Year 10 Higher Big Picture – Maths

Autumn 1 7 weeks	Autumn 2 7 weeks	Spring 1 7 weeks
Content H1 Rearranging formulae H2 Linear Graphs H3 Linear Simultaneous equations H4 Volume 2	**Content** H5 Compound Measures H6 Quadratics - graphical H7 Quadratics - algebraic H8 Further graphs	**Content** H9 Probability 2 H10 Statistics 2 H11 Cumulative frequency and Box Plots H11* Standard form
Assessment Objectives This is the knowledge, application and skills assessed by the Big Test: • Rearrange formulae to change the subject in a geometrical context • Change the subject of a formula (including kinematic formulae) involving the use of square roots and squares • **Calculate the radius or diameter when Sector area or Arc length is given** • **Rearrangement complex formulae involving fractions, roots and powers and where the subject appears on both sides of the formula** • Plot and read coordinates in all four quadrants • Draw, label and scale axes • Plot straight line graphs • Recognise, sketch and interpret straight line graphs • Find approximate solutions using a graph • Find the coordinates of the midpoint of a line segment • Use real life graphs: ready reckoner graphs, conversion graphs, fuel bills graphs, fixed charge and cost per unit • Identify and interpret gradients and intercepts of straight-line graphs • Identify and interpret gradient from an equation y = mx + c • **Plot and draw graphs of straight lines in the form**	**Assessment Objectives** This is the knowledge, application and skills assessed by the Big Test: • Interpret distance–time graphs, and calculate: the speed of individual sections, total distance and total time • Change between standard units e.g. time, mass, length, money, volume, area • Change between compound units e.g. speed, rates of pay, prices • Work out time intervals for graph scales • **Change between standard units and compound units e.g. density and pressure** • Recognise, sketch and interpret graphs of quadratic functions • **Identify roots, intercepts and turning points of a quadratic function** • **Find approximate solutions using a graph** • **Identify the line of symmetry of a quadratic graph** • **Find roots of a quadratic algebraically by factorisation - with rearrangement needed** • **Factorising quadratic expressions of the form ax2 + bx + c** • **Deduce turning points by completing the square** • **Simplify algebraic fractions** • **Multiply, divide, add and subtract algebraic fractions**	**Assessment Objectives** This is the knowledge, application and skills assessed by the Big Test: • Apply systematic listing strategies • Describe probability using the probability scale, tables and frequency trees • Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments • Calculate expected outcomes • Mutually exclusive events sum to one • Experimental and theoretical probability • Use Venn diagrams and appropriate notation • Probability space/sample space diagrams • Find a missing probability from a list or table including algebraic terms • **Unbiased samples and effects of increasing sample size** • **Probability tree diagrams for independent and dependent events** • **Calculate the probability of independent and dependent combined events** • **Sets and combinations of sets using Venn diagrams** • **Calculate and interpret conditional probabilities: Use a two-way table to calculate conditional probability; Use a tree diagram to calculate conditional probability; Use a Venn diagram to**

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ax + by = c • Find the equation of a straight line from a graph • Use y = mx + c to identify parallel lines • Find the equation of a line through two given points or -through one point with a given gradient • Know that the gradient of a straight line is interpreted as a rate of change • Identify and interpret the gradient from an equation ax + by = c • Use y = mx + c to identify perpendicular lines • Generate equations of lines perpendicular to the given line • Solve two simultaneous equations in two variables (linear/linear) algebraically • Find approximate solutions using a graph • Derive two simultaneous equations, solve the equation and interpret the solution • Know and apply formulae to calculate volume of cuboids and other right prisms (including cylinders) • Find the volume of spheres, pyramids, cones and composite solids	• Expand more than two brackets • Recognise and sketch cubic graphs and the reciprocal graph • Plot and interpret reciprocal graphs • Recognise and interpret graphs that illustrate direct and inverse proportion • Sketch and interpret graphs of exponential functions y = kx for positive values of k and integer values of x • Draw circles, centre the origin, equation x2 + y2 = r2 • Sketch graphs of simple cubic functions, given as three linear expressions	calculate conditional probability • Tree diagrams with algebraic expressions • Draw and Interpret frequency tables, bar charts, composite bar charts, pie charts, pictograms, vertical line charts, stem and leaf (including back-to-back stem and leaf) • Mean, mode, median, modal class • Range and outliers • Compare the mean, median, mode and range (as appropriate) of two distributions using bar charts, dual bar charts, pictograms and back-to-back stem and leaf • Recognise the advantages and disadvantages between measures of average • Scatter graphs - recognise correlation • Recognise types of data: primary secondary, quantitative and qualitative • Understand sample and population • Listing combinations • Sampling - infer properties of populations or distributions from a sample, while knowing the limitations of sampling • Interpret and construct tables and line graphs for time series data • Scatter graphs - draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends while knowing the dangers of doing so • Cumulative frequency graphs • Draw, interpret and compare box plots • Range, quartiles and inter-quartile range • Convert large and small numbers into standard form and vice versa • Add and subtract numbers in standard form • Multiply and divide numbers in standard form • Use a calculator in standard form calculations

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Unit test (marked by teacher) Unit test H2 **Unit tests (Self-assessment)** Unit tests H1, H3, H4 **Feedforward and Intervention** Students to complete the questions where they made errors (in purple pen)	**Unit test (marked by teacher)** Unit test H5 **Unit tests (Self-assessment)** Unit tests H6, H8 **Feedforward and Intervention** Students to complete the questions where they made errors (in purple pen)	**Big test PPE (marked by teacher)** PPE Big Test 1 **Unit tests (Self-assessment)** Unit tests H9, H10, H11* **Feedforward and Intervention** Students to complete the questions where they made errors (in purple pen)
ATL Data capture	**PPE and ATL data**	**PPE data** **ATL Data capture**
Spring 2 **5 weeks**	**Summer 1** **6 weeks**	**Summer 2** **7 weeks**
Content H12 Growth & Decay H13 Ratio 2 H14 Ratio 3 H15 Similar shapes	**Content** H16 Algebraic proportion H17 Surds H18 Right angled Trigonometry	**Content** H19 Bounds H20 Bearings and scale drawing
Assessment Objectives This is the knowledge, application and skills assessed by the Big Test: • Simple interest • **Set up, solve and interpret the answers in growth and decay problems, including compound interest** • **Identify the interest rate in compound interest questions** • **Set up, solve and interpret the answers in growth and decay problems** • Simplify ratios • Divide a quantity into a given ratio • Write ratios as fractions • Compare lengths, areas and volumes using ratio notation and scale factors • **Solve ratio problems involving the change of a ratio**	**Assessment Objectives** This is the knowledge, application and skills assessed by the Big Test: • **Recognise and interpret graphs that illustrate direct and inverse proportion** • **Interpret equations and graphs that describe direct and inverse proportion** • **Capture and recapture** • **Identify direct proportion from a table of values, by comparing ratios of values, for x squared and x cubed relationships** • **Write statements of proportionality for quantities proportional to the square, cube or other power of another quantity** • **Set up and use equations to solve word and other problems involving direct proportion or inverse**	**Assessment Objectives** This is the knowledge, application and skills assessed by the Big Test: • Calculate the upper and lowers bounds of numbers given to varying degrees of accuracy • Calculate the upper and lower bounds of an expression involving the four operations • Find the upper and lower bounds in real-life situations using measurements given to appropriate degrees of accuracy • Find the upper and lower bounds of calculations involving perimeters, areas and volumes of 2D and 3D shapes • Calculate the upper and lower bounds of calculations, particularly when working with measurements

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within a question • **Relate ratios to fractions and to linear functions** • **Solve complex multi-step problems involving fractions and probability** • **Solve complex multi-step problems involving algebraic terms** • **Use formal geometric proof for the similarity of two given triangles** • **Identify the scale factor of an enlargement of a similar shape as the ratio of the lengths of two corresponding sides, using integer or fraction scale factors** • **Find missing lengths in similar 3D solids** • **Relationships between areas and volumes in similar figures** • **Understand the effect of enlargement on angles, perimeter, area and volume of shapes and solids** • **Write the lengths, areas and volumes of two shapes as ratios in their simplest form** • **Find missing areas and volumes in similar 3D solids** • **Know the relationships between linear, area and volume scale factors of mathematically similar shapes and solids** • **Use the relationship between enlargement and areas and volumes of simple shapes and solids** • **Solve problems involving frustums of cones where you have to find missing lengths first using similar triangles** **Unit test (marked by teacher)** Unit test H13 **Unit tests (Self-assessment)** Unit tests H12, H15 **Feedforward and Intervention** Students to complete the questions where they made errors (in purple pen)	**proportion** • **Use y = kx to solve direct proportion problems, including questions where students find k, and then use k to find another value** • **Solve problems involving inverse proportionality** • **Simplify and manipulate algebraic expressions involving surds** • Simplify surd expressions involving squares (e.g. √12 = √(4 × 3) = √4 × √3 = 2√3) • Understand surd notation, e.g. calculator gives answer to √8 as 2√2 • Expand and simplify single and double brackets involving surd manipulation • Rationalise denominators • **Trigonometry in right angled triangles** • **Know the exact values of sinθ and cosθ for θ = 0°, 30°, 45°, 60° and 90°. Know the exact value of tanθ for θ = 0°, 30°, 45° and 60°** • **Use formal geometric proof for the similarity of two given triangles** **Unit test (marked by teacher)** Unit test H17 **Unit tests (Self-assessment)** Unit tests H16, H18 **Feedforward and Intervention** Students to complete the questions where they made errors (in purple pen)	• Interpret maps and scale drawings • Estimate lengths using a scale diagram • Make an accurate scale drawing from a diagram • Know and use compass directions • Use three-figure bearings to specify direction • Mark on a diagram the position of point B given its bearing from point A • Give a bearing between the points on a map or scaled plan • Given the bearing of a point A from point B, work out the bearing of B from A • Use accurate drawing to solve bearings problems • Solve locus problems including bearings • EOY Revision programme- Revision of key topics • Preparation for UL tests and exam papers **EOY PPE test (marked by teacher)** EOY PPE Paper 1 and Paper 2 **Unit tests (Self-assessment)** n/a **Feedforward and Intervention** Students to complete the questions where they made errors (in purple pen)

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ATL data	**ATL Data capture**	**PPE data** **PPE and ATL data**