

FOUNDATION: Key Stage 4 Maths Curriculum

Long Term Plan Year 9

Autumn 1

Chapter 1: Calculations

Assessment: Chapter Test A

Builds Upon:

- Write numbers in words from figures and vice versa
- Order integers, decimals and negative numbers
- Round to nearest 10, 100, 1000
- Round to decimal places
- Add/Subtract numbers with decimals
- Multiply/Divide positive and negative numbers
- Multiply 2 digits and 3 digit numbers
- Multiply numbers with decimals
- Divide using the algorithm (by hand)
- Divide decimal numbers using the algorithm

Order of operations (BIDMAS)

Introduces:

- Round to significant figures
- Add/Subtract positive and negative numbers
- Multiply/Divide positive and negative numbers

Manipulate of operations involving decimals (using one calculation to find the answer to another)

Autumn 2

Chapter 2: Expressions

Assessment: Chapter Test A

Builds Upon:

- Apply algebraic notation to write simple expressions
- Simplify expressions by collecting like terms (addition and subtraction)
- Substitute for variables in simple expressions

Introduces:

- Apply the Index laws (multiplication, division)
- Apply the Index laws (fractional, negative and zero)
- Expanding single brackets
- Factorise single brackets
- Simplifying algebraic fractions
- Add/Subtract algebraic fractions
- Multiplying algebraic fractions
- Divide algebraic fractions

Spring 1

Chapter 3: Angles and Polygons

Assessment: Chapter Test A

Builds Upon:

- Measure and describe angles as acute, right, obtuse or reflex

Introduces:

- Describe and apply the properties of angles around a point (sum of 360 degrees)
- Calculate bearings based on angles around a point
- Describe and apply the properties of angles on a straight line (sum of 180 degrees)
- Derive and apply the sum of angles in triangles and quadrilaterals
- Apply knowledge of special triangles to derive angles
- Describe and apply the equivalence of vertically opposite angles
- Identify and apply the properties of angles in parallel lines (alternate, corresponding and co-interior rules)
- Solve problems involving all of the above (providing reasons)
- Identify similarity between shapes
- Calculate and apply scale factors
- Identify and describe types of congruence (SSS, SAS, ASA, RHS)
- Apply similarity and congruence to problem solve
- Calculate and apply scale factors for area and volume from the linear scale factor
- Calculate interior angles in polygons (using angles in a triangle)
- Deduce and apply the sum of interior angles of any polygon and use $(n-2)*180$
- Calculate exterior angles in polygons
- Solve problems involving angles in polygons

Spring 2

Chapter 4: Handling Data 1

Assessment: Chapter Test A

Builds Upon:

- Represent data in tally tables
- Understand the link between tally and frequency tables
- Read and interpret tally tables to solve problems
- Construct and interpret pictograms
- Construct and interpret bar charts
- Calculate the mean, mode and median of listed data
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Introduces:

- Represent data in two-way tables
Interpret two way tables to solve problems
- Construct and interpret pie charts
- Calculate the mean, mode and median of data in a frequency table
- Calculate the range of data in lists and frequency tables
- Understand the advantages and disadvantages of different averages
- Identify outliers and explain their effect on averages/ranges
- Compare distributions using averages and range

Summer 1

Chapter 5: Fractions, Decimals and Percentages

Assessment: Chapter Test A

Builds Upon:

- Name and construct fraction diagrams
- Convert between improper fractions and mixed numbers
- Identify and create equivalent fractions
- Simplifying fractions
- Write fractions as decimals
- Order fractions and mixed numbers
- Calculate fractions of amounts
- Calculating percentages of amounts
- Multiplying fractions, including simplifying (cancelling common factors)
- Multiplying fractions and mixed numbers
- Dividing fractions and mixed numbers
- Adding and subtracting fractions with the same denominator
- Adding and subtracting fractions with different denominators
- Adding and subtracting mixed numbers
- Solve worded fraction problems
- Write percentages as fractions and decimals
- Converting between fractions, decimals and percentages
- Compare using $<$ or $>$ and order fractions, decimals and percentages

