Curriculum Map **Subject:** **Further Maths** **Year Group: 13**

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Content- WHAT will be learned? What previous learning can be linked? Why this order/**sequence**? **We sequence our curriculum in this order to reduce cognitive load by drawing on prior knowledge and logically plan episodes of learning so that they accumulate in small stages, securing understanding at one stage before moving on to the next.** **Skills are revisited as via interleaved starters and retrieval practise throughout the year.** **Knowledge of course content is covered during early stages of the curriculum and then built upon at spaced intervals allowing skills to be improved upon over time.**	**Core Pure** **Complex Numbers** • Exponential form of complex numbers • Multiplying and dividing complex numbers • De Moivre's theorem • Trigonometric identities • Sums of series • nth roots of a complex number • solving geometric problems **Series** • The method of two differences • Higher derivatives • Maclaurin series • Series expansions of compound functions **Decision** **Linear programming** • Linear programming problems • Graphical methods • Locating the optimal point • Solutions with integer values **Mechanics** **Momentum and Pulse** • Momentum in one direction • Conservation of momentum Momentum of a vector	**Core Pure** **Methods in Claculus** • Improper integrals • The mean value of a function • Differentiating inverse trigonometric functions • Integrating with inverse trigonometric functions • Integrating using partial fractions **Volumes of Revolution** • Volumes of revolution around the x-axis • Volumes of revolution around the y-axis • Volumes of revolution of parametrically defined curves • Modelling with volumes of revolution **Decision** **The Simplex algorithm** • Formulating linear programming problems • The simplex method • Problems requiring integer solutions **Mechanics** **Work Energy and Power** • Work done • Kinetic and potential energy • Conservation of mechanical energy and the work-energy principle • power	**Core Pure** **Polar Coordinates** • Polar coordinates and equations • Sketching curves • Area enclosed by a polar curve • Tangents to polar curves **Hyperbolic Functions** • Introduction to hyperbolic functions • Inverse hyperbolic functions • Identities and equations • Differentiating hyperbolic functions • Integrating hyperbolic functions **Decision** **The Simplex algorithm** • Two stage simplex method • The Big-M method **Mechanics** **Elastic Strings and Springs** • Hooke's law and equilibrium problems • Hooke's law and dynamics problems • Elastic energy Problems involving elastic energy	**Core Pure** **Methods in Differential equations** • First-order differential equations • Second-order homogeneous differential equations • Second-order non-homogeneous differential equations • Using boundary conditions **Decision** **Critical Path Analysis** • Modelling a project • Dummy activities • Early and late event times • Critical activities **Mechanics** **Elastic Collisions in one Dimension** • Direct impact and Newton's law of restitution • Direct collision with a smooth plane • Loss of kinetic energy Successive direct impacts	**Core Pure** **Modelling with Differential Equations** • Modelling with first-order differential equations • Simple harmonic motion • Damped and forced harmonic motion • Coupled first-order simultaneous differential equations **Decision** **Critical Path Analysis** • The float of an activity • Gantt charts • Resource histograms • Scheduling diagrams **Mechanics** **Elastic collisions in two dimensions** • Oblique impact with a fixed surface • Successive oblique impacts • Oblique impact of smooth spheres	**Core Pure** **Exam Preparation** • Practice Exam papers • Past Questions • Exam Technique • Examiners Reports • Use of Mark Schemes **Decision** **Exam Preparation** • Practice Exam papers • Past Questions • Exam Technique • Examiners Reports • Use of Mark Schemes **Mechanics** **Exam Preparation** • Practice Exam papers • Past Questions • Exam Technique • Examiners Reports • Use of Mark Schemes
Skills- What will be developed?	Learners develop their mathematical fluency in a range of areas through a concrete, pictorial and abstract (CPA) approach. Learners apply their understanding to be able to	Learners develop their mathematical fluency in a range of areas through a concrete, pictorial and abstract (CPA) approach. Learners apply their understanding to be able to	Learners develop their mathematical fluency in a range of areas through a concrete, pictorial and abstract (CPA) approach. Learners apply their understanding to be able to	Learners develop their mathematical fluency in a range of areas through a concrete, pictorial and abstract (CPA) approach. Learners apply their understanding to be able to	Learners develop their mathematical fluency in a range of areas through a concrete, pictorial and abstract (CPA) approach. Learners apply their understanding to be able to	Learners develop their mathematical fluency in a range of areas through a concrete, pictorial and abstract (CPA) approach. Learners apply their understanding to be able to

	solve problems in a range of different contexts. Learners explain their reasoning when identifying solutions to problems and when responding to mathematical statements.	solve problems in a range of different contexts. Learners explain their reasoning when identifying solutions to problems and when responding to mathematical statements.	solve problems in a range of different contexts. Learners explain their reasoning when identifying solutions to problems and when responding to mathematical statements.	solve problems in a range of different contexts. Learners explain their reasoning when identifying solutions to problems and when responding to mathematical statements.	solve problems in a range of different contexts. Learners explain their reasoning when identifying solutions to problems and when responding to mathematical statements.	solve problems in a range of different contexts. Learners explain their reasoning when identifying solutions to problems and when responding to mathematical statements.
Key ‘How’/’Why’ Questions- What **powerful knowledge** will be gained? What areas/themes/concepts will be explored?	How to apply the content listed above in the real-world address why the skills are learned in school. Contextual questions related to the learning designed to embed the ideas to allow the concepts to be used later in the curriculum where they are built upon in other topics that rely of the fluency of these skills. All skills listed above are used later in the course, so it is essential to build solid foundations before moving on.	How to apply the content listed above in the real-world address why the skills are learned in school. Contextual questions related to the learning designed to embed the ideas to allow the concepts to be used later in the curriculum where they are built upon in other topics that rely of the fluency of these skills. All skills listed above are used later in the course, so it is essential to build solid foundations before moving on.	How to apply the content listed above in the real-world address why the skills are learned in school. Contextual questions related to the learning designed to embed the ideas to allow the concepts to be used later in the curriculum where they are built upon in other topics that rely of the fluency of these skills. All skills listed above are used later in the course, so it is essential to build solid foundations before moving on.	How to apply the content listed above in the real-world address why the skills are learned in school. Contextual questions related to the learning designed to embed the ideas to allow the concepts to be used later in the curriculum where they are built upon in other topics that rely of the fluency of these skills. All skills listed above are used later in the course, so it is essential to build solid foundations before moving on.	How to apply the content listed above in the real-world address why the skills are learned in school. Contextual questions related to the learning designed to embed the ideas to allow the concepts to be used later in the curriculum where they are built upon in other topics that rely of the fluency of these skills. All skills listed above are used later in the course, so it is essential to build solid foundations before moving on.	How to apply the content listed above in the real-world address why the skills are learned in school. Contextual questions related to the learning designed to embed the ideas to allow the concepts to be used later in the curriculum where they are built upon in other topics that rely of the fluency of these skills. All skills listed above are used later in the course, so it is essential to build solid foundations before moving on.
SEND- how will support be seen? Seating plans? Simplified questions?	• SEND and identified pupils placed strategically to ensure the best possible support. • Colour copies for all Irlen’s students • All SEND notes taken into consideration for the pupils that this affects. • Support given to pupils who struggle or have been identified as weaker in the groups. • Classrooms and boards uncluttered to ensure an optimal learning environment (only relevant information given)	• SEND and identified pupils placed strategically to ensure the best possible support. • Colour copies for all Irlen’s students • All SEND notes taken into consideration for the pupils that this affects. • Support given to pupils who struggle or have been identified as weaker in the groups. • Classrooms and boards uncluttered to ensure an optimal learning environment (only relevant information given)	• SEND and identified pupils placed strategically to ensure the best possible support. • Colour copies for all Irlen’s students • All SEND notes taken into consideration for the pupils that this affects. • Support given to pupils who struggle or have been identified as weaker in the groups. • Classrooms and boards uncluttered to ensure an optimal learning environment (only relevant information given)	• SEND and identified pupils placed strategically to ensure the best possible support. • Colour copies for all Irlen’s students • All SEND notes taken into consideration for the pupils that this affects. • Support given to pupils who struggle or have been identified as weaker in the groups. • Classrooms and boards uncluttered to ensure an optimal learning environment (only relevant information given)	• SEND and identified pupils placed strategically to ensure the best possible support. • Colour copies for all Irlen’s students • All SEND notes taken into consideration for the pupils that this affects. • Support given to pupils who struggle or have been identified as weaker in the groups. • Classrooms and boards uncluttered to ensure an optimal learning environment (only relevant information given)	• SEND and identified pupils placed strategically to ensure the best possible support. • Colour copies for all Irlen’s students • All SEND notes taken into consideration for the pupils that this affects. • Support given to pupils who struggle or have been identified as weaker in the groups. • Classrooms and boards uncluttered to ensure an optimal learning environment (only relevant information given)

Assessment- What? Why?	Gap task Pure Mini quizzes in lesson	Mechanics and Stats assessments Mini quizzes in lesson	Mock exam – Pure Mini quizzes in lesson	Stats assessment Mini quizzes in lesson	Mechanics assessment Mini quizzes in lesson	Mock exams – Pure and Applied Mini quizzes in lesson
