Mathematics

Year 10 Higher
Scheme of Work

Subject leader: K Ellender

Topics by term	Topic overview for Year 10 Higher					
	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Topics taught	**7H – Area and Volume** 7a. Perimeter and Area 7b. Bounds 7c. Prisms 7d. Circles and sectors 7e. Cylinders, spheres, and cones Knowledge recall / Quiz	**9H – Equations and Inequalities** 9a . Solving quadratics 9b. Completing the square 9c. Simultaneous equations 9d. Linear and quadratic simultaneous equations. 9e. Solving inequalities Knowledge recall / Quiz	**10H – Probability** 10a. Product Rule for Outcomes 10b. Outcomes and mutually exclusive events 10c. Experimental Probability 10d. Tree diagrams 10e. Venn diagrams and Set notation Knowledge recall / Quiz **12H-Similarity & Congruence** 12.a. Congruence 12.b Similarity Knowledge Recall and Quiz	**11H - Multiplicative Reasoning** 11a. Multipliers-Growth & Decay 11b. Compound measures 11c. Direct and inverse proportion Knowledge recall / Quiz	**14H – Further Statistics** 14a. Cumulative Frequency 14b. Box Plots 14c. Histograms 14d. Sampling 14e. Populations Knowledge recall / Quiz **WTM – Higher papers**	**8H – Transformations and Constructions** 8a. Reflections & rotations 8b. Enlargements 8c. Translations and combinations 8d. 3D Solids 8e. Bearings and Scales 8f. Constructions and Loci Knowledge recall / Quiz

	Vital prerequisites	Vital prerequisites	Vital prerequisites	Vital prerequisites	Vital prerequisites	Vital prerequisites
	Students need a solid understanding of geometry, including properties of shapes (triangles, quadrilaterals, circles etc.), angles, and geometric transformations. They should be proficient in measurement, including calculating perimeter, area, and volume for various shapes (rectangles, triangles, circles, prisms, cylinders, cones, spheres). Algebra skills are essential for manipulating formulas related to area and volume and solving equations. Additionally, knowledge of ratio and proportion helps in understanding scaling factors applied to area and volume calculations.	Students should have a strong grasp of advanced mathematical concepts including algebra (solving quadratic and simultaneous equations, manipulating algebraic expressions), functions (understanding linear, quadratic, and other types of functions, including composite functions), graphs (interpreting and analysing graphs, especially linear and quadratic graphs), inequalities (solving and graphing inequalities, understanding their solutions), and number theory (knowledge of indices, logarithms, and their application in solving equations).	10H - Students need a solid grasp of basic probability concepts, statistics (including data interpretation), algebra (equations and formulas), ratio and proportion (proportional relationships in probability), and basic graph interpretation. These skills are essential for understanding and applying probability concepts effectively. 12H - Students need a solid understanding of geometry, including properties of shapes like triangles, quadrilaterals, and circles. Knowledge of proportion, scaling factors in geometry, and basic trigonometric ratios.	Students need a strong foundation in number skills (multiplication, division, fractions, decimals, percentages), algebra (equations involving multiplication and division), ratio and proportion concepts (proportional reasoning), basic graphs and functions (proportional relationships), and statistical data interpretation (multiplicative relationships like growth rates and percentages).	Students need a solid foundation in basic statistics, including measures of central tendency (mean, median, mode) and dispersion (range, interquartile range, standard deviation). They should be familiar with probability concepts and calculations, proficient in data handling (collecting, organizing, interpreting data), and understand various sampling techniques. Additionally, knowledge of correlation and regression analysis for examining relationships between variables is essential.	Students need a strong foundation in geometry, including understanding basic shapes like triangles, quadrilaterals, and circles. They should be familiar with geometric transformations. Proficiency in working with coordinates in the Cartesian plane is essential, including plotting points and understanding transformations in terms of coordinates. Knowledge of constructing geometric figures using a compass and straightedge, as well as understanding angle properties and measurement.
	Why are we teaching this now?	Why are we teaching this now?	Why are we teaching this now?	Why are we teaching this now?	Why are we teaching this now?	Why are we teaching this now?
	Covering area and volume, is essential for future learning by laying foundations for advanced maths, enhancing problem-solving skills, preparing for exams and practical applications in engineering and sciences, supporting interdisciplinary connections, and developing critical thinking skills.	Provides foundational skills for advanced mathematics like calculus and mathematical modelling, enhances problem-solving abilities, and prepares students for success in GCSE exams and further studies in STEM fields. These concepts have practical applications in engineering, economics, and computer science, fostering interdisciplinary understanding and preparing students for careers in analytical fields such as data analysis, finance, and engineering.	10H - Crucial for advanced statistics and decision theory. Enhances critical thinking and analytical skills, crucial in economics, engineering, and data science. It's essential for STEM success and applications in finance, insurance, healthcare. 12H - Provides foundational geometry skills crucial for advanced studies. Enhances problem-solving and prepares for careers in architecture, engineering, and design.	Provides foundational skills for advanced mathematics like algebra, calculus, and statistics. Mastery enhances problem-solving abilities across academic disciplines and prepares students for success in exams and careers requiring quantitative analysis in fields such as finance, economics, and engineering.	Covers advanced statistical methods crucial for studies in statistics, economics, and data science. Mastery enhances analytical skills, preparing students for roles in research, business analytics, and decision-making. Proficiency in these concepts is vital for exam success and careers in fields like healthcare, finance, and social sciences, supporting interdisciplinary connections and diverse career opportunities requiring statistical analysis.	It provides foundational skills in geometry and spatial reasoning, crucial for advanced studies in mathematics, engineering, and architecture. Mastery enhances problem-solving abilities applicable in diverse fields like computer graphics and robotics. Proficiency in these concepts is vital for exam success and further studies in STEM disciplines, with practical applications in areas such as architecture and urban planning.

Contents

This symbol indicates that there are aspects of this curriculum area that pupils have previously practised. Pupils will be revisiting earlier content as part of their consolidation or in order to ensure knowledge is secure before expanding into new learning. References to these earlier SOL are noted for teachers to check specific objectives and content.

Edexcel Foundation 1MA1							

Specification References	Big questions	Topic area: Main Items	Learning Objectives /Outcomes All: grades 4-5 Most: grades 6-7 Some: grades 8-9 Examples	Key Terms/ concepts Literacy Numeracy	Assessment and homework tasks	Resources	Personal Development Curriculum links (SMSC, British Values, PSHE)
Term 1							
		Topic 1: 7H -Area and Volume (6 Weeks)					
N8, N14, N15, R1, G1, G9, G14, G16, G17, G18, N16	What are the area formulae that you need to know? Yr7, Yr8 Ch2	7a. Perimeter and Area	Recall and use the formulae for the area of a triangle, rectangle, trapezium and parallelogram using a variety of metric measures; Calculate the area of compound shapes made from triangles, rectangles, trapezia and parallelograms using a variety of metric measures; Find the perimeter of a rectangle, trapezium and parallelogram using a variety of metric measures; Calculate the perimeter of compound shapes made from triangles and rectangles; **Include the use of Pythaoras' Theorem to calculate dimensions required in area calculations.** Estimate area and perimeter by rounding measurements to 1 significant figure to check reasonableness of answers.	Triangle, rectangle, parallelogram, trapezium, area, perimeter, formula, length, width, prism, compound, measurement, polygon, cuboid, volume, bounds, accuracy, surface area, volume, prism, nets, isometric, symmetry, vertices, edge, face, circle, segment, arc, sector, cylinder, circumference, radius, diameter, pi, composite, sphere, cone, capacity, hemisphere, segment, frustum, See command words	**Starter quizzes for the term should include:** **Required prior knowledge** **Mixed skills practice** **Focused accuracy drills** **Knowledge gap support** **Look, cover, write, check.** Pupils are expected to complete purposeful exercises and repeated practice on: • Perimeter of shapes • Area of rectangles and parallelogram • Area of triangles, • Area of compound shapes • Area of trapezia • Area of compound shapes. • Perimeter of compound shapes. • Converting metric units • Upper and Lower bounds • Bound calculations Practical problems involving area and perimeter with cost implications and metric units. Practical problems involving compound shape area and perimeter.	• Pearson's GCSE Maths 9-1 Textbook: Ch7 • Purposeful Practice Book Ch7 • Edexcel Higher Linear Course Text Book Ch9, 16 • Common misconception information. Scientific Calculators Compasses Year 10 Term 1 Knowledge Organiser for key terms, recall and low stakes quizzing. N17 Bounds Edexcel (Resourceaholic) Mensuration – (resourceaholic) Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 style questions for assessment. .	By maintaining high standards of behaviour, including mutual respect and tolerance for different ideas to their own, class teachers will be promoting British values. Throughout the year, students should be encouraged to actively listen to understand the viewpoint of others when learning involves opinions, interpretation of fact and alternative methods. **Gatsby Benchmarks: Careers** Use real-life contexts wherever possible to help students to engage and relate learning to everyday and working life. E.g. Area calculations linked to cost – design and construction. . Maths, Why Bother?	MYPATH Careers Resources (mypathcareersuk.com)
		7b. Bounds and Measures	Convert between metric lengths and area measures Calculate the upper and lowers bounds of numbers given to varying degrees of accuracy; Use inequality notation to specify an error bound. 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;		Multistep problems in a range of scenarios with reasoning, where necessary. Plenary style questions – White Rose Maths - Assessment Papers https://www.missbsresources.com/ > Geometry> skills review Mathsbox > Topic resources > 4 Questions / Exit tickets		
N8, N15, G12, G13, G14, G16, G17	How does calculating the surface area and volume of a prism relate to your area knowledge? 🌀 Yr8 Ch2	7c. Prisms	Find the surface area of prisms using the formulae for triangles and rectangles, and other (simple) shapes with and without a diagram; Draw sketches of 3D solids; Identify planes of symmetry of 3D solids, and sketch planes of symmetry; Recall and use the formula for the volume of a cuboid or prism made from composite 3D solids using a variety of metric measures; Convert between metric measures of area. Convert between metric measures of volume and capacity, e.g. 1 ml = 1 cm3; Use volume to solve problems; Estimating surface area, perimeter and volume by rounding measurements to 1 significant figure to check reasonableness of answers. **The Abbey Lens:** **Science – volume and surface area ratios.**		Pupils are expected to complete purposeful exercises and repeated practice on: ● Surface area calculations ● Volume calculations ● Converting between metric units ● Estimating in area and volume problems Practical problems involving area and volume with cost implications. Practical problems involving metric units. Multistep problems in a range of scenarios with reasoning, where necessary. Plenary style questions – White Rose Maths - Assessment Papers https://www.missbsresources.com/ > Geometry> skills review Mathsbox > Topic resources > 4 Questions / Exit tickets	● Pearson's GCSE Maths 9-1 Textbook: Ch7 ● Purposeful Practice Book Ch7 ● Edexcel Higher Linear Course Text Book Ch22 ● Common misconception information. Scientific Calculators 3D solids / cardboard nets Year 10 Term 1 Knowledge Organiser for key terms, recall and low stakes quizzing. Surface Area Challenges – Solvemymaths.com Volume of Compound Objects - Mathematics Assessment Project Functional Volume Questions – AccessMaths Functional Volume – Access Maths Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 style questions for assessment.	
N8, N14, N15, R1, G1, G9,	How do the properties of circles help us measure	7d. Circles and sectors	Recall the definition of a circle and name and draw parts of a circle; Recall and use formulae for the circumference of a circle and the area		Pupils are expected to complete purposeful exercises and repeated practice on:	● Pearson's GCSE Maths 9-1 Textbook: Ch7 ● Purposeful Practice Book Ch7	**Gatsby Benchmarks: Careers** Use real-life contexts wherever possible to

G14, G16, G17, G18, G13	objects with curved surfaces?		enclosed by a circle (using circumference = $2\pi r = \pi d$ and area of a circle = πr^2 using a variety of metric measures; Use $\pi \approx 3.142$ or use the π button on a calculator; Calculate perimeters and areas of composite shapes made from circles and parts of circles (including semicircles, quarter-circles, combinations of these and also incorporating other polygons); Calculate arc lengths, angles and areas of sectors of circles; Find radius or diameter, given area or circumference. Give answers in terms of π;		• Circumference and area calculations • Sector calculations • Volume of a cylinder • Surface area of a cylinder • Volume and surface area of a pyramid and cone • Volume and surface area of a sphere and hemisphere.	• Edexcel Higher Linear Course Text Book Ch22 • Common misconception information.	help students to engage and relate learning to everyday and working life. E.g. Product and packaging design and cost.
		7e. Cylinders, spheres, and cones	Form equations involving more complex shapes and solve these equations. Find the volume and surface area of a cylinder; Recall and use the formula for volume of pyramid; Find the surface area of a pyramid; Use the formulae for volume and surface area of spheres and cones; Find the surface area and volumes of compound solids constructed from cubes, cuboids, cones, pyramids, spheres, hemispheres, cylinders; Form equations involving more complex shapes and solve these equations. Solve problems involving more complex shapes and solids, including segments of circles and frustums; **If there is time left at the end of this unit, you should revisit the angle calculations from Ch5H, specifically focusing on trigonometry, angles in parallel lines and polygons.**		Practical problems involving use of the surface area and volume formulae. Practical problems involving metric units. Multistep problems in a range of scenarios with reasoning, where necessary. Plenary style questions – White Rose Maths - Assessment Papers https://www.missbsresources.com/ > Geometry> skills review Mathsbox > Topic resources > 4 Questions / Exit tickets	Scientific Calculators Compasses 3D solids / cardboard nets Year 10 Term 1 Knowledge Organiser for key terms, recall and low stakes quizzing. Circle sector problems - Access Maths Paper clip - Illustrative Mathematics Mensuration – (resourceaholic) Functional Volume – Access Maths Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 style questions for assessment.	Maths, Why Bother? | MYPATH Careers Resources (mypathcareersuk.com)
		Knowledge Recall	Big Questions of the unit are reviewed, and key areas revisited. Planned consolidation. Worded problems should be used, as well as exam style questions from the board. Further examples could include, but should not be limited to: Emphasis on the functional elements with carpets, tiles for walls, boxes in a larger box, etc. Best value and minimum cost can be incorporated too.			Knowledge Recall Lesson – Unit 7H – Shared area. Pearson's GCSE Maths 9-1 Textbook: Problem solving,	

| | | | Examples use different metric units of length, including decimals.
Lots of practical examples to ensure that students can distinguish between surface area and volume.
Making solids using multi-link cubes can be useful. | | | Check Up, Strengthen and Extend questions. | |
| | | Knowledge Quiz | Knowledge Quiz and self-assessment. | | Ch7H Knowledge Quiz – Shared area. | | |

Assessments for the year group will take place in Week 3 of each term, followed by feedback and focussed Pupil Improvement Time.

