Subject: Mathematics
Year 9 Overview – Alpha

ST. MARY MAGDALENE
C OF E SCHOOL
PENINSULA CAMPUS
Excellence through innovation,
founded in faith since 1840.

Key content – knowledge and skills	National Curriculum focus
Autumn 1: Number calculations, sequences and equations Adding and subtracting; multiplying; dividing; multiplying and dividing negative numbers; squares, cubes and roots; more powers; calculations; algebraic expressions; using the nth term; finding the nth term; solving equations.	**Subject content from the National Curriculum Framework Document September 2014:** Pupils will be taught: • To use the four operations, including formal written methods, with positive and negative improper fractions and mixed numbers. • To use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals. • To use integer powers and associated real roots (square, cube and higher). • To recognise powers of 2, 3, 4, 5
Autumn 2: Statistics, fractions, decimals and percentages. Planning a survey; statistics from tables; comparing data; tables; pie charts and scatter graphs, misleading graphs; equivalent proportions, recurring decimals; adding and subtracting fractions; multiplying fractions; dividing fractions; comparing fractions; percentage change.	• To use and interpret algebraic notation: ab in place of a × b. • To use and interpret algebraic notation: 3y in place of y + y + y and 3 × y. • To use and interpret algebraic notation: a^2 in place of a × a.
Spring 1: Geometry in 2D and 3D, algebraic and real-life graphs Angles; maps and scales, constructions; 3D solids; pythagora's theorem; reading graphs; plotting graphs; distance-time graphs; midpoints; intercepts and gradients	• To generate terms of a sequence from a term-to-term rule. • To generate terms of a sequence from a position-to-term. • To recognise arithmetic sequences. • To find the nth term.
Spring 2: Multiplicative reasoning Using ratios; using proportions; problem-solving with proportions; measures and conversions.	• To describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete data.
Summer 1: Algebraic and geometric formulae' probability Substituting into formulae; more complex formulae, formulae in geometry; compound shapes; circles; probability experiments; sample space diagrams; two way tables; tree diagram.	• To describe, interpret and compare observed distributions of a single variable through: appropriate graphical
Summer 2: Polygons and transformations and Unit 1 of Year 10 SOL. Quadrilaterals; triangles; transformations; enlargement; congruent shapes.	

	representation involving continuous and grouped data.
	• To describe, interpret and compare observed distributions of a single variable through: appropriate measures of central tendency (mean, mode, median).
	• To describe, interpret and compare observed distributions of a single variable through: appropriate measures of spread (range, consideration of outliers)
	• To construct and interpret frequency tables.
	• To construct and interpret bar charts.
	• To construct and interpret pie charts.
	• To construct and interpret vertical line (or bar) charts for ungrouped data.
	• To construct and interpret vertical line (or bar) charts for grouped numerical data.
	• To Describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts.
	• To Illustrate simple mathematical relationships between two variables (bivariate data) using scatter graphs.
	• To work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 and 3/8)
	• To interpret percentages multiplicatively.
	• To express one quantity as a percentage of another.
	• To compare two quantities using percentages.
	• To work with percentages greater than 100%.
	• To solve problems involving percentage change: percentage increase.

	- To solve problems involving percentage change: decrease - To solve problems involving percentage change: original value problems. - To solve problems involving percentage change: simple interest in financial mathematics. - derive and apply formulae to calculate and solve problems involving volume of cuboids (including cubes) - To use scale diagrams. - To use maps. - To derive and apply formulae to calculate and solve problems involving volume of cuboids (including cubes). - To derive and use the standard ruler and compass constructions: perpendicular bisector of a line segment. - To derive and use the standard ruler and compass constructions: constructing a perpendicular to a given line from/at a given point. - To derive and use the standard ruler and compass constructions: bisecting a given angle. - To recognise and use the perpendicular distance from a point to a line as the shortest distance to the line. - To describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric. - To understand and use the relationship between parallel lines and alternate and corresponding angles.

	- To use the sum of angles in a triangle to deduce the angle sum in any polygon. - To derive properties of regular polygons. - To use the sum of angles in a triangle to deduce the angle sum in any polygon. - To derive properties of regular polygons. - To use the sum of angles in a triangle to deduce the angle sum in any polygon. - To derive properties of regular polygons. - To use Pythagoras' Theorem to solve problems involving right-angled triangles. - To model situations or procedures by using graphs. - To work with coordinates in all four quadrants. - To recognise, sketch and produce graphs of linear functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane. - To interpret mathematical relationships both algebraically and graphically. - To reduce a given linear equation in two variables to the standard form $y = mx + c$. - To calculate and interpret gradients and intercepts of graphs of such linear equations numerically. - To calculate and interpret gradients and intercepts of graphs of such linear equations graphically. - To use standard units of mass, length, time, money and other measures, including with decimal quantities. - To change freely between related standard units [for example time, length, area, volume/capacity, mass].

	- To divide a given quantity into two parts in a given part:whole ratio. - To relate the language of ratios and the associated calculations to the arithmetic of fractions. - To solve problems involving direct proportion. - To solve proportion problems including graphical and algebraic representations. - To use compound units such as speed, unit pricing and density to solve problems. - To understand and use standard mathematical formulae. - To rearrange formulae to change the subject. - To model situations or procedures by translating them into algebraic expressions or formulae. - To use algebraic methods to solve linear equations. - To derive formulae to calculate and solve problems involving perimeter of triangles, parallelograms, trapezia. - To derive and apply formulae to calculate and solve problems involving area of triangles, parallelograms, trapezia. - To calculate and solve problems involving perimeters of circles. - To calculate and solve problems involving areas of circles. - To calculate and solve problems involving composite shapes. - To record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes. - To use appropriate language of probability. - To use the 0–1 probability scale. - To understand that probabilities of all possible outcomes sum to 1.

	- To generate theoretical sample spaces for single and combined events with equally likely and mutually exclusive outcomes. - To use sample spaces for single and combined events to calculate theoretical probabilities. - To use scale factors. - To identify and construct congruent triangles. - To construct similar shapes by enlargement without coordinate grids. - To construct similar shapes by enlargement, coordinate grids. - To apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides.

Key assessment points

Summative assessment will take place each half term, with spelling tests for each unit being completed on SMH formative assessments to be carried out throughout the academic year. End of topic tests will be synoptic, including questions on all content covered up to that point. Assessment will focus on understanding of the content above – each assessment will cover progress steps as outlined by Pearson education of which can be directly translated to the 9-1 scale.

Christian ethos

A Christian ethos will be promoted in Maths lessons by encouraging a sense of wonder in the natural world and a respect for all of God's creation. Students will treat each other with mutual respect and learn to work together through group and practical activities, and consider Christian views on ethical issues discussed. The incorporation of real-life skills will also encourage a wider scope on the natural world and further develop students sense of wonder, mainly focused around a firm financial understanding of money, saving and its impact on the day to day

British values

- **Individual liberty** in the sense of being able to develop and express one's own views, **tolerance** and **mutual respect** for one another's views is taught through the topics in which different views and/or ethics are involved. Through students
- **The rule of law** is addressed in units of work covering the need to have speed limits, through students understanding the need for following classroom rules**.**
- **Democracy** is taught through student debates when reasoning mathematically and explaining proofs.
- Group activities in Maths require students to engage in **team work** and show **mutual respect** for each other.