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| **Year 10 Curriculum Map : Mathematics** |
|  | **Autumn** | **Spring** | **Summer** |
| **Assessment Objectives** | **AO1** Use and apply standard techniques (Foundation 50%, Higher 40%)**AO2** Reason, interpret and communicate mathematically (Foundation 25%, Higher 30%)**AO3** Solve problems within mathematics and in other contexts (Foundation 25%, Higher30%) |
| **Unit Length** | **Foundation Unit 9** - Graphs: 3 weeks**Unit 10** – Transformations: 3 weeks**Unit 11 –** Ratio and proportion: 3 weeks**HigherUnit 9** – Equations and inequalities –2 weeks**Unit 10** – Probability:– 2weeks**Unit 11** – Multiplicative reasoning – 2 weeks | **FoundationUnit 12** – right-angled triangles –4 weeks**Unit 13** – probability – 2 weeks**Unit 14** – Multiplicative reasoning – 2 weeks**HigherUnit 12** – Similarly and congruence:–2 weeks**Unit 13** – More trigonometry – 3-4 weeks**Unit 14** – Further statistics – 2 weeks | **FoundationUnit 15** – constructions, Loci and Bearings –3 weeks**Unit 16** – Quadratic Equations and Graphs – 2 weeks**Unit 17** – Perimeter, area and volume 3– 4 weeks**HigherUnit 15** – Equations and graphs –4 weeks**Unit 16** – Circle theorems – 4 weeks**Unit 17** – More algebra – 2 weeks |
| **Key Learning Outcomes** | **FoundationUnit 9 - Graphs:**  students will study finding the midpoint of a line segment, ● Recognise, name and plot the graphs of y = x and y = –x, ●Plot straight-line graphs from tables of values, ●Draw graphs to represent relationships, ●Find the gradient of a line. ●Understand that parallel lines have the same gradient. ● Understand what m and c represent in y = mx + c, ● Find the equations of straight-line graphs.Intentional monitoring**Unit 10 – Transformations:** students will study to translate a shape on a coordinate grid, ● Use a column vector to describe a translation, ●Draw reflections on a coordinate grid, ● Describe reflections on a coordinate grid, ● Rotate a shape on a coordinate grid, ●Describe a rotation, ●Enlarge a shape by a scale factor, ● Enlarge a shape using a centre of enlargement, ● ●Identify the scale factor of an enlargement, ●Find the centre of enlargement, ● Describe an enlargement.Intentional monitoring**Unit 11 – Ratio and proportion:**  students will study to use ratio notation, ● solve problems using ratios, ●Use ratios to convert between units, write and use ratios for shapes and their enlargements, ● Divide a quantity into a given ratio, ● Use ratios involving decimals, ●Compare ratios, ●Solve ratio and proportion problems, ●Use the unitary method to solve proportion problems, ●solve proportion problems in words, ● work out which product is better value for money. ●Recognise and use direct proportion on a graph, ● understand the link between the unit ratio and the gradient, ● solve word problems involving direct and inverse proportion.Progress assessment, feedback, reteach and DIRT.  | **Foundation****Unit 12 – Right-angled triangles:** students will study calculating the length in a right-angled triangle, ●solve problems using Pythagoras’ theorem. ● use the sine, cosine and tangent ratios to calculate the length of a side in a right-angled triangle ● use the sine, cosine and tangent ratios to calculate an angle in a right-angled triangle, ● use the trigonometry ratio to solve problems. Intentional monitoring **Unit 13 – Probability:** students will study calculating simple probabilities from equally likely events. ●Understand mutually exclusive and exhaustive outcomes. ●Use two-way tables to record the outcomes from two events. ●Work out probabilities from sample space diagrams. ●Use Venn diagrams to work out probabilities. ●Understand the language of sets and Venn diagrams. Use frequency trees and tree diagrams. ●Work out probabilities using tree diagrams. ●Understand independent events. ●Solve probability problems involving events that are not independent.**Unit 14 – Multiplicative reasoning:**  students will study calculating a percentage profit or loss. ●Express a given number as a percentage of another in more complex situations. ●Find the original amount given the final amount after a percentage increase or decrease. ●Find an amount after repeated percentage change, ● solve growth and decay problems. ●Solve problems involving compound measures. ●Convert between metric speed measures. ●Calculate average speed, distance and time. ●Use formulae to calculate speed and acceleration. Progress assessment, feedback, reteach and DIRT.  | **Foundation****Unit 15 - Constructions, loci and bearings:** students will study recognising 3D shapes and their properties. ●Describe 3D shapes using the correct mathematical words. ● Understand and draw plans and elevations of 3D shapes. ● Make accurate drawings of triangles using a ruler, protractor and compasses.● Identify SSS, ASA, SAS and RHS triangles as unique from a given description.● Identify congruent triangles. ●Accurately draw angles and 2D shapes using a ruler, protractor and compasses.● Construct a polygon inside a circle.● Recognise nets and make accurate drawings of nets of common 3D objects.● Bisect angles and lines using rulers and compasses. ● Draw loci for the path of points that follow a given rule.● Identify regions bounded by loci to solve practical problems. ●Find and use three-figure bearings. ● Solve problems involving bearings and scale diagrams.Intentional monitoring**Unit 16 – Quadratic equations and graphs:** students will study to multiply double brackets.● Recognise quadratic expressions.● Square single brackets. ● Plot graphs of quadratic functions.● Recognise a quadratic function. ● Use quadratic graphs to solve problems. ● Solve quadratic equations ax2 + bx + c = 0 using a graph.● Solve quadratic equations ax2 + bx + c = k ● Using a graph. ● Factorise quadratic expressions. ● Solve quadratic functions algebraically.Intentional monitoring**Unit 17 – Perimeter, area and volume 2:**  students will study calculating the circumference of a circle. ● Solve problems involving the circumference of a circle. ● Work out the area of a circle.● Work out the radius or diameter of circle.● Solve problems involving the area of a circle.● Give answers in terms of π. ● Work out areas of semicircles and quarter circle and perimeters. ● Work out the volume and surface area of cylinders. ● Work out the volume and surface area of a pyramid, cone and sphere.Progress assessment, feedback, reteach and DIRT.  |
| **Prior knowledge** | "AO3: demonstrate knowledge, understanding and skills in handlingdata:• statistics• probability.""AO3: demonstrate knowledge, understanding and skills in handlingdata:• statistics• probability.""AO1: demonstrate knowledge, understanding and skills in number and algebra: • numbers and the numbering system• calculations • solving numerical problems • equations, formulae and identities • sequences, functions and graphs.""AO1: demonstrate knowledge, understanding and skills in number and algebra: • numbers and the numbering system• calculations • solving numerical problems • equations, formulae and identities • sequences, functions and graphs.""AO2: demonstrate knowledge, understanding and skills in shape,space and measures:• geometry• vectors and transformation geometry. 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| **CEIAG** **Specific careers links** | The specific value of maths as a required or preferred subject for particular careers, e.g.: * Engineers and engineering technicians
* Surveyors and surveying technicians
* Systems analysts
* Actuaries
* Accountants
* Operational researchers
* Chemists
* Software engineers
* Statisticians
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| **RRSA** | Article 2 – Non discriminationArticle 12 – Respect for the views of the childArticle 13 – Freedom of expressionArticle 14 – Freedom of thought, belief and religionArticle 15 – Freedom of associationArticle 16 – Right to privacyArticle 23 – Right to a full life if child with disabilityArticle 28 – Right to educationArticle 29 – Goals of educationArticle 42 – Knowledge of rights | Article 2 – Non discriminationArticle 12 – Respect for the views of the childArticle 13 – Freedom of expressionArticle 14 – Freedom of thought, belief and religionArticle 15 – Freedom of associationArticle 16 – Right to privacyArticle 23 – Right to a full life if child with disabilityArticle 28 – Right to educationArticle 29 – Goals of educationArticle 42 – Knowledge of rights | Article 2 – Non discriminationArticle 12 – Respect for the views of the childArticle 13 – Freedom of expressionArticle 14 – Freedom of thought, belief and religionArticle 15 – Freedom of associationArticle 16 – Right to privacyArticle 23 – Right to a full life if child with disabilityArticle 28 – Right to educationArticle 29 – Goals of educationArticle 42 – Knowledge of rights |
| **Cross curricular links** | Art & Design and Maths* Symmetrical art can be analysed and the number of lines of symmetry can be found. Also, the order of rotational symmetry can be studied.
* Ratio is used to mix paints. For example, to make purple, you mix 3 parts red to 7 parts blue.
* You could also explore the [Art through mathematics](https://www.ncetm.org.uk/resources/38454) section on the NCETM website.