Term 2

Topic 2: 9H -Equations and Inequalities (6 Weeks)

| N8, A4, A9, A11, A18, A19, A21 | What does it mean to 'solve a quadratic'?

🌀Yr9 Ch2 | 9a . Solving quadratics

9b. Completing the square | **Revisit expanding and factorising single brackets and then quadratic expressions (Unit 2H).**
Factorise and solve quadratic expressions in the form $x2+bx+c$;
Factorise and solve quadratic expressions in the form $ax2+bx+c$;
Solve quadratic equations that need rearranging;
Set up and solve quadratic equations;
Solve quadratic equations by using the quadratic formula;

Solve quadratic equations by completing the square;
Solve quadratic equations that need rearranging; | Quadratic, solution, root, linear, solve, factorise, rearrange, surd, function, solve, simultaneous, inequality, variable, eliminate, rearrange,

See command words | **Starter quizzes for the term should include:**
Required prior knowledge
Mixed skills practice
Focused accuracy drills
Knowledge gap support
Look, cover, write, check.

Pupils are expected to complete purposeful exercises and repeated practice on:
• Factorising expressions
• Solving quadratic equations
• Use the quadratic formula
• Rearranging quadratics in the form (x+a)^2+b
• Solve quadratic equations by completing the square.
• Understand when to use each method of solving to best suit the situation.

Multistep problems in a range of scenarios with reasoning, where necessary.

Plenary style questions –
White Rose Maths - Assessment Papers
https://www.missbsresources.com/ > Algebra> skills review Mathsbox > Topic resources > 4 Questions / Exit tickets | • Pearson's GCSE Maths 9-1 Textbook: Ch7
• Purposeful Practice Book Ch7
• Edexcel Higher Linear Course Text Book Ch30
• Common misconception information.

Scientific calculators

Year 10 Term 2 Knowledge Organiser for key terms, recall and low stakes quizzing.

Tap Top (includes questions with a > 1) - Median Don Steward
Factorising quadratics - SRWhitehouse on TES

Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 style questions for assessment. | **Gatsby Benchmarks: Careers**
Introduce students to real examples of quadratic equations for context. Students might be unaware of opportunities for further study and employment with advanced mathematical knowledge.
Real World Examples of Quadratic Equations (mathsisfun.com)
Maths, Why Bother? | MYPATH Careers Resources (mypathcareersuk.com)

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N8, A4, A9, A11, A18, A19, A21	How do we use algebraic manipulation to solve simultaneous equations? 🌀 Yr9 Ch2	9c. Simultaneous equations 9d. Linear and quadratic simultaneous equations.	**Revisit solving linear equations including brackets, fractions and variables on both sides. (Unit 2H)** Find the exact solutions of two simultaneous equations in two unknowns; Use elimination or substitution to solve simultaneous equations; • linear / linear, including where both need multiplying; • linear / quadratic; • linear / $x2 + y2 = r2$; Set up and solve a pair of simultaneous equations in two variables for each of the above scenarios, including to represent a situation; Interpret the solution in the context of the problem;		Pupils are expected to complete purposeful exercises and repeated practice on: • Solving linear simultaneous equations • Solving linear and quadratic simultaneous equations • Setting up simultaneous equations to represent a situation. • Understand when to use differing methods of solving to best suit the situation. Practical problems involving using simultaneous equations to represent a situation. Multistep problems in a range of scenarios with reasoning, where necessary. Plenary style questions – [White Rose Maths - Assessment Papers](https://www.missbsresources.com/) > Algebra> skills review Mathsbox > Topic resources > 4 Questions / Exit tickets	• Pearson's GCSE Maths 9-1 Textbook: Ch7 • Purposeful Practice Book Ch7 • Edexcel Higher Linear Course Text Book Ch32 • Common misconception information. Scientific calculators Year 10 Term 2 Knowledge Organiser for key terms, recall and low stakes quizzing. Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 style questions for assessment.	**Gatsby Benchmarks: Personal Finance** Discuss the importance of Maths skills to develop and demonstrate confidence and competence in personal finance/planning. Relatable examples within the context of outcomes listed could include: Cost calculations from simultaneous equations
N1, A22	How does solving inequalities differ from solving equations?	9e. Solving inequalities	Show inequalities on number lines; Write down whole number values that satisfy an inequality; Solve simple linear inequalities in one variable, and represent the solution set on a number line; Solve two linear inequalities in x, find the solution sets and compare them to see which value of x satisfies both solve linear inequalities in two variables algebraically; Use the correct notation to show inclusive and exclusive inequalities		Pupils are expected to complete purposeful exercises and repeated practice on: • Representing inequalities and use correct notation. • Solving linear inequalities • Solve multiple inequalities to find a value for x which satisfies both.	• Pearson's GCSE Maths 9-1 Textbook: Ch7 • Purposeful Practice Book Ch7 • Edexcel Higher Linear Course Text Book Ch15 • Common misconception information. Scientific calculators Quadratic inequalities - mssteelmaths.com	

				Multistep problems in a range of scenarios with reasoning, where necessary. Plenary style questions – White Rose Maths - Assessment Papers https://www.missbsresources.com/ > Algebra> skills review Mathsbox > Topic resources > 4 Questions / Exit tickets	Defining Regions Using Inequalities - Mathematics Assessment Project Year 10 Term 2 Knowledge Organiser for key terms, recall and low stakes quizzing. Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 style questions for assessment.	
		Knowledge Recall	Big Questions of the unit are reviewed, and key areas revisited. Planned consolidation. Worded problems should be used, as well as exam style questions from the board. Further examples could include, but should not be limited to: Forming and solving quadratics for the area of rectangles/trapezia Simultaneous equations formed from prices of items with varying units of pounds and pence. . Linking to Ch6H (quadratic graphs)		Knowledge Recall Lesson – Unit 9H – Shared area. Pearson's GCSE Maths 9-1 Textbook: Problem solving, Check Up, Strengthen and Extend Questions	
		Knowledge Quiz	Knowledge Quiz and self-assessment.		Ch9H Knowledge Quiz – Shared area.	

<p style="color:red; text-align:center">Assessments for the year group will take place in Week 3 of each term, followed by feedback and focussed Pupil Improvement Time.</p>

Term 3

Topic 3: 10H - Probability (4 Weeks)

| N2, N3, N5, N14, N15, P1, P2, P3, P4, P5, P6, P7 | How do I describe and calculate probability for events?

Y7 Ch6 | 10a. Product Rule for Outcomes

10b. Outcomes and mutually exclusive events | List all outcomes for single events, and combined events, systematically;
Use the product rule for counting (i.e. if there are m ways of doing one task and n ways of doing another, then the total number of ways the two tasks can be done is m × n ways);

Revisit calculating with fractions/decimals (Unit 1H)
Write probabilities using fractions, percentages or decimals;
Find the probability of successive events, such as several throws of a single dice;
Draw sample space diagrams and use them for adding simple probabilities;
Know that the sum of the probabilities of all outcomes is 1 and use this to calculate probability; | Outcome, product, probability, even, certain, likely, impossible, scale, mutually exclusive, sample space, outcomes, mutually exclusive, independent, event, experiment, relative frequency, sample, trial,

See command words | **Starter quizzes for the term should include:**
Required prior knowledge
Mixed skills practice
Focused accuracy drills
Knowledge gap support
Look, cover, write, check.

Pupils are expected to complete purposeful exercises and repeated practice on:
Pupils are expected to complete purposeful exercises and repeated practice on:
• Probability scale
• Listing outcomes,
• Systematic listing
• Theoretical probability | • Pearson's GCSE Maths 9-1 Textbook: Ch10H
• Purposeful Practice Book Ch7
• Edexcel Higher Linear Course Text Book Ch24
• Common misconception information.

Scientific calculators

Great Expectations: Probability Through Problems (maths.org)

Year 10 Term 3 Knowledge Organiser for key terms, recall and low stakes quizzing. | **SMSC and BV**
There may be opportunities to challenge ideas and support students to think critically and not simply accept what they are told. Use of statistics and factual probability can be a very valuable way to show that claims and assertions should be critically analysed before being accepted. Equally, there may be times when discussions with students can broaden their outlook to develop their |

		10c. Experimental Probability	Use 1 – *p* as the probability of an event not occurring where *p* is the probability of the event occurring; Find a missing probability from a list or two-way table inc. algebraic terms; Use a two-way table to calculate conditional probability; Understand conditional probabilities and decide if two events are independent; Understand and use experimental and theoretical measures of probability, including relative frequency to include outcomes using dice, spinners, coins, etc; Estimate the number of times an event will occur, given the probability and the number of trials; Compare experimental data and theoretical probabilities; Compare relative frequencies from samples of different sizes.		• Mutually exclusive events • Mutually exclusive calculations • Two way tables and data tables • Estimating probability, • Sample spaces, • Relative frequencies • Estimating outcomes Practical problems involving Probability. Multistep problems in a range of scenarios with reasoning, where necessary Plenary style questions – White Rose Maths - Assessment Papers https://www.missbsresources.com/ > Data > skills review Mathsbox > Topic resources > 4 Questions / Exit tickets	Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 style questions for assessment.	resilience. Home - Office for National Statistics (ons.gov.uk) **Gatsby Benchmarks: Careers** Use real-life contexts with ratios wherever possible to help students to engage and relate learning to everyday and working life Maths, Why Bother? | MYPATH Careers Resources (mypathcareersuk.com) .
P1, P2, P3, P4, P5, P6, P7, P8, P9	How can we use diagrams to help us solve probability problems?	10d. Tree diagrams 10e. Venn diagrams and Set notation	Draw a probability tree diagram based on given information. Understand selection with or without replacement; Calculate the probability of independent and dependent combined events; Use a tree diagram to calculate conditional probability; Use Venn diagrams to group sets of numbers/values. Use Venn diagrams to represent real life situations. Work out probabilities from Venn diagrams to represent real-life situations and also 'abstract' sets of numbers/values; Use union and intersection notation;		Pupils are expected to complete purposeful exercises and repeated practice on: Pupils are expected to complete purposeful exercises and repeated practice on: • Tree diagrams for independent and dependent events • Calculating probabilities from tree diagrams for multiple events • Completing Venn diagrams • Calculating probabilities from Venn diagrams • Identification of values and probability with set notation	• Pearson's GCSE Maths 9-1 Textbook: Ch10H • Purposeful Practice Book Ch7 • Edexcel Higher Linear Course Text Book Ch24 • Common misconception information. Scientific calculators Manipulatives to explore Venn properties - Venn Diagrams (mathsbot.com) Year 10 Term 3 Knowledge Organiser for key terms, recall and low stakes quizzing.	.

				Practical problems involving Probability. Multistep problems in a range of scenarios with reasoning, where necessary Plenary style questions – White Rose Maths - Assessment Papers https://www.missbsresources.com/ > Data > skills review Mathsbox > Topic resources > 4 Questions / Exit tickets	Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 style questions for assessment.	
		Knowledge Recall	Big Questions of the unit are reviewed, and key areas revisited. Planned consolidation. Worded problems should be used, as well as exam style questions from the board. Further examples could include, but should not be limited to: Scenarios where the best method is to be decided by the student. Three part Venn diagrams Tree and Venn diagram with algebraic notation		Knowledge Recall Lesson – Unit 10H – Shared area. Pearson's GCSE Maths 9-1 Textbook: Problem solving, Check Up, Strengthen and Extend Questions.	
		Knowledge Quiz	Knowledge Quiz and self-assessment.		Ch10H Knowledge Quiz – Shared area.	
Topic 4: 12H – Congruence and Similarity (2 Weeks)						
G5, G6, G19	How do congruence and similarity differ?	12.a Congruency and Similarity	Understand and use SSS, SAS, ASA and RHS conditions to prove the congruence of triangles using formal arguments. Solve angle problems by first proving congruence; Understand similarity of triangles and of other plane shapes, and use this to make geometric inferences; Prove that two shapes are similar by showing that all corresponding angles are equal in size and/or lengths of sides are in the same ratio/one is an enlargement of the other, giving the scale factor;	Congruence, side, angle, hypotenuse shape, volume, length, area, volume, scale factor, enlargement, similar, perimeter, frustum See command words	**Starter quizzes for the term should include: Required prior knowledge Mixed skills practice Focused accuracy drills Knowledge gap support Look, cover, write, check.** Pupils are expected to complete purposeful exercises and repeated practice on: • Congruency recognition and proof • Similarity recognition and proof • Formal notation practice • Linear scale factor manipulation • Area scale factor manipulation	• Pearson's GCSE Maths H 9-1 Textbook: Ch12H • Purposeful Practice Book Ch12H, • Edexcel Higher Linear Course Text Book Ch27, 33 • Common misconception information. Scientific calculators Similar triangles/shapes - mathsmalakiss.com Analysing congruency proofs - Mathematics Assessment Project Complete the congruence proof - topdrawer.aamt.edu.au Prove it! - MathsPad	
R6, R12, G17	How does the scale factor affect the area and	12.b Similarity	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; Write the lengths, areas and volumes of two shapes as ratios;				

			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; Find missing lengths, areas and volumes in similar 3D solids; Understand the effect of enlargement on angles, perimeter, area and volume of shapes and solids; Solve problems involving frustums of cones where you have to find missing lengths first using similar triangles.		• Volume scale factor manipulation • Scale factor ratios and applications • Linear, area and volume relationships. Practical problems involving linear, area and volume relationships for contextual problems. Multistep problems in a range of scenarios with reasoning, where necessary. Plenary style questions – White Rose Maths - Assessment Papers https://www.missbsresources.com/ > Geometry> skills review Mathsbox > Topic resources > 4 Questions / Exit tickets	Year 11 Term 4 Knowledge Organiser for key terms, recall and low stakes quizzing. Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 style questions for assessment.	
volume of similar shapes?							
		Knowledge Recall	Big Questions of the unit are reviewed, and key areas revisited. Planned consolidation. Worded problems should be used, as well as exam style questions from the board. Further examples could include, but should not be limited to: Formal notation for geometric proof, compare to exam mark schemes. Ensure that examples involving given volumes are used, requiring the cube root being calculated to find the length scale factor. Make links between similarity and trigonometric ratios. Show why SSA and AAA are not proof of congruency.		Knowledge Recall Lesson – Unit 12H – Shared area. Pearson's GCSE Maths H 9-1 Textbook: Problem solving, Check Up, Strengthen and Extend questions.	
		Knowledge Quiz	Knowledge Quiz and self-assessment.		Ch12H Knowledge Quiz – Shared area.	Knowledge Quiz and self-assessment.	

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Term 4

Topic 5: 11H – Multiplicative Reasoning (6 Weeks)

| R16, N3, N12, R6 | How are multipliers used in real life? | 11a. Multipliers-Growth & Decay | Express a given number as a percentage of another number in more complex situations;
Calculate percentages with a multiplier.
Calculate reverse percentages | Profit, original, increase, decrease, annual, ratio, proportion, best value, proportional change, compound measure, density, mass, volume, | **Starter quizzes for the term should include:**
Required prior knowledge
Mixed skills practice
Focused accuracy drills
Knowledge gap support | • Pearson's GCSE Maths F 9-1 Textbook: Ch11
• Purposeful Practice Book Ch11H | **Gatsby Benchmarks: Personal Finance** Discuss the importance of Maths skills to develop and demonstrate |

	🌀 Yr9 Ch4			Work out the multiplier for repeated proportional change as a single decimal number; Calculate percentage profit or loss; Find the original amount given the final amount after a percentage increase or decrease; Calculate simple interest Calculate compound interest Understand the difference between simple and compound interest. Use compound interest to determine the best investments when presented with choices; Make calculations involving repeated percentage change, including depreciation. Set up, solve and interpret the answers in growth and decay problems; **Abbey Lens: Business Studies – Salary, profit and loss, interest rates.**	speed, distance, time, density, mass, volume, pressure, acceleration, velocity, Inverse, direct, See Command words	**Look, cover, write, check.** Pupils are expected to complete purposeful exercises and repeated practice on: • Calculating percentages • FDP conversion revision • Express a given number as a percentage of another. • Repeated percentage changes. • Reverse percentages • Calculating interest • Calculate percentage profit or loss. • Compound growth or depreciation Practical problems involving percentages. Multistep problems in a range of scenarios with reasoning, where necessary	• Edexcel Higher Linear Course Text Book Ch12 • Common misconception information Year 10 Term 4 Knowledge Organiser for key terms, recall and low stakes quizzing. Percentage Unchanged (maths.org) Retiring to Paradise (maths.org) Roasting Old Chestnuts 4 (maths.org) Compound percentage activities (Teachit Maths) Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 questions for practice and assessment.	confidence and competence in personal finance/planning. Relatable examples within the context of outcomes listed could include: Percentages – including taxation, sales, inflation, interest rates, loans Compound increase and depreciation Percentage change problems including price and salary changes. Maths KS3 / GCSE: Finance - BBC Teach
N13, R1, R11	What does it mean for a unit to be 'compound'?	11b. Compound measures	Understand and use compound measures, including the need to use multiple formulae in one problem. Convert between metric speed measures; Convert between density measures; Convert between pressure measures; Use kinematics formulae from the formulae sheet to calculate speed, acceleration, etc (with variables defined in the question); **Abbey Lens: Science – Compound measurements and units.**		Pupils are expected to complete purposeful exercises and repeated practice on: • Compound calculations of density, volume and mass values. • Compound calculations of pressure, force and area values. • Compound calculations of speed, distance and time values. • Converting units and problems. • Use of the kinematics formulae.	• Pearson's GCSE Maths F 9-1 Textbook: Ch11 • Purposeful Practice Book Ch11H • Edexcel Higher Linear Course Text Book Ch6 • Common misconception information Year 10 Term 4 Knowledge Organiser for key terms, recall and low stakes quizzing. Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 questions for practice and assessment	

					Practical problems involving compound measures. Multistep problems in a range of scenarios with reasoning, where necessary Plenary style questions – White Rose Maths - Assessment Papers https://www.missbsresources.com/ > Geometry> skills review Mathsbox > Topic resources > 4 Questions / Exit tickets		
R10, R14	What does direct and indirect proportion look like on a graph and what does it mean? Yr9 Ch4	11c. Direct and inverse proportion	Recognise when values are in direct proportion by reference to the graph form, and use a graph to find the value of k in $y = kx$; Recognise when values are in inverse proportion by reference to the graph form; Understand that X is inversely proportional to Y is equivalent to X is proportional to 1/Y; Calculate an unknown quantity from quantities that vary in direct or inverse proportion; Set up and use equations to solve word and other problems involving direct proportion (this is covered in more detail in unit 19); Extension opportunity from Ch19: *Set up and use equations to solve word and other problems involving direct proportion including square, cube or other power of another quantity;* *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 proportion using graphs by plotting and reading values from graphs;* *Solve problems involving inverse proportionality;*		Pupils are expected to complete purposeful exercises and repeated practice on: • Calculating values through direct and inversely proportionate relationships. • Set up and use proportion formulae. Practical problems involving compound proportion. Multistep problems in a range of scenarios with reasoning, where necessary Plenary style questions – White Rose Maths - Assessment Papers https://www.missbsresources.com/ > Number > skills review Mathsbox > Topic resources > 4 Questions / Exit tickets	• Pearson's GCSE Maths F 9-1 Textbook: Ch11 • Purposeful Practice Book Ch11H • Edexcel Higher Linear Course Text Book Ch34 • Common misconception information Year 10 Term 4 Knowledge Organiser for key terms, recall and low stakes quizzing. Physics in proportion (Resourceaholic) Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 questions for practice and assessment	**Gatsby Benchmarks: Personal Finance** Discuss the importance of Maths skills to develop and demonstrate confidence and competence in personal finance/planning. Relatable examples within the context of outcomes listed could include: Business and project staff requirements through direct and inverse proportion.

			Set up and use equations to solve word and other problems involving direct or inverse proportion.				
		Knowledge Recall	Big Questions of the unit are reviewed, and key areas revisited. Planned consolidation. Worded problems should be used, as well as exam style questions from the board. Further examples could include, but should not be limited to: Multiple unit changes for compound measures. Solve word problems involving direct and inverse proportion.			Knowledge Recall Lesson – Unit 11H – Shared area. Pearson's GCSE Maths H 9-1 Textbook: Problem solving, Check Up, Strengthen and Extend questions.	Links to our Personal Development Curriculum will be populated during the 2022-23 academic year.
		Knowledge Quiz	Knowledge Quiz and self-assessment.		Ch11H Knowledge Quiz – Shared area.	Knowledge Quiz and self-assessment.	

Term 5

Topic 6: 14H – Further Stats (6 Weeks)

| S1, S3, S4 | How do we visually represent the spread of data? 🌪 Yr9 Ch3 | 14a. Cumulative Frequency 14b. Box Plots 14c. Histograms | **Planned consolidation. Firstly revisit Unit 3H:** **Averages from data and tables** **Combined mean** **Estimating averages from grouped frequency tables** **Frequency polygons** Know the appropriate uses of cumulative frequency diagrams; Construct and interpret cumulative frequency tables; Construct and interpret cumulative frequency graphs/diagrams and from the graph: -estimate frequency greater/less than a given value; -find the median and quartile values and interquartile range; Produce box plots from raw data and when given quartiles, median and identify any outliers; Interpret box plots to find median, quartiles, range and interquartile range and draw conclusions; Compare the mean and range of two distributions, or median and interquartile range, as appropriate; Know the appropriate uses of histograms; | Sample, population, fraction, decimal, percentage, bias, stratified sample, random, cumulative frequency, box plot, frequency, mean, median, mode, range, lower quartile, upper quartile, interquartile range, spread, comparison, outlier, histogram, frequency density, See command words | **Starter quizzes for the term should include:** **Required prior knowledge** **Mixed skills practice** **Focused accuracy drills** **Knowledge gap support** **Look, cover, write, check.** Pupils are expected to complete purposeful exercises and repeated practice on: - Calculating cumulative frequency values - Plotting and interpreting cumulative frequency graphs. - Calculating quartile values - Plotting / interpreting box plots. - Calculating histogram values including frequency density and frequencies. - Plotting and interpreting histograms. Practical problems involving the interpretation from real life data. | - Pearson's GCSE Maths F 9-1 Textbook: Ch14 - Purposeful Practice Book Ch14H - Edexcel Higher Linear Course Text Book Ch21 - Common misconception information Year 10 Term 5 Knowledge Organiser for key terms, recall and low stakes quizzing.   Box plots - Box plots: increase, decrease, same? – Variation Theory GCSE questions on histograms - mathsteaching.wordpress.com GCSE 9 - 1 exam questions - Maths4Everyone on TES Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 questions for practice and assessment | **SMSC and BV** Use recent and relevant statistical representations in the media for discussion and context. Home - Office for National Statistics (ons.gov.uk) Opportunities to discuss data connections to individual liberty and the rule of law. Activity 1.2 and 1.2 - Democracy and Law – General Elections British values maths resources **Gatsby Bench marks: Careers** Discussing statistics in the real world at this point is a useful way to remind students of the link between Maths and other areas of interest such as the growing field of Sports Analytics. |

			Construct and interpret histograms from class intervals with unequal width; Use and understand frequency density; From histograms: -complete a grouped frequency table; -understand and define frequency density; Estimate the mean from a histogram; Estimate the median from a histogram with unequal class widths or any other information from a histogram, such as the number of people in a given interval.		Multistep problems in a range of scenarios with reasoning, where necessary Plenary style questions – White Rose Maths - Assessment Papers https://www.missbsresources.com/ > Data > skills review Mathsbox > Topic resources > 4 Questions / Exit tickets		Learn the Role of Maths in Sport | Importance of Maths (superprof.co.in)
S1, S3, S4 , S5	How do biologists predict the number of tigers left in the world?	14d. Sampling 14e. Populations	Understand what is meant by sample and population; Understand how different sample sizes may affect the reliability of conclusions drawn; Identify possible sources of bias and plan to minimise it; Specify the problem and plan: • decide what data to collect and analysis needed; • understand primary and secondary data sources; • consider fairness; Write questions to eliminate bias, and understand how the timing and location of a survey can ensure a sample is representative (see note); Use statistics found in all graphs/charts in this unit to describe a population; Be able to estimate the size of a population using the capture-recapture method and discuss limitations. **The Abbey Lens - Biological ecosystems**		Pupils are expected to complete purposeful exercises and repeated practice on: • Key definitions and examples in context • Calculating sample sizes • Calculating population sizes. Practical problems involving the interpretation from real life data. Multistep problems in a range of scenarios with reasoning, where necessary Plenary style questions – White Rose Maths - Assessment Papers https://www.missbsresources.com/ > Data > skills review Mathsbox > Topic resources > 4 Questions / Exit tickets	• Pearson's GCSE Maths F 9-1 Textbook: Ch14 • Purposeful Practice Book Ch14H • Edexcel Higher Linear Course Text Book Ch11 • Common misconception information Year 10 Term 5 Knowledge Organiser for key terms, recall and low stakes quizzing. Capture-mark-recapture - Investigating ecosystems - GCSE Biology (Single Science) Revision - BBC Bitesize Please see the Resources section for available materials on practice questions and AO1/AO2/AO3 questions for practice and assessment	
		Knowledge Recall	Big Questions of the unit are reviewed, and key areas revisited. Planned consolidation. Worded problems should be used, as well as exam style questions from the board. Further examples could include, but should not be limited to: Sampling in various contexts. Completing and interpreting a range of histograms and box plots. Use of the exam mark schemes.			Knowledge Recall Lesson – Unit 14H – Shared area. Pearson's GCSE Maths H 9-1 Textbook: Problem solving, Check Up, Strengthen and Extend questions.	

		Knowledge Quiz	Knowledge Quiz and self-assessment.		Ch14H Knowledge Quiz – Shared area.	Knowledge Quiz and self-assessment.	

Assessments for the year group will take place in Week 3 of each term, followed by feedback and focussed Pupil Improvement Time.

Term 6

Topic 7: 8H – Transformations and Constructions (6 Weeks)

| R6, G5, G6, G7, G8, G24, G25 | What are the 4 types of transformation and how do we describe them?

🌀 Yr7 Ch10 | 8a. Reflections & rotations

8b. Enlargements | Identify the equation of a line of symmetry;
Recognise and describe reflections on a coordinate grid – know to include the mirror line as a simple algebraic equation, $x = a$, $y = a$, $y = x$, $y = -x$ and lines not parallel to the axes;
Reflect 2D shapes using specified mirror lines including lines parallel to the axes and also $y = x$ and $y = -x$;

Recognise and describe rotations – know that that they are specified by a centre and an angle;
Rotate 2D shapes using the origin or any other point (not necessarily on a coordinate grid);

Enlarge a shape on a grid without a centre specified;
Describe and transform 2D shapes using enlargements by a positive integer, positive fractional, and negative scale factor;
Know that an enlargement on a grid is specified by a centre and a scale factor;
Identify the scale factor of an enlargement of a shape;
Enlarge a given shape using a given centre as the centre of enlargement by counting distances from centre, and find the centre of enlargement by drawing;
Find areas after enlargement and compare with before enlargement, to deduce multiplicative relationship (area scale factor); given the areas of two shapes, one an enlargement of the other, find the scale factor of the enlargement (whole number values only); | Transformation, rotation, reflection, centre, angle, direction, mirror line, centre of enlargement, describe, distance, congruence, similar, combination, single, corresponding, congruent, enlargement, scale factor, translate, vector, similar, invariance, constructions, compasses, protractor, perpendicular, bearing, bisector, bisect, line segment, loci, bearing, plan, elevation, dimension, sketch, isometric

See command words | **Starter quizzes for the term should include:**
Required prior knowledge
Mixed skills practice
Focused accuracy drills
Knowledge gap support
Look, cover, write, check.

Pupils are expected to complete purposeful exercises and repeated practice on:
Pupils are expected to complete purposeful exercises and repeated practice on:
• Drawing reflections
• Describing reflections
• Drawing rotations
• Describing rotations
• Drawing translations
• Describing translations
• Drawing enlargements
• Describing enlargements
• Combining transformations
• Area calculations from enlargements.

Multistep problems in a range of scenarios with reasoning, where necessary.

Plenary style questions – White Rose Maths - Assessment Papers https://www.missbsresources.com/ > Geometry> skills review | • Pearson's GCSE Maths F 9-1 Textbook: Ch8
• Purposeful Practice Book Ch8H
• Edexcel Higher Linear Course Text Book Ch14
• Common misconception information

Transformation workbook – Maths4everyone.com

Year 10 Term 6 Knowledge Organiser for key terms, recall and low stakes quizzing. | |

		8c. Translations and combinations	Recognise and describe single translations using column vectors on a coordinate grid; Translate a given shape by a vector; Understand the effect of one translation followed by another, in terms of column vectors (to introduce vectors in a concrete way); Distinguish properties that are preserved under particular transformations; Use congruence to show that translations, rotations and reflections preserve length and angle, so that any figure is congruent to its image under any of these transformations; Describe and transform 2D shapes using combined rotations, reflections, translations, or enlargements; Describe the changes and invariance achieved by combinations of rotations, reflections and translations.		Mathsbox > Topic resources > 4 Questions / Exit tickets		
R2, G1, G2, G3, G12, G13, G15, G19	How do we describe and draw 3D solids?	8d. 3D solids	Know the terms face, edge and vertex; Identify and sketch planes of symmetry of 3D solids; Understand and draw front and side elevations and plans of shapes made from simple solids; Given the front and side elevations and the plan of a solid, draw a sketch of the 3D solid. Use isometric grids to draw 2D representations of 3D solids;		Pupils are expected to complete purposeful exercises and repeated practice on: • 3D solid properties • Plans and Elevations	• Pearson's GCSE Maths F 9-1 Textbook: Ch8 • Purposeful Practice Book Ch8H • Edexcel Higher Linear Course Text Book Ch22 • Common misconception information Year 10 Term 6 Knowledge Organiser for key terms, recall and low stakes quizzing.	**Gatsby Benchmarks: Careers** Use real-life contexts wherever possible to help students to engage and relate learning to everyday and working life. E.g. Armed forces, Aeronautical planning. Maths, Why Bother? | MYPATH Careers Resources (mypathcareersuk.com)
R2, G1, G2, G3, G12, G13, G15, G19	How do we use mathematical tools to draw accurately?	8e. Bearings and scale drawings	Use and interpret maps and scale drawings, using a variety of scales and units; Read and construct scale drawings, drawing lines and shapes to scale; Estimate lengths using a scale diagram; Understand, draw and measure bearings;		Pupils are expected to complete purposeful exercises and repeated practice on: • Scale drawings • Constructions with accuracy • Drawing triangles • Drawing loci	• Pearson's GCSE Maths F 9-1 Textbook: Ch8 • Purposeful Practice Book Ch8H • Edexcel Higher Linear Course Text Book Ch27 • Common misconception information	

		8f.Constructions and loci	Calculate bearings and solve bearings problems, including on scaled maps, and find/mark and measure bearings **Bearings will be relevant to the Advanced Trigonometry Chapter at the start of year 11.** **The Abbey Lens:** **Geography – Locations (Cities, Landmarks etc.)** Use the standard ruler and compass constructions: • bisect a given angle; • construct a perpendicular to a given line from/at a given point; • construct angles of 90°, 45°; • perpendicular bisector of a line segment; • a region bounded by a circle and an intersecting line; • a given distance from a point and a given distance from a line; • equal distances from two points or two line segments; • regions which may be defined by 'nearer to' or 'greater than'; Find and describe regions satisfying a combination of loci, including in3D; Use constructions to solve loci problems including with bearings; Know that the perpendicular distance from a point to a line is the shortest distance to the line.		• Region identification • Drawing and reading bearings Practical problems involving loci descriptions. Multistep problems in a range of scenarios with reasoning, where necessary. Plenary style questions – White Rose Maths - Assessment Papers https://www.missbsresources.com/ > Geometry> skills review Mathsbox > Topic resources > 4 Questions / Exit tickets	Construct a scenario - Teachit Maths Bearings Challenges - solvemymaths.com Find the Treasure - MathsPad Angle properties and bearings - pas1001 on TES Year 10 Term 6 Knowledge Organiser for key terms, recall and low stakes quizzing.	**Gatsby Benchmarks: Careers** Use real-life contexts wherever possible to help students to engage and relate learning to everyday and working life. E.g. Town and city planning, Architecture design, Maths, Why Bother? | MYPATH Careers Resources (mypathcareersuk.com)
		Knowledge Recall	Big Questions of the unit are reviewed, and key areas revisited. Planned consolidation. Worded problems should be used, as well as exam style questions from the board. Further examples could include, but should not be limited to: Large variety of transformation for practice – drawing and describing. Resultant transformations from a combination of others. Bearings with Pythagoras / Trigonometry calculations. Relate loci problems to real-life scenarios, including mobile phone masts and coverage. Large variety of loci scenarios for practice.			Knowledge Recall Lesson – Unit 8H – Shared area. Pearson's GCSE Maths H 9-1 Textbook: Problem solving, Check Up, Strengthen and Extend questions.	
		Knowledge Quiz	Knowledge Quiz and self-assessment.		Ch8H Knowledge Quiz – Shared area.	Knowledge Quiz and self-assessment.	
Assessments for the year group will take place in Week 3 of each term, followed by feedback and focussed Pupil Improvement Time.						

Use of Big Questions and Lesson Questions

Please refer to the department document on using Big Questions as part of The Abbey Lesson – "What does an Abbey Lesson look like in Maths?".

Big Questions are designed to build upon pupils' prior knowledge and link topics across KS2, 3 and 4. Big Questions will connect a series of learning outcomes, as opposed to focussing on individual objectives. All students, regardless of ability will be exposed to the same knowledge within reason, but able to explore Mathematical concepts to varying depths and wider applications. The spectrum of the Big Question focus allows for this to happen. This is where Lesson Questions are used to tailor the approach, level of detail and depth of knowledge to suit the ability, attainment, and confidence of individual classes.

Common Misconceptions Notes

Ch7H
Students often get the concepts of area and perimeter confused.
Shapes involving missing lengths of sides often result in incorrect answers.
Diameter and radius are often confused, and recollection of area and circumference of circles involves incorrect radius or diameter.
Students often get the concepts of surface area and volume confused.
Students readily accept the rounding for lower bounds, but take some convincing in relation to upper bounds.

Ch9H
Using the formula involving negatives can result in incorrect answers.
If students are using calculators for the quadratic formula, they can come to rely on them and miss the fact that some solutions can be left in surd form.
When solving inequalities students often state their final answer as a number quantity, and exclude the inequality or change it to =.
Some students believe that –6 is greater than –3

Ch10H
Probability without replacement is best illustrated visually and by initially working out probability 'with' replacement.
Not using fractions or decimals when working with probability trees.

Ch12H
Students commonly use the same scale factor for length, area and volume.

Ch11H
Recall of basic formula can be poor – use of formulae triangles can help.
Students needs to be reminded of the importance of not rounding until the end of the calculation if doing in stages

Ch14H
Labelling axes incorrectly in terms of the scales, and also using 'Frequency' instead of 'Frequency Density' or 'Cumulative Frequency'.
Students often confuse the methods involved with cumulative frequency, estimating the mean and histograms when dealing with data tables.
Often not aware of what a census is: the whole population (the UK census takes place every 10 years in a year ending with a 1 – the next one is due in 2021).
Specifying the problem and planning for data collection is not included in the programme of study, but is a prerequisite to understanding the context of the topic.
Writing a questionnaire is also not included in the programme of study, but remains a good topic for demonstrating bias and ways to reduce bias in terms of timing, location and question types.

Ch8H

Students often use the term 'transformation' when describing transformations instead of the required information.

Correct use of a protractor may be an issue.

Lines parallel to the coordinate axes often get confused

GCSE – Command Words

Please note that this table is not exhaustive but uses the most commonly used command words. These should be highlighted, explained and demonstrated when giving out problem solving work and GCSE questions.

Command word	Comments
Write down... Write...	No working will be needed
Find...	Some working will be needed but will be minimal
Work out...	Used interchangeably with 'calculate', it will be necessary to do some working out
Calculate...	Used interchangeably with 'work out' but use of 'calculate' suggests that a calculator will be needed, it will be necessary to do some workings.
Explain...	Explanation needed – may be a sentence or could be a mathematical statement
Give a reason...	Clear reasons needed; if geometrical reasons then must link into working
Draw...	Implies accuracy is important
Sketch...	Less formal than 'draw'...(no accurate measurements needed)
Complete...	Usually means that some values need filling in, for example, on a probability tree diagram or a table of values
Show...	All working needed to get to the required answer must be shown
Prove...	More formal than 'show', all steps must be present and, in the case of a geometrical proof, reasons must be given
Prove algebraically...	Algebra must be used in the proof
Describe...	Words needed to describe, for example, a transformation
Justify...	Show all working or give a written explanation
Expand...	Remove brackets
Expand and simplify...	Remove brackets and simplify
Factorise...	Straight forward factorisation
Factorise fully...	More complex factorisation, more than one factor to consider
Simplify...	Simplify the given expression
Simplify fully....	Likely to be more than one stage needed to simplify expression
Solve...	Solve an equation / inequality

General Resources Bank

Teachers will select the resources required for individual lessons. These will be fit for purpose for their class in order to promote the best progress and understanding for individual objectives, whilst still working towards the Big Question.

