

FOUNDATION: Key Stage 4 Maths Curriculum

Medium term plan Year 9

Autumn 1

Chapter 1: Calculations

Assessment: Chapter Test A

Content:

- 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

- Round to significant figures

- Add/Subtract numbers with decimals

- Add/Subtract positive and negative numbers

- 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

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

- Order of operations (BIDMAS)

Key terms:

Decimal system
Digit
Place value
Negative numbers
Rounding

Decimal places (dp)
Significant figures (sf)
First significant figure
Partitioning
Compensation

Autumn 2

Chapter 2: Expressions

Assessment: Chapter Test A

Content:

- Write simple algebraic expressions from words
- Simplify expressions by collecting like terms (addition and subtraction)
- 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

Key terms:

Expression

Equation

Formula formulae

Term

Substituting

Unknown

Index/indices/power

Base

Index laws

Coefficient

Brackets

Simplify

HCF

Spring 1

Chapter 3: Angles and Polygons

Assessment: Chapter Test A

Content:

- Measure and describe angles as acute, right, obtuse or reflex
- Describe and apply the properties of angles around a point (sum of 360 degrees)
- Describe and apply the properties of angles on a straight line (sum of 180 degrees)
- Calculate bearings based on angles around a point
- 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)
- Apply knowledge of special triangles to derive angles
- Solve problems involving all of the above (providing reasons)
- Identify similarity between shapes
- Identify and describe types of congruence (SSS, SAS, ASA, RHS)
- Calculate and apply scale factors
- Calculate and apply scale factors for area and volume from the linear scale factor
- Apply similarity and congruence to problem solve
- Derive and apply the sum of angles in triangles and quadrilaterals
- 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

Key terms:

Degree
Acute angle
Right angle
Obtuse angle
Reflex angle
Alternate angles

Corresponding angles
Three figure bearing
Polygon
Regular polygon
Triangle
Quadrilateral

Congruent
Hypotenuse
Similar
Scale factor
Interior angle
Exterior angle

Spring 2

Chapter 4: Handling Data 1

Assessment: Chapter Test A

Content:

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

Key Terms:

Population
Sample
Survey
Data collection sheet
Tally chart
Frequency table
Frequency
Pictogram
Bar-chart
Bar-line chart
Scale
Axis label
Pie chart
Mean
Mode
Median
Range
Outlier

Summer 1

Chapter 5: Fractions, Decimals and Percentages

Assessment: Chapter Test A

Content:

- 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
- Convert recurring decimals to fractions
- Compare using $<$ or $>$ and order fractions, decimals and percentages

Key Terms

Fraction

Equal

Numerator

Denominator

Mixed number

Improper fraction

Decimal

Decimal equivalent

Common factor

Cancel

Lowest common denominator

Ascending

Descending

Terminating decimal

Recurring decimal

Summer 2	
Chapter 6: Formulae & Functions	Chapter 7: Working in 2D
Assessment: Chapter Test A	Assessment: Chapter Test A
Content: <ul style="list-style-type: none"> • Write formulae from sentences • Substitute to solve (positive and negative numbers) • Use standard formulae (e.g. kinematics) • Change the subject of formulae • Identify expressions, equations, inequalities, formulae and identities • Simplify expressions • Expand single brackets • Expand double brackets • Factorise quadratic expressions • Complete the difference of two squares • Distinguishing between, and factorise : $x^2 - 4$ and $x^2 - 4x$ 	Content: <ul style="list-style-type: none"> • Accurately measure and draw line segments and angles • Apply scale to drawings -find distances on a map and in real life • Bearings on a map • Area of quadrilaterals (squares, rectangles, parallelograms, trapezium) and triangles • Area of compound 2D shapes • Sketching lines such as $y = -2$, $y = x$ etc. • Completing transformations: <ul style="list-style-type: none"> • -Translations <ul style="list-style-type: none"> - Reflections - Rotations from origin and a point - Enlargements (greater than 1 & between 0 and 1) - Enlargements from a point • Combinations of Transformations • Describing transformations
Key Terms: Variable Like terms Function machine Input Output Operation Inverse Subject Rearrange Identity Function Expand Factorise Quadratic	Key Terms: Length Angle Area Perimeter Transformations Translation Reflection / Mirror Line Rotation / Centre of rotation Enlargement/ Scale factor/ Centre of enlargement Invariant

Year 10

Autumn 1	
Chapter 8: Probability	Chapter 9: Estimation and Approximation
Assessment: Chapter Test A	Assessment: Chapter Test A
<p>Content:</p> <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 • 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 	<p>Content:</p> <ul style="list-style-type: none"> • Round to appropriate degree of accuracy (10,100,1000s, dps, sfs) • Use approximation to make estimates • Check calculations using approximation and estimation • Estimate square roots • Use common calculation functions • Convert units of length, mass, volume, capacity, time and area • 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
<p>Key Terms:</p> <p>Trial Outcomes Event Impossible Certain Likely Unlikely Even chance Relative frequency Expected frequency Theoretical frequency Bias/ Biased Equally likely</p>	<p>Key Terms;</p> <p>Approximation Estimation Significant figures (sf) Mass Capacity Volume Speed Density Accuracy Implied accuracy</p>

Autumn 2**Chapter 10: Equations and Inequalities****Assessment Chapter Test A****Content:**

