Pope Francis
Catholic Multi Academy Trust

The Salesian Academy of
St. John
Bosco

Mathematics Curriculum Map

Vision Statement

At the Salesian Academy of St John Bosco, we believe mathematical success is possible for every child. We have high expectations for all our students to both enjoy and be successful in mathematics. It is our belief that mathematical ability is not innate, but rather, increased through effort and hard work. Using the Mathematics Mastery approach, we believe students can become confident, enthusiastic and inquisitive learners. We aim for all students to leave school as confident mathematicians with the skills to achieve their aspirations, with a large proportion of young adults continuing their study of mathematics and entering mathematical based jobs in later life.

We will deliver a curriculum that:

- Allows the student to learn new skills year on year and build on these skills as they progress through school
- Inspires learning through excellent teaching practices that build on prior learning and allow for repetition and progression of skills that build upon high starting points
- Builds on their high starting points and is aspirational throughout school
- Is inclusive and scaffolds learnings so that all our children can access learning and be suitably challenged
- Encourages our students to be self-motivated, independent and resilient by being fluent in the basic skills and developing skills that allow them to make mistakes and learn from them.
- Challenges the students to become excellent mathematicians that are fluent, accurate and confident when applying their skills to a range of contexts

Our commitment to Salesian values shapes also our approach to mathematics education in the following ways:

- Love and Care for Every Child
- Empowering Through Hard Work
- Community and Inclusivity
- Inspiration Through Teaching
- Aspirations and Service
- Confidence and Competence

Year 7 Curriculum INTENT
The Year 7 curriculum will consolidate and build on the key themes studied at KS2. Students will study all aspects of mathematics – Number, Algebra, Geometry and Data. Key concepts will be revisited through retrieval practice, and then developed at a level appropriate to the ability of each student. New learning will be carefully spaced and regular consolidation tasks will enable retention of key knowledge. Key skills will be developed with repeated practice and frequent problem solving activities requiring students to identify the skills needed to complete the task. Students will develop understanding of key concepts and will be given the opportunity to demonstrate this in a range of different contexts.

Year 7 Curriculum Map – Autumn			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Place value In this unit, students will explore integers up to one billion and decimals to hundredths, adapting these choices where appropriate for your groups e.g. standard index form could additionally be introduced to student	18	Recognise the place value of any number in an integer up to one billion Understand and write integers up to one billion in words and figures Work out intervals on a number line Position integers on a number line	• Consolidate their understanding of the number system and place value to include decimals

following the Higher strand. Using and understanding number lines is a key strategy explored in depth, and will be useful for later work on scales for axes. When putting numbers in order, this is a suitable point to introduce both the median and the range, separating them from other measures to avoid getting them mixed up. Rounding to the nearest given positive power of ten is developed, alongside rounding to one significant figure. Decimal places will come later, again to avoid too similar concepts being covered at the same time. Topics from last term such as sequences and equations, will be interleaved into this unit.		Round integers to the nearest power of ten Compare two numbers using =, ≠, <, >, ≤, ≥ Order a list of integers Find the range of a set of numbers Find the median of a set of numbers Understand place value for decimals Position decimals on a number line Compare and order any number up to one billion Round a number to 1 significant figure Write 10, 100, 1000 etc. as powers of ten Write positive integers in the form A x 10n Investigate negative powers of ten Write decimals in the form A x 10n	• understand and use place value for decimals, measures and integers of any size • order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, , ≤, ≥ • work interchangeably with terminating decimals and their corresponding fractions • round numbers to an appropriate degree of accuracy • describe, interpret and compare observed distributions of a single variable through: the median and the range • interpret and compare numbers in standard form
Problem solving with addition and subtraction The focus of these two weeks is building on the formal methods of addition and subtraction students have developed at Key Stage 2. All students will look at this in the context of interpreting and solving problems, for those whom these skills are secure, there will be even more emphasis on this. Problems will be drawn from the contexts of perimeter, money, interpreting bar charts and tables and looking at frequency trees; these are better studied alongside addition and subtraction rather than separately. Calculators should be used to check and/or support calculations, with significant figures explicitly revisited.	11	Properties of addition and subtraction Mental strategies for addition and subtractions Use formal methods for addition of integers Use formal methods for addition of decimals Use formal methods for subtraction of integers Use formal methods for subtraction of decimals Choose the most appropriate method: mental strategies, formal written of calculator (remove) Solve problems in the context of perimeter Solve problems involving money and timetables Solve problems with frequency trees Add and subtract numbers given in standard form (H)	Use formal written methods, applied to positive integers and decimals Recognise and use relationships between operations including inverse operations Derive and apply formulae to calculate and solve problems involving perimeter Construct and interpret appropriate tables, charts and diagrams, including frequency tables, bar charts and pictograms for categorical data, and vertical line or bar charts for ungrouped numerical data.

Multiplication and division Unit conversions is the main context as multiplication by 10, 100 and 1000 are explored. As well as distinguishing between multiples and factors, substitution and simplification can also be extended from Key Stage 2. Again the emphasis will be on solving problems, particularly involving area of common shapes and mean. Choosing the correct operation to solve a problem will also be a focus. There will be some exploration of the order of operations, which will be reinforced alongside much of this content next term when studying directed number.	15	Properties of multiplication and division Understand and use factors Understand and use multiples Multiply and divide integers and decimals by powers of 10 Multiply by 0.1 and 0.01 (H) Convert metric units Use formal methods to multiply integers Use formal methods to multiply decimals Use formal methods to divide integers Use formal methods to divide Decimals Understand and use order of operations Solve problems using the area of rectangles and parallelograms Solve problems using the area of triangles Solve problems using the area of trapezia (H) Solve problems using the mean Explore multiplication and division in algebraic expressions (H)	Use formal written methods, applied to positive integers and decimals Select and use appropriate calculation strategies to solve increasingly complex problems Recognise and use relationships between operations including inverse operations Use the concepts and vocabulary factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple. Change freely between related standard units (time, length, area, volume/capacity, mass) Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, and trapezia (H) Substitute numerical values into formulae and expressions, including scientific formulae Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) Describe, interpret and compare observed distributions of a single variable through the mean.

Developing number sense Students will review their mental strategies with a focus on using a known fact to find other facts. Strategies for simplifying complex calculations will also be explored. <u>Interleaving/Extension of previous work</u> • Order of operations	6	Know and use mental addition and subtraction strategies for integers Know and use mental multiplication and division strategies for integers Know and use mental arithmetic strategies for decimals Use factors to simplify calculations Use estimation as a method for checking mental calculations Use known number facts to derive other facts Know when to use a mental strategy, formal written method or a calculator	Consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions powers and roots Select and use appropriate calculation strategies to solve increasingly complex problems
Prime numbers and proof Factors and multiples will be revisited to introduce the concept of prime numbers, and the Higher strand will include Venn diagrams to solve more complex HCF and LCM problems. Odd, even, prime, square and triangular numbers will be used as the basis of forming and testing conjectures. The use of counterexamples will also be addressed. <u>Interleaving/Extension of previous work</u> Factors and multiples	9	Find and use multiples Identify factors of numbers Recognise and identify prime numbers Recognise square and triangular numbers Find common factors of a set of numbers including the HCF Find common multiples of a set of numbers including the LCM Write a number as a product of its prime factors Use a Venn diagram to calculate the HCF and LCM (H)	Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including product notation and the unique factorisation property Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 Make and test conjectures about patterns and relationships; look for proofs or counterexamples Begin to reason deductively in number and algebra

Year 7 Curriculum Map – Spring			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Fraction decimal and percentage equivalence		Represent tenths and hundredths as diagrams Represent tenths and hundredths on number lines	**Consolidate their understanding of the number system and place**

Building on earlier work on decimals, the key focus for this three weeks is for students to gain a deep understanding of the links between fractions, decimals and percentages so that they can convert fluently between those most commonly seen in real-life. The foundation strand will focus on multiples of one tenth and on quarter whilst the Higher strand will look at more complex conversions. Various forms of representation of any fraction will be studied, focusing on equivalence. The focus is very much on a secure understanding of the most common fractions under one, but fractions above one will be touched upon, particularly in the Higher strand.		Interchange between fractional and decimal number lines Convert between fractions and decimals – tenths and hundredths Convert between fractions and decimals – fifths and quarters Convert between fractions and decimals – eights and thousands (H) Understand the meaning of percentage using a hundred square Convert fluently between simple fractions, decimals and percentages Represent any fraction as a diagram Represent fractions on number lines Identify and use simple equivalent fractions Understand fractions as division Convert fluently between fractions, decimals and percentages Explore fractions above one, decimals and percentages (H)	value to include decimals and fractions Move freely between different numerical representations (for example, equivalent fractions, fractions and decimals) Extend their understanding of the number system; make connections between number relationships Express one quantity as a fraction of another, where the fraction is less than 1 and great than 1. Define percentage as 'number of parts per hundred', interpret percentages as a fraction or a decimal. Compare two quantities using percentages Work with percentages greater than 100%
Fractional thinking This block builds on the previous block. It will provide more experience of equivalence of fractions with any denominators, and introduce the addition and subtraction of fractions. Bar models and concrete representations will be used extensively to support this. Adding fractions with the same denominators will lead to further exploration of fractions greater than one, and for the Core strand adding and subtracting with different		Convert between mixed numbers and fractions Add and subtract unit fractions with the same denominator Add and subtract fractions with the same denominator Add and subtract fractions from integers expressing the answer as a single fraction Understand and use equivalent fractions Add and subtract fractions where denominators share a single common multiple Add and subtract fractions with any denominator Add and subtract improper fractions and mixed numbers Use equivalence to add and subtract decimals and fractions Add and subtract simple algebraic fractions (H)	Move freely between different numerical, graphical and diagrammatic representations (for example, equivalent fractions, fractions and decimals) Express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1 order positive and negative integers, decimals and fractions; use the number line as a model

denominators will be restricted to cases where one is a multiple of the other.			for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥ Select and use appropriate calculation strategies to solve increasingly complex problems use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 and 3/8)
The data handling cycle Much of the statistics content in Key Stage 3 is a continuation of that studied at primary school. A particular focus is using charts to compare different distributions. We also explore when graphs may be misleading, an important real-life consideration. Collection of data is also covered, including designing and criticising questionnaires. An extended project could be used so students become aware of the pitfalls and difficulties of data collection and interpretation as well as the procedural production of graphs and charts.		Set up a statistical enquiry Design and criticise questionnaires Draw and interpret pictograms, bar charts and vertical lines Draw and interpret multiple bar charts Use and interpret pie charts Draw and interpret line graphs Choose the most appropriate diagram for given set of data Read and interpret ungrouped frequency tables Find the range of a set of numbers Find the median of a set of numbers Compare distributions using charts Identify misleading graphs	describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data

Operations with directed number Students will only have had limited experience of directed number at primary school, so this block is designed to extend and deepen their understanding of this. Multiple representations and contexts will be used to enable students to appreciate the meaning behind operations with negative integers rather than relying on a series of potentially confusing "rules". <u>Interleaving/Extension of previous work</u> Use conventional notation for the priority of operations		Understand and use representations of directed numbers Order directed numbers using lines and appropriate symbols Perform calculations that cross zero Add directed numbers Subtract directed numbers Multiplication of directed numbers Multiplication and division of directed numbers Use a calculator for directed number calculations Evaluate algebraic expressions with directed number Use order of operations with directed numbers Roots of positive numbers (H) Explore higher powers and roots (H)	select and use appropriate calculation strategies to solve increasingly complex problems use the four operations, including formal written methods, applied to integers, both positive and negative recognise and use relationships between operations including inverse operations use square and square roots use a calculator and other technologies to calculate results accurately and then interpret them appropriately substitute numerical values into formulae and expressions, including scientific formulae understand and use the concepts and vocabulary of expressions, equations,

Year 7 Curriculum Map – Summer			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Sequences Rather than rushing to find the rules for the nth term, this week is spent exploring sequences in detail, using both diagrams and lists of numbers. Technology is used to produce graphs so students appreciate and		Describe and continue a sequence given diagrammatically Predict and check the next term(s) of a sequence Represent sequences in tabular and graphically forms Recognise the difference between linear and non-linear sequences Continue numerical linear sequences	Move freely between different numerical, algebraic, graphical and diagrammatic representations Make and test conjectures about patterns and relationships

use the words “linear” and non-linear” linking to the patterns they have spotted. Calculators are used throughout so number skills are not a barrier to finding the changes between terms and subsequent terms. Sequences are treated more formally later this unit.		Continue numerical non-linear sequences Explain the term-to-term rule of numerical sequences in words Find missing numbers within sequences (H)	Use a calculator and other technologies to calculate results accurately and then interpret them appropriately Generate terms of a sequence from a term-to-term rule Recognise arithmetic sequences Recognise geometric sequences and appreciate other sequences that arise.
Understand and use algebraic notation The focus of these three weeks is to develop a deep understanding of the basic algebraic forms, with more complex expressions being dealt with later. Function machines are used alongside bar models and letter notation, with time invested in single function machines and the links to inverse operations before moving on to series of two machines and substitution into abstract expressions. <u>Interleaving/Extension of previous work</u> Use directed number		Given a numerical input, find the output of a single function machine Using inverse operations to find the input given the output Use diagrams and letters to generalise number operations Use diagrams and letters with single function machines Find the function machine given a simple expressions Substitute values into a single expression Find numerical inputs and outputs for a series of two function machines Use diagrams and letters with a series of two function machines Find the function machines given a two-step expression Substitute values into two-step expressions Generate sequences given an algebraic rule Represent one and two step functions graphically	Move freely between different numerical, algebraic, graphical and diagrammatic representations Use algebra to generalise the structure of arithmetic, including to formulate mathematical relationship Recognise and use relationships between operations including inverse operations Model situations or procedures by translating them into algebraic expressions Substitute values in expressions, rearrange and simplify expressions Use and interpret algebraic notation, including: ab in place of $a \times b$ $3y$ in place of $y + y + y$ and $3 \times y$ a^2 in place of a × a, a^3 in place of a × a × a; a^2b in place of a × a × b

			$\frac{a}{b}$in place of a ÷ b Generate terms of a sequence from a term-to-term rule Produce graphs of linear functions of one variable.
Equality and equivalence In this section students are introduced to forming and solving one step linear equations, building on their study of inverse operations. The equations met will mainly require the use of a calculator, both to develop their skills and to ensure understanding of how to solve equations rather than spotting solutions. This work will be developed when two step equations are met throughout the course. The unit finishes within consideration and the difference between this and equality, illustrated through collecting like terms. <u>Interleaving/Extension of previous work</u> Use directed number		Understand the meaning of equality Understand and use fact families, numerically and algebraically Solve one step linear equations using +/- using inverse operations (2 lessons) Solve one step linear equations using ×/÷ using inverse operations (2 lessons) Understand the meaning of like and unlike terms Understand the meaning of equivalence Simplify algebraic expressions by collecting like terms, using the ≡ symbol	Use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships Simplify and manipulate algebraic expressions to maintain equivalence by collecting like terms Use approximation through rounding to estimate answers Use algebraic methods to solve linear equations in one variable
Measuring and using geometric notation Students will build on their KS2 skills using rulers, protractors and other measuring equipment to construct and measure increasingly complex diagrams using correct mathematical notation. This will include three letter notation for angles, the use of hatch marks to indicate equality and the use of arrows to indicate parallel lines. Pie charts will be revisited here to gain further practice at drawing and measuring angles. <u>Interleaving/Extension of previous work</u> Revisit four operations		Understand and use letter and labelling conventions including those for geometric figures Draw and measure line segments including geometric figures Understand angles as a measure or a turn Classify angles Measure angles up to 180° Draw angles up to 180° Draw and measure angles between 180° and 360° Identify perpendicular and parallel lines Recognise types of triangle Recognise types of quadrilateral Identify polygons up to a decagon	Use language and properties precisely to analyse 2-D shapes Begin to reason deductively in geometry including using geometrical constructions Draw and measure line segments and angles in geometric figures, including interpreting scale drawings Describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, right angles, regular polygons, and other polygons

Revisit pie charts			that are reflectively and rotationally symmetric Use the standard conventions for labelling sides and angles Construct and interpret pie charts for categorical, ungrouped and grouped numerical data Identify and construct triangles
Developing geometric reasoning This block covers basic geometric language, names and properties of types of triangles and quadrilaterals, and the names of other polygons. Angle rules will be introduced and used to form short chains of reasoning. The Higher strand will take this further, investigating and using parallel lines rules. Interleaving/Extension of previous work Forming and solving linear equations Revisiting addition and subtraction, including decimals.		Understand and use the sum of angles at a point Understand and use the sum of angles on a straight line Understand and use the equality of vertically opposite angles Know and apply the sum of angles in a quadrilateral Solve angle problems using properties of triangles and quadrilaterals Solve complex angle problems Find and use the angle sum of any polygon (H) Investigate angles in parallel lines (H) Understand and use parallel line angle rules (H) Use known facts to obtain simple proofs (H)	Use language and properties precisely to analyse 2-Shapes, Begin to reason deductively in geometry including using geometrical constructions Describe, sketch and draw using conventional terms and notations; points, lines parallel liknes, perpendicular lines, right angles, regualar polygons and other polygons that are reflectively and rotationally symmetric Use the standard conventions for labelling sides and angles Derive and illustrate properties of triangles, quadrilaterals, circles and other plane figures (for example, equal lengths and angles) using appropriate language and technologies Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles

			Apply angle facts, triangle similarity and properties of quadrilaterals to derive results about angles and sides, and use known results to obtain simple proofs Understand and use the relationship between parallel lines and alternate and corresponding angles (H) Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons (H)

Year 8 Curriculum INTENT
The Year 8 curriculum will consolidate and build on the key themes studied at KS2 and during Year 7. Students will study all aspects of mathematics – Number, Algebra, Geometry and Data. Key concepts will be revisited through retrieval practice, and then developed at a level appropriate to the ability of each students. New learning will be carefully spaced and regular consolidation tasks will enable retention of key knowledge. Key skills will be developed with repeated practice and frequent problem solving activities requiring students to identify the skills needed to complete the task. Students will develop understanding of key concepts and will be given the opportunity to demonstrate this in a range of different contexts.

Year 8 Curriculum Map – Autumn			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Multiplication and division of fractions Students will have had little experience of multiplying and dividing fractions in Year 6, here we seek to deepen understanding by looking at multiple representations to see what underpins the, often confusing, algorithms. Multiplication and division by both		Represent multiplication of fractions Multiply a fraction by an integer Find the product of a pair of unit fractions Find the product of a pair of any fractions Divide an integer by a fraction Divide a fraction by unit fraction Understand and use the reciprocal	Consolidate their numerical and mathematical capacity from key stage 2 and extend their understanding of the number system and place value to include decimals and fractions.

integers and fractions are covered, with an emphasis on the understanding of the reciprocal and its uses. Links between fractions and decimals are also revisited. Students following the Higher strand will also cover multiplying and dividing with mixed numbers and improper fractions.		Divide any pair of fractions Multiply and divide improper and mixed fractions (H) Multiply and divide algebraic fractions (H)	Select and use appropriate calculation strategies to solve increasingly complex problems Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.
Fractions and percentages This block focuses on the relationship between fractions and percentages, including decimal equivalents, and using these to work out percentage increase and decrease. Students also explore expressing one number as a fraction and percentage of another. Both calculator and non-calculator methods are developed throughout to support students to choose efficient methods. Financial maths I developed through the contexts of e.g. profit, loss and interest. The higher strand also looks at finding the original value given a percentage od after a percentage change		Find a fraction of a given amount Use a given fraction to find the whole and/or other fractions Convert fluently between key fractions, decimals and percentages (R) Calculate key fractions, decimals and percentages of an amount without a calculator (Mental methods) Calculate key fractions, decimals and percentages of an amount using calculator methods Convert between decimals and percentages greater than 100% Calculate percentage increase and decrease using a multiplier Express one number as a fraction or a percentage of another without a calculator Express one number as a fraction or a percentage of another using calculator methods Work with percentage change Choose appropriate methods to solve percentage problems Find the original amount given the percentage less than 100 % Find the original amount given the percentage greater than 100 % (H) Choose appropriate methods to solve complex percentage problems(H)	Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions. Work interchangeably with terminating decimals and their corresponding fractions Define percentage as 'number of parts per hundred' interpret percentages and percentage change as a fraction of decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%

		Recognise and solve percentage problems (Non-calculator) Recognise and solve percentage problems (calculator) Solve problems with repeated percentage change (H)	Interpret fractions and percentages as operators. Solve problems involving percentage change, including increase, decrease and original value problems and simple interest in financial mathematics.
Maths and money Students practice their number skills in various financial contexts in this block. The language of financial mathematics, already introduced in year 7, is further developed. Simple ideas of tax and wages are introduced, and the percentage studied in the last block are applied in various contexts including simple and compound interest.		Solve problems with bills and bank statements Calculate simple interest Calculate compound interest (H) Solve problems with Value added Tax Calculate wages and taxes Solve problems with exchange rates Solve unit pricing problems Calculate with money	Solve problems involving percentage change, including percentage increase, decrease and original value problems and simple interest in financial mathematics Select and use appropriate calculations strategies to solve increasingly complex problems Interpret when the structure of numerical problem requires additive, multiplicative or proportional reasoning. Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics.
Number Sense This block provides a timely opportunity to revisit a lot of basic skills in a wide variety of contexts. Estimation is a key focus and the use of mental strategies will therefore be embedded throughout. We will also use conversion of metric units to revisit multiplying and dividing by 10, 100 and 1000 in context. The higher strand will extend this		Round numbers to powers of 10, and 1 significant figure (R) Round numbers to a given number of decimal places Estimate the answer to a calculation Understand and use error interval notation (H) Calculate using the order of operations (R) Convert metric measures of length Convert metric units of weight and capacity Convert metric units of area (H) Convert metric units of Volume (H)	Use standard units of mass, length, time, money and other measures, including with decimal quantities Round numbers and measures to an appropriate degree of accuracy (for example, to a number of decimal places or significant figures)

to look at the conversion of area and volume units, as well as having as extra step on the use of error notation. We also look explicitly at solving problems using the time calendar as this area is sometimes neglected leaving gaps in student knowledge.		Solve problems involving time and the calendar	Use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation a<x≤b Use a calculator and other technologies to calculate results accurately and then interpret them appropriately.

Year 8 Curriculum Map – Spring			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Brackets, equations and inequalities Building on their understanding of equivalence from Year 7, students will explore expanding over a single bracket and factorising by taking out common factors. The higher strand will also explore expanding two binomials. All students will revisit and extend their knowledge of solving equations, now to include those with brackets and for the higher, with unknowns on both sides. Bar models will be recommended as a tool to help students make sense of the maths. Students will also learn to solve formal inequalities for the first time, learning the meaning of a solution set and exploring the similarities and differences compared to solving equations. Emphasis is placed on both forming and solving equations rather than just looking at procedural methods of finding solutions.		Form algebraic expressions Use directed number with algebra (Lesson needs adapted – remove solving equations, add more collecting like terms and some substitution) Multiply out a single bracket Factorise into a single bracket Expand multiple single brackets and simplify Expand a pair of binomials (H) Solve equations Solve equations, including with brackets Form and solve, equations with brackets Solve equations with unknowns on both sides (H) Form and solve equations with unknowns on both sides (H) Reading and writing inequalities Understand and solve simple inequalities Form and solve inequalities Solve inequalities with unknowns on both sides (H) Form and solve inequalities with unknowns on both sides (H) Identify and use formulae, expressions, identities and equations Equations and inequalities mini assessment	Identify variables and express relationships between variables algebraically. Begin to model situations mathematically and express the results using a range of formal mathematical representations. Substitute numerical values into formulae and expressions, equations, inequalities, terms and factors. Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors. Simplify and manipulate algebraic expressions to maintain equivalence by: Collecting like terms Multiplying a single term over a bracket Taking out common factors

			Expanding products of two or more binomials Understand and use standard mathematical formulae Use algebraic methods to solve linear equations in one variable.
Area of trapezia and circles Students following the higher stand will have met the formula for the area of a trapezium in year 7; this knowledge is now extended to all students along side the formula for the area of a circle. A key aspect of this unit is choosing and using the correct formula for the correct shape, reinforcing recognising the shapes, their properties and names, and looking explicitly at compound shapes		Calculate the area of triangles, rectangles and parallelograms (R) Calculate the area of a trapezium Calculate the perimeter and area of compound shapes (1) Investigate circles (Area and circumference) Calculate the circumference of a circle Calculate the circumference of a circle and parts of a circle with a calculator Calculate the area of a circle Calculate the area of a circle and parts of a circle with a calculator Calculate the perimeter and area of compound shapes (2)	Derive and apply formulae to calculate and solve problems involving; perimeter and area of triangles, parallelogram, trapezia. Calculate and solve problems involving; perimeter of 2-D shapes (including circles), areas of circles and composite shapes
3D shapes This is the first time students have studied 3-D shapes formally at KS3, so they will need reminding about the associated vocabulary. Students could be supported by the use of practical equipment such as cubes, squared and isometric paper. As well as surface area and volume, students will also explore plans and elevations. There is a wide variety of software available to support this, and again practical work is very useful to develop visualisation and understanding. For students following the higher strand, there is a step on investigating volumes of other 3-D shapes; as		Know the names of 2-D and 3-D shapes Recognise prisms Accurate nets of cuboids and other 3-D shapes Plans and elevations Area of 2D shapes Surface area of cubes and cuboids Surface area of triangular prisms Surface area of a cylinder (H) Volume of cubes and cuboids Volume of other 3-D shapes – prisms and cylinders (H) Explore volumes of cones, pyramids and spheres (H)	Use language and properties precisely to analyse numbers, algebraic expressions, 2-D and 3-D shapes. Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D Derive and apply formulae to calculate and solve problems involving, perimeter and area of triangles, parallelograms, trapezia, volume of cuboids

this is a KS4 content this can be omitted if time is short.			(including cubes) other prisms (including cylinders)

Year 8 Curriculum Map – Summer			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Ratio and scales This unit focuses initially on the meaning of ratio and the various models that can be used to represent rations. Based on this understanding, it moves on to sharing in a ratio given the whole or one of the parts, and how to use e.g bar models to ensure the correct approach to problem solving. After this we look at simplifying ratios, using previous answers to deepen the understanding of equivalent ratio rather than 'cancelling' purely as a procedure. We also explore the links between ratio and fractions and understanding π as the ratio of the circumference of a circle to its diameter. Students following the higher strand also look at gradient to prepare for later studies.		Understand the meaning and representation of ratio Understand and use ratio notation Solve problems involving ratios in the form 1 : n (or n : 1) Solve proportional problems involving the ratio m :n Divide a value into a given ratio Express ratios in their simplest integer form Express ratios in the form 1 : n (H) Compare ratios and related fractions Understand π as the ratio between diameter and circumference Understand gradient of a line as a ratio (H)	Make connections between number relationships, and their algebraic and graphical representations Use scale factors, scale diagrams and maps Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction Divide a given quantity into two parts in a given part: part or part: while ratio; express the division of a quantity into two parts as a ratio Solve problems involving direct and inverse proportion
Multiplicative change Students now work with the link between ratio and scaling, including the idea of direct proportion, linking various form including graphs and using context such as conversion of currencies which provides rich opportunities for problem solving.		Solve problems involving direct proportion Explore conversion graphs Convert between currencies Explore direct proportion graphs (H) Explore relationships between similar shapes Understand scale factors as multiplicative representations Draw and interpret scale diagrams Interpret maps using scale factors and ratios	extend and formalise their knowledge of ratio and proportion in working with measures and in formulating proportional relations algebraically interpret when the structure of a numerical problem requires additive, multiplicative

Conversion graphs will be looked at in this block and could be revisited in the more formal graphical work later in the term. Links are also made with maps and scales, and with the use of scale factors to find missing lengths in pairs of similar shapes.			or proportional reasoning use scale factors, scale diagrams and maps solve problems involving direct and inverse proportion, including graphical and algebraic representations move freely between different numerical, algebraic, graphical and diagrammatic representations
Reasoning with data Students are introduced formally to bivariate data and the idea of linear correlation. They extend their knowledge of graphs and charts from Key Stage 2 to deal with both discrete and continuous data.		Draw and interpret scatter graphs Understand and describe linear correlation Draw and use line of best fit Identify non-linear relationships Represent data in two-way tables Draw pie charts Interpret simple pie charts using proportion (top set don't do) Interpret pie charts using a protractor Identify and represent sets Interpret and create Venn diagrams Understand and use the intersection of sets Understand and use the union of sets Understand and use the complement of a set (H)	describe, interpret and compare observed distributions of a single variable through appropriate graphical representation involving discrete, continuous and grouped data construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data • describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs • use language and properties precisely to analyse probability and statistics
Measures of location Students have already met the median and the mean earlier in KS3. This block introduces the mode and also looks at when and why each average should be used. Students		Identify different types of data Understand and use the mean, median and mode Choose the most appropriate average Read and interpret ungrouped frequency tables Find the mean from ungrouped frequency table (H)	describe, interpret and compare observed distributions of a single variable through appropriate measures of central tendency (mean, mode, median) and

following the Higher strand will look at the mean from grouped and ungrouped frequency tables, and these steps may well also be accessible to the vast majority of students following the Core strand. The previous block is built on as students have the opportunity to compare distributions, use these averages and the range. We also consider outliers, considering what effect these have on all the measures studied, and whether they should be included or excluded in our calculations. Again, much of the material in the block is suitable for exploring through project work		Read and interpret grouped frequency tables Find the mean from a grouped frequency table (H) Represent grouped discrete data Represent continuous data grouped into equal classes Identify outliers Compare distributions using averages and the range	spread (range, consideration of outliers)
Tables and probability Students will learn about sets, set notation and systematic listing strategies. Students will look at sample spaces and the use of tables to represent probabilities.		Identify and represent sets Interpret and create Venn diagrams Understand and use the intersection of sets Understand and use the union of sets Understand and use the complement of a set (H) Know and use the vocabulary of probability Generate sample spaces for single events Calculate the probability of a single event Understand and the use the probability scale Know that the sum of probabilities of all possible outcomes is 1	Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0 – 1 probability scale Understand that the probabilities of all possible outcomes sum to 1 Enumerate sets and unions/intersections of sets systemically, using tables, grids and Venn diagrams Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities

			Use language and properties precisely to analyse probability and statistics

Year 9 Curriculum INTENT
The Year 9 curriculum will consolidate and build on the key themes studied during Year 7 and Year 8. Students will study all aspects of mathematics – Number, Algebra, Geometry and Data. Key concepts will be revisited through retrieval practice, and then developed at a level appropriate to the ability of each students. New learning will be carefully spaced and regular consolidation tasks will enable retention of key knowledge. Key skills will be developed with repeated practice and frequent problem solving activities requiring students to identify the skills needed to complete the task. Students will develop understanding of key concepts and will be given the opportunity to demonstrate this in a range of different contexts.

Year 9 Curriculum Map – Autumn			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Indices Before exploring the ideas behind the addition and subtraction laws of indices (which will be revisited when standard form is studied in the next topic), the groundwork is laid by making sure students are comfortable with expressions involving powers, simplifying e.g. $3x^2y \times 5xy^3$. The higher strand also looks at finding powers of powers.		Adding and subtracting expressions for indices Simplifying algebraic expressions by multiplying indices Using the addition law for indices Simplifying algebraic expressions by dividing indices Using the addition and subtraction law for indices **Exploring powers of powers (H)**	use and interpret algebraic notation, including a^3 in place of $a \times a \times a$; a^2b in place of $a \times a \times b$ use language and properties precisely to analyse algebraic expressions • begin to model situations mathematically and express the results using a range of formal mathematical representations substitute values in expressions, rearrange and simplify expressions and solve equations
Standard form Higher strand students may have already briefly looked at standard form in year 7 and now this knowledge is introduced to all		Investigate positive powers of 10 Work with numbers greater than 1 in standard form Investigate negative powers of 10 Work with numbers between 0 and 1 in standard form	Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and

students, building on from their earlier work of indices last unit. The use of content is important to help students make sense of the need for the notation and its uses. The higher strand includes a basic introduction to negative and fractional indices.		Compare and order numbers in standard form Add and subtract numbers in standard form Multiply numbers in standard form Divide numbers in standard form Use a calculator to work with numbers in standard form Understand and use negative indices (H) Understand and use fractional indices (H)	distinguish between exact representations of roots and their decimal approximations Interpret and compare number in standard for A x 10^n $1 \leq A < 10$, where n is a positive or negative integer or zero.
Equations and inequalities Students revisit and extend their knowledge of forming and solving linear equations and inequalities, including those related to different parts of the mathematics curriculum. They also explore rearranging formulae seeing how this links to solving equations and reinforcing their understanding of the difference between equations, formulae and expressions. This is a good opportunity to practice non-calculator skills if appropriate.		Solve one and two step equations (R) Solve one and two step equations with brackets (R) Solve one and two step inequalities (R) Solve one and two step inequalities with brackets (R) Expand a pair of binomials (x2 if needed) Inequalities with negative numbers Solve equations with unknowns on both sides (H) Solve inequalities with unknowns on both sides (H) Solving equations and inequalities in context Substituting into formulae and equations Rearrange formulae (one-step) Rearrange formulae (two-step) Rearrange complex formulae including brackets and squares (H)	move freely between different numerical, algebraic, graphical and diagrammatic representations [for example. equations and graphs] use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) understand and use standard mathematical formula; rearrange formulae to change the subject model situations or procedures by translating them into algebraic expressions or formulae and by using graphs
Sequences This short block reinforces students. Learning from year 7, extending this to look at sequences with more complex algebraic rules now that students are more familiar with a wider range of notation. The higher strand includes finding a rule or the nth term for a		Generate sequences given a rule in words Generate sequences given a simple algebraic rule Generate sequences given a complex algebraic rule Find the rule for the nth term of a linear sequence	Generate terms of a sequence from either a term-to-term or a position-to-term rule Recognise arithmetic sequences and find the nth term Recognise geometric sequences and appreciate other sequences that arise

liner sequence, using objects and images to understand the meaning of the rule.			
Transformation *Line symmetry and reflection* This block is intended to build confidence with shapes and lines in different orientations. Students can revisit and enhance their knowledge of special triangles and quadrilaterals and focus on key vocabulary such as object, image, congruent etc. *Rotation and translation* Building on the study of line symmetry and reflection, students then look at rotational symmetry and rotation. They then move on to study translations, which are described in vector form. They compare the different effects of the transformations studied so far, noticing tar the objects and images are congruent. *Enlargement and similarity* Students develop their knowledge of transformations to include enlargement, learning the mathematical meaning of the word similar. You can link back to other transformations as necessary. If appropriate students can move on to negative scale factors. All students should experience finding unknown sides in similar shapes and this can be extended to formal similar triangles problems and trigonometry in the 30/60/90 triangle. General trigonometry is introduced in year 10.		Recognise line symmetry Reflect a shape in a horizontal or vertical line 1 (shapes touching the line) Reflect a shape in a horizontal or vertical line 2 (shapes not touching the line) Reflect a shape in a diagonal line 1 (shapes touching the line) Reflect a shape in a diagonal line 2 (shapes not touching the line) Identify the order of rotational symmetry of a shape Compare and contrast rotational symmetry with line symmetry Rotate a shape about a point on a shape Rotate a shape about a point not on a shape Reflection and rotation practice Compare rotation and reflection of shapes Translate points and shapes by a given vector Find the result of a series of transformations (H) Recognise enlargement and similarity Enlarge a shape by a positive integer scale factor Enlarge a shape by a positive integer scale factor from a point Enlarge a shape by a positive fractional scale factor Enlarge a shape by a negative scale factor (H) Work out missing sides and angles in a pair of given similar shapes Solve problems with similar triangles (H) Explore ratios in right –angled triangles (H)	describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric identify properties of, and describe the results of reflections applied to given figures identify properties of, and describe the results of, translations, rotations and reflections applied to given figures describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems construct similar shapes by enlargement, with and without coordinate grids. use scale factors, scale diagrams and maps apply angle facts,

			triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction. use Pythagoras Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles

Year 9 Curriculum Map – Spring			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Working in the cartesian plane Building on their knowledge of coordinates from KS2, students will look formally at algebraic rules for straight lines, starting with lines parallel to the axes and moving on to the more general form. They study $y = mx + c$ as the general form of the equation of a straight line, interpreting m and c in abstract and real life contexts, and reducing to this form in simple cases. This builds from re arranging formula from the early algebra block. Use of technology to illustrate graphs should be embedded. Appreciating the similarities and differences between sequences, lists of coordinates and lines is another key point. Students following the higher strand may also explore non-linear graphs and mid points of		Work with co-ordinates in all four quadrants Identify and draw lines that are parallel to the axes, Recognise and use the line $y = x$ Recognise and use lines of the form $y = kx$ Link $y = kx$ to direct proportion problems Explore the gradient of the line $y = kx$ (H) Recognise and use lines in the form $y = x + a$ Explore graphs with negative gradient $(y = -kx,\ y = a - x,\ x + y = a)$ Compare gradients Compare intercepts Link graphs to linear sequences Plot graphs in the form $y = mx + c$ Find the equation of a line from a graph Write an equation in the form $y = mx + c$ (H) Explore non-linear graphs (H) (move to algebraic representations) Find the midpoint of a line segment (H) Model real-life graphs involving inverse proportion	move freely between different numerical, algebraic, graphical and diagrammatic representations make connections between number relationships, and their algebraic and graphical representations substitute numerical values into formulae and expressions develop algebraic and graphical fluency, including understanding linear and simple quadratic functions recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane

segments. Higher strand students will also consider inverse relationships and perpendicular lines.		Explore perpendicular lines (H) Explore non-linear graphs	interpret mathematical relationships both algebraically and graphically reduce a given linear equation in two variables to the standard form y = mx + c; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically use linear and quadratic graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations solve problems involving direct and inverse proportion, including graphical and algebraic representations
Ratio and proportion problems Building on students' experience in previous years, here they solve all types of ratio problems and make the links with direct proportion for the first time, and if following the Higher strand they also look at graphs of inverse relationships. If appropriate students could also look at more complex problems involving algebra. Students also revisit 'best buys' comparing unit pricing with alternative methods such as using scaling.		Solve problems with direct proportion (R) Direct proportion and conversion graphs (R) Solve problems with inverse proportion Graphs of inverse relationships (H) Solve ratio problems given the whole or a part (R) Solve 'best buy' problems Solve problems with ratio and algebra (H)	divide a given quantity into two parts in a given part: part or part: whole ratio; express the division of a quantity into two parts as a ratio understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction solve problems involving direct and inverse proportion, including graphical and algebraic representations use compound units such as speed, unit pricing and density to solve problems

Rates Students develop their knowledge of inverse relationships to explore speed, distance and time in detail. They also look at graphs and the link between the speed/distance/time formulae and density/mass/volume. Students go on to explore other compound units including exploring flow problems such as how long it will take to fill/empty tanks of different shapes at different rates. Students following the Higher strand will also look at converting compound units such as m/s to km/h.		Solve speed, distance and time problems without a calculator Solve speed, distance and time problems with a calculator Use distance/time graphs Solve problems with density, mass and volume Solve flow problems and their graphs Rates of change and their units Convert compound units (H)	use compound units such as speed, unit pricing and density to solve problems understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction change freely between related standard units [for example time, length, area, volume/capacity, mass]
Probability Students will learn about sets, set notation and systematic listing strategies. Students will look at sample spaces and the use of tables to represent probabilities.		Single event probability (R) Find probabilities from a sample space Find probabilities from two way tables Find probabilities from Venn diagrams Use the product rule for finding the total number of possible outcomes (H) Relative frequency – include convergence Expected outcomes Independent events Use tree diagrams (H) Use tree diagrams to solve 'without replacement' problems (H)	record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale . understand that the probabilities of all possible outcomes sum to 1 . enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities . use language and properties precisely to analyse probability and statistics

Year 9 Curriculum Map – Summer			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Angles in parallel lines and polygons This block builds on KS2 and year 7 understanding of angle notation and relationships, extending all students to explore angles in parallel lines and thus solve increasingly complex missing angle problems. Links are then made to the closely connected properties of polygons and quadrilaterals. The use of dynamic geometry software to illustrate results is highly recommended, and students following the higher strand will also develop their understanding of the idea of proof. They will also start to explore constructions with rulers and pairs of compasses.		Understand and use basic angles rules and notation (R) Investigate angles between parallel lines and the transversal Identify and calculate with alternate and corresponding angles Identify and calculate co-interior, alternate and corresponding angles Solve complex problems with parallel lines Construct triangles and special quadrilaterals (R) Investigate the properties of special quadrilaterals Identify and calculate with sides and angles in special quadrilaterals Understand and use the properties of diagonals and quadrilaterals (H) Understand and use the sum of exterior angles of any polygon Calculate missing interior angles in regular polygons Prove simple geometric facts (H)	apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles understand and use the relationship between parallel lines and alternate and corresponding angles derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons .. use the standard conventions for labelling the sides and angles of triangle ABC derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures (for example, equal lengths and angles] using appropriate language and technologies derive and use the standard ruler and compass constructions (H only)
Constructions and congruency This block builds on the constructions studied during Years 7 and 8 to formally look at the idea of locus and the standard constructions using straight edge and a pair of compasses. This is a very practical unit and it is useful to explore loci using objects and rulers as well as		Construct and interpret scale drawings (R) Construct an angle bisector Construct a perpendicular bisector Construct a perpendicular from a point Construct a perpendicular to a point Locus of distance from a point Locus of distance from a straight line/shape	draw and measure line segments and angles in geometric figures, including interpreting scale drawings derive and use the standard ruler and compass constructions (perpendicular bisector of a line segment,

the paper based approach. Indeed 'human geometry' is a very engaging way of promoting understanding through e.g. asking students to all line up 2m from a point or 2 m from a wall to explore the different loci formed. Congruency is also explored again taking a practical approach to compare congruent figures of all kinds before looking at the formal aspect of identifying congruent triangles.		Locus equidistant from two points Locus of distance from two lines Identify and explore congruent figures Identify and explore congruent triangles Construct triangles using SSS Construct triangles using SSS, SAS and ASA Construct more complex polygons	constructing a perpendicular to a given line from/at a given point, bisecting a given angle); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric use the standard conventions for labelling the sides and angles of triangle ABC, and know and use the criteria for congruence of triangles
Pythagoras theorem and introduction to trigonometry Students revise squares and square roots before moving on to investigate the relationship between the sides of a right angled triangle. The converse of the theorem is emphasised so that students are aware that if the sides of a triangle satisfy the rule $a^2 + b^2 = c^2$ then the triangle must be a right angled. Students explore using the theorem in a variety of context, including on coordinate axes, and a higher step is including 3D shapes. Introduction to trigonometry through similarity		Squares and roots (R) Identify the hypotenuse of a right-angled triangle Determine whether a triangle is right angled Calculate the hypotenuse of a right-angled triangle Calculate the missing side in right-angled triangles Use Pythagoras theorem on coordinate axes Explore proofs of Pythagoras' theorem Use Pythagoras' theorem in 3D shapes (H)	use Pythagoras Theorem to solve problems involving right-angled triangles apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras Theorem, and use known results to obtain simple proofs interpret mathematical relationships both algebraically and geometrically begin to reason deductively in geometry, number and algebra,

			including using geometrical constructions begin to model situations mathematically and express the results using a range of formal mathematical representations use Pythagoras' Theorem and trigonometric ratios
Revision of KS3			

HIGHER PATHWAY

Year 10 Curriculum INTENT
Students start their GCSE at the beginning of Year 10 and are taught in ability groups working towards the reformed GCSE qualification that will award a numerical grade of 3 to 9. With the increased level of challenge, the Mathematics department at The Salesian Academy of St John Bosco aims to ensure that every student is thoroughly prepared for the end of Key Stage examination. As such, a strong emphasis is placed on developing problem solving skills and applying Mathematics to everyday situations. We aim to develop students' resilience and offer a comprehensive programme of support throughout the GCSE programme.

Year 10 Curriculum Map – Autumn			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage Specification reference
Number		Number problems and reasoning Place value and estimating HCF and LCM Calculating with powers (indices) Zero, negative and fractional indices Powers of 10 and standard form Surds	N2 N3 N4 N5 N6 N7 N8 N9 N14 N15
Algebra		Algebraic indices Expanding and factorising Equations Formulae	N1 N3 N8 N9 A1 A2 A3 A4 A5 A6 A7 A17 A21 A22 A23 A24 A25

		Linear sequences Non-linear sequences More expanding and factorising	
Interpreting and representing data		Statistical diagrams 1 Time series Scatter graphs Line of best fit Averages and range Statistical diagrams 2	G14 S1 S2 S3 S4 S5 S6
Further Statistics		Sampling Cumulative frequency Box plots Drawing histograms Interpreting histograms Comparing and describing populations	S1 S3 S4

Year 10 Curriculum Map – Spring			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Fractions, ratio and percentages		Fractions Ratios Ratio and proportion Percentages Fractions, decimals and percentages	N2 N3 N8 N10 N11 N12 N13 R3 R4 R5 R6 R7 R8 R9 R10
Angles and trigonometry		Angle properties of triangles and quadrilaterals Interior angles of a polygon Exterior angles of a polygon Recall square numbers and square roots. Pythagoras' theorem Trigonometry	N7 N8 N15 G1 G3 G4 G6 G20 G21
Graphs		Linear graphs More linear graphs Graphing rates of change Real-life graphs Line segments	N13 A8 A9 A10 A11 A12 A14 A15 A16 A17 G11 R8 R10 R11

		Quadratic graphs Cubic and reciprocal graphs More graphs	
Area and volume		Perimeter and area Units and accuracy Prisms Circles Sectors of circles Cylinders and spheres Pyramids and cones	N8 N13 N14 N15 N16 R1 G1 G9 G12 G14 G16 G17 G18

Year 10 Curriculum Map – Summer			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Transformations and constructions		Draw plans and elevations of 3D solids. Reflect a 2D shape in a mirror line. Rotate a 2D shape about a centre of rotation. Describe reflections and rotations. Enlarge shapes by fractional and negative scale factors about a centre of enlargement. Translate a shape using a vector. Carry out and describe combinations of transformations. Draw and use scales on maps and scale drawings. Solve problems involving bearings. Construct triangles using a ruler and compasses. Construct the perpendicular bisector of a line. Construct the shortest distance from a point to a line using a ruler and compasses. Bisect an angle using a ruler and compasses. Construct angles using a ruler and compasses. Construct shapes made from triangles using a ruler and compasses. Draw a locus. Use loci to solve problems.	R2 R6 G1 G2 G7 G8 G12 G13 G15 G24 G25

Equations and inequalities		Solving quadratic equations 1 Find the roots of quadratic functions. Rearrange and solve simple quadratic equations. Solve more complex quadratic equations. Use the quadratic formula to solve a quadratic equation. Completing the square Solving simple simultaneous equations More simultaneous equations Solving linear and quadratic simultaneous equations Solving linear inequalities	N1 N8 A3 A4 A5 A9 A11 A18 A19 A21 A22
Probability		Combined events Mutually exclusive events Experimental probability Independent events and tree diagrams Conditional probability Venn diagrams and set notation	N1 P1 P2 P3 P4 P5 P6 P7 P8 P9
Multiplicative reasoning		Growth and decay Compound measures More compound measures Ratio and proportion	N12 N13 A2 A9 R1 R6 R9 R10 R11 R13 R14 R16
Similarity and congruence		Congruence Geometric proof and congruence Similarity More similarity Similarity in 3D solids	R6 R12 G5 G6 G7 G17 G19

Year 11 Curriculum INTENT

Students start their GCSE at the beginning of Year 10 and are taught in ability groups working towards the reformed GCSE qualification that will award a numerical grade of 1 to 9.

With the increased level of challenge, the Mathematics department at The Salesian Academy of St John Bosco aims to ensure that every student is thoroughly prepared for the end of Key Stage examination. As such, a strong emphasis is placed on developing problem solving skills and applying

Mathematics to everyday situations. We aim to develop students' resilience and offer a comprehensive programme of support throughout the GCSE programme.

Year 11 Curriculum Map – Autumn			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Equations and graphs		Solving simultaneous equations graphically Representing inequalities graphically Graphs of quadratic functions Solving quadratic equations graphically Graphs of cubic functions	N8 A4 A11 A12 A18 A19 A20 A21 A22
Further trigonometry		Accuracy Graph of the sine function Graph of the cosine function The tangent function Calculating areas and the sine rule The cosine rule and 2D trigonometric problems Solving problems in 3D Transforming trigonometric graphs	N16 A8 A12 A13 G20 G22 G23
Circle theorems		Radii and chords Tangents Angles in circles 1 Angles in circles 2 Applying circle theorems	A16 G9 G10

Year 11 Curriculum Map – Spring			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Further algebra		Rearranging formulae Algebraic fractions Simplifying algebraic fractions	N8 A4 A5 A6 A7 A18

		More algebraic fractions Surds Solving algebraic fraction equations Functions Proof	
Vectors and geometric proof		Vectors and vector notation Vector arithmetic More vector arithmetic Parallel vectors and collinear points Solving geometric problems	G25
Proportion and graphs		Direct proportion More direct proportion Inverse proportion Exponential functions Non-linear graphs Translating graphs of functions Reflecting and stretching graphs of functions	A7 A12 A13 A14 A15 R7 R10 R13 R14 R15 R16

Year 11 Curriculum Map – Summer			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Revision			

FOUNDATION PATHWAY

Year 10 Curriculum INTENT
Students start their GCSE at the beginning of Year 10 and are taught in ability groups working towards the reformed GCSE qualification that will award a numerical grade of 1 to 5. With the increased level of challenge, the Mathematics department at The Salesian Academy of St John Bosco aims to ensure that every student is thoroughly prepared for the end of Key Stage examination. As such, a strong emphasis is placed on developing problem solving skills and applying

Mathematics to everyday situations. We aim to develop students' resilience and offer a comprehensive programme of support throughout the GCSE programme.

Year 10 Curriculum Map – Autumn			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Number		Calculations Decimal numbers Place value Factors and multiples Squares, cubes and roots Index notation Prime factors	N1 N2 N3 N4 N5 N6 N7 N13 N14 N15
Algebra		Algebraic expressions Simplifying expressions Substitution Formulae Expanding brackets Factorising Using expressions and formulae	N1 N3 N4 A1 A2 A3 A4 A5 A6 A7 A21
Statistics		Frequency tables Two-way tables Representing data Time series Stem and leaf diagrams Pie charts Scatter graphs Line of best fit	G2 G14 G15 S2 S4 S5 S6
Fractions, decimals and percentages		Working with fractions Operations with fractions Multiplying fractions Dividing fractions Fractions and decimals	*N1* N2 N3 N4 N8 N10 N12 N15 R3 R9 S2

		Fractions and percentages Calculating percentages	

Year 10 Curriculum Map – Spring			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Equations, inequalities and sequences		Solving equations 1 Solving equations 2 Solving equations with brackets Introducing inequalities More inequalities More formulae Generating sequences Using the nth term of a sequence	N1 N3 A2 A3 A5 A7 A17 A21 A22 A23 A24 A25
Angles		Properties of shapes Angles in parallel lines Angles in triangles Exterior and interior angles More exterior and interior angles Geometrical patterns	G1 G3 G4 G6 G7 G11
Averages and range		Mean and range Mode, median and range Types of average Estimating the mean Sampling	S1 S2 S4 S5
Perimeter, area and volume		Rectangles, parallelograms and triangles Trapezia and changing units Area of compound shapes Surface area of 3D solids Volume of prisms More volume and surface area	N13 N14 R1 G12 G14 G16 G17 R1
Graphs		Coordinates Linear graphs Gradient $y = mx + c$	N13 A7 A8 A9 A10 A12 A14 A17 R11 R14 G14

		Real-life graphs Distance-time graphs More real-life graphs	

Year 10 Curriculum Map – Summer			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Transformations		Translation Reflection Rotation Enlargement Describing enlargements Combining transformations	R6 G1 G7 G24
Ratio and proportion		Writing ratios Using ratios 1 Ratios and measures Using ratios 2 Comparing using ratios Using proportion Proportion and graphs Proportion problems	N11 N13 R1 R4 R5 R6 R7 R8 R10 R11 R12 R14
Right-angled triangles		Pythagoras' theorem Trigonometry: the sine ratio Trigonometry: the cosine ratio Trigonometry: the tangent ratio Finding lengths and angles using trigonometry	N7 N15 R12 G6 G11 G20 G21
Probability		Calculating probability Two events Experimental probability Venn diagrams Tree diagrams	N5 P1 P2 P3 P4 P5 P6 P7 P8
Multiplicative reasoning		Percentages Growth and decay Compound measures Distance, speed and time	N13 R1 R7 R9 R10 R11 R13 R16 G14

		Direct and inverse proportion	
Constructions, loci and bearings		3D solids Plans and elevations Accurate drawings Scale drawings and maps Constructions Loci and regions Bearings	R2 R6 G1 G2 G4 G5 G6 G7 G12 G13 G15

Year 11 Curriculum INTENT
Students start their GCSE at the beginning of Year 10 and are taught in ability groups working towards the reformed GCSE qualification that will award a numerical grade of 1 to 9. With the increased level of challenge, the Mathematics department at The Salesian Academy of St John Bosco aims to ensure that every student is thoroughly prepared for the end of Key Stage examination. As such, a strong emphasis is placed on developing problem solving skills and applying Mathematics to everyday situations. We aim to develop students' resilience and offer a comprehensive programme of support throughout the GCSE programme.

Year 11 Curriculum Map – Autumn			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Quadratic equations and graphs		Expanding double brackets Plotting quadratic graphs Using quadratic graphs	N4 A1 A3 A4 A6 A8 A11 A12 A14 A18

		Factorising quadratic expressions Solving quadratic equations algebraically	
Perimeter, area and volume 2		Circumference of a circle Area of a circle Semicircles and sectors Composite 2D shapes and cylinders Pyramids and cones Spheres and composite solids	N8 N14 N15 N16 G9 G14 G16 G17 G18
Fractions, indices and standard form		Multiplying and dividing fractions The laws of indices Writing large numbers in standard form Writing small numbers in standard form Calculating with standard form	N2 N3 N6 N7 N8 N9

Year 11 Curriculum Map – Spring			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage
Congruence, similarity and vectors		Similarity and enlargement More similarity Using similarity Congruence Vectors	R6 R12 G3 G5 G6 G7 G17 G19 G24 G25
More algebra		Graphs of cubic and reciprocal functions Non-linear graphs Solving simultaneous equations graphically Solving simultaneous equations algebraically Rearranging formulae Proof	A2 A3 A5 A6 A12 A14 A17 A19 A21 R10 R13 R14 R16

Year 11 Curriculum Map – Summer			
Topic details	No. of Lessons	Rational/sequencing	N.C. coverage

Revision			

GCSE Specification

REFERENCE	STATEMENT FROM EDEXCEL SPECIFICATION FOR GCSE (9-1) MATHEMATICS
Higher tier students will be assessed on all content. Foundation tier students will be assessed on content identified by the standard and underlined type.	
N1	order positive and negative integers, decimals and fractions; use the symbols =, ≠, <, > , ≤, ≥
N2	apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative; understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals)
N3	recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions); use conventional notation for priority of operations, including brackets, powers, roots and reciprocals
N4	use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem
N5	apply systematic listing strategies, **including use of the product rule for counting (i.e. if there are m ways of doing one task and for each of these, there are n ways of doing another task, then the total number of ways the two tasks can be done is m × n ways)**
N6	use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5**; estimate powers and roots of any given positive number**
N7	calculate with roots, and with integer **and fractional** indices
N8	calculate exactly with fractions, **surds** and multiples of π; **simplify surd expressions involving squares (e.g. √12 = √(4 × 3) = √4 × √3 = 2√3) and rationalise denominators**
N9	calculate with and interpret standard form $A \times 10^n$, where $1 \leq A < 10$ and n is an integer
N10	work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 or 3/8); **change recurring decimals into their corresponding fractions and vice versa**
N11	identify and work with fractions in ratio problems
N12	interpret fractions and percentages as operators