A **sample** list of resource materials is given as a starting point or for new ideas and are used by the department:

- Pearson's Edexcel 9-1 Textbook Series 1 and 2 - ActiveLearn (pearsonactivelearn.com)
- Pearson's Purposeful Practice book - ActiveLearn (pearsonactivelearn.com)
- MathsBox - Mathsbox

- o A wide-ranging selection of mixed quizzes, repeated practice and differentiated questions for use in the classroom, including short term cover work.
- MathsBot - MathsBot.com - Tools for Maths Teachers
  - o Interactive tools and activites to aid the teaching of mathematics. Hundreds of randomly generated questions and answers and Mathematics Manipulatives for mastery.
- Corbett maths Corbettmaths – Videos, worksheets, 5-a-day and much more
  - o Video tutorials, questions, revision resources and puzzles.
- Maths 4 Everyone - Maths Worksheets [Primary and Secondary] (maths4everyone.com)
  - o Carefully thought-out questions that are designed for the different stages of learning a topic. Typically, there is one sheet that focuses on the First Steps, and then other sheets that contain questions which help students to Strengthen and then Extend their understanding.
- Go Teach Maths - Go Teach Maths: 1000s of free resources
  - o Animated PowerPoint slides to demonstrate a mathematical method within lessons and supporting activities with an individual or paired consolidation focus.
- Maths Genie –   Maths Genie • Learn GCSE Maths for Free
  - o GCSE revision videos, exam style questions and solutions.
- Oak Academy - Oak National Academy (thenational.academy)
  - o Online lessons and resources to support independent study – particularly useful for students who are having to spend significant amounts of time outside of the classroom.
- Mr Barton – Variation Theory - Variation Theory
  - o A collection of high-quality, sequences of questions and examples using key principles from Variation Theory. Holds questions and examples constant, together with the mathematical behaviour of *reflect, expect, check, explain*.
- Dr Frost Maths - DrFrostMaths.com
  - o A diverse set of free teaching resources and tools including downloadable teaching slides/worksheets for KS3-5, teaching videos and an online platform for whiteboard practice and exam questions.
- Edexcel Exam Wizard- ExamWizard :: Index
  - o ExamWizard is a free exam preparation tool containing a bank of past Edexcel exam questions, mark schemes and examiners' reports for a range of GCSE subjects.

- Additional Maths Blogs and other online resources include:
  - Solvemymaths
  - Resouraholic
  - Colleenyoung.wordpress
  - missquinnmaths.wordpress
  - Just Maths
  - Mathed Up
  - Miss B resources

Boss Maths
SavemyExams
Nrich
Pret Homework
BBC Bitesize
GCSE POD

Assessments/ Quizzes / Walking Talking Mocks / Pre-Public Examinations

Through the GCSE syllabus, pupils are assessed regularly to monitor progress, understanding and make predictions.

- **Formal Graded Assessments**

Formal assessments will occur once a term, during week 3 for monitoring purposes and formal feedback. It will be a mixed topic assessment to mimic the mixed topics they will need to answer for their end of year and public examinations. It is to support a more active attitude to revision in small, manageable tasks, as well as allowing students to revisit topics in a formal setting and identify gaps in knowledge.

- **Topic Quizzes**

Other assessment will be end of unit quizzes to assess recent learning and conducted when learning of that sequence is concluded.

For an improved response to revision and independent study, students are expected to undertake guided revision tasks through the year before assessments as part of their homework.   Staff will support students with effective techniques and resources offered where required.   These revision homework tasks will consist of:
- *Directions to important online videos and tasks to consolidate knowledge or expose students to a higher-level task or topic.*
- *Pre-prepared practice questions on the relevant topics, such as the Active Learn assessment materials and Hegarty Maths.*
- *GCSEPOD with videos and related questions.*

- **Walking, Talking Mocks**

Year 11 will have a Walking Talking Mock as a method of revisiting public exam formats and good exam technique. During the WTM, the teacher will model an approach to questions on an examination paper and guide students to complete it, with a large focus on areas that students struggle with and/or do not perform their best.   Dates TBC following the publication of the exam schedule.

- **End of Year Assessments**

GCSE Public Examinations – dates to follow.

Consolidation and Review Activities

As part of each chapter of work, the students will need to undertake consolidation and review activities of their learning before moving on to new topics. This will be done as a Knowledge Recall activity.

This should consist of the following:
   a.   Revisiting the Big Questions, answered with new knowledge and connections reinforced. The focus here is on questioning of students and consolidation the sequences of lessons from the chapter.

   b.   Problem solving / literacy based questions with emphasis placed on highlighting key words and data, before undertaking problems as a sequence of steps. This is only if appropriate for the topic and required as additional work to lesson content.
   c.   Depending out the outcome of the Knowledge Recall, students can be directed on to either the strengthen exercise for any gaps in understanding or the extension activity work.
A topic quiz will then be set to assess understanding.

Starter activities should include topics identified in PIT from earlier assessments, as well as a constant revision of previous topics for assessment for learning.

Homework

Mathematics homework is designed and set to promote students' understanding and their ability to use mathematics in a variety of situations.

Homework should be set once per week and consist of:

- Online homework through Hegarty Maths *Trial beginning in September 2021.
- Preparation and Revision for assessments and quizzes, with particular reference to the Knowledge Organisers.
- Written homework when the teacher feels it is necessary or beneficial
- Past paper practice
- Research or Investigative Tasks.

It is expected that KS4 students will undertake a minimum of 45 minutes homework per week.

All students are given individual logins to a variety of virtual learning environments, which give them access to video tutorials, practice questions and answers. The main programmes being used are: Hegarty Maths, GCSE POD, Active Learn

For the majority of the time, homework will support in-class learning and reinforce topics that students have studied recently within the classroom.

If students fail to complete homework, staff will follow procedures outlined in the Behaviour Policy.

SMSC/ ICT/ Cross Curricular Connections

The programme of study is designed to encourage the development of wider problem solving as the mathematical knowledge of the student advances. Students must look for action points and next steps that are not explicit, in order to solve increasingly complex problems.

 Lessons should :

- Value listening and respecting the viewpoint of others in problem solving.
- Promote the discussion of mathematical understanding and challenge assumption.
- Support students to question information and data that they are presented with.
- Discourage jumping to conclusions.
- Seek opportunities to build self-confidence.
- Include questions chosen based on prior lack of confidence,
- Encourage collaborative learning in the classroom – in the form of listening and learning from each other and paired discussion.
- Develop powers of logic, reasoning and explanation.
- Build competence – every student is good at something, and students struggle when connections between their strengths are not obvious or of a clear use.
- Allow choices to promote self-determination, and deal with the consequences, however minor. Giving authentic (not false) choices doesn't have to be complex—for example, choices around how to complete a multi-step problem.

Staff will seek out opportunities to encourage these values within individual lessons.

Staff should also seek out opportunities to link learning to other subjects as part of the ongoing cross -curricular cohesion project. This is ongoing but some existing links are referred to in this document as examples. (The Abbey Lens)