- 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
- 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)
- Form and solve equations from worded questions
- Form and solve equations with the unknown on both sides
- 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

Key Terms

Balance Method

Quadratic

Factorising

Solve

Solution

Simultaneous Equation

Inequality

Spring 1

Chapter 11: Circles and Constructions

Assessment Chapter Test A

Content:

- 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
- Calculate arc length
- Calculate area of sectors
- Calculate perimeter and area of composite shapes involving sectors
- Construct and measure lines (using rulers)
- Construct and measure angles (using protractors)
- Construct a circle (using a compass)
- 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)

Key Terms

Circle
Diameter
Radius
Radii (plural)
Circumference
Arc
Chord
Tangent

Segment
Sector
Construction
Construction Lines
Bisect
Angle Bisector
Perpendicular Bisector
Locus
Loci (plural)

Spring 2	
Chapter 12: Ratio & Proportion	Chapter 13: Factors, Powers and Roots
Assessment Chapter A Test	Assessment Chapter A Test
<p>Content:</p> <ul style="list-style-type: none"> • 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) • Write proportions as ratios • Simplify proportion ratios • Share using ratios (ADAM) • Use ratio to solve proportion and scale factor problems • Reasoning and problem solving 	<p>Content:</p> <ul style="list-style-type: none"> • 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) • Identify HCF and LCM using product notation (Venn diagram method) • Calculate positive integer powers and roots
<p>Key Terms</p> <p>Proportion Ratio Simplify Scale Scale Drawing Percentage Simple Interest Percentage Increase Percentage Decrease Reverse Percentage Problem</p>	<p>Key Terms</p> <p>Multiple Factor Prime number Prime factor Prime factor decomposition Common factor Highest Common Factor HCF Lowest Common Multiple (LCM) Square number Square root Cube number Cube root</p>

Summer 1		
PPES	Chapter 17: Calculations 2	Chapter 15: Working in 3D
Assessment 2 x 90 minute papers	Assessment Test A	Assessment Test A
1x calculator 1 x non calculator	Content: <ul style="list-style-type: none"> • Calculate basic roots and indices • Apply index laws (multiplying, dividing and powers of a power) • Solve more complex index problems • Calculate exact solutions with fractions (addition, multiplication and division) • Calculate exact solutions with multiples of π • Convert large numbers in and out of standard form • Convert small numbers in and out of standard form • • Solve standard form calculations (multiplication and division) • Solve worded standard form problems 	Content: <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 • Construct and interpret plan, front and side elevations of 3D shapes • Calculate volume of cuboids and prisms • Calculate volume of cylinders • 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

Spring 2	
Chapter 16: Handling Data 2	Chapter 14: Graphs 1
Assessment	Assessment
<p>Content:</p> <ul style="list-style-type: none"> • Explain key data terms (discrete and continuous) • Interpret and construct group frequency/tally tables • Interpret and construct bar graphs for group discrete data • 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 	<p>Content:</p> <ul style="list-style-type: none"> • Name and plot basic coordinates • 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 • Calculate speed from distance-time graphs using gradient (contrast exact speed vs. average speed) • Calculate acceleration from distance-time graphs using speed)
<p>Key Terms Modal class Estimated mean Scatter graph Scatter graph Line of best fit Correlation Time series graph Line graph Trend</p>	<p>Key Terms Coordinate grid Gradient y-intercept $y=mx+c$ Distance-time graph Speed Acceleration</p>

Year 11

Autumn 1

Chapter 18: Graphs 2

Assessment Chapter A Test

Content:

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

Key Terms

Quadratic function

Cubic function

Reciprocal function

Turning point

Root

y-intercept

Solve

Solution

Autumn 2		
PPES	Chapter 19: Pythagoras, Trigonometry and Vectors	Chapter 20: Combined events
Assessment 2 x 90 minute papers	Assessment Chapter A test	Assessment Chapter A Test
1x calculator 1 x non calculator	Content: <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 	Content: <ul style="list-style-type: none"> • Arrange sets into Venn diagrams • 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
	Key Terms Hypotenuse Pythagoras theorem Adjacent Opposite Sine ratio Cosine ratio Tangent ratio Scalar Vector Resultant Multiple	Key Terms Set Member element Universal set Empty set Intersection \cap Union \cup Complement Venn diagram Sample space Frequency tree Tree diagram Independent Dependent

Spring 1	
Chapter 21: Sequences	Chapter 22: Units and Proportionality
Assessment Chapter A Test	Assessment Chapter A Test
Content: <ul style="list-style-type: none"> • 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) • Find terms of quadratic sequence using term to term or position to term rule 	Content: <ul style="list-style-type: none"> • Calculations using standard and compound units (speed, density and pressure) • 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
Key Terms Sequence Term Position Term-to-term rule Position-to-term rule Linear/Arithmetic sequence Common difference Nth term Cube numbers Triangular numbers Geometric sequence Fibonacci-type sequence Quadratic sequence	Key Terms Rate Proportion Proportional Direct proportion Constant of proportionality Inverse proportion Varies

Spring 2
GCSE EXAM REVISION
PPES 2x 90 min exams
Content Informed by QLAs and teacher planned
Key Terms

Summer 1
GCSE EXAMS
Assessment 3x 90 min official public exams
Content Content informed by QLAs and teacher planned
Key Terms

Summer 2