Introduces:

- Convert recurring decimals to fractions
- Solving complex worded problems with a mixture of fractions, decimals and percentages

Summer 2

Chapter 6: Formulae & Functions

Assessment: Chapter Test A

Builds Upon:

- Write formulae from sentences
- Substitute to solve (positive and negative numbers)
- Use standard formulae (e.g. kinematics)
- Simplify expressions
- Expand single brackets

Introduces:

- Change the subject of formulae
- Identify expressions, equations, inequalities, formulae and identities
- Expand double brackets
- Factorise quadratic expressions
- Complete the difference of two squares
- Distinguishing between, and factorise : $x^2 - 4$ and $x^2 - 4x$

Chapter 7: Working in 2D

Assessment: Chapter Test A

Builds Upon:

- Accurately measure and draw line segments and angles
- Bearings on a map
- Area of quadrilaterals (squares, rectangles, parallelograms, trapezium) and triangles
- Area of compound 2D shapes

Introduces:

- Apply scale to drawings -find distances on a map and in real life
- Sketching lines such as $y = -2$, $y = x$ etc.
- Completing transformations:
 - Translation
 - Reflections
 - Rotations from origin and a point
 - Enlargements (greater than 1 & between 0 and 1)
 - Enlargements from a point
 - Combinations of Transformations
- Describing transformations

Year 10

Autumn 1	
Chapter 8: Probability	Chapter 9: Estimation and Approximation
Assessment: Chapter Test A	Assessment: Chapter Test A
Builds Upon: <ul style="list-style-type: none"> • Understand the probability scale • Construct sample space diagrams List sample space of an experiment • Write experimental and theoretical probabilities as fractions 	Builds Upon: <ul style="list-style-type: none"> • Round to appropriate degree of accuracy (10,100,1000s, dps, sfs) • Use common calculator functions • Convert units of length, mass, volume, capacity, time and area
Introduces: <ul style="list-style-type: none"> • Write experimental and theoretical probabilities as relative frequencies • Calculate expected frequencies • Compare theoretical probabilities with experimental probabilities • Recognise mutually exclusive events and exhaustive events • Understand that the probabilities of mutually exclusive exhaustive events sum to one • Compare bias and equally likely events 	Introduces: <ul style="list-style-type: none"> • Use approximation to make estimates • Check calculations using approximation and estimation • Estimate square roots • Calculate compound units of speed and density • Rearrange compound unit calculations to find missing values • Use inequality notation to state error intervals and interpret limits of accuracy

Autumn 2

Chapter 10: Equations and Inequalities

Assessment

Chapter Test A

Builds Upon:

- Solve one step equations (using function machines)
- Solve one step equations (using balancing method)
- Solve two step equations (without brackets)
- Solve two step equations (with brackets)
- Solve two step equations (including negatives and improper fractions as solutions)
- Solve equations with variables on both sides
- Changing the subject of a Formula
- Form and solve equations from worded questions
- Form and solve equations with the unknown on both sides
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Introduces

- Solve equations by reading off graphs (provide graphs if unable to plot)
- Solving quadratic equations by reading off graphs (provide graphs if unable to plot)
- Factorise quadratics
- Solving quadratics without coeff of x^2 by factorising
- Solving quadratics with coeff of x^2 by factorising
- Solve simultaneous equations (using elimination)
- Solve simultaneous equations (using substitution)
- Form and solve simultaneous equations
- Represent inequalities on number lines
- Solve inequalities and representing solutions on a number line

Spring 1

Chapter 11: Circles and Constructions

Assessment Chapter Test A

Builds Upon:

- Calculate the perimeter of basic shapes (rectangles and triangles)
- Calculate the area of basic shapes (rectangles and triangles)
- Calculate circumference of circles
- Calculate area of circles
- Calculate perimeter and area of composite shapes involving halves and quarters of circles
- Construct and measure lines (using rulers)
- Construct a circle (using a compass)
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Introduces:

