MATHEMATICS 2024-25

'Pure mathematics is, in its way, the poetry of logical ideas.' – Albert Einstein

"So teach us to number our days that we may get a heart of wisdom" - Psalm 90:12

Intent statement

It is the intention of the St Cuthbert's Mathematics department to deliver a curriculum that is knowledge based, ambitious and designed to meet the needs of all our students. We aim to create an aspirational, high-achieving culture while also considering our students individual needs and learning styles thus enabling all students to experience success.

We aim to develop the skills set out in the National Curriculum to promote an appreciation of Mathematics as a creative and highly transferable discipline, which will aid students in their further learning, apprenticeships, or employment. We do not limit the life chances of any student as we offer a linear scheme up to the summer of year 10.

We aim to provide students with a sense of enjoyment and curiosity about the subject together with an appreciation of the beauty and power of Maths in different cultures. We endeavour to provide support across a range of topics to develop Mathematical fluency (component knowledge) with an emphasis on problem-solving (composite knowledge), making sure that all learning is embedded in long-term memory. The curriculum will emphasis secure learning, rather than just coverage through continually revisiting and building on prior knowledge. This will build resilience and enable students to recall information to use in a variety of new learning opportunities as well as real life situations.

Research the curriculum is based on

As a department we understand that our curriculum most do the following:

- Specify the mathematical methods to be taught ensuring these form a coherent, 'forward-facing', base of mathematical knowledge rather than a collection of disconnected algorithms and tricks.
- Give all students an opportunity to reach their potential, without limiting the content taught. At Key Stage 4 the curriculum is aligned until towards the end of KS4, ensuring all students secure the depth of knowledge the need to move into the final stage of GCSE and giving teachers time to make tier of entry decisions.
- Plans how student will learn to apply their component knowledge to composite (problem-solving) questions over time, for example by:
    - clearly identifying the range of problems to which students should be able to apply their factual and procedural (methods) knowledge
    - teaching students how their new facts and methods can be used to solve a range of problems
    - ensuring that all students have enough opportunities to practise solving problems, after they have first being taught, and that these opportunities require students to make decisions about how best to solve these unfamiliar problems
        - Mathematics Subject report – July 2023 Ofsted

Therefore, this year we are moving to the Sparx Maths Curriculum, because of the wealth of experience at Sparx Maths, the quality-assured content, their access to significant data and the shared common goal of helping students to become the very best mathematicians they can be.

Over the last 10 years, the Sparx Maths content design team have been creating and refining a high-quality bank of nearly 50,000 questions.

Contributions from a team of teachers, mathematicians, scientists, data analysts and linguists have led to a comprehensive and sophisticated content library for secondary maths.

The data that has been collected from over 1 billion question attempts helps to continually refine the offering. Sparx, delivers a high-quality content which is crucial for learning.

Teachers and students are at the heart of the content creation process; the attention to detail on every question helps all teachers to understand and support their students in every aspect of maths.

What are the key principles of the Sparx Maths Curriculum?

The Sparx Maths Curriculum is sequenced to build on prior learning, enables a deep understanding of the concepts taught and supports the delivery of high-quality teaching and learning. The supporting resources have been designed to complement each other and link to the curriculum, providing teachers and students with a coherent journey through secondary maths.

Here are the eight principles of the Sparx Maths Curriculum:

1. **Encourages depth of knowledge**
   By designing the curriculum as a 5-year programme, suitable time is given to cover concepts in depth, providing students with a strong foundation to build upon each year. The Sparx Maths Curriculum provides full coverage of the KS3 national curriculum and the GCSE mathematics specification, catering for all major exam boards in England.
2. **Empowers all teachers**
   The curriculum is supported by a suite of resources that supports teacher planning and delivery but, most importantly, gives teachers ownership over their lesson plans. Every context is different to ensure that teachers have the flexibility to create the lessons that work best for them and their students.
3. **Provides impactful assessment**
   The Sparx Maths Curriculum is supported by formative baseline and termly assessments, complete with mark schemes, and in conjunction with the Sparx Maths homework platform question level analysis and bespoke fix it tasks, which provide teachers with crucial insights on student progress to help inform their planning.
4. **Develops fluency and problem solving**
   Fluency is essential for giving students the secure toolkit they need to deepen their understanding. Equally, Sparx have ensured that problem solving is a prominent feature throughout. This balance ensures that students build the confidence they need to be successful in maths
5. **Provides retrieval practice**
   Through intelligently designed resources, there is regular interleaving of prior knowledge to give opportunities for retrieval practice. Cross-topic content and, at times, stepping back before moving forward, allows students to consolidate the knowledge they need to take them confidently through the curriculum. Constant revision of concepts through this well-structured retrieval practice ensures that the content can be taught in depth, and in a timely manner.

6. **Supports all learners**
   The curriculum is structured flexibly to ensure that all students can be supported. Suggested building blocks are provided to support this journey, and the language used throughout is student-friendly. Tiering decisions are not required until late into Year 10. This gives students and teachers the time they need to make this, sometimes complex, decision.
7. **Challenges all learners**
   For each unit of work, there are opportunities to deepen knowledge as deepening knowledge and understanding of each topic before moving on aids long term learning. Where suitable, there are also suggested areas for further teaching.

From the department work with the maths hub in conjunction with the NCETM our curriculum underpins the follow principles

- Mathematics teaching for mastery assumes everyone can learn and enjoy mathematics.
- Mathematical learning behaviours are developed such that students focus and engage fully as learners who reason and seek to make connections.
- Teachers continually develop their specialist knowledge for teaching mathematics, working collaboratively to refine and improve their teaching, through internal CPL, Craig Barton visits and our departmental drop ins.
- Curriculum design ensures a coherent and detailed sequence of essential content to support sustained progression over time.

Lesson design

- Lesson design links to prior learning to ensure all can access the new learning and identifies carefully sequenced steps in progression to build secure understanding.
- Examples, representations and models are carefully selected to expose the structure of mathematical concepts and emphasise connections, enabling students to develop a deep knowledge of mathematics. (Example pairs, deepen problem solve questions, examples to follow)
- Procedural fluency and conceptual understanding are developed in tandem because each supports the development of the other.

In the classroom

- Students are taught through whole-class interactive teaching, enabling all to master the concepts necessary for the next part of the curriculum sequence.
- In a typical lesson, the teacher leads back and forth interaction, including questioning, checks for listening, checks for understanding, short tasks, MIB work, explanation, demonstration, and discussion, enabling students to think, reason and apply their knowledge to solve problems.
- Use of precise mathematical language enables all students to communicate their reasoning and thinking effectively.
- If a student fails to grasp a concept or procedure, this is identified quickly (Craig Barton staged MWB approach), and gaps in understanding are addressed systematically to prevent them falling behind.
- Significant time is spent developing deep understanding of the key ideas that are needed to underpin future learning. This is continually revisited in the curriculum through interleaving and Review of

Learning.

- Key number facts are learnt to automaticity, and other key mathematical facts are learned deeply and practised regularly, to avoid cognitive overload in working memory and enable students to focus on new learning.

The Essence of Teaching for Mastery was first published by the NCETM in 2022.

We aim for the whole school to understand the maths curriculum and the rationale behind it. The maths department will be running CPL sessions for the LSAs and other staff to attend so they have a clear understanding, and they will be provided with their own copy of the curriculum and introduced to the online Sparx platform.

Powerful knowledge

The Mathematics Department at St Cuthbert's inspires students to question and explore the beauty of mathematics, leading to the development of resilient and analytical problem solvers who are able to numerically question the world around them.

In order to deliver a powerful, knowledge-rich curriculum we have selected knowledge by:

- Acknowledging that not all content taught is of equal importance. Number work is revisited and cemented in year 7 and interleaved into every curriculum area thereafter as it is the foundation upon which every other area of maths is based.
- Identifying the content that needs to be deeply embedded in long-term memory which is revisited through Review of Learnings, interleaving and 40% of homework being retrieval content.
- Clearly focusing upon what students pay attention to, making lessons interesting and relatable for students but avoiding overloading working memory.
- Identifying the right components – the individual 'bits' of knowledge that are necessary for complex performance.

The key mathematical method our student will learn in are:

- The structure of the number system
- Operating number
- Multiplicative reasoning
- Sequences and Graphs
- Statistic and Probability
- Geometry

KS3 Curriculum Rationale and Sequencing

The Sparx curriculum is presented on a termly timescale to allow flexibility. The timings given within a term are a guide, enabling class teachers to adapt the curriculum to fit their context and classes. Each term is 12 weeks in length, ensuring there is a buffer for revision and assessment, and for any additional teaching time that may be needed.

Each term consists of blocks of related units, for example, the block on "Number sense and calculations" is made up of 6 related units. Each unit is supported by:

- suggested teaching topics, with topic codes for Sparx Maths users.
- building blocks to highlight links to prior learning.

- example pairs of questions that support teachers in modelling key learning points and allow students to practice these new concepts. This includes a version with modelled solutions.
- examples of opportunities to deepen knowledge.

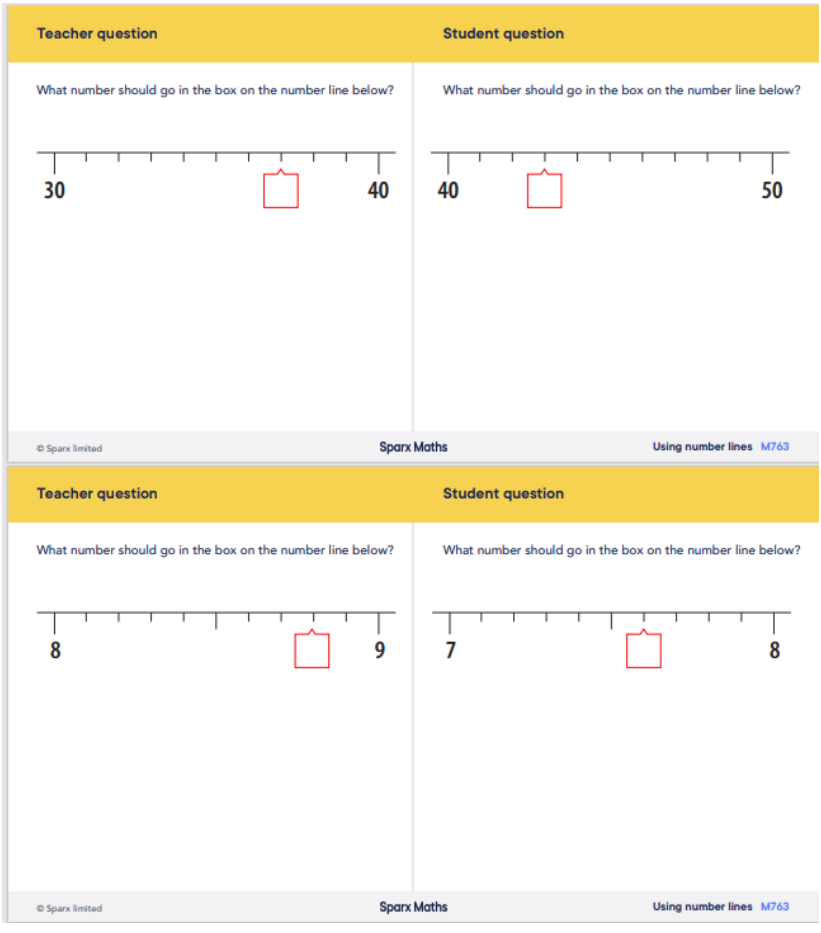
The carefully considered sequencing of content ensures that students have gained the fluency required to access upcoming units of work. Subsequent units provide ample opportunity for frequent retrieval of prior knowledge by incorporating cross-topic content. It also considers how areas of maths progress through the years, ensuring previous work is continually built upon and concepts are developed. Building blocks are signposted throughout so that prior learning can be revisited if required, to allow all students to move forwards with confidence.

The curriculum is colour coded to provide a clear visual overview of each strand across all year groups:

- Number – Yellow
- Algebra – Pink
- Statistics – Blue
- Ratio and Proportion – Orange
- Geometry – Green
- Probability – Purple

Problem solving will play a major part in our curriculum. Component knowledge will be used in every lesson to then answer composite, problem solve, questions.
The SOL sets out example pairs for the componant knowledge which the department will use as a collective approach. The SOL also has a deepen section for each unit of learning which all staff will use to encourage and develop each student's problem solving abilities.

Examples Pairs Example



Problem Solve Example

Opportunities to deepen knowledge

Number sense Y7

Understanding and ordering integers, decimals and negative numbers

- Solving complex fluency and reasoning problems
- Interpreting real-life contexts including measurements and temperatures
- Constructing numbers and calculations given specified criteria

Work out $1 + \frac{4}{10} + \frac{5}{100}$

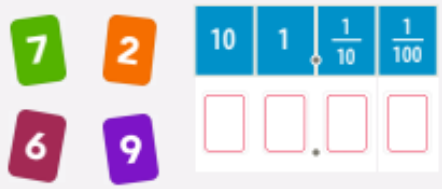
Give your answer as a decimal.

What number is halfway between 34.2 and 34.21?

Stefan believes that 1.25 is bigger than 1.7
Explain how Stefan might have made this mistake.

Write this number in figures:
negative sixteen point eight

Put the number cards shown into the gaps to make the largest number possible.



Put the number cards shown into the gaps to make the lowest number possible.

Which city has the lowest temperature?

Put these lengths in order of size, starting with the shortest:
1.2m 1.12m 1.4m 1.7m

Put the number cards shown into the gaps to create the largest number possible between 45.72 and 62.14

Put the number cards shown into the gaps to make the value of the calculation as small as possible.

Year 7

Term 1

Starts with number as this is the foundation of the maths curriculum throughout KS3 and KS4.
Expressions and equations is a new and exciting topic for our year 7 students. These skills fundamentally underpin many areas in maths and these ideas are interleaved in upcoming topics so having this topic early on in year 7 is sensible.

Time and Measure are investigated in the final part of term 1, interleaving in the number sense and calculations topic.

Term 2

2D shapes, perimeter and area are introduced at the start of term 2. They use the building blocks of adding and multiplication from term 1.

Coordinates – Students are asked to reading and plot coordinates, which incorporates some composite elements with shape weaved into the topic.

Factors, multiples and primes, introducing highest common factor, lowest common multiple and prime factor decomposition. This recalls fluency (component) knowledge from term 1.

Fractions - Finding fractions of shapes, finding equivalent fractions, simplifying fractions, ordering fractions and converting between mixed numbers and improper fractions and addition and subtraction of fractions. This revisits the building blocks from the last unit of LCM and HCF.

Single Brackets - Using the distributive law to expanding single brackets, expanding single brackets and simplifying expressions and factorising into one bracket. These interleaves simplifying expressions and HCF.

Term 3

Angles – Revisit types of angles from primary, including estimating angles, measuring angles and drawing angles as this will establish a solid basis for investigating different angle rules. Then students will then investigate angles on a line and about a point, vertically opposite angles and angles in triangles. This will also include composite questions involving solving equations.

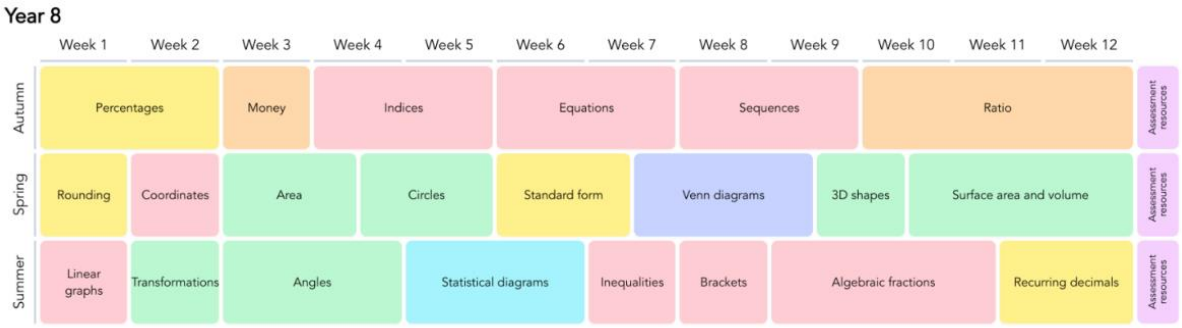
Handling data and statistical diagrams – This includes calculating the range, the median, the mode and the mean. The topic them moves onto interpreting frequency tables and two-way tables, drawing and interpreting tally charts, pictograms and bar charts. The students will then find averages from frequency tables and choose suitable averages and solving problems. This will require recall knowledge of place value, addition, subtraction, multiplication and division.

Proportion worded problems – Students will solve proportion problems building on their skills of using a calculator.

Fractions, decimals and percentages – Students will build upon their prior knowledge and start to learn about reciprocals, multiplying fractions, dividing fractions, multiplying with mixed numbers and dividing with mixed numbers. This will build on recall of simplifying fractions and converting between mixed numbers and improper fractions. The topic will then concentrate on fractions of amounts without a calculator and move to fractions of amounts with a calculator which will incorporate prior knowledge from solving proportion problems in the previous unit. Converting between fractions decimals and percentages, ordering fractions, decimals and percentages and writing numbers as percentages of other numbers with finish the unit recalling knowledge from finding equivalent fractions, simplifying fractions and ordering fractions from term 2.

Year 7 finishes with the probability topic. This will incorporate using probability phrases, writing probabilities as fractions, writing probabilities as fractions, decimals and percentages, probabilities of mutually exclusive events and sample space diagrams. This will build on the previous learning of adding and subtracting fractions, converting between fractions, decimals and percentages and ordering fractions, decimals and percentages.

Year 8



Term 1

Year 8 starts with percentage as it builds on a lot of the fundamental number work already covered in year 7, this includes finding percentages of amounts with and without a calculator and percentage change with and without a calculator. This will incorporate the prior building blocks of converting between fractions, decimals and percentages and fractions of amounts with and without a calculator.

Value for money is the next topic studied in year which interleaves with solving proportion problems, adding decimals and subtracting decimals.

The next three units of work are all under the algebra umbrella and starts with index rules with positive and negative indices, simplifying expressions using index laws and simplifying algebraic fractions by cancelling common factors which builds on their prior learning of calculating with roots and powers, simplifying fractions and algebraic notation. We then more to solving equations where we are solving equations in the form $(x+a)/b=c$, involving brackets, with the unknown in the denominator and an unknown on both sides. Students will also construct equations incorporating their knowledge from topics such as angles. We will then look at sequences including Term-to-term rules for numerical sequences and Term-to-term rules for sequences of patterns. Moving onto substituting into position-to-term rules, Position-to-term rules for arithmetic sequences and Position-to-term rules for sequences of patterns. This will interleaved with fluency knowledge of number, including negatives.

The final block in term 1 is on ratio. This includes writing and simplifying ratios, writing ratios in the form 1:n, converting between ratios, fractions and percentages and using equivalent ratios to find unknown amounts. Finally, students will share amounts in a given ratio. This will consolidate finding the HCF, constructing fractions and writing numbers as a % of another number.

Term 2

This term starts with number in the form of significant figures as this will build on the students prior knowledge of rounding to the nearest 10,100,1000, decimal place etc. Students will be taught to round integers using significant figures, rounding decimals using significant figures and estimate calculations.

The next topic is coordinates and midpoints. Students will calculate midpoints and mixed problems with coordinates and midpoints with will consolidate the learning of reading and plotting coordinates in year 7.

The next two units of work will concentrate on geometry. This will include finding the area of parallelograms, trapeziums and converting units of area. Students will also be asked to identifying parts of circles and then find the circumference and area. This will include retrieval practice on finding the area of rectangles, compound shapes and triangles.

The spring term continues with number and using standard form with positive and negative indices. This will incorporate retrieval on multiplying and dividing by 10, 100 and 1000

We then move onto a probability unit that introduces Venn diagrams and probabilities from Venn diagrams. This will then progress to finding the HCF and LCM from a Venn diagram, building on prior learning from fractions, decimals, percentages, factors and multiples.

Finally, in term 2 we revisit geometry as this builds upon the prior geometry topics studied in year 7. Starting with properties and nets of 3D shapes which solidifies knowledge of 2D shape properties. Using the nets of the shapes we will start to find the surface area of cubes and cuboids and other prisms, interleaving work completed on area of shapes and compound shapes. We will also begin to find the volume of cubes, cuboids and other prisms.

Term 3

Term 3 will begin with linear graphs as this interleave previous graph and coordinate work. This involves plotting horizontal, vertical and diagonal lines, plotting straight line graphs and finding equations of straight line graphs consolidating work not only on coordinates but also substitution.

We then move onto geometry in the form of translation and reflection. Again, using knowledge of coordinate points. After this we move onto angles and look at angles in quadrilaterals, combining angle facts, angles on parallel lines, using quadrilateral properties to find angles and angles in polygons. This will revisit angles on a line and about a point, Vertically opposite angles and angles in triangles.

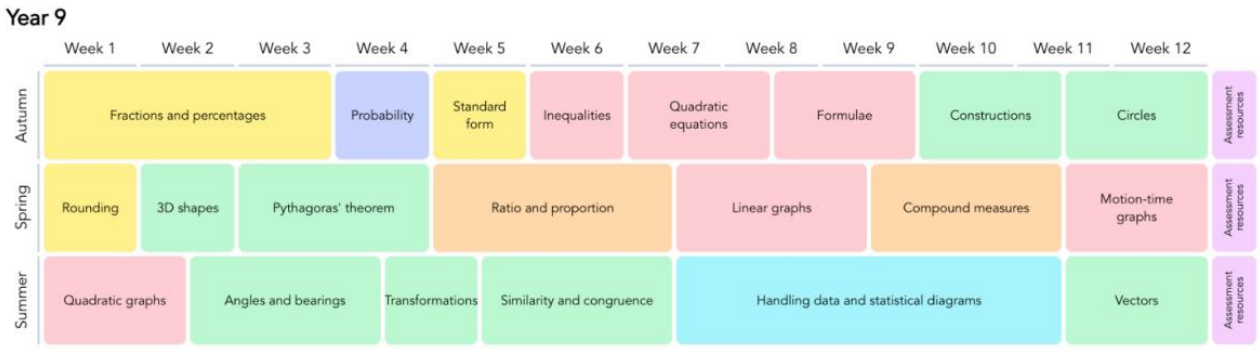
The next topic covered is drawing and interpreting statistical diagrams. This includes drawing pie charts, interpreting pie charts, drawing line graphs and Interpreting line graphs. This will recall work done previously including angles on a line and about a point, vertically opposite angles and angles in triangles.

We then move back to algebra for the next few units of work. This covers reading and drawing linear inequalities on number lines, solving single inequalities and expanding double brackets. We will then learn to calculate with fractions and mixed numbers building up to simplifying algebraic fractions by factorising and

adding and subtracting algebraic fractions together. This will consolidate the algebra work completed in year 7 and 8 so far.

The final topic in year 9 will be on recurring decimals. This will involve using recurring decimal notation and converting fractions to recurring decimals. The with interleave with fractions, decimals and percentages from earlier topics

Year 9



Term 1

Term 1 begins in Year 9 with a review of fractions, decimals and percentages. This will build on the work from previous years including finding equivalent fractions, ordering fractions and multiplying fractions. This includes converting between fractions, decimals and percentages and ordering fractions, decimals and percentages. Students will also be finding fractions and percentages of amounts with and without a calculator. The topic will then move into percentage change and cover percentage change with and without a calculator, finding original values in percentage calculations, finding the percentage an amount has been changed by and simple interest calculations.

We then move into probability looking at theoretical and experimental probability. This will include expected results from repeated experiments, calculating experimental probabilities and frequency trees. This will incorporate the building blocks of writing probabilities as fractions, decimals and percentages, probabilities of mutually exclusive events, finding fractions of amounts and finding percentages of amounts.

The next unit will move onto standard form and it will build on the previous standard form unit in year 8. This will include multiplying and dividing numbers in standard form, adding and subtracting numbers in standard form and standard form with a calculator. This will use the building blocks of using standard form with positive and negative indices.

The year 9 SOL then moves onto solving inequalities with the unknown on both sides, solving double inequalities and constructing and solving inequalities. This will interleave reading and drawing inequalities on number lines. We will then move onto factorising quadratic equations of the form $x^2 + bx + c$ and factorising the difference of two squares. This will build upon their knowledge of expanding double brackets and factorising into one bracket. Finally, we will be changing the subjects of formulae with one or multiple steps. This will use prior learning of solving equations.

The autumn term will finish with geometry and constructing bisectors of angles and lines and perpendicular bisector. This will recap using a ruler and using a pair of compasses. The geometry will continue with finding the arc length and area of sectors and finding the surface area and volume of cylinders. This will revisit identifying parts of circles, finding the area and circumference of circles and the volume of prisms.

Term 2

The spring term in Year 9 starts with finding error intervals and truncating decimals. Students will be finding error intervals for truncated numbers. This will build on the prior learning of rounding integers, rounding decimals, rounding integers using significant figures and rounding decimals using significant figures.

The scheme of learning will then move back to geometry and starts with plans and elevations building upon properties of 3D shapes. We will then start using and applying Pythagoras' Theorem in 2D. This will reinforce knowledge of roots and powers.

The next part of the spring term will look at ratio and proportion. This will include writing and simplifying ratios and sharing amounts in a given ratio. Again, this will build in prior knowledge of HCF. We will then move to solving direct proportion word problems and solving inverse proportion word problems. This will include currency conversion.

The scheme of learning then moves back to algebra and plotting straight line graphs including finding equations of straight line graphs and interpreting equations of straight line graphs. This will interleave the prior knowledge of reading and plotting coordinates and plotting horizontal, vertical and diagonal lines.

The spring term continues looking again at ratio and proportion. This will include calculating with speed and calculating with rates, drawing upon the students' prior knowledge of substitution.

We then move on to plotting, interpreting and calculating speed from distance-time graphs, using a topic covered earlier in the year which looked at speed.

Term 3

The summer term starts with algebra, looking at plotting graphs of quadratic functions and interpreting graphs of quadratic functions. The students will then solve quadratic equations graphically. This will required drawing upon prior learning about substitution and plotting straight line graphs.

We then move onto geometry with combining angle facts, angles on parallel lines, using quadrilateral properties to find angles and angles in polygons. This will consolidate prior learning of basic angle rules. Bearings will then be introduced building on this prior learning, learning to measure and draw bearings and calculating bearings using angle facts.

Geometry continues with Translation, Reflection, Rotation and Enlargement by a positive scale factor, moving onto mixed transformations. This will consolidate the prior learning on translation and reflection from year 8.

The next unit will concentrate on understanding similarity and finding unknown sides in similar shapes, using prior knowledge of direct proportion. This progresses onto understanding congruence, congruent triangles and constructing triangles.

Next in the summer term we will look at statistics, concentrating on types of data, presenting data, making conclusions, comparing populations using diagrams and choosing suitable averages and solving problems. This will recall learning from averages and range. We will then start to study scatter graphs, including plotting scatter graphs, interpreting scatter graphs and using lines of best fit, again consolidating prior work on plotting coordinates and equations of straight line graphs. We will then look to interpreting frequency tables with grouped data, find averages from grouped data to draw and interpret frequency polygons building on prior knowledge of finding averages from a table.

The year 9 SOL will finish looking at understanding column vectors, including adding and subtracting column vectors, multiplying column vectors by a scalar and identifying parallel vectors.

Key Stage 4 Rationale and Sequencing

The Sparx Maths Curriculum for KS4 is set out in a way so that no tiering decisions are made until towards the end of KS4, therefore **all** students have the opportunity to take the higher paper. This gives our class teachers the time they need to make tier of entry decisions by keeping the Foundation and Higher tiers aligned until Year 11. Until this point, the SOL has not included any 'higher only' content but have instead ensured that learners are securing the depth of knowledge they need to move into the final phase of the GCSE, no matter which tier of entry they follow.

Following the October Mock examination any student that has taken the foundation mock and achieved a grade 4 or 5 will be given an opportunity to move to the higher course. This will be achieved through intervention classes, set moves and targeted homework to fill any higher content gaps. The following areas would need to be covered: (The codes at the end of the topic are videos for the students to watch and complete work on using Sparx)

- Multiplying and dividing surds(U633)
- Simplifying surds(U338)
- Adding and subtracting surds(U872)
- Expanding brackets with surds(U499)
- Rationalising denominators containing a single term(U707)
- Rationalising denominators containing two terms(U281)
- Simplifying algebraic fractions by factorising into one bracket(U437)
- Simplifying algebraic fractions by factorising into two brackets(U294)
- Adding and subtracting algebraic fractions(U685)
- Multiplying algebraic fractions(U457)
- Dividing algebraic fractions(U824)
- Factorising to solve quadratic equations of the form (U960)
- Solving quadratic equations by completing the square(U589)
- Solving quadratic equations using the quadratic formula(U665)
- Constructing and solving quadratic equations(U150)
- Solving quadratic equations graphically(U601)
- Solving simultaneous equations involving quadratics(U547)
- Solving simultaneous equations involving quadratics graphically(U875)

All the content from KS3 will be used and built upon in KS4.

Again, problem solving will be an integral part of the KS4 curriculum. As in KS3, component knowledge will be used in every lesson to then answer composite, problem solve, questions.
The SOL sets out example pairs for the competent knowledge which the department will use as a collective approach. The SOL also has a deepen section for each unit of learning which all staff will use to encourage and develop each student's problem solve abilities.

Examples Pair Examples KS4

Teacher question	Student question
A bank account starts with a balance of £20 000 and pays compound interest at a rate of 3% per year. Work out the balance of the account a) after 1 year. Answer: £ ..... b) after 2 years. Answer: £	A bank account starts with a balance of £10 000 and pays compound interest at a rate of 4% per year. Work out the balance of the account a) after 1 year. Answer: £ ..... b) after 2 years. Answer: £ .....

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Teacher question	Student question
Bryce takes out a loan of £750. It gains compound interest at a rate of 8% per year. How much money will Bryce owe after 6 years? Give your answer in pounds to the nearest 1p. Answer: £	Rhiannon takes out a loan of £950. It gains compound interest at a rate of 7% per year. How much money will Rhiannon owe after 5 years? Give your answer in pounds to the nearest 1p. Answer: £ .....

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Teacher question	Student question
Elina opens a savings account which gathers compound interest of 3.5% per year. She puts £2100 into the account. a) How much money will Elina have in the account after 9 years? Give your answer in pounds to the nearest 1p. Answer: £ ..... b) How much interest will Elina have earned from this account after 9 years? Give your answer in pounds to the nearest 1p. Answer: £	Munya opens a savings account which gathers compound interest of 4.5% per year. He puts £1700 into the account. a) How much money will Munya have in the account after 8 years? Give your answer in pounds to the nearest 1p. Answer: £ ..... b) How much interest will Munya have earned from this account after 8 years? Give your answer in pounds to the nearest 1p. Answer: £ .....

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Problem Solve Examples

Opportunities to deepen knowledge

Repeated percentage change Y10

- Comparing compound interest with simple interest
- Solving cross-topic questions involving currency conversion
- Using trial and improvement to work out the length of time in a repeated percentage change problem
- Solving complex fluency and reasoning problems

A bank offers two different types of savings account which pay interest as shown below. Yusuf wants to invest £3200 in one of these accounts for 13 years.

a) Which account will pay Yusuf more interest after 13 years?

b) How much more interest will it pay?

Give your answer in pounds to the nearest 1p.

Account 1	Account 2
Simple interest at a rate of 5% per year	Compound interest at a rate of 4% per year

In 2018, the population of Canada was 37 million.

A mathematician predicted that Canada's population would grow by 1.2% every year from then.

If the mathematician was correct, how many whole years would it take from 2018 for the population of Canada to grow to over 50 million?

George buys a new car.

The value of George's car will depreciate at a rate of 7% per year.

George wants to work out how long it will take for the car's value to have depreciated by more than 45%

How many whole years after he bought the car will this happen?

A bank in the USA only accepts money in dollars. One of its savings accounts has a compound interest rate of 3.5% per year.

Natasha converts £3500 to dollars when the conversion rate is £1 = $1.32 and saves it in the bank account.

After 8 years, she takes the money out of the account and converts it back to pounds when the conversion rate is £1 = $1.24

How much more money does Natasha have now? Give your answer to the nearest £1.

Rosie opens an account which gathers compound interest.

In the first year, the interest rate is 6% per annum.

The following year, the interest rate drops, but the amount of money added to the account as interest stays the same.

What is the new interest rate?

Give your answer as a percentage to 1 d.p.

A drinks company made a profit of £24 500 in its first year of trading.

The increase in profit between its second and third year of trading was £1019.20

The company's profit increased by the same percentage each year.

Work out this percentage increase.

Examination Rational - OCR

OCR's GCSE (9–1) in Mathematics provides a broad and coherent course of study. It encourages learners to develop confidence in, and a positive attitude towards mathematics and to recognise the importance of mathematics in their own lives and to society.

OCR is right for our student at St Cuthbert's as exam papers contain clear, concise statements with words that students find familiar. They also have a straightforward layout, which makes them easily accessible for students of all abilities. Foundation students in particular can feel confident they will be tested on their maths, with questions presented in a clear and understandable way for them.

Key reasons for choosing OCR

There are more marks available for showing mathematical method. With 100 marks available in each of our three exam papers, they reward students for each correct step they show on the way to their final answer, whether that answer is right or not.

The first of the GCSE (9-1) Maths papers is a calculator paper. This helps to get students' exam experience off to a good start, helping to reduce issues by building their confidence and motivation from the beginning.

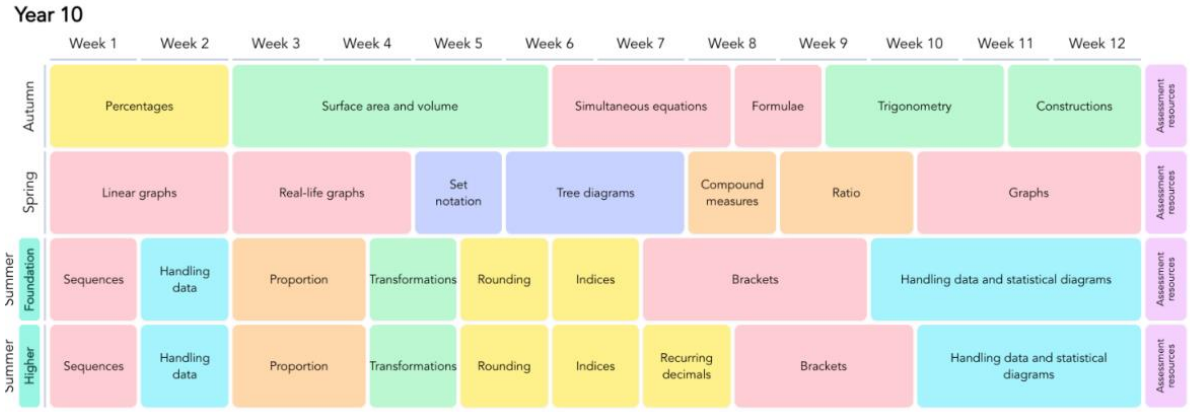
Accessibility is key when writing our GCSE (9-1) Maths papers. OCR have drawn up a set of accessibility principles for GCSE (9-1) Maths, to ensure the wording, layout and design of the questions papers all help students to access the questions being asked.

The specification makes it clear where to pitch the subject content. Content is arranged in three columns showing the split clearly between 'initial learning', foundation level and higher level, so you'll know exactly how to cover the content at the right level before moving on to more difficult areas.

They have extensive formative assessment support. They have over 100 Check In tests, to provide formative assessment opportunities for each of our three levels of subject content. Section Check In tests, available for both foundation and higher tier, each cover whole sections of content.

Lots of practice papers, alternative papers and free access to ExamBuilder, so the students have ample opportunities to experience exam-style assessments.

Year 10



Term 1

The year 10 scheme of learning starts with percentages as it again undermines the component knowledge from KS3. They will start to do compound interest calculations and growth and decay. This will build on work covered in KS3 including percentage change with a calculator and finding original values in percentage calculations

We will then move onto geometry. Students will be finding the surface area and volume of pyramids, cones, spheres and frustums. This will move on to composite shapes. This will be building on their prior knowledge of cubes, cuboids, prisms and cylinders.

Algebra will be the next unit, concentration on solving simultaneous equations using elimination, substitution and graphically. Students will also be asked to construct and solve simultaneous equations. This will interleave prior learning on solving equations with two or more steps and unknowns on both sides. We will then start to look at changing the subjects of formulae with two or more steps and then changing the subject when the subject appears more than once which revisits expanding and factorising brackets.

We will then move back to geometry looking at trigonometry, starting with understanding sin, cos and tan, then finding unknown sides in right-angled triangles followed by finding unknown angles in right-angled triangles. Exact values will also be covered. The building blocks revisited here will be calculating with roots and powers, solving equations with two or more steps, changing the subjects of formulae with two or more steps, angles in triangles and measuring and drawing bearings.

The autumn term will finish with constructing loci, building on the prior learning of constructing bisectors of angles and constructing perpendicular bisectors and lines.

Term 2

Spring term begins with finding the equation of a straight line from its gradient and a point, finding the equation of a straight line from two points on the line and equations of parallel and perpendicular lines, recalling the building blocks of finding equations of straight line graphs and interpreting equations of straight line graphs. This will move into looking at plotting linear real-life graphs, using and interpreting linear real-life graphs and finding equations of linear real-life graphs. Students will also be asked to sketch graphs of water flows.

The scheme of learning will then move onto probability starting with revisiting Venn diagrams with set notation, consolidating the prior learning of writing probabilities as fractions, decimals and percentages. We will then move on to tree diagrams for independent events, tree diagrams for dependent events and recall learning from multiplying fractions.

We will then move on to ratio and proportion, looking at calculating with density and calculating with pressure. This will recall component knowledge from substituting, converting units, solving equations and changing the subjects of formulae with two or more steps. This will be followed by looking again at ratio, including combining ratios, calculating with ratios and algebra and changing ratios. This will underpin learning on writing and simplifying ratios and sharing amounts in a given ratio.

The spring term will finish back at algebra concentrating on plotting velocity-time graphs and calculating acceleration from velocity-time graphs recalling work on plotting and interpreting distance-time graphs and calculating speed. We will then look at graphs of cubic functions, graphs of reciprocal functions and exponential functions.

Term 3

The summer term starts off with algebra looking at position-to-term rules for arithmetic sequences and position-to-term rules for sequences of patterns. Geometric sequences might also be covered here. This will build on previous knowledge of term-to-term rules and substituting into position-to-term rules.

We then move onto statistics looking at sampling and bias using component knowledge of direct proportion. This will include capture, recapture

Ratio and proportion will be our next unit looking at interpreting direct proportion equations, interpreting inverse proportion equations and graphs of direct and inverse proportion, building on prior learning of direct proportion.

The scheme of learning then moves back to geometry. We will combine transformations previously taught including translation, reflection, rotation and enlargement by a positive scale factor. Negative scale factors might also be taught here.

Number is our next topic including finding error intervals, finding error intervals for truncated numbers and possibly bound for calculations. Index rules with positive indices and negative indices will then be taught, incorporating more difficult index laws where needed. This will recap calculating with roots and powers and simplifying fractions.

Foundation

The foundation course will continue with expanding double brackets, Factorising quadratic expressions and the difference of two square. This will solidity prior learning on using algebraic notation, simplifying expressions by collecting like terms, finding the highest common factor, expanding single brackets and factorising into one bracket.

The summer term will finish with statistics, including interpreting frequency tables with grouped data and finding averages from grouped data. This will recap interpreting frequency tables and two-way tables and finding averages from frequency tables. The topic will continue with drawing and interpreting stem-and-leaf diagrams, drawing and interpreting line graphs and drawing and interpreting frequency polygons. This will recall component knowledge from reading and plotting coordinates, drawing bar charts and interpreting bar charts.

Higher

The higher course will continue with converting fractions to recurring decimals and converting recurring decimals to fractions building on prior knowledge of using a written method to divide with decimals and solving equations with two or more steps.

We will then move onto algebra with expanding triple brackets, completing the square and factorising and solving quadratic. This will use the building blocks of expanding double brackets and earlier factorise topics.

The summer term will finish with statistics, looking at drawing and interpreting cumulative frequency graphs, bring in component knowledge of frequency tables with grouped data. Finally, the students will learn how to draw and interpret box plots and comparing populations using box plots and cumulative frequency graphs. This will recap calculating the median and finding the mode.

Year 11 (September 2024)

Students in year 11 in September 2024 will continue to follow the foundation or higher course from Year 10 from the prior SOL until their exam in summer 2025. However, **all** students will have the ability to move between foundation and the higher course of study.
Any student achieving a grade 4 or 5 in the foundation mock in Year 11 will be afforded the opportunity to move to the higher course. As stated above in the KS4 curriculum rationale, any gaps in knowledge will be filled by intervention classes, bespoke homework using targeted videos and set moves. Final decisions on tiering will only take place after the February mock.

Curriculum rationale

Topics are covered matching to the tier of entry and are carefully sequenced to enable students to build upon prior knowledge. All topics are taught at a mastery level and interleaved to other areas of maths at all times. Staff are aware what has been delivered in previous year groups and their planning is adapted accordingly. ROL is used to reinforce prior knowledge and move onto new learning quickly. There is a huge emphasis on using problem solving and reasoning questioning in all year groups but especially in Y10 and 11 where some topics may have been seen before

Foundation

Unit 9 - Perimeter, Area and Volume 1

- Many areas and volumes are quickly recapped with problem solve being interleaved within.
- What differs this unity from KS3 is its link between volume and capacity and as well as the links made between volume and density/pressure.

Unit 10 – Straight Line Graphs

- These students will revisit drawing some easier graphs from their KS3 which will then progress into y = mx + c which will be further developed from some earlier Y9 work.
- Substitution and rearranging formula from earlier units will help support this new learning as well as work with negatives.

Unit 11 Transformations

- This is a discreet topic that these students will be seeing for the first time. We will cover it now to give students an easier topic following y = mx + c in the last chapter which gets quite difficult. Reflection will also require some knowledge of Unit 10 Graphs when we need to name lines of reflection.

Unit 12 - Right-Angled Triangles

- Quite a few Geometry topics to cover so this will be placed here at the end of Y10. This is easily accessible to a Y10 foundation student so placed here.
- Indices and Pythagoras will be revisited from KS3 as Pythagoras will need these. Both Pythagoras and Trig will then be covered in depth and with problem solve elements added.
- This can be an easy topic to forget and can quickly and easily recalled in Y11.

Unit 13 - Ratio and Proportion Start of Y11

- Simple ratios will be revised from Y9 such as simplifying and sharing ratios however these will extend further by introducing fractions with ratio as well as when there are 3 ratios within one question.
- Direct proportion will also be revised from KS3 but extend to inverse proportion as well as linking proportion to graphs.
- Speed will be covered here too as it is sensible to complete this with Time distance graphs that is here also
- As Speed, Density and Pressure all need to use triangle formulas have recently covered trigonometry makes sense as this skill of triangular formulas are revisited.

Unit 14 – Probability

- Basic probability will have been already covered in KS3 and revised here before extending to frequency trees, Venn diagrams and tree diagrams.
- This topic needs to follow work on operations with fractions and decimals as this will be required to fully access tree diagrams. Unit 1 and Unit 4.

Unit 15 Constructions, Loci and Bearings

- Constructions and Loci will be a new topic for these students that needs to be cover here before the end of Y11. This Geometry topic is nicely placed to break up a two large number (lots of number in probability) and algebraic topics before and after it.
- Bearings is placed within the same unit and requires all knowledge of angles from earlier in Y10. These angle rules will be quickly revisited here.

Unit 16 - Quadratic Equations and Graphs

- Multiplying and factorising single brackets will already have occurred in previous years. They will be revisited here briefly before extending to double brackets and factorising quadratics. Students often struggle with these two topics so we leave these later in the course to give them the best chance at success.
- We draw the quadratic graph here as the links can be made between expanding, factorising and drawing. This should give the students the best chance at linking these topics and thus remembering them long-term.

Unit 17 - Perimeter, Area and Volume 2

- This is a nice topic as it is difficult yet students often are very successful with it. As many algebraic topics are needed such as substituting, it needs to come after these.
- Area, perimeter and volume 1, concentrated on basic areas and perimeters as well as volume of non-circular prisms. That knowledge is still required but expanded upon to further develop all circles and prism involving circles and sectors. Cones and spheres are also covered here. Substituting into formula from a previous year will be essential for students to be successful on these topics.

Unit 18 - Fractions, Indices and Standard Form

- Standard Form with basic index laws will be revisited from KS3 and Y10 enabling us to move onto calculations with standard form. Previous decimal work will also have to be revisited here to aide student learning.

Higher

Unit 8 – Transformations and Constructions

- These are discrete topics that these students will be seeing for the first time and require very little prior knowledge.
- Previous fraction work in KS3 will allow students to access all aspects of enlargement.
- Previous Graph work in Unit 7 will allow students to fully access reflection.

Unit 9 – Equations and Inequalities

- Multiplying and factorising single brackets will already have occurred in previous years. They will be revisited here briefly before extending to double brackets and factorising quadratics including with co-efficients and Difference of two squares.
- Solving Quadratics will now extend further to encompass the Quadratic Formula and Completing the Square.
- Prior knowledge on substitution and linear equations will allow students to access simultaneous equations.

Unit 10 Probability

- Basic probability will have been already covered and revised here before extending to frequency tress and tree diagrams. Previous fraction and decimal work are revisited and embedded further here to allow students to fully access tree diagrams, including conditional as well as understanding the “And” and “OR” rules.
- Venn Diagrams are extended upon from KS3 to have the problem solve and equation element added to them.

From Unit 11 Onwards we are looking at higher topics only and previous knowledge from all years underpin these topics.

Unit 11 – Similarity and Congruence

- A deep understanding on previous topics area and volume is needed as we now look at the relationships between similarity and volumes and areas.
- Squares, cubes and their roots (KS3) will also be revisited to deepen knowledge on this topic.
- This can be a difficult topic however as there are set procedures that students can follow it is placed earlier than some of the upcoming topics.

Unit 12 – More Trigonometry

- All higher-level Trig is covered here. Sine and Cosine rules as well as area of a triangle. Prior knowledge of substitution is needed here to use these formulae.
- Again, this can generally be grade 8 and 9 work but students are normally successful as set rules are followed and questions are rarely abstract in nature. Thus, it is placed early in the difficult graded topics.

Unit 13 Further Statistics

- Covered in this unit is Sampling and Stratified Sampling, UQ LQ and IQR from a list of numbers and why this is useful, Cumulative Frequency and boxplots. Drawing and interpreting histograms are also covered.
- All of these topics are discrete and don’t really require prior knowledge.
- Covering the last statistics topic here breaks up the two algebraic topics either side of it.

Unit 14 Further Equations and Graphs

- Sim Equations with Lines meeting Quadratics and Circles and Graphing Inequalities relies on prior knowledge of y = mx + c
- Multiplying Cubic Brackets and Understanding Roots relies students being able to expand a double bracket.
- Iteration relies on students being able to substitute
- These topics are all difficult and it makes sense to leave them late in the course to give students the best chance at being successful in them. Also, as they all require so much prior knowledge to interleave it is essential that they are left close to the end.

Unit 15 – Circle Theorems

- Circle Theorems are introduced here but students must recall all their angle work from KS3 and Y10. Results plus from previous years GCSEs show that this topic can be poorly answered so although the prior knowledge that in needed (angle rules) is not that difficult this topic is left until the end.
- Circle Problems with Tangents again require a deep understanding of y = mx + c and again is a grade 9 topic so to give students the best chance at being successful it is late on in the course.
- This geometric topic is also used to break up two difficult algebraic topics.

Unit 16 – More Algebra

- Algebraic Fractions are covered in their entirety and require recall of operations with fractions as well as expanding and factorising brackets from previous units.
- Surds are covered in their entirety with previous knowledge of square numbers, fraction work and expanding brackets all coming together to make surds accessible to students.
- Functions are introduced and again are underpinned by students recalling information on substitution, and creating and solving equations.
- And finally, all our expanding single and double brackets as well as factorising will give students the opportunity to be successful with algebraic proof.
- All topics in this unit are grade 8 and 9 in nature so are left close to the end to give students the best chance of success.
- We also leave these algebraic topics to the end of the course as they are expected knowledge for any students doing A level and a big part of Core 1. Covering them here lessens the time between them been seen at the end of GCSE and the start of A level.

Unit 17 – Vectors and Geometric Proof

- Vector Arithmetic will also be seen by these students for the first time but having already covered directed number this will make this very accessible. An easy topic but is left until now as it closely relates to vector geometry which is a grade 9 topic.
- Vector Geometry will be new and will require students to recall operations with fraction sand ratios. A grade 9 topic left until the penultimate topic to allow students to recall more easily.
- Yet again we use this geometric topic to break up two algebraic topics and give students a different diet towards the end of the course.

Unit 18 – Proportion and Graphs

- Direct and Inverse Proportion - Formula follows on from work on direct and inverse proportion without the formula in KS3
- Transforming Functions stand alone as a discreet topic and are grade 9. Thus, we cover them here at the end of the course. We will also Transform Trig Graphs at the same time.

Those students who begin year 10 in September 2024, will follow the Sparx Curriculum in year 11.

Teaching and Learning

"Every teacher needs to improve, not because they are not good enough, but because they can be even better."

Professor Dylan Wiliam

"A great teacher is one who is willing to do what it takes to be demonstrably more effective next year than this: it is not about how good you are today, but the journey you are on and the commitment to relentless improvement".

Professor Rob Coe

All Curriculum Leaders will:

- Oversee and ensure the creation of high quality, well-sequenced, broad and balanced teaching and learning resources that builds knowledge and skills.
- Ensure all curriculum documentation is available to all teachers to plan teaching and learning
- Sequence teaching and learning in a way that allows students to know more and remember more over time
- Use their budget effectively to resource their curriculum area, providing teachers with the necessary resources for teaching and learning
- Drive improvement in teaching and learning, working with teachers to identify any challenges or barriers
- Timetable their subject to allocate time for students to achieve breadth and depth in teaching and learning
- Understand their subject fully and demonstrate excellence in their own teaching and learning
- Monitor progress in teaching and learning across their curriculum area by systematically reviewing a range of evidence, such as curriculum reviews, outcomes/assessment data, lesson observations, work scrutiny and student voice
- Improve on areas for development identified in their monitoring activities
- Create and communicate clear aims and intentions for teaching and learning in their curriculum area
- Create a culture of teacher development and improvement where all teachers are encouraged to share ideas, resources and good practice.
- Ensure all teachers in their curriculum area are engaged in T&L CPL activities such as subject knowledge development, T&L information briefings, instructional coaching programme and Steplab learning resources

All Teachers will:

- Understand the content they are teaching
- Have a deep and fluent knowledge and flexible understanding of the curriculum content they are teaching
- Be clear and precise about the knowledge and skills they want students to learn in every lesson. *What will students know, understand or be able to do by the end of the learning sequence?*
- Make Key Learning explicit to students in every lesson

- Be clear and precise about the subject specific vocabulary that students will need to know and understand to access the learning, and plan to pre-teach where necessary
- Ask themselves questions when planning effective implementation of the curriculum content, such as:
    - Where are the students starting from?
    - Where do I want them to get to?
    - How will I know when they are all there?
    - How can I best help them all to get there?
    - What may be the common sticking points in this content?

Maximise opportunities for all students to learn all of the content

- Know students; their prior attainment, gaps in knowledge and specific needs, and use this as key part of planning.
- Demonstrate quality first teaching as the first wave of intervention for meeting the needs of SEND students
- Consider the different pedagogical approaches used to engage, motivate and challenge all learners in subject
- Aim for all students to access learning and succeed with even the most challenging content if scaffolded appropriately

Activate hard thinking for all students through a range of high quality teaching and learning strategies

What a “typical lesson” will look like in Maths will vary depending on the individual teacher and students. Teachers will utilise a variety of their own teaching and learning strategies based upon their professional judgement and their knowledge of students and classes. However, it is expected that the following high-quality teaching strategies are used effectively in the majority of lessons. “All knowing all” is the explicit goal in all lessons.

Structuring

- Ensure learning activities are appropriately sequenced; signalling Key Learning, Review of Learning, overview and key vocabulary from the outset
- Have high expectations of all students all of the time, regardless of their prior attainment, SEND need, disposition or background.
- Make learning accessible to all by matching tasks to learners needs
- Ensure that learning activities and outcomes focus on what students know and understand rather than what tasks they have completed.
- Aim to remove scaffolds over time and gradually increase independent practice for all students.
- Limit the amount of material students receive at one time, and then check that they have understood it before moving on
- Aim to provide students with time and opportunities to think, respond, make meaning and practice in every lesson.

Explaining

- Plan instruction and exposition with awareness of demands on students’ cognitive load, by presenting new material in small step
- Give clear and simple instructions and explanations
- Model steps and procedures during explanations

- Provide many examples (and non examples)
- Use worked examples and part worked examples in explanations
- Connect new ideas to prior learning and knowledge in explanations to help students build schema
- Check for listening and check for understanding during explanations

Modelling

- Teach to the top with expert instruction, explanation, exposition and modelling
- Understand students need to watch and listen to experts guide them through the process, step by step, before they attempt it themselves.
- May demonstrate the worked activity in front of students, eg using a visualiser or live on the board
- Think aloud to narrate their thought process.
- Show it is ok to make a mistake and empathy, e.g. I found this bit challenging too.
- Integrate quick fire questioning e.g. why am I doing this now?
- Provide a range of models
- Guide practice with scaffolding (we do)
- Use examples and scaffolding to support students to demonstrate their learning. eg. sentence starters, key word definitions, procedural steps visible etc.
- Encourage effective class discussion
- Guide Independent, deliberate practice (you do)
- Provide the time they need to practise new material in a number of ways in order to master it.
- Aim to ensure scaffolding is reduced or removed for majority of students over time

Responsive Teaching

- Ensure that learning has stuck by checking for understanding of all students
- Confidently and accurately use teaching techniques to gather a secure overview about whether the key learning has actually been learnt.
- Ensure that If learning is not yet secure for most students the lesson should be adapted or retaught differently
- Ask lots of questions, to lots of students, and then use what they learn from this process to adapt and reshape teaching within and between lessons.

Accountable Questioning

- Plan and ask a large number of questions to a large number of students skilfully, as the main tool to probe, check and extend all students' understanding
- Ensure that the majority of questions are asked through cold calling, with targeted questioning used to support and challenge students.
- Ensure that whole class responses to questioning can be done effectively with mini whiteboards and other similar strategies.
- Use a wide range and combination of questioning such as cold calling, process questions, probing questions, elaborate interrogation, think pair share, show me, affirmative checking, multiple choice, convergent, divergent, hinge and stretch it questions.
- Focus as much on error as on correctness when asking questions
- Focus on 'who still doesn't know' instead of 'who knows..'
- Ensure that all questioning is accountable and encourages all students to think
- Ensure no opt out for students by using 'I'll come back to you'

Retrieval Practice

- Ensure there is a review of learning (ROL) activity at the start of each lesson.
- Use retrieval practice regularly in lessons to support students with retrieving material that they have previously learnt from their long-term memory.
- Ensure retrieval practice is low stakes, completed without access to notes and used in a spaced manner

Effective feedback

- Feedback exists in many forms (e.g. Key assessed task marking, teacher live marking of exercise books, whole class marking and feedback, verbal feedback, peer and self-assessment), but what matters is what students do with it.
- Teachers will ensure that effective feedback in lessons:
    - Is frequent and timely
    - Informs their future planning and teaching
    - Generates action and should be more work for the recipient than the donor.
    - Is specific and focused on the most prominent areas to improve.
    - Is accompanied by support in how to be successful with the next steps
    - Allows appropriate time to make it better (MIB)

Creating a supportive learning environment so that all students can learn

Teachers know that in order for there to be excellent learning behaviours there needs to be the right classroom conditions, where all students feel safe, supported, appropriately challenged and valued. Teachers will ensure all students are confident in knowing what is expected of them in terms of learning and behaviour. Clear rules, routines and expectations are in place in all *subject* lessons.

All teachers are expected to:

- Have high expectations of all students
- Teach to the top, with necessary scaffolds to support those who need it
- Have clear and consistent routines and procedures so there is a safe, orderly environment, transitions are smooth and learning time is maximised
- Promote active engagement not just compliance
- Establish a growth mindset culture, mistakes are celebrated, use language such as “not there yet”, “Who still doesn’t understand?”
- Aim to build positive interactions and relationships with all students through positive behaviour management, mutual respect and professionalism at all times.
- Model the manners, warmth, kindness and calmness that they expect from students
- Welcome all students into your class by greeting them at the door
  Use positive framing to remind students of expectations and learning routines
  Use meaningful praise and rewards as much as possible
- Provide students with the opportunity to adapt their behaviour before consequences are implemented
- Demonstrate that consequences are temporary, eg new lesson, fresh start approach
- Ensure that learning begins immediately and is sustained for the absolute maximum time in lessons
- Students sit in a seating plan that has been strategically thought out by teachers to maximise learning and support all students most effectively
- Have consistent classroom rules and expectations which are fair and reasonable, so that all students know exactly what is expected of them.

- Aim to use the least invasive behaviour correction strategies such as: Non Verbal Intervention **(NVI)** Anonymous Individual Correction **(AIC)** Positive Group Correction **(PGC)** Private Individual Correction **(PIC)** Lightening Quick Public Correction **(LQPC)**

Assessment in Maths

Assessment Rationale
KS3

Year 7	Year 8	Year 9
• Baseline assessment – KAT1 • End of Term 1 assessment – KAT 2 • End of Term 2 assessment – KAT 3 • End of Term 3 assessment – KAT 4 • End of year assessment	• Baseline assessment – KAT1 • End of Term 1 assessment – KAT 2 • End of Term 2 assessment – KAT 3 • End of Term 3 assessment – KAT 4 • End of year assessment	• Baseline assessment – KAT1 • End of Term 1 assessment – KAT 2 • End of Term 2 assessment – KAT 3 • End of Term 3 assessment – KAT 4 • End of year assessment
There will also be 8 Knowledge Checks per year group in KS3		

Baseline assessment - A Year 7, 8 and 9 formative baseline assessment package will help us to understand what our new students know and do not know. This assessment is supported by a Question Level Analysis (QLA), giving our teachers I follow up tasks, ROLs and 'fix up' homeworks to close any gaps in student knowledge right from the beginning of term

In all three years there will be 3 end of term assessment and 1 end of year assessment which will be towards the end of term 3A. Each termly assessment predominantly focuses on the teaching topics in that term. However, prior knowledge is continually assessed through cross-topic questions and a small number of targeted fluency questions.

The end of year assessment will focus upon content taught throughout the year, including cross topic composite question to check for deeper understanding.

After each assessment there will be a QLA which will give each student detailed feedback of any gaps in their knowledge. Each class teacher will also be able to produce a report detailing key areas for their classes from their class report and assessment insights to inform in class MIB and future ROLs.

Each student will then complete a 'fix up' task online to close these gaps further which will also be incorporated into the students' weekly homework.

KS4

Year 10 (Sparx SOL)	Year 11 (Original SOL)
• Baseline assessment – KAT1 • End of Term 1 assessment – KAT 2 • Mid- year assessment • End of Term 2 assessment – KAT 3 • End of year assessment • 8 Knowledge Checks	• KAT 1 • KAT 2 • KAT 3 • Mock 1 – October • Mock 2 - February • GCSE – May/June • 6 Knowledge Checks

In Year 10 there will be a baseline assessment. There will then be 2 end of term assessment and 1 midterm and 1 end of year assessment which will be towards the end of term 3A. Each termly assessment predominantly focuses on the teaching topics in that term. However, prior knowledge is continually assessed through cross-topic questions and a small number of targeted fluency questions.

The midyear and end of year assessment will be focuses on the teaching throughout the year to date, including cross topic composite question to check for deeper understanding.

After each assessment there will be a QLA which will give each student detailed feedback of any gaps in their knowledge. Each class teacher will also be able to produce a report detailing key areas for their classes from their class report and assessment insights to inform in class MIB and future ROLs.

Each student will then complete a ‘fix up’ task online to close these gaps further which will also be incorporated into the student’s weekly homework.

Results in the unit tests will be used to inform ROLs.

After each Mock there will be a QLA which will give each student detailed feedback of any gaps in their knowledge. Each class teacher will also be able to produce a report detailing key areas for their classes from their class report and assessment insights to inform in class MIB and future ROLs.

Each student will then complete a ‘fix up’ task online to close these gaps further which will also be incorporated into the student’s weekly homework.

Assessment Strategies in Maths

We will be utilising the MWB policy below throughout the department which we have refined recently following CPL from Craig Barton.
Mini-whiteboards are an instant formative assessment tool that allow teachers to engage with the thinking, understanding and progress of all students at once. There is no more efficient way to find out a) who knows and b) who need additional help. They have become an integral part of our daily lessons and give immediate feedback to both the teacher and the student.

Maths Department – Mini-whiteboard (MWB) Usage.

- All equipment is left in the wallet until we are asked to use it by the teacher, so we don't miss anything important.
- As soon as we take the pen out, we put the lid on the top, so it doesn't roll away.
- If we have any missing/non-working equipment we put our hand up as soon as we have been instructed to get the equipment ready and wait to ask the teacher for replacements.
- We don't start writing until the teacher says 'Go' and we do not write/draw anything not relevant to the question.
- We complete the work in silence, as this gives everyone the time they need to think hard about the question.
- We keep the boards secret and answer on our own, without looking at others. This lets the teacher know if we need help. Looking at others' work, or checking our own by doing so, means our teacher won't know when we need help. Everyone needs help sometimes, it's ok to make a mistake as long as you have tried your best.
- We write clearly and large enough that the teacher can read it.
- We try our absolute hardest, show our working out and write down what we do know.
- When we have written our answer, we gently hover our mini-whiteboards face down above the desk. This helps the teacher to see when people are ready to show their answers.
- When the teacher says 'three, two, one, show me' we show our boards as directed.
- We use both hands to hold the boards so they don't wobble and the teacher can read them.
- Even if we haven't finished our answer, we hold up our boards as it helps the teacher to see how far we have got.
- We wait to be told to put our whiteboards down.
- We only clear our boards when instructed by the teacher to do so, this means we can use the boards for discussion
- We ensure all the equipment is clean and packed away nicely, so that the next person to use it finds it in great condition, this means we should always receive a nice MWB folder.

Questioning is a huge part of our assessment strategy in maths. We have incorporated check for listening and checks for understanding routinely into our day to day teaching. We have used strategies such as saying the students name after a pause at the end of the questions, and bouncing the question from student to student to gain a real sense of where the class is up to in the lesson.

Low stakes testing is being used in the form of knowledge checks and peer assessment on a regular basis.

Summative assessments are at regular intervals in each year group, see assessment rationale.

ROLs are using at the start of every lesson to fill in identified gaps in knowledge, building up component ‘fluency’ elements to enable composite questioning.

Cultural Capital

Cultural capital is the accumulation of knowledge, behaviours, and skills that a student can draw upon and which demonstrates their cultural awareness, knowledge and competence; it is one of the key ingredients a student will draw upon to be successful in society, their career and the world around them.

Our maths curriculum will help develop cultural capital knowledge of the following:

- How labourers use formula to charge. eg. Callout £30 + £20 per hour. Linked to graph. Make sure to use real life numbers so students can see how much people earn.
- Using directed numbers to explain overdrafts and negative temperatures.

- Estimation - why we estimate, what estimation do we do and why eg..areas when buying carpet, foodbill in shop
- On bar/line charts - through work on representing and analysing data students are to think critically about information that is represented to them as well as understanding when data may be misleading.
- Be able to read real life bus and train timetables
- On pie charts - through work on representing and analysing data students are to think critically about information that is represented to them as well as understanding when data may be misleading.
- Refer to Pythagoras PP as famous mathematician that has a theorem on angles in polygons.
- Link Standard Form to understand how large things can be eg planets, as well as how small they can be in relation to human cells.
- Understand how averages are used and how they can be misleading. eg...mean wages in a company might not be as good as median wage and why
- Conversion graph for currency and how and why these can change daily.
- Inverse proportion and its relation to workforce and productivity.
- Understand speed in a number of contexts eg...m/s, km/h, lightspeed, and explanation of different units eh mph and kmph. Why are there two types

Catholic Social Teachings

Catholic Social Teaching is a key aspect of teaching within the school. CST has been integrated into the curriculum and links to real life contexts of each mathematical process explored in every year group. For example, teachers support students to consider different wages and discuss a realistic percentage of that wage that can be used to support the poor and vulnerable, a key aspect of Catholic teaching, especially when considering how this can be exercised in society. When looking at data, we explore the numerous statistics related to the human impact of a lack of clean water and food or communities and individuals affected by natural disasters. The Mathematics department use classroom displays and signposts to pique the students' curiosity and to invite conversations that link Catholic Social Teaching to everyday life. As a teaching strategy in Maths, we are tolerant of differing methods of learning and use class discussion to tackle mathematical problems, we often find varying strategies to come to the same solution. We teach that no method is better than the other and accept and listen to other points of view.