CARDINAL NEWMAN CATHOLIC SCHOOL

Cardinal Newman School: Medium Term Plan Maths Year 9

Year 9	Half Term 1.1				
Topics/ Skills	**Prior Learning:**	**Next Steps:**	**National Curriculum links:**	**Key Words/ Vocabulary:**	**Mathswatch videos:**
Sequences: - To generate terms of a sequence from the nth term - To calculate the nth term of a linear sequence - To identify whether a given term is in a sequence - To solve problems involving Fibonacci Sequences - To understand Arithmetic and Geometric Sequences - To find the nth term of simple quadratic sequences (Sets 1-2)	Y8 Autumn 1.2 Sequences	KS4 Algebra	• generate terms of a sequence from either a term-to-term or a position-to-term rule • recognise arithmetic sequences and find the nth term • recognise geometric sequences and appreciate other sequences that arise	- Sequence - Generate - Nth term - Arithmetic - Geometric - Quadratic - Fibonacci	A11b A11c A22 A23a A23b N12
Decimals and Fractions: - To use the 4 operations with decimals - To use the 4 operations with fractions, including mixed numbers - To convert fractions to decimals - To convert terminating decimals to fractions - To convert recurring decimals to fractions (sets 1-2)	Y8 Autumn 1.1 Numeracy Y8 Autumn 1.1 Fractions	KS4 Number	• use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative • work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 and 3/8)	- Decimal - Fraction - Mixed Number - Improper Fraction - Terminating - Recurring - Convert	N13b N14b N28b N29b N41 N42a N42b N32 177 189
Pitstop: Sequences, Decimals and Fractions					
Angles: - To review basic angle rules, including types of triangles	Y8 Spring 2.2 Angles	KS4 Geometry and Measures	• describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and	- Isosceles - Equilateral - Scalene	G13 G16 G17 G18

- To identify angles in Parallel lines - To draw and measure bearings - To calculate bearings. - To solve angle chasing problems involving parallel lines - To derive and use the sum of angles in any polygon. - To calculate exterior and interior angles of a polygon.			other polygons that are reflectively and rotationally symmetric • use the standard conventions for labelling the sides and angles of triangle ABC • derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies • apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles • understand and use the relationship between parallel lines and alternate and corresponding angles • derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons • apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides	- Vertically opposite - Parallel - Alternate - Corresponding - Co-interior - Polygon - Interior - Exterior - Bearing	G19 G23
Algebra: - To expand and simplify expressions with single brackets - To factorise into a single bracket - To expand a pair of brackets - To expand triple brackets - To factorise simple quadratics into a pair of brackets (sets 1-2)	Y8 Autumn 1.1 Algebraic Manipulation	KS4 Algebra	• simplify and manipulate algebraic expressions to maintain equivalence by: collecting like terms, multiplying a single term over a bracket, taking out common factors, expanding products of two or more binomials	- Expand - Simplify - Factorise - Quadratic - Bracket	A8 A9 A18 157 178
Pitstop: Angles, Algebra					

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Year 9	Half Term 1.2				
Topics/ Skills	**Prior Learning:**	**Next Steps:**	**National Curriculum links:**	**Key Words/ Vocabulary:**	**Mathswatch videos:**
Number and Indices: - To calculate using the order of operations (BIDMAS) - To write a number as a product of prime factors - To find the HCF and LCM from a Venn Diagram - To simplify expressions using the laws of indices - To evaluate negative indices - To evaluate fractional indices (Sets 1-2)	Y8 Autumn 1.1 Numeracy Y8 Autumn 1.1 Factors, Multiples and Primes Y8 Autumn 1.2 Indices	KS4 Number	• use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals • use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property • use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations	- BIDMAS - Product - Prime - Highest Common Factor - Lowest Common Multiple - Indices - Venn Diagram	N20 N25 N30b N31a N31b 29 82 154 182
Pitstop: Number and Indices					
Autumn Assessment					
Area and Volume: - To review area of 2D shapes - To calculate the area of a circle, including area of composite shapes - To calculate the circumference of a circle, including perimeter of composite shapes. - To calculate arc lengths - To calculate the area of a sector - To find the volume of prisms and cylinders - To find the surface area of cuboids and other prisms	Y7 Spring 2.1 Area and Perimeter Y8 Autumn 1.1 Volume	KS4 Geometry and Measures	• derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders) • calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes	- Area - Circle - Radius - Diameter - Circumference - Arc - Sector - Volume - Prism - Cylinder - Surface Area	G20a G20b G20c G20d G21a G21b G22a G22b G24 G25a G25b 167

- To find the surface area of cylinders (Sets 1-2)					
Pitstop: Area and Volume					
Charts and Diagrams: - To construct pie charts. - To interpret pie charts - To plot scatter graphs - To interpret scatter graphs - To draw frequency polygons - To draw and interpret stem and leaf diagrams	Y8 Summer 3.1 Charts and Diagrams	KS4 Statistics	• construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data • describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.	- Pie Chart - Scatter Graph - Frequency Polygon - Stem and leaf diagram	S8 S9 65b 128b
Year 9	**Half Term 2.1**				
Topics/ Skills	**Prior Learning:**	**Next Steps:**	**National Curriculum links:**	**Key Words/ Vocabulary:**	**Mathswatch videos:**
Measures: - To use and convert between standard units of length and mass - To convert between units of area and volume - To convert between units of time and calculate speed. - To solve problems with speed, distance and time - To draw and interpret distance-time graphs - To calculate with density - To calculate with pressure	Y8 Summer 3.2 Measures	KS4 Geometry and Measures KS4 Ratio, Proportion and Rates of Change	• use standard units of mass, length, time, money and other measures, including with decimal quantities • use compound units such as speed, unit pricing and density to solve problems	- Compound Unit - Speed - Distance - Time - Distance-Time Graph - Density - Mass - Force - Pressure	A21a N7a N7b R11a R11b 142c

- To calculate and use rates of pay and unit pricing.					
Pitstop: Charts and Diagrams, Measures					
Equations: - To solve a linear equations with unknowns on one side - To solve an equation with unknown on both sides. - To form an equation and solve it (shape/angle problems)	Y8 Autumn 1.2 Solving Equations	KS4 Algebra	• use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) • model situations or procedures by translating them into algebraic expressions or formulae	- Linear - Variable - Form - Solve	A12 A17 A19a A19b
Inequalities: - To solve a linear inequalities in one variable - To represent the solution of an inequality on a number line. - To represent and solve combinations of inequalities - To form an inequality and solve (shape/angle problems)	Y8 Summer 3.1 Inequalities	KS4 Algebra	• understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors • model situations or procedures by translating them into algebraic expressions or formulae	- Inequality - Number line - Form - Solve	A20a A20b
Pitstop: Equations, Inequalities					
Ratio and Proportion: - To divide a given quantity into two or more parts - To solve ratio problems given one part or the difference between parts. - To combine ratios - To solve 'best buy' problems - To solve work rate problems	Y8 Autumn 1.1 ratio	KS4 Ratio, Proportion and Rates of Change	• use ratio notation, including reduction to simplest form • divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio • understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction • relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions	- Ratio - Proportion - Share - Part - Combine - Difference	R5b R13 165b

			• solve problems involving direct and inverse proportion, including graphical and algebraic representations		
Year 9	**Half Term 2.2**				
Topics/ Skills	**Prior Learning:**	**Next Steps:**	**National Curriculum links:**	**Key Words/ Vocabulary:**	**Mathswatch videos:**
Percentages: - To find fractions and percentages of amounts - To increase or decrease by a percentage - To calculate the original amount given a percentage change - To calculate compound interest - To compare compound and simple interest	Y8 Spring 2.1 Percentages	KS4 Number	• define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100% • interpret fractions and percentages as operators • solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics	- Fraction - Percentage - Increase - Decrease - Compound Interest - Simple Interest	N24b N33 R7 R12 164
Pitstop: Ratio and Proportion, Percentages					
Spring Assessment					
Averages: - To calculate averages and the range from a list - To solve reverse mean/changing means questions - To find averages from a table (discrete) - To estimate the mean from a grouped frequency table. - To calculate the median and modal group for grouped data	Y8 Summer 3.1 Averages	KS4 Statistics	• describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers)	- Average - Mean - Mode - Median - Range - Frequency Table - Quartile - Interquartile Range	S6 S7 S10a S10b

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- To calculate quartiles and the interquartile range (Sets 1-2)					
Pitstop: Averages					
Year 9	**Half Term 3.1**				
Topics/ Skills	**Prior Learning:**	**Next Steps:**	**National Curriculum links:**	**Key Words/ Vocabulary:**	**Mathswatch videos:**
Graphs: - To identify equations of vertical and horizontal lines - To plot straight Line Graphs using a table of values - To find the gradient and intercepts graphically and relate to y=mx+c - To find the equation of a line given the gradient and a point. - To find the equation of a line given two points. - To plot quadratic graphs from a table of values - To find turning points and solutions to a quadratic using its graph	Y8 Spring 2.1 Graphs	KS4 Algebra	• model situations or procedures by translating them into algebraic expressions or formulae and by using graphs • work with coordinates in all four quadrants • recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane • interpret mathematical relationships both algebraically and graphically • reduce a given linear equation in two variables to the standard form y = mx + c; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically • use linear and quadratic graphs to estimate values of y for given values of x and vice versa • find approximate solutions to contextual problems from given graphs of a variety of functions	- Graph - Vertical - Horizontal - Gradient - y-intercept - Equation - Linear - Quadratic - Turning point - Solution	A5 A14a A14b A14c A15
Transformations: - To perform and describe translations	Y7 Spring 2.1 Transformations	KS4 Geometry and Measures	• identify properties of, and describe the results of, translations, rotations and reflections applied to given figures	- Translation - Rotation	G4a G4b G5

- To perform and describe reflections - To rotate shapes and describe rotations - To enlarge shapes using centre of enlargement (including fractional) and describe enlargements - To enlarge using negative scale factors (Sets 1-2) - To answer questions involving combinations of transformations	Y8 Spring 2.1 Transformations		• construct similar shapes by enlargement, with and without coordinate grids	- Reflection - Enlargement - Scale Factor - Centre - Column Vector	G6 G7 G28 G34
Pitstop: Graphs, Transformations					
Pythagoras' Theorem: - To know and apply Pythagoras' Theorem - To find the distance between two points on a grid. - To apply Pythagoras Theorem to problems. - To use Pythagoras Theorem in 3D (Sets 1-2)	Y8 Spring 2.1 Pythagoras' Theorem	KS4 Geometry and Measures	• apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs • use Pythagoras' Theorem … to solve problems involving right-angled triangles	- Pythagoras - Hypotenuse - Triangle	G30
Year 9	**Half Term 3.2**				
Topics/ Skills	**Prior Learning:**	**Next Steps:**	**National Curriculum links:**	**Key Words/ Vocabulary:**	**Mathswatch videos:**
Trigonometry: - To know the trigonometric ratios - To find lengths in right angled triangles using trigonometry - To use trigonometry to find angles in right angled triangles - To use trigonometry to find missing sides and angles - To use trigonometry in three dimensions (Sets 1-2)	Y9 Pythagoras' Theorem	KS4 Geometry and Measures	• use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles	- Trigonometry - Opposite - Adjacent - Sine - Cosine - Tangent	G35a G35b
Pitstop: Pythagoras, Trigonometry					

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Summer Assessment					
Standard Form: - To change between standard form and ordinary numbers - To add and subtract with standard form - To multiply and divide with standard form	Y8 Spring 2.2 Standard Form	KS4 Number	• interpret and compare numbers in standard form A x 10n 1≤A	- Indices - Power - Standard Form	N45a N45b
Simultaneous Equations: - To review solving linear equations - To review plotting linear graphs - To solve simultaneous equations graphically - To solve simultaneous equations algebraically (Sets 1-2)	Y9 Equations Y9 Graphs	KS4 Algebra	• use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) • recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane • use linear and quadratic graphs … to find approximate solutions of simultaneous linear equations	- Equation - Solve - Plot - Simultaneous Equation -	A14a A19a A19b A24a A24b A26b A26c
Pitstop: Standard Form, Simultaneous Equations					
Data Representation: - To find quartiles and the IQR - To draw box plots - To interpret and compare box plots - To review constructing and interpreting frequency polygons - To construct cumulative frequency graphs - To interpret cumulative frequency graphs	Y9 Charts and Diagrams	KS4 Data	• describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) • construct and interpret appropriate tables, charts, and diagrams… for ungrouped and grouped numerical data	- Quartile - IQR - Box Plot - Frequency Polygon - Cumulative Frequency	65b 186 187
Pitstop: Data Representation					