepts and vocabulary of factors
use and interpret algebraic notation, including: a^2b in place of a × a × b, coefficients written as fractions rather than as decimals
simplify and manipulate algebraic expressions by taking out common factors and simplifying expressions involving sums, products and powers, including the laws of indices
solve linear equations with the unknown on both sides of the equation
Geometry – shapes and measures
measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings
know the formulae: circumference of a circle = $2\pi r = \pi d$,
know the formulae: area of a circle = πr^2
calculate areas of circles and composite shapes
identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference
Geometry -3D shapes

know and apply formulae to calculate volume of right prisms (including cylinders)
interpret plans and elevations of 3D shapes
Number – fractions, decimals and percentages
calculate exactly with fractions
work with percentages greater than 100%
solve problems involving percentage change, including original value problems, and simple interest including in financial mathematics
work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 or 3/8)
interpret fractions and percentages as operators
Probability
record describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees
apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one
enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams
calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions
Geometry – 2D shapes, angles and constructions
measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings
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)
understand and use alternate and corresponding angles on parallel lines
use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle)
use these to construct given figures and solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line
Algebra – substitution and formulae
substitute numerical values into scientific formulae
rearrange formulae to change the subject
Algebra – sequences and graphs
generate terms of a sequence from either a term-to-term or a position-to-term rule
deduce expressions to calculate the nth term of linear sequences.
plot graphs of equations that correspond to straight-line graphs in the coordinate plane
identify and interpret gradients and intercepts of linear functions graphically
recognise, sketch and interpret graphs of linear functions and simple quadratic functions
plot and interpret graphs and graphs of non-standard (piece-wise linear) functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance and speed.
find approximate solutions to linear equations using a graph
Number – ratio and proportion
change freely between compound units (e.g. speed, rates of pay, prices) in numerical contexts
use compound units such as speed, rates of pay, unit pricing)
measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings
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)
express a multiplicative relationship between two quantities as a ratio or a fraction
understand and use proportion as equality of ratios

relate ratios to fractions and to linear functions
compare lengths, areas and volumes using ratio notation
use scale factors, scale diagrams and maps
identify and work with fractions in ratio problems
Statistics
use and interpret scatter graphs of bivariate data
recognise correlation
interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data
interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers)
apply statistics to describe a population
Geometry – transformations
identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement
identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement