St. Wilfrid's
R.C. College

Mathematics Curriculum

Excellentia per fidem,
per scientiam, per adiuvatum

Excellence through faith, learning and support

Curriculum Intent

The maths curriculum at St Wilfrid's RC College is an ambitious, connected curriculum accessible to all our students right through from primary to the end of Year 13. Our structured and coherent curriculum promotes mathematical thinking. St Wilfrid's maths curriculum supports the whole school and BCCET vision of creating resilient and fluent mathematicians.

The fundamental idea behind our curriculum design is to support students to be able to perform more challenging tasks, we believe all students are capable mathematicians. Each cycle is made up of mathematical blocks of learning, within each of these blocks we then have small steps which are sequenced in order of difficulty and dependency.

Our curriculum has been designed to help our students gain a deeper understanding and make connections between fundamental mathematical concepts. However, we also recognise that just spending a significant amount of time on a topic doesn't mean that all students will 'master' the concepts initially, we have the opportunity for connections to be developed and content revisited throughout our curriculum.

Spaced retrieval practice and students being exposed to mathematical concepts in various different contexts help them develop their understanding.

Prior Learning

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The curriculum for key stage 3 is organised into distinct domains; shape, handling data, number and algebra where pupils will build on key stage 2 knowledge and make deeper connections between mathematical concepts to develop fluency, mathematical reasoning and problem solving. They will also have the opportunity to apply their mathematical knowledge in other subjects such as Science, Computing and Geography.

Key Stage Three

Our KS3 curriculum builds on the skills developed at KS2. We continue to develop our students' abilities to reason and problem solve by integrating opportunities into classroom practice as much as possible in the order that is appropriate for the small step.

Through our curriculum, we aim to meet the needs and demands to prepare our students for KS4 and our ever- changing society by delivering a curriculum that will allow students to develop fluent knowledge, acquire and apply mathematical techniques to solve problems and draw mathematical conclusions.

Key Stage Four

In Year 10 our students begin to study for their GCSE examinations. Review steps are built into our Key Stage 3 (KS3) and Key Stage 4 (KS4) curriculum, at KS3 small steps that are identified as review steps would have been taught in KS2 and review steps in KS4 cover content that was taught in KS3.

Key Stage Five

In year 12 and 13 we encourage pupils to be problem-solvers and critical thinkers, taking the problems that are presented to them, breaking them down into their constituent parts, applying their knowledge and evaluating their solutions. We encourage students to discuss their approaches, using subject-specific vocabulary working in pairs and groups to see that there are usually many ways to tackle a problem. We hope to provide the knowledge and skills necessary not only for students to carry on their studies of mathematics post-18 but also to incorporate their new-found skills into other subjects and real-life scenarios.

Curriculum Intent

Assessment and Homework

Our long term and medium term plans support one curriculum being taught to all students. All students study the same area of mathematics at the same time, with teachers using formative assessment to decide the depth of coverage for each topic. Block assessments and question level analysis are used to identify students areas of deep understanding and areas for development. Opportunities to address student misconceptions are built into lessons and assessments.

In Key Stage 3, higher steps identified in the medium term plans can be used to provide challenge for classes or individual students. From Year 10 the higher steps represent higher tier GCSE content and teachers can adapt the steps depending on their learners' needs.

As our schemes demonstrate coherence of mathematical concepts that are developed each year, each small step can be adapted or built upon using the prior knowledge from previous small steps or challenge materials that support students developing a deeper conceptual understanding to transfer their knowledge to different mathematical concepts. KS3 cycle assessments are used holistically to identify if students have a surface, deep or transfer understanding of the taught curriculum.

In Key Stage 4, similar to KS3, block assessments are used to identify students understanding of mathematical concepts and their ability to transfer their knowledge. In Year 11 the use of past exam papers alongside block assessments are used to identify gaps in knowledge and the students ability to apply their knowledge to GCSE exam questions.

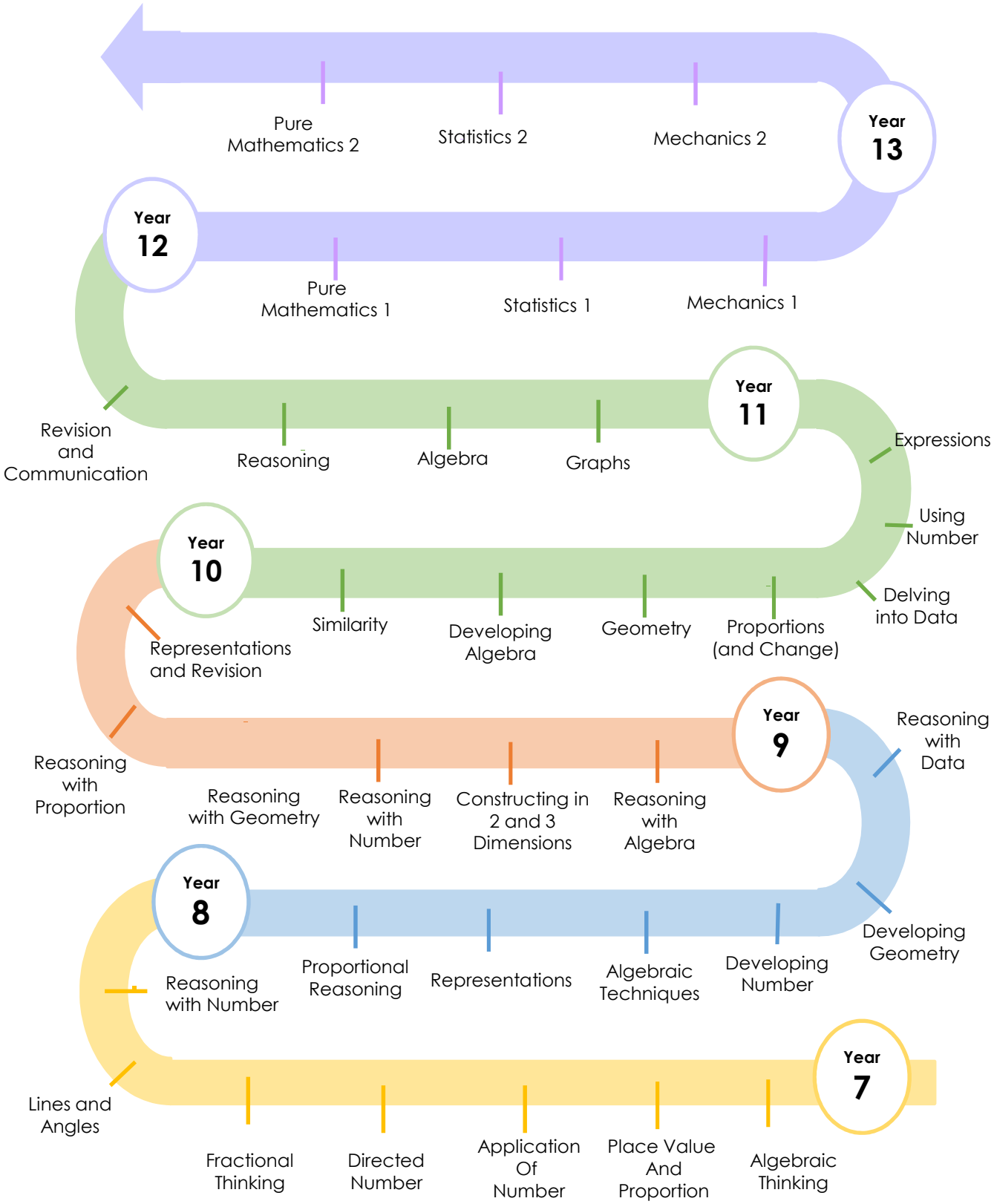
In maths students receive homework weekly on Sparxmaths. The homework is designed to support the curriculum, assessments are used by the class teacher to supplement the learning and understanding of misconceptions. Homework is designed to support students long term memory and the retrieval of knowledge while also assessing the work being complete in lessons is being fully understood.

Curriculum Intent

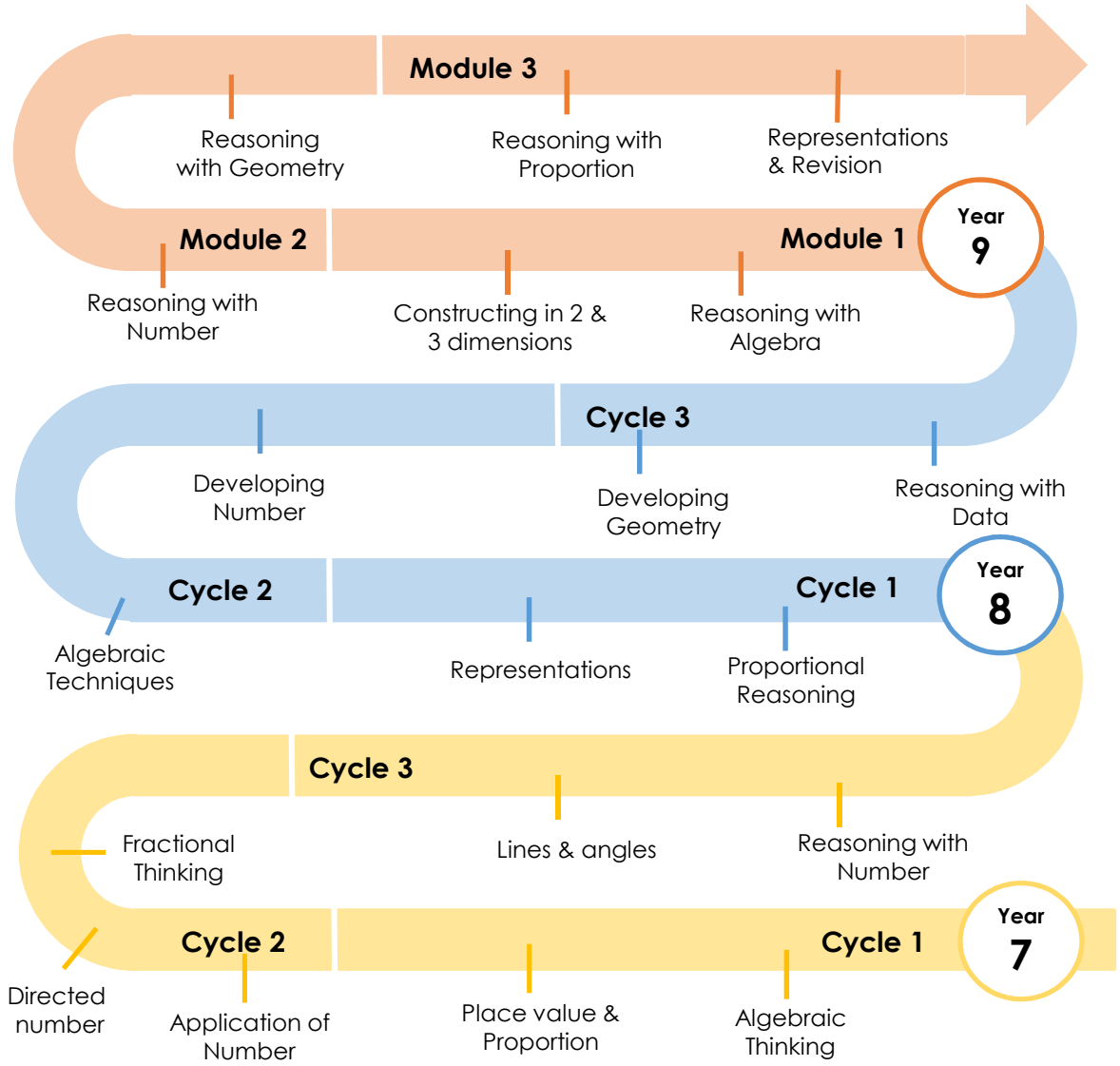
The intent of the curriculum is to build on what the students can do already and produce students with high levels of mathematical fluency and reasoning skills. The curriculum is clear on what the students need to be able to do at the end of each unit, module, year and key stage. The curriculum is sequenced clearly so that new knowledge and skills build on what has been taught previously, we will use a detailed baseline assessment in each year group to assess the strengths and areas for development of each student. The curriculum will be amended accordingly so that each class will be following their own bespoke scheme of learning, the curriculum will be continually reviewed throughout the year.

	Vision	Key Concepts and Key Skills
Year 7	In Year 7 students will focus on their maths transition for KS2 topics. Building on skills they already have and learning new methods and approaches for key mathematical concepts.	Students meet topics from the core areas of shape, handling data, number and algebra with references across the whole school curriculum.
Year 8	Year 8 students will be taught using an evidence-based approach to ensure they have a depth of understanding in basic mathematical concepts.	Students meet topics from the core areas of shape, handling data, number and algebra with references across the whole school curriculum. There is also a focus on applying their knowledge to practical situations.
Year 9	Students in year 9 will be taught how to mathematically reason and embed problem-solving skills in all areas of the KS3 curriculum, as well as develop as passion for mathematics.	Students meet topics from the core areas of shape, handling data, number and algebra with references across the whole school curriculum. There is also a focus on applying their knowledge to practical situations. Our curriculum, resources and lessons foster fluency, resilience, mastery, reasoning and problem solving skills.
Year 10	In year 10 students will develop their understanding from KS3 topics by facing challenging mathematical problems which build in difficulty.	Through our curriculum, we aim to meet the needs and demands to prepare our students for GCSE and our ever- changing society by delivering a curriculum that will allow students to develop fluent knowledge, acquire and apply mathematical techniques to solve problems and draw mathematical conclusions.
Year 11	Year 11 students will develop exam techniques by being exposed to a variety of question styles for each topic.	Students will follow a unique class-specific curriculum based from key misconceptions identified by the teacher.
Year 12	In year 12 students will build the foundations of key new topics to A-Level such as calculus, whilst also furthering their knowledge of GCSE mathematics.	The complete maths AS level content is taught in year 12, covering Pure maths, Statistics and Mechanics.
Year 13	Year 13 students will face more complex mathematical problems where all knowledge from year 12 must be utilised and deepened.	Students will cover all topics in the A-Level mathematics specification for Pure maths, Statistics and Mechanics.

Mathematics | St Wilfrid's

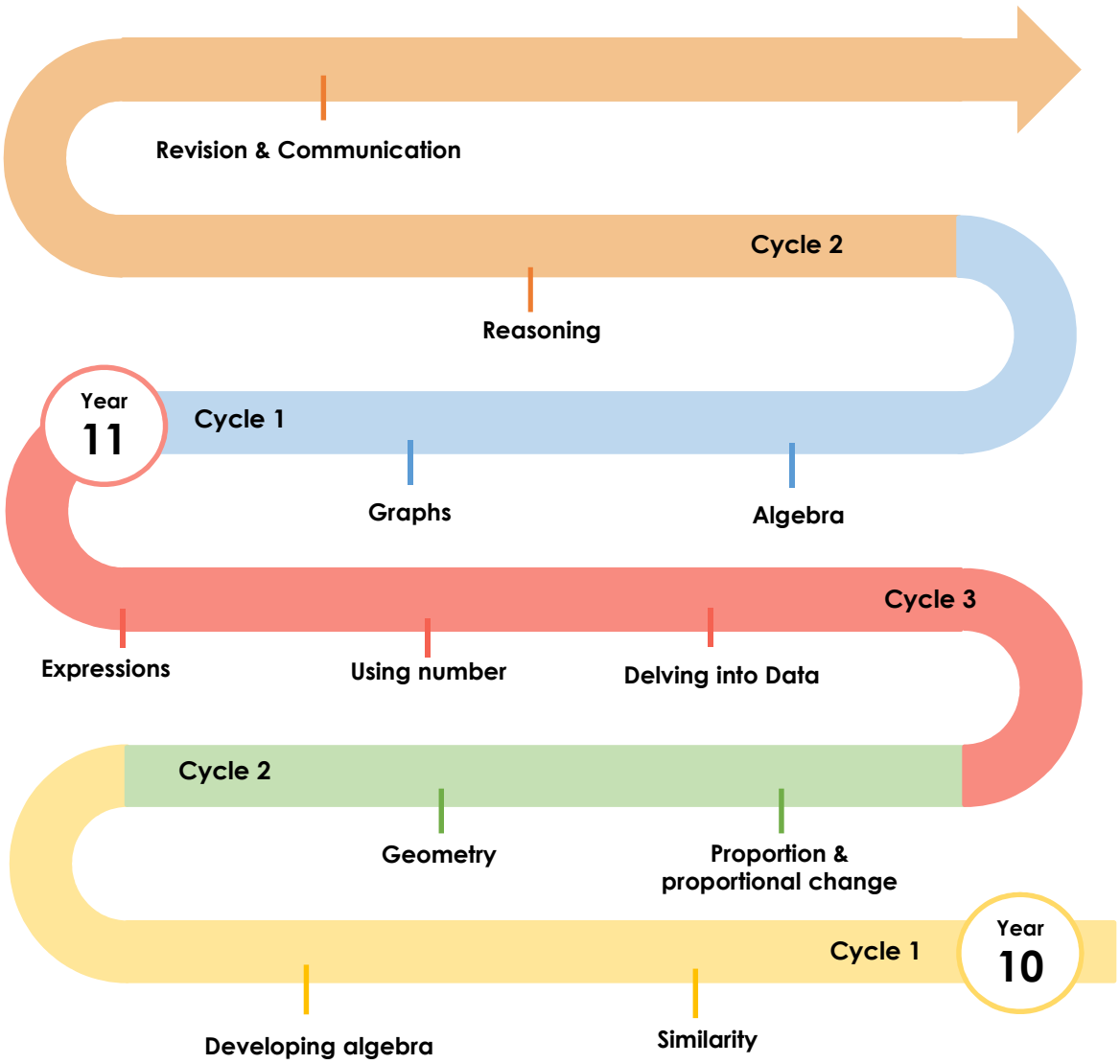


KS3 Mathematics | St Wilfrid's



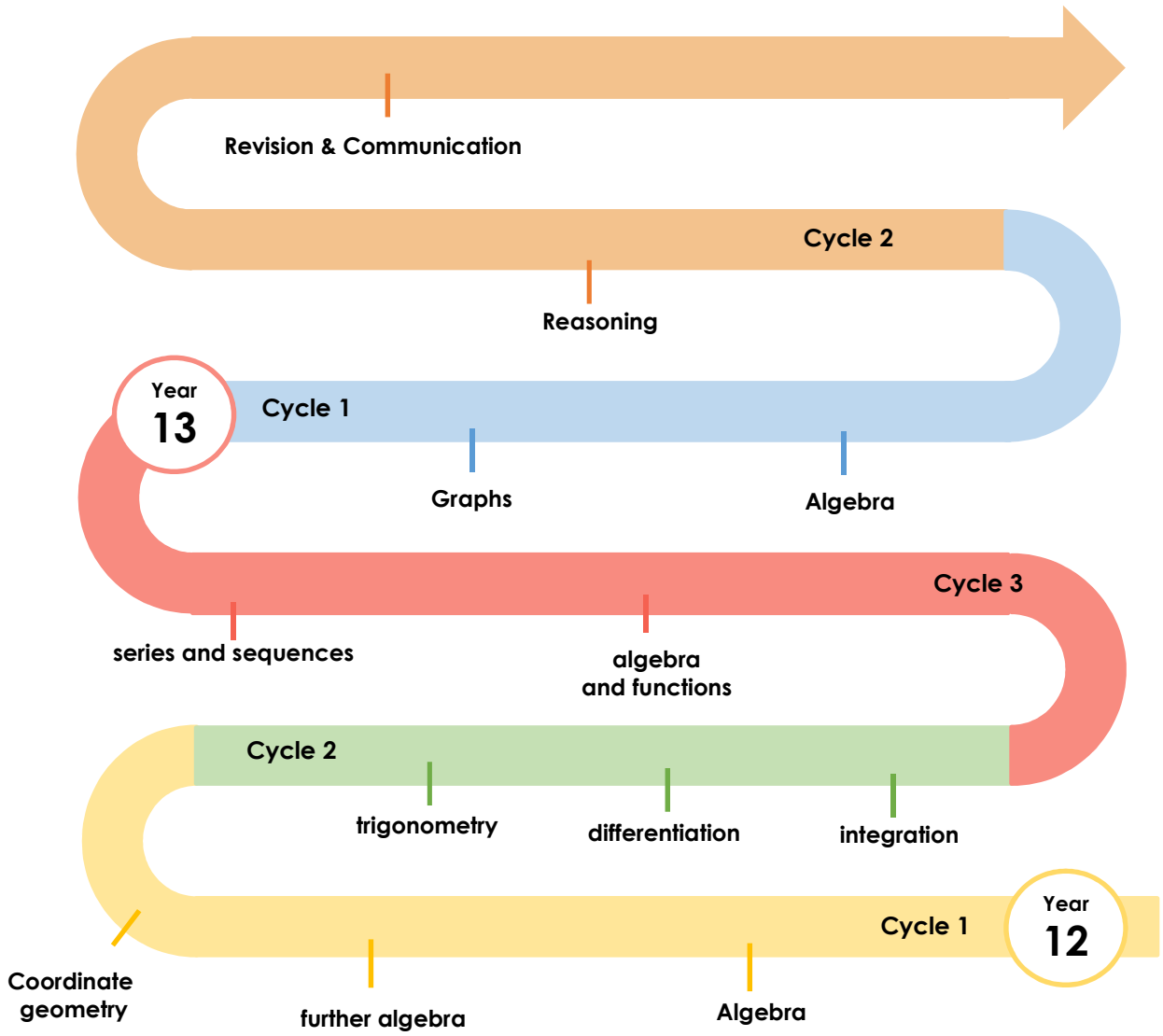
Mathematics Breakdown		
Year 7 • Cycle 1 Sequences Understand & use algebraic notation Equality & equivalence Place value & ordering integers & decimals Fraction, decimal & percentage equivalence • Cycle 2 Solving problems with addition & subtraction Solving problems with multiplication & division Fractions & percentages of amounts Operations & equations with directed number Addition & subtraction of fractions • Cycle 3 Constructing, measure & using geometric notation Developing geometric reasoning Developing number sense Sets & probability Prime numbers & proof	**Year 8** • Cycle 1 Ratio & scale Multiplicative change Multiplying and dividing fractions Working in the cartesian plane Representing data Tables & probability • Cycle 2 Brackets, equations & inequalities Sequences Indices Fractions & percentages Standard index form Number sense • Cycle 3 Angles in parallel lines & polygons Area of trapezia & circles Line symmetry & reflection The data handling cycle Measures of location	**Year 9** • Cycle 1 Straight line graphs Forming & solving equations Testing conjectures Three dimensional shapes Constructions & congruency • Cycle 2 Numbers Using percentages Maths & money Deduction Rotation & translation Pythagoras' theorem • Cycle 3 Enlargement & similarity Solving ratio & proportion problems Rates Probability Algebraic representation

KS4 Mathematics | St Wilfrid's



Mathematics Breakdown	
Year 10 • Cycle 1 Congruency, similarity & enlargement Trigonometry Representing solutions of equations & inequalities Simultaneous equations • Cycle 2 Angles & bearings Working with circles Vectors Ratios & fractions Percentages & interest Probability • Cycle 3 Collecting, representing & interpreting data Non-calculator methods Types of number & sequences Indices & roots Manipulating expressions	**Year 11** • Cycle 1 Gradients & lines Non-linear graphs Using graphs Expanding & factorising Changing the subject Functions • Cycle 2 Multiplicative reasoning Geometric reasoning Algebraic reasoning Transforming & constructing Listing & describing Show that

KS5 Mathematics | St Wilfrid's



Mathematics Breakdown	
Year 12 Cycle 1 Unit 1 – algebra Unit 2 – further algebra Unit 3 – coordinate geometry in the (x,y) plane Cycle 2 Unit 4 – trigonometry Unit 5 – differentiation Unit 6 – integration Cycle 3 Unit 7 – algebra and functions Unit 8 – series and sequences	**Year 13** Cycle 1 Unit 1 – algebra (year 13) Unit 2 – functions and modelling Cycle 2 Unit 3 – further differentiation Unit 4 – further integration

GCSE Mathematics

AQA GCSE Mathematics

Paper 1 Non-Calculator Assessment
Written examination: 1 hour and 30 minutes
33.33% of the qualification
80 marks

Paper 2: Calculator Assessment
Written examination: 1 hour and 30 minutes
33.33% of the qualification
80 marks

Paper 3: Calculator Assessment
Written examination: 1 hour and 30 minutes
33.33% of the qualification
80 marks

Assessment overview – all papers can include questions on topics from:

1. Number
2. Algebra
3. Ratio, proportion and rates of change
4. Geometry and measures
5. Probability
6. Statistics

Students must:		% Foundation	% Higher
AO1	Use and apply standard techniques: • accurately recall facts, terminology and definitions • use and interpret notation correctly • accurately carry out routine procedures	40-60	30-50
AO2	Reason, interpret and communicate mathematically • make deductions, inferences and draw conclusions • construct chains of reasoning to achieve a given result • interpret and communicate information accurately • present arguments and proofs • assess the validity of an argument and critically evaluate	15-35	20-40
AO3	Solve problems within mathematics and in other contexts • translate problems in contexts into a process • make and use connections in mathematics • interpret results in the context of the given problem • evaluate methods used and results obtained • evaluate solutions and assumptions made	15-35	20-40

GCE Mathematics

Edexcel A Level Mathematics

Paper 1: Pure Mathematics 1 (calculator allowed)

Written exam: 2 hours
33.33% of A-level
100 marks

Paper 2: Pure Mathematics 2 (calculator allowed)

Written exam: 2 hours
33.33% of A-level
100 marks

Assessment Overview:

- *Paper 1 and Paper 2 may contain any topics from the content*
- *Proof*
- *Algebra and functions*
- *Coordinate geometry*
- *Sequences and series*
- *Trigonometry*
- *Exponentials and logarithms*
- *Differentiation*
- *Integration*
- *Numerical methods*
- *Vectors*

Paper 3: Statistics and Mechanics (Calculator allowed)

Written exam: 2 hours
33.33% of A-level
100 marks

Assessment Overview
Statistics

- *Statistical sampling*
- *Data presentation and interpretation*
- *Probability*
- *Statistical distributions*
- *Statistical hypothesis testing*

Assessment Overview
Mechanics

- *Quantities and units in mechanics*
- *Kinematics*
- *Forces and Newton's law*
- *Moments*

Students must:		% in A Level
AO1	Use and apply standard techniques • select and correctly carry out routine procedures • accurately recall facts, terminology and definitions	48-52
AO2	Reason, interpret and communicate mathematically • construct rigorous mathematical arguments (including proofs) • make deductions and inferences • assess the validity of mathematical arguments • use mathematical language and notation correctly.	23-27
AO3	Solve problems within mathematics and in other contexts • translate problems into mathematical processes • interpret solutions to problems and evaluate their accuracy • translate situations in context into mathematical models • use and evaluate the outcomes of modelling in context	23-27

Key Texts and Websites

Key texts and websites that you can access to support their knowledge development in this subject include:

	Year 12	Year 13
	Exam Board Website: https://qualifications.pearsons.com/en/home.html	
Websites	https://www.examsolutions.net/ https://www.physicsandmathstutor.com/ https://www.mathsgenie.co.uk/	https://www.examsolutions.net/ https://www.physicsandmathstutor.com/ https://www.mathsgenie.co.uk/
Key Texts and Books	CGP: A-level maths revision guide and workbook for Edexcel Fermat's Last Theorem by Simon Singh The Cryptographic Mathematics of Enigma by Dr. A Ray Miller Humble Pi by Matt Parker Chaos by James Gleick e: the story of a number Eli Maor Alex's adventures in numberland by Alex Bellos	

	Year 10	Year 11
	Exam Board Website: https://www.aqa.org.uk/	
Websites	Sparx Maths https://corbettmaths.com/ DrFrostMaths.com https://diagnosticquestions.com/	Sparx Maths https://corbettmaths.com/ DrFrostMaths.com https://diagnosticquestions.com/
Key Texts and Books	CGP: GCSE maths revision guide and workbook for AQA – both higher and foundation tiers Graphs of maths by Greg Tang Math curse by Jon Scieszka and Lane Smith The number devil by Hans Enzenberger The simpsons and their mathematical secrets by Simon Singh 17 equations that changed the world by Ian Stewart Flatland – Edwin Abbott The house keeper and the professor – Yoko Ogawa A certain ambiguity – Gaurav Suri and Hartosh Singh Bal The Da Vinci Code – Dan Brown	

	Year 7, 8 and 9
Websites	Sparx Maths https://corbettmaths.com/ Home learning White Rose Maths (Teams)
Key Texts and Books	CGP: KS3 mathematics complete revision and practice A Gebra Names Al by Wendy Isdell Sir cumference and the dragon of pi by Cindy Neuschwander The adventures of Penrose the mathematical cat by Theoni Pappas Multiplying Menace by Pam Calvert Humble Pi by Matt Parker A beautiful Mind by Sylvia Nasar Imitation Game by Jane Rollason