What **memory for learning** skills will be required- modelling? Concrete answers? Retrieval?	Interleaved starters and retrieval practise, regular skills checks and mini assessments and model answers. Regular homework tasks to check understanding	Interleaved starters and retrieval practise, regular skills checks and mini assessments and model answers. Regular homework tasks to check understanding	Interleaved starters and retrieval practise, regular skills checks and mini assessments and model answers. Regular homework tasks to check understanding	Interleaved starters and retrieval practise, regular skills checks and mini assessments and model answers. Regular homework tasks to check understanding	Interleaved starters and retrieval practise, regular skills checks and mini assessments and model answers. Regular homework tasks to check understanding	Interleaved starters and retrieval practise, regular skills checks and mini assessments and model answers. Regular homework tasks to check understanding
Literacy- reading, extended accurate writing and oracy opportunities	Key words/terms emphasised and highlighted in lessons. Reading and breaking down questions to allow all learners to access the skills needed.	Key words/terms emphasised and highlighted in lessons. Reading and breaking down questions to allow all learners to access the skills needed.	Key words/terms emphasised and highlighted in lessons. Reading and breaking down questions to allow all learners to access the skills needed.	Key words/terms emphasised and highlighted in lessons. Reading and breaking down questions to allow all learners to access the skills needed.	Key words/terms emphasised and highlighted in lessons. Reading and breaking down questions to allow all learners to access the skills needed.	Key words/terms emphasised and highlighted in lessons. Reading and breaking down questions to allow all learners to access the skills needed.
Numeracy/computing skills	All topics require good numeracy skills	All topics require good numeracy skills	All topics require good numeracy skills	All topics require good numeracy skills	All topics require good numeracy skills	All topics require good numeracy skills
Character development	Cold calling ensures that all pupils are required to answer questions as there is a no opt out culture. Pupils with Anxiety around this are managed well and the teachers ensure that they are included but feel supported. Real life examples and experiences are called upon regularly.	Cold calling ensures that all pupils are required to answer questions as there is a no opt out culture. Pupils with Anxiety around this are managed well and the teachers ensure that they are included but feel supported. Real life examples and experiences are called upon regularly.	Cold calling ensures that all pupils are required to answer questions as there is a no opt out culture. Pupils with Anxiety around this are managed well and the teachers ensure that they are included but feel supported. Real life examples and experiences are called upon regularly.	Cold calling ensures that all pupils are required to answer questions as there is a no opt out culture. Pupils with Anxiety around this are managed well and the teachers ensure that they are included but feel supported. Real life examples and experiences are called upon regularly.	Cold calling ensures that all pupils are required to answer questions as there is a no opt out culture. Pupils with Anxiety around this are managed well and the teachers ensure that they are included but feel supported. Real life examples and experiences are called upon regularly.	Cold calling ensures that all pupils are required to answer questions as there is a no opt out culture. Pupils with Anxiety around this are managed well and the teachers ensure that they are included but feel supported. Real life examples and experiences are called upon regularly.
Equality/Diversity opportunities	Real world e.g’s used Super curriculum available for all learners. Where the curriculum lends itself, a range of diverse careers are incorporated into the real-life applications of the mathematics.	Real world e.g’s used Super curriculum available for all learners. Where the curriculum lends itself, a range of diverse careers are incorporated into the real-life applications of the mathematics.	Real world e.g’s used Super curriculum available for all learners. Where the curriculum lends itself, a range of diverse careers are incorporated into the real-life applications of the mathematics.	Real world e.g’s used Super curriculum available for all learners. Where the curriculum lends itself, a range of diverse careers are incorporated into the real-life applications of the mathematics.	Real world e.g’s used Super curriculum available for all learners. Where the curriculum lends itself, a range of diverse careers are incorporated into the real-life applications of the mathematics.	Real world e.g’s used Super curriculum available for all learners. Where the curriculum lends itself, a range of diverse careers are incorporated into the real-life applications of the mathematics.
Homework/Independent learning	Use of exam questions and Uplearn to embed the skills required	Use of exam questions and Uplearn to embed the skills required	Use of exam questions and Uplearn to embed the skills required	Use of exam questions and Uplearn to embed the skills required	Use of exam questions and Uplearn to embed the skills required	Use of exam questions and Uplearn to embed the skills required
CIAG coverage/links	Super curriculum activities in maths. Real life examples and uses for the topics where appropriate.	Super curriculum activities in maths. Real life examples and uses for the topics where appropriate.	Super curriculum activities in maths. Real life examples and uses for the topics where appropriate.	Super curriculum activities in maths. Real life examples and uses for the topics where appropriate.	Super curriculum activities in maths. Real life examples and uses for the topics where appropriate.	Super curriculum activities in maths. Real life examples and uses for the topics where appropriate.