- Calculate arc length
- Calculate area of sectors
- Calculate perimeter and area of composite shapes involving sectors
- Construct and measure angles (using protractors)
- Construct a perpendicular line bisector
- Construct a perpendicular at a point on a line
- Construct a perpendicular to a line from a point
- Construct an angle bisector
- Construct a SAS triangle
- Construct an ASA triangle
- Construct a SSS triangle
- Loci (from one point, two points (line), two lines)
- Loci (a combination of one point, two points and two lines)

Spring 2

Chapter 12: Ratio & Proportion

Chapter 13: Factors, Powers and Roots

Assessment Chapter Test A

Assessment Chapter Test A

Builds Upon:

- Write fractions
- Convert fractions to decimals (using non calculator 10th, 100ths, 1000ths method)
- Convert fractions to decimals (using calculator method)
- Convert decimals to fractions (using non calculator 10th, 100ths, 1000ths method)
- Convert basic fractions to percentage (using number line)
- Convert percentages to fractions (using out of 100)
- Convert decimals to percentages (link to number line)
- Convert percentages to decimals (link to number line)
- Ordering fractions, decimals and percentages
- Calculate percentage of an amount (non calculator method)
- Calculate percentage of an amount (calculator/multiplier method)
- Reverse percentage (calculate fraction of an amount as a percentage)
- Calculate percentage increases and decreases
- Reverse percentage (calculate increase or decrease as a percentage)

Builds Upon:

- List primes
- List multiplies
- List factors
- Identify primes, multiples and factors from a list
- Identify HCF of two numbers
- Identify LCM of two numbers
- Solve worded LCM and HCF problems
- Construct a prime factor tree (Prime factor decomposition)
- Calculate positive integer powers and roots

Introduces:

- Write proportions as ratios
- Simplify proportion ratios
- Share using ratios (ADAM)
- Use ratio to solve proportion and scale factor problems
- Reasoning and problem solving

Introduces:

- Identify HCF and LCM using product notation (Venn diagram method)

Summer 1		
PPES	Chapter 17: Calculations 2	Chapter 15: Working in 3D
Assessment 2 x 90 min exams	Assessment Chapter Test A	Assessment Chapter Test A
	Builds Upon: <ul style="list-style-type: none"> • Calculate basic roots and indices • Apply index laws (multiplying, dividing and powers of a power) • Convert large numbers in and out of standard form • Convert small numbers in and out of standard form • 	Builds Upon: <ul style="list-style-type: none"> • Identify the numbers of faces, edges and vertices of 3D shapes • Construct nets of 3D shapes • Identify nets of 3D shapes • Calculate volume of cuboids and prisms • Calculate volume of cylinders
	Introduces: <ul style="list-style-type: none"> • Solve more complex index problems • Calculate exact solutions with fractions (addition, multiplication and division) • Calculate exact solutions with multiples of π • Solve standard form calculations (multiplication and division) • Solve worded standard form problems 	Introduces: <ul style="list-style-type: none"> • Construct and interpret plan, front and side elevations of 3D shapes • Solve problems to find missing lengths given volume • Calculate surface area of cuboids • Calculate surface area of prisms • Calculate surface area of spheres, pyramids, cones and composite shapes • Solve problems to find missing lengths given surface area

Summer 2

Chapter 16: Handling Data 2

Chapter 14: Graphs 1

Assessment Chapter Test A

Assessment Chapter Test A

Builds Upon:

- Explain key data terms (discrete and continuous)
- Interpret and construct group frequency/tally tables
- Interpret and construct bar graphs for group discrete data

Builds Upon:

- Name and plot basic coordinates
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Introduces:

- Interpret and construct histograms for group continuous data
- Identify the estimated mean
- Identify modal class
- Identify the class interval in which the median lies
- Use estimated mean, modal class, class interval and range to compare distributions
- Construct scatter graphs
- Describe scatter graph correlation
- Draw lines of best fit on scatter graphs
- Extrapolate predictions from scatter graphs using line of best fit
- Interpret and construct line graphs for time series data
- Calculate speed from distance-time graphs using gradient (contrast exact speed vs. average speed)
- Calculate acceleration from distance-time graphs using speed)

Introduces:

- Substitute into $y=mx+c$ to create a table of values
- Plot tables of values to draw lines
- Investigate and plot $y=?$ and $x=?$ lines
- Investigate to observe the effect of positive and negative gradients
Calculate gradient of lines (using $\text{rise} \div \text{run}$)
- Investigate to observe the effect of changing c
- Write linear equations from graphs
- Write linear equations from worded problems
- Interpret distance-time graphs
- Construct distance-time graphs
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Year 11

Autumn 1

Chapter 18: Graphs 2

Assessment

Chapter Test A

Builds Upon:

- Plot linear graphs using tables of values
- Plot and interpret real-life graphs

Introduces:

- Plot quadratic functions
- Identify and interpret roots, intercepts and turning points of quadratic functions
- Solve quadratic equation by finding approximate solutions using graphs
- Recognise, sketch and interpret graphs cubic functions
- Recognise, sketch and interpret graphs reciprocal functions

Autumn 2

PPES	Chapter 19: Pythagoras, Trigonometry and Vectors	Chapter 20: Combined events
Assessment 2x 90 min exams	Assessment Chapter Test A	Assessment Chapter Test A
	Builds Upon: <ul style="list-style-type: none"> Apply the sum of angles rule in triangles 	Builds Upon: <ul style="list-style-type: none"> Arrange sets into Venn diagrams
	Introduces: <ul style="list-style-type: none"> Apply formulae for Pythagoras' theorem to find long sides Apply formulae for Pythagoras' theorem to find short sides Apply trigonometric ratios (sin/cos/tan) to find lengths Apply trigonometric ratios (sin/cos/tan) to find angles Know the exact values of $\sin\theta$ and $\cos\theta$ for $\theta = 0, 30, 45, 60, 90$ degrees Know the exact value of $\tan\theta$ for $\theta = 0, 30, 45, 60$ degrees Write column vectors and draw vector diagrams Add and subtract vectors Calculate multiples of vectors using a scalar 	Introduces: <ul style="list-style-type: none"> Describe sets using Venn diagrams (intersection, union and complement) Use Venn diagrams to record outcomes and calculate probabilities of events Construct possibility (sample) space diagrams Calculate probabilities from sample space diagrams Use tree diagrams to show the frequency or probabilities of two events Use tree diagrams to calculate the probabilities of independent and dependent events Calculate estimated outcomes using probabilities

Spring 1

Chapter 21: Sequences

Assessment Chapter Test A

Builds Upon:

- Write sequence using term to term rule
- Write sequences using position to term rule (nth rule)
- Write the position to term rule (nth rule) for a linear sequence
- Recognise special types of sequence (square, cube, triangular, arithmetic, geometric, Fibonacci and quadratic)

Introduces:

- Find terms of quadratic sequence using term to term or position to term rule

Chapter 22: Units and Proportionality

Assessment Chapter Test A

Builds Upon:

- Calculations using standard and compound units (speed, density and pressure)

Introduces:

- Compare lengths, areas, and volumes of similar shapes
- Solve direct proportion problems
- Interpret the gradient of a straight line graph as a rate of change
- Solve inverse proportion problems
- Interpret graphs that illustrate direct and inverse proportion
- Set up, solve and interpret growth and decay problems

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Spring 2

PPEs and GCSE EXAM REVISION

Assessment
2x 90min exams

Builds Upon:

Introduces:

Summer 1

GCSE EXAM REVISION

Assessment:

3 x 90 min official public exams

Builds Upon:

Introduces:

Summer 2
