


**Year 10 Foundation**

OSA Maths Faculty Year 10 Curriculum - Foundation																																																															
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38																									
Year 10	Autumn Term							Half term	Autumn Term							Christmas	Spring Term							Half term	Spring Term							Easter	Summer Term							Half term	Summer Term																						
10a3, 10b3,	NP1 - NP3 essentials (new)							NP4 - NP7 essentials (new)							A1 - A5 essentials (new)							GM1 - GM3 essentials (new)							SP1 - SP2 essentials (new)							NP8 - NP10 essentials (new)							A6 - A8 essentials (new)							GM4							SP3						

**GEOMETRY AND MEASURES 1 - Drawing, Measuring and Construction**

Constructing and drawing triangles; Bisecting lines and angles; Perpendicular lines; Loci.

**GEOMETRY AND MEASURES 2 - Polygons and Angles**

Interior angles in a triangle; Interior angles in a quadrilateral; Using the properties of quadrilaterals; Using the properties of quadrilaterals; Sum of interior angles in polygons; Angles in parallel lines; Setting up equations to solve geometric problems; Bearings.

**GEOMETRY AND MEASURES 3 - Area**

Area of a parallelogram; Area of a trapezium; Mixed area and perimeter; Area of circles.

**STATISTICS AND PROBABILITY 1 - Discrete Data**

Collecting data; Processing data; Stem and Leaf diagrams; Drawing and using pie charts; Mode, median and range; Mean; Summary statistics from frequency tables and graphs.

**STATISTICS AND PROBABILITY 2 - Bivariate Data**

Reading a scatter graph; Drawing a scatter graph; Correlation; Outliers; Lines of best fit; Time series graphs.

**NUMBER AND PROBABILITY 8 - Percentages, Fractions and Decimals**

Writing decimals as fractions; Writing fractions as decimals; Writing percentages as fractions and decimals; Finding a percentage of an amount; Decimal multipliers; Increasing and decreasing by a percentage.

**NUMBER AND PROBABILITY 9 - Estimation and use of the Calculator**

Fluent use of the calculator ; Rounding, truncation and error intervals; Estimation of calculations.

**NUMBER AND PROBABILITY 10 -**

Direct proportion; Inverse proportion; Value for money; Exchange rates; Decimal multipliers to increase and decrease.

**ALGEBRA 6 - The Cartesian Grid**

Coordinates in all 4 quadrants; Find the midpoint of a line segment; Horizontal and vertical lines; Plot a linear graph; Finding gradient and y intercept from  $y = mx + c$ ; Plot a quadratic graph.

**ALGEBRA 7 - Introduction to Sequences**

Find missing numbers in sequences; Writing term to term rules; Generate terms of a sequence; Find the nth term of a sequence; Picture sequences.

**ALGEBRA 8 - Linear Inequalities**

Understanding inequality symbols; Comparative inequalities; Restrictive inequalities; Solve linear inequalities; Represent inequalities involving x or y by shading on a graph.



#### **GEOMETRY AND MEASURES 4 - Congruence and Similarity**

Congruence – introduction; Tessellating congruent shapes to fill the plane; Isometries: translation (as a vector), reflection and rotation, including rotational and reflective symmetry, combinations of transformations, including successive translations. Knowing that reflection, rotation and translation produce congruent shapes; Similarity of length, proving shapes are similar, finding scale factors and writing equivalent sides as equivalent ratios; Enlargement (including negative and fractional enlargements). Knowing that enlargements produce similar shapes; Conditions for congruent triangles - simple examples, getting familiar with terms.

#### **STATISTICS AND PROBABILITY 3 - Introduction to Probability**

systematic listing (product rule for counting); Record, describe and analyse the frequency of outcomes of simple probability experiments, introduce language of probability; Theoretical probability - formalising language and notation, calculating; Sum of probabilities of all mutually exclusive events = 1; Generate theoretical sample spaces, including systematic listing of combinations and outcomes, and use these to calculate probabilities; Recording outcomes and possibilities using frequency trees, two-way tables and simple Venn diagrams.

## Year 10 Crossover

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10a2, 10b2,	NP4 - NP9 essentials (new)							A3 - A8 essentials (new)							NP10 - NP11 essentials (new)							GM1 - GM3 essentials (new)							NP12 - NP13							GM4							A9 - A10							SP3							GM5							GM6							GM7						

### NUMBER AND PROBABILITY 12 – Standard Form

Small and large numbers in standard form; Converting from 'almost standard' form to standard form; Comparing numbers in standard form (and "almost standard" form); Adding and subtracting in standard form, by converting to normal form and by using distributivity; Multiplying and dividing in standard form using commutativity; Problems and applications, including order of operations; SI prefixes and engineering form.

### NUMBER AND PROBABILITY 13- Advanced Proportion and Rates of Change

Reverse percentages (original value problems) and finding the original value given a percentage of it; Simple interest; Direct (linear) proportion - first numerically, then graphically, then algebraically; Inverse proportion (excluding squares, cubes, roots) - first numerically, then graphically, then algebraically; Compound units - density, pressure, speed, value for money, including conversions between compound units; Ratio problems - combining ratios, finding parts, differences and wholes; mixing ratios with fractions.

### GEOMETRY AND MEASURES 4 - Congruence and Similarity

Congruence – introduction; Tessellating congruent shapes to fill the plane; Isometries: translation (as a vector), reflection and rotation, including rotational and reflective symmetry, combinations of transformations, including successive translations. Knowing that reflection, rotation and translation produce congruent shapes; Similarity of length, proving shapes are similar, finding scale factors and writing equivalent sides as equivalent ratios; Enlargement (including negative and fractional enlargements). Knowing that enlargements produce similar shapes; Conditions for congruent triangles - simple examples, getting familiar with terms.

### ALGEBRA 9 – Contextual Graphs

General "real-life" graphs, interpreting y-intercepts as a fixed value/charge, etc, and gradient as a rate of change in context; Drawing, reading from and extrapolating from conversion graphs; Introduction to speed, distance, time; Distance-time graphs, including finding the average speed, speed of a section as the gradient of the line; Velocity-time graphs, including finding the acceleration as the gradient and displacement as the area under the graph.

### ALGEBRA 10 - Advanced Linear Graphs and Equations

Find the gradient of a line using change in y/change in x; Use the form  $y=mx+c$  to draw lines and factorising to find the root and sketching linear graphs; Identify equations of parallel and perpendicular lines; Advanced  $y=mx+c$  questions, finding equations given two points or a point and gradient; Solve equations in two variables graphically: know that the points on a line represent the solution set to an equation in two variables, and that the intersection of two lines represents the solution to a pair of simultaneous equations in two variables; Find the solution to a pair of simultaneous equations by elimination and by substitution, and check the solution; Write and solve simultaneous equations from contexts; Find regional solutions to linear inequalities in two variables on a Cartesian grid, including regions formed from multiple inequalities and identifying integer solutions in a region.



### STATISTICS AND PROBABILITY 3 - Introduction to Probability

systematic listing (product rule for counting); Record, describe and analyse the frequency of outcomes of simple probability experiments, introduce language of probability; Theoretical probability - formalising language and notation, calculating; Sum of probabilities of all mutually exclusive events = 1; Generate theoretical sample spaces, including systematic listing of combinations and outcomes, and use these to calculate probabilities; Recording outcomes and possibilities using frequency trees, two-way tables and simple Venn diagrams.

### GEOMETRY AND MEASURES 5 - Right-Angled Triangles

Pythagoras' Theorem in 2D to find missing sides; Proving a triangle is right-angled with Pythagoras; Identifying Pythagorean triples; Pythagoras to find the distance between two points; Trigonometric ratios for finding missing sides in right-angled triangles; Trigonometric ratios for finding missing angles in right-angled triangles; Exact values of  $\sin q$ ,  $\cos q$  and  $\tan q$  for  $q = 0, 30, 45, 60, 90$  by heart; Problems involving Pythagoras and trigonometry (including bearings), method selection practice.

### GEOMETRY AND MEASURES 6 - Circles

Circle parts and properties; Circumference of a circle (and semi/quarter circles), in terms of  $\pi$  and rounded; Area of a circle (recap) and semi/quarter circles, in terms of  $\pi$  and rounded; Problems with circumference and area of a circle; Length of an arc and area of a sector; Identifying and using the circle theorems.

### GEOMETRY AND MEASURES 7 - Advanced Drawing, Measuring and Constructing

Interior and exterior angles in polygons; Problems with angles, including in parallel lines, bearings and polygons, and explaining reasoning; Converting between 2D and 3D units of measurement; Naming and recognising polyhedral; Labelling conventions; Euler's Formula ( $F + V - 2 = E$ ); Drawing 3D shapes: normal and isometric; 2D representations of 3D shapes: constructing and interpreting nets, plans and elevations; Planes of symmetry; Loci - fixed distance from a point, fixed distance from a line, equidistant from a two points, equidistant from two lines.

**Year 10 Higher**

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**STATISTICS AND PROBABILITY 4 - Continuous Data**

Measures of central tendency of grouped data - mean, mode and median; Graphical representations of continuous and grouped data - cumulative frequency and boxplots; Measures of spread - interquartile range, including why it is better than the range; Compare data sets through graphs, central tendency and spread.

**GEOMETRY AND MEASURES 7 - Advanced Drawing, Measuring and Constructing**

Interior and exterior angles in polygons; Problems with angles, including in parallel lines, bearings and polygons, and explaining reasoning; Converting between 2D and 3D units of measurement; Naming and recognising polyhedral; Labelling conventions; Euler's Formula ( $F + V - 2 = E$ ); Drawing 3D shapes: normal and isometric; 2D representations of 3D shapes: constructing and interpreting nets, plans and elevations; Planes of symmetry; Loci - fixed distance from a point, fixed distance from a line, equidistant from a two points, equidistant from two lines.

**STATISTICS AND PROBABILITY 5 - Set Theory and Logic**

Thinking logically; Representing sets with set notation; Representing sets with Venn diagrams; Intersections and unions of sets (in notation and on Venns), subsets; Solving probability problems using sets; Applying the 'AND' and 'OR' rules for independent and mutually exclusive events; Linking to intersections and unions; Represent the solutions to linear inequalities using set notation.

**NUMBER AND PROBABILITY 14 - Number Theory**

the Fundamental Theorem of Arithmetic; Finding HCF/LCM using prime factors; HCF/LCM problems; Advanced prime factors - square/cube numbers, using numbers given in factorised form; Recurring and terminating decimals - prime factor rule for identifying terminating decimals, converting a recurring decimal to a fraction; writing error intervals (recap rounding and truncation); calculations with upper and lower bounds, combining upper and lower bounds, percentage error of these calculations.

**ALGEBRA 11 - Advanced manipulating and simplifying expressions**

Addition and subtraction of indices, power of a power, power of 0; expand two and three binomials, including adding expressions which need first expanding; factorising a quadratic where  $a = 1$ ; factorising the difference of two squares; factorising a quadratic where  $a > 1$ ; simplifying algebraic fractions, including numerical factors, single letter factors and bracket factors; rearranging more complex formulae (including non-linear, subject in denominator, and subject appearing twice); simplifying an expression by factorising out a bracket.

**ALGEBRA 12 - Quadratic Graphs and Equations**

Plotting a quadratic and reading values from a graph; solving quadratics graphically and simple  $ax^2=b$  by rearrangement; Solving quadratic equations  $= 0$  by factorising, identifying the solutions on a graph;



Solving quadratic equations = 0 using the quadratic formula, identifying the solutions on a graph; Completing the square to find roots. Simple examples where b is even and a = 1; Producing a sketch graph of a quadratic by finding roots, y-intercept and turning points (by symmetry only); Solving quadratics presented not equal to 0, selecting the best method for solving.

#### **GEOMETRY AND MEASURES 8 - Surface Area and Volume**

Surface area of prisms and cylinders; Surface area of spheres, pyramids, cones, composite solids, frustums and other polyhedral; Volume of prisms and cylinders; Volume of spheres, pyramids, cones, composite solids, frustums and other polyhedral; Similarity of volume and area - generalising LAV similarity with scale factors and ratios.

#### **ALGEBRA 13 - Advanced Sequences**

Working with visual representations of arithmetic, quadratic and geometric sequences; Fibonacci sequences - numerical and algebraic; Quadratic sequences, including finding the nth term; Recurrence relations.

#### **GEOMETRY AND MEASURES 9 - Advanced Length and Area**

Pythagoras and right-angled trigonometry in 3D; Area of a triangle =  $\frac{1}{2}ab\sin C$ ; Sine and cosine rules (including the ambiguous case of the sine rule); Area of a segment; Problems involving length and area, including bearings, 3D and multi-step problems.