English and Maths* Spelling mathematical vocabulary correctly and using it in the correct context.
* Mastery of maths is advanced by children being able to explain their mathematical thinking to others and to justify methods and conclusions.
* English skills can be used to clearly interpret and discuss results you get from collecting data in maths lessons.
* Solving comprehension questions from [maths comprehension cards](https://www.learningresources.co.uk/category/products/maths-comprehension-cards.do).

Design & Technology and Maths* Reading Scales.
* Measuring ingredients and working out proportions.
* Using ratios in recipes.

Geography and Maths* Collecting and representing data from field trips or for weather investigations.
* Grid references and coordinates.
* Using scales on Ordnance Survey maps to establish the correct distance between two points.

Computing and Maths* Angles and direction which can be drawn and measured using floor robots and apps too.
* Information can be represented in Excel and calculations using formula can be done on the data here too.
* Logic is used in programming as is problem solving.

Foreign Languages and Maths* Numbers can be used to do sums or times tables in French.
* Asking what time it is in another language.

Music and Maths* Time and speed can be represented by tempo which is the number of beats per minute (BPM).
* Equivalent fractions can be shown using musical notation where a different type of note is worth a different fraction of a whole beat.

History and Maths* Historical timelines can be used as a basis for finding the difference in dates.
* Historical dates can also be utilised for sequencing events.

Physical Education and Maths* Time, distance and speed of races can be incorporated into Maths sessions to enable children
* Averages (Mean, Mode and Median) can be used to assess and athlete’s performance.
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| **Useful websites/videos** | <https://www.bbc.co.uk/bitesize/subjects/zqhs34j><https://hegartymaths.com/><https://corbettmaths.com/> |
| **Wider Reading** | * Research the history of algebra. Where did the word algebra derive from? Which civilizations introduced algebra? Who were the early pioneers?
* Investigate Egyptian fractions. What are they? How did they work? Are they still used anywhere today? What are the benefits and drawbacks of Egyptian fractions?
* Investigate misleading graphs. Where can they be seen? Why would the media use misleading charts or graphs?
* Research Greek Mathematician Pythagoras of Samos. Investigate some careers where Pythagoras and trigonometry skills could be required.
* Investigate where averages are used in everyday life. What jobs might require you to work with averages.
* Investigate quadratic graphs. What do they look like? Where might quadratic graphs be used in real life?
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| **Literacy Programme** | * Decode it NOW
* Guided practice/model answers
* Sentence Starters
* Writing strategies
 | * Decode it NOW
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* Sentence Starters
* Writing strategies
 | * Decode it NOW
* Guided practice/model answers
* Sentence Starters
* Writing strategies
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| **Independent Learning Tasks** | Hegarty maths tasksKnowledge organisers  | Hegarty maths tasks Knowledge organisers | Hegarty maths tasksKnowledge organisers  |