N13	use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate
N14	estimate answers; check calculations using approximation and estimation, including answers obtained using technology
N15	round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures); use inequality notation to specify simple error intervals due to truncation or rounding
N16	apply and interpret limits of accuracy, **including upper and lower bounds**
A1	use and interpret algebraic manipulation, including: ● ab in place of a × b ● 3y in place of y + y + y and 3 × y ● a^2 in place of a × a, a^3 in place of a × a × a, a^2b in place of a × a × b ● a/b in place of a ÷ b ● coefficients written as fractions rather than as decimals ● brackets
A2	substitute numerical values into formulae and expressions, including scientific formulae
A3	understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors
A4	simplify and manipulate algebraic expressions (including those involving surds **and algebraic fractions**) by: ● collecting like terms ● multiplying a single term over a bracket ● taking out common factors ● expanding products of two **or more** binomials ● factorising quadratic expressions of the form $x^2 + bx + c$, including the difference of two squares; **factorising quadratic expressions of the form $ax^2 + bx + c$** ● simplifying expressions involving sums, products and powers, including the laws of indices
A5	understand and use standard mathematical formulae; rearrange formulae to change the subject
A6	know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments **and proofs**
A7	where appropriate, interpret simple expressions as functions with inputs and outputs; ; **interpret the reverse process as the 'inverse function'; interpret the succession of two functions as a 'composite function' (the use of formal function notation is expected)**
A8	work with coordinates in all four quadrants

A9	plot graphs of equations that correspond to straight-line graphs in the coordinate plane; use the form y = mx + c to identify parallel **and perpendicular** lines; find the equation of the line through two given points or through one point with a given gradient
A10	identify and interpret gradients and intercepts of linear functions graphically and algebraically
A11	identify and interpret roots, intercepts, turning points of quadratic functions graphically; deduce roots algebraically **and turning points by completing the square**
A12	recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, the reciprocal function $y = 1/x$ with $x \neq 0$, **exponential functions $y = k^x$ for positive values of k, and the trigonometric functions (with arguments in degrees) y = sin x, y = cos x and y = tan x for angles of any size**
A13	**sketch translations and reflections of a given function**
A14	plot and interpret graphs (including reciprocal graphs **and exponential graphs**) and graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration
A15	**calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts (this does not include calculus)**
A16	**recognise and use the equation of a circle with centre at the origin; find the equation of a tangent to a circle at a given point**
A17	solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation); find approximate solutions using a graph
A18	solve quadratic equations (**including those that require rearrangement**) algebraically by factorising, **by completing the square and by using the quadratic formula**; find approximate solutions using a graph
A19	solve two simultaneous equations in two variables (linear/linear **or linear/quadratic)** algebraically; find approximate solutions using a graph
A20	**find approximate solutions to equations numerically using iteration**
A21	translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution
A22	solve linear inequalities in one **or two** variable**(s), and quadratic inequalities in one variable;** represent the solution set on a number line, **using set notation and on a graph**
A23	generate terms of a sequence from either a term-to-term or a position-to-term rule
A24	recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions, Fibonacci type sequences, quadratic sequences, and simple geometric progressions (r^n where n is an integer, and r is a rational number > 0 **or a surd**) **and other sequences**
A25	deduce expressions to calculate the nth term of linear **and quadratic** sequences

R1	change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts
R2	use scale factors, scale diagrams and maps
R3	express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1
R4	use ratio notation, including reduction to simplest form
R5	divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio; apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations)
R6	express a multiplicative relationship betweeb two quantities as a ratio or a fraction
R7	understand and use proportion as equality of ratios
R8	relate ratios to fractions and to linear functions
R9	define percentage as `number of parts per hundred¿; interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; express one quantity as a percentage of another; compare two quantities using percentages; work with percentages greater than 100%; solve problems involving percentage change, including percentage increase/decrease and original value problems, and simple interest including in financial mathematics
R10	solve problems involving direct and inverse proportion, including graphical and algebraic representations
R11	use compound units such as speed, rates of pay, unit pricing, density and pressure
R12	compare lengths, areas and volumes using ratio notation; make links to similarity (including trigonometric ratios) and scale factors
R13	understand that X is inversely proportional to Y is equivalent to X is proportional to 1/Y; **construct and** interpret equations that describe direct and inverse proportion
R14	interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion
R15	**interpret the gradient at a point on a curve as the instantaneous rate of change; apply the concepts of average and instantaneous rate of change (gradients of chords and tangents) in numerical, algebraic and graphical contexts (this does not include calculus)**
R16	set up, solve and interpret the answers in growth and decay problems, including compound interest **and work with general iterative processes**
G1	use conventional terms and notation: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries; use the standard conventions for labelling and referring to the sides and angles of triangles; draw diagrams from written description

G2	use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); use these to construct given figures and solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line
G3	apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles; understand and use alternate and corresponding angles on parallel lines; derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)
G4	derive and apply the properties and definitions of special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; and triangles and other plane figures using appropriate language
G5	use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)
G6	apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras' theorem and the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs
G7	identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargement (including fractional **and negative** scale factors)
G8	**describe the changes and invariance achieved by combinations of rotations, reflections and translations**
G9	identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment
G10	**apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results**
G11	solve geometrical problems on coordinate axes
G12	identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres
G13	construct and interpret plans and elevations of 3D shapes
G14	use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)
G15	measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings
G16	know and apply formulae to calculate: area of triangles, parallelograms, trapezia; volume of cuboids and other right prisms (including cylinders)

G17	know the formulae: circumference of a circle = $2\pi r = \pi d$, area of a circle = πr^2; calculate: perimeters of 2D shapes, including circles; areas of circles and composite shapes; surface area and volume of spheres, pyramids, cones and composite solids
G18	calculate arc lengths, angles and areas of sectors of circles
G19	apply the concepts of congruence and similarity, including the relationships between lengths, **areas and volumes** in similar figures
G20	know the formulae for: Pythagoras' theorem $a^2 + b^2 = c^2$, and the trigonometric ratios, $\sin\theta$ = opposite/hypotenuse, $\cos\theta$ = adjacent/hypotenuse and $\tan\theta$ = opposite/adjacent apply them to find angles and lengths in right-angled triangles **and, where possible, general triangles** in two **and three** dimensional figures
G21	know the exact values of $\sin\theta$ and $\cos\theta$ for $\theta = 0°, 30°, 45°, 60°$ and $90°$; know the exact value of $\tan\theta$ for $\theta = 0°, 30°, 45°$ and $60°$
G22	**know and apply the sine rule $a/\sin A = b/\sin B = c/\sin C$, and cosine rule $a^2 = b^2 + c^2 – 2bc \cos A$, to find unknown lengths and angles**
G23	**know and apply Area = 1/2 ab sin C to calculate the area, sides or angles of any triangle**
G24	describe translations as 2D vectors
G25	apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; **use vectors to construct geometric arguments and proofs**
P1	record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees
P2	apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments
P3	relate relative expected frequencies to theoretical probability, using appropriate language and the 0-1 probability scale
P4	apply the property that the probabilities of an exhaustive set of outcomes sum to one; apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one
P5	understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size
P6	enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams and tree diagrams
P7	construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities
P8	calculate the probability of independent and ependent combined events, including using tree diagrams and other representations, and know the underlying assumptions

P9	**calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams**
S1	infer properties of populations or distributions from a sample, while knowing the limitations of sampling
S2	interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, tables and line graphs for time series data and know their appropriate use
S3	**construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use**
S4	interpret, analyse and compare the distributions of data sets from univariate empirical distributions through: ● appropriate graphical representation involving discrete, continuous and grouped data, **including box plots** ● appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers, **quartiles and inter-quartile range**)
S5	apply statistics to describe a population
S6	use and interpret scatter graphs of bivariate data; recognise correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends while knowing the dangers of so doing