MATHEMATICS
CURRICULUM MAP

Our subject vision:

Aspiration	We firmly believe that Maths is a fascinating and elegant language that everyone can enjoy learning. Not only is it beautiful, but it is also a gateway to so many other subjects and futures for students. We intend to equip all students with a confident grasp of the knowledge, skills and understanding of mathematical concepts that they will need for their futures. **Knowledge:** Maths is a series of building blocks, every new block relying on the soundness of the one beneath it for a firm footing to the next. Our Fitzharrys Maths Learning Cycle is key to student success; each topic begins with a diagnostic assessment that ensures students can fix knowledge gaps and build new bricks in every lesson. Teachers are empowered to plan for individual student needs and aim high for all. **Skills:** Students will learn to model situations, to generalise patterns and create rules. They will learn to follow Mathematical instructions, to present information effectively and to analyse data. These are just some of the transcendent skills that students will take forward into their lives after studying Maths at Fitzharrys. **Understanding:** Students will leave Fitzharrys Maths lessons with a sense of achievement, and a clear understanding of their progress. They will have a confidence with numbers, which is essential to all walks of life. Students will be able to communicate and analyse data effectively and have the versatility to apply their Mathematical skills to varied future contents. They will have an understanding of our number system, shapes, proportionality, algebra and statistics; most importantly they will know how all these amazing elements connect and intertwine.
Opportunity	**Within the classroom:** In Maths lessons, students will regularly check their understanding both at the beginning and end of topics. This not only allows us to provide the optimum balance of challenge and scaffold as teachers, but it also encourages students to be strong independent learners. Our curriculum spirals through the different areas of Maths - Geometry and Measures, Number, Algebra, Statistics, Ratio & Proportion. There is a strong focus on knowledge (Maths Memory) and skills to ensure strong foundations which enable application to new contexts. **Beyond the classroom:** Alongside the curriculum students can participate in: • National Maths Challenges • Girls in Maths days • Mathematical lectures • Statistics GCSE & Further Maths Level 2 course (the ideal transition to A-level Maths!) • Mathematical Student mentoring or leadership opportunities
Integrity	**Knowledge:** Students will have the Mathematical knowledge to empower them to see statistics and finances clearly, understanding how people can use them to influence and even manipulate others. **Skills:** The skills of modelling, visualising and presenting numerical arguments will allow students to express themselves, explore complex ideas and understand others' ideas and perspectives. **Understanding:** The world is full of Maths, a firm understanding of what you are consuming helps you to craft intelligent and measured opinions. Students will not be taken in by questionable statistics or duped by dubious deals. They will have an understanding of finances and statistics that will support them to be active, knowledgeable citizens who can make measured decisions in their future.

MATHEMATICS
CURRICULUM MAP

Our subject vision:

Mathematics is a language that we can use to unlock and understand so many different elements of our natural and constructed world. Beyond the intricate beauty of Pure Mathematics itself, it also provides important tools for work in a plethora of different fields. Fitzharrys students will learn fluency in this elegant gateway language as well as the wider Mathematical themes of visualising and representing ideas differently, organising information, generalising, conjecturing and modelling to name but a few.

Being a Mathematician is a way of being; it is a way of interacting with the universe; it is a way of thinking. Fitzharrys students will become curious about the fascinating construct that is Maths and how they can use it to solve problems and explore ideas.

Here at Fitzharrys, students are stretched and supported dynamically to achieve their very best; we use diagnostic assessment to ensure that all students are learning the concepts most pivotal to their progress. We build firm foundations that allow students to take their next Mathematical steps.

Fitzharrys students know that they are learning; progress in Maths is visible, celebrated and shared regularly with home. We ensure our students have mastered the skills and consumed the knowledge they will need for their futures, no matter what course those futures take.

How this document works:

This Curriculum Map will show you everything we do in Maths. It shows the learning journey from Year 7 to Year 11, setting up students for further study in Maths & a range of related subjects.

At each point it will show you what is covered and how it will be assessed. Click on each topic and it will automatically take you to an explanation of why we learn it.

If you have any further questions, contact Mr Tim Smytheman - Head of Maths

SUBJECT CURRICULUM MAP: KS4

Exam board: AQA GCSE Maths (8300)

Edexcel GCSE Statistics (1ST0)
Level 2 certificate in Further Maths

Further study

GCSE Statistics
Further Maths
Sciences
Art & Design
Computer Science

All A-Levels and many college courses require grade 4 and above. Without a grade 4 at GCSE students are required to continue to study Maths GCSE until you are 18.

Career pathways

Computer Scientist
Economics
Banking
Architecture
Engineering
Design
Marketing

...most jobs require some element of Maths!

REVISION

Summer exams

28. Further Trigonometry
- Know how and when to use the sine and cosine rules
- Draw quadratic graphs

27. Vectors
- Understand and use vectors

26. Surds
- Arithmetic with surds
- Rationalise surds

25. Proportions
- Direct proportion
- Inverse proportion

24. Circle Theorems
- Know and use circle theorems to solve angle problems

March Mock Exams

23. Functions & Graph Transformations
- Transformation of graphs
- Function notation
- Iterations

Foundation tier students begin revision after topic 22.

22. Further Graphs
- Non linear graphs
- Graphical inequalities
- Circle equations

21. Simultaneous equations
- Solve simultaneous equations

20. Quadratics
- Drawing quadratics
- Solving quadratics
- Using quadratics

November Mock Exams

19. Measures & Applied graphs
- Kinematics graphs
- Compound measures

18. Scale & Constructions
- Scales
- Constructions
- Compound measurements

Year 11

Mock exams & final tier decisions made

17. Data
- Work with averages
- Statistical diagrams
- Statistical analysis

16. Transformations
- Reflect
- Rotate
- Translate
- Enlarge

15. Probability
- Calculating probabilities
- Probability diagrams
- Experimental probability

For each topic you will complete a diagnostic and progress test. The progress test results will be sent to parents who are signed up to the Mini Test website.

Trips and visits;
- Senior Maths team challenge
- Year 10 Maths Feast
- Royal Institution Mathematical masterclasses
- Online enrichment events

GCSE Statistics option available!

14. Similarity & congruence
- Congruent shapes
- Similar shapes

13. Sequences & Graphs
- Types of sequence
- Sequence formulae
- Drawing sequences as diagrams and graphs

12. 3D shapes
- Volume of shapes
- Surface areas of shapes

11. Algebra
- Identities
- Formulae
- Quadratics

10. Angles
- Angles facts
- Solve complex angle problems
- Plan drawings
- Isometric drawing

9. Pythagoras & Trigonometry
- Use Pythagoras theorem
- Use Trigonometry with right angles triangles

Year 10

SUBJECT CURRICULUM MAP: KS3

Year 7

1. Number Operations
Four Operations, Manipulating negatives, BIDMAS, basic calculator skills

2. Place Value, Ordering & Rounding
Rounding to significant figured and decimals, ordering all number, estimating solutions.

3. Algebra
Understanding algebra, manipulating letters in maths, substitution, solving equations, forming and solving equations, expanding and factorising brackets

4. Integers, Powers & Roots
Square and Cube numbers and roots. Factors, Multiples & Primes, Laws of Indices and Standard Form

5. Angles
Finding Missing Angles, working with Regular Polygons, Parallel & Perpendicular Lines, Bearings

For each topic you will complete a diagnostic and progress test. The progress test results will be sent to parents who are signed up to the Mini Test website.

Trips and visits
- Team Maths Challenge

Year 8

End of year assessment

6. Statistics
Frequency Tables and Pictograms, Surveys, Line Graphs, Averages (including Grouped Frequency Tables), Pie Charts, Scatter Graphs, Bar Charts

7. Fractions, Decimals, Percentages & Ratio
FDP conversion, finding percentages/fractions of amounts, percentage increase/decrease, four operations with fractions and decimals, sharing ratios.

8. Length, Area & Volume
Area and Perimeter of 2D shapes (including circles), working in terms of π. Finding volume and surface area of 3D shapes.

9. Sequences, Functions and Graphs
Exploring linear and quadratic sequences, understanding linear and quadratic graphs. Using y=mx+c.

For each topic you will complete a diagnostic and progress test. The progress test results will be sent to parents who are signed up to the Mini Test website.

10. Probability
Probability scale and basic probability, tree diagrams, frequency trees, sample spaces, experimental vs theoretical probability, Venn diagrams.

Trips and visits
- Team Maths Challenge at Oxford University

Year 9

1. Types of number
- Types of numbers
- Arithmetic
- Inequalities

Start of tiered GCSE Maths classes

2. Rounding & Accuracy
- Rounding to decimal places
- Rounding to significant figures
- Error bounds

3. The Language of Algebra
- Writing in algebra
- Algebraic manipulation
- Collecting like terms
- Expand
- Factorise

4. Equations
- Solve equations
- Solve more complex equations
- Solve inequalities

For each topic you will complete a diagnostic and progress test. The progress test results will be sent to parents who are signed up to the Mini Test website.

Foundations of GCSE Revision
Revision of the Year 7 and Year 8 course.

End of year assessment

11. Transformations, Shape & Constructions
Symmetry, Translation, Rotation, Reflection and Enlargement, Constructions and Loci, Pythagoras and Trigonometry.

5. Fractions & Decimals
- Arithmetic with fractions
- Arithmetic with decimals

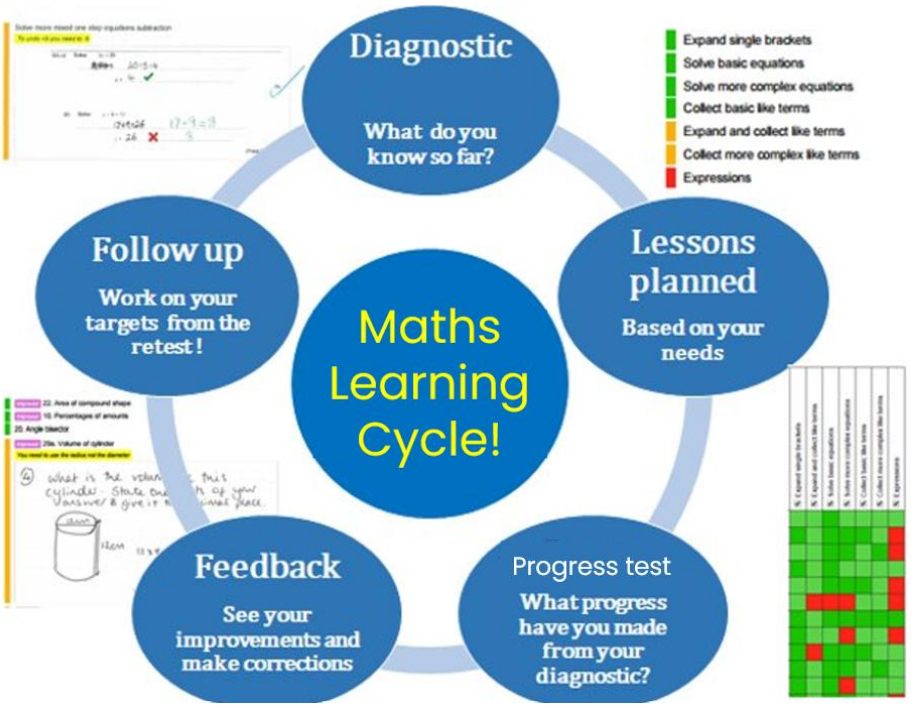
6. Area & Perimeter
- Areas of key shapes
- Compound areas
- Perimeters of shapes including circles & sectors

7. Percentages
- Understand percentage conversions
- Use multipliers to calculate percentages
- Calculate percentage change
- Confidently problem solve with percentages

8. Ratio & Proportion
- Understanding ratios
- Sharing amounts into ratio
- Solving ratio problems

Trips and visits
- Girls conference
- Team Maths Challenge @ Oxford University
- Assisting with Primary Maths Team Challenge
- Royal Institution Mathematical Masterclasses

KS4



Year 11

26 Surds

Why this?	Surds are exact values. This is something that you need to be confident working in. Using surds in calculations increases accuracy greatly.
Why now?	Surds are visited briefly in the first topic. Time to recap and advance to harder skills essential for A-Level Maths.

27 Vectors

Why this?	Vectors are quantities with magnitude and direction. This is an important construct for A-Level problems.
Why now?	Higher level topics prepare students for A-Levels.

28 Further Trigonometry

Why this?	Following from trigonometry in right angled triangles this topic allows you to find angles and sides in any triangles.
Why now?	Higher level topics prepare students for A-Levels.

Year 11

25 Proportions

Why this?	Another essential Mathematical concept that is woven through all that we do.
Why now?	Understanding proportion will allow students to refresh and stretch their number skills.

24 Circle Theorems

Why this?	Angles trapped in circles have specific properties that are interesting to investigate!
Why now?	Using students understanding of proportion and applying it to geometry.

23 Functions & Graph Transformations

Why this?	Angles trapped in circles have specific properties that are interesting to investigate!
Why now?	Using students understanding of proportion and applying it to geometry.

Year 11

20 Quadratics

Why this?	Another essential Mathematical concept looking at higher order equations.
Why now?	This an integral skill for further Mathematical study.

21 Simultaneous Equations

Why this?	Solving linked equations once again allows us to solve a different kind of Mathematical puzzle.
Why now?	An extension of solving equations that is a frequent problem solving topic, especially for higher tier linking to A-Level study.

22 Further Graphs

Why this?	Graphs are images of equations, this topic allows us to look at more complex ones and re-visit linear graphs.
Why now?	Foundation tiers last element of equations and graphs is completed.

19 Measures & Applied Graphs

Why this?	Graphs allow us to understand and share maths more easily.
Why now?	This covers the last section of the foundation tier. After this topic Foundation tier students will begin revision.

Year 10

18 Scale & Constructions

Why this?	Compound measures will help you to solve problems in the Sciences. Whereas constructions can help with design and art.
Why now?	This topic uses specialist equipment such as compasses.

17 Data

Why this?	Statistical diagrams are an important part of our everyday lives and essential to all future studies/jobs.
Why now?	As we come to then end of the foundation tier content we will complete the statistics content

16 Transformations

Why this?	How shapes can changes shapes and size is an integral part of design in all forms.
Why now?	A fairly straightforward topic. Placed towards the end of year 10 to finish off Foundation tier.

13 Sequences & Graphs

Why this?	Understanding the patters that we see in the world is an integral part of understanding the world around is.
Why now?	Understanding sequences allows us to draw graphs.

14 Similarity & Congruence

Why this?	Another element of art, design and engineering. How shapes can vary is an interesting part of geometry.
Why now?	Similar shapes are a prequal to proportion.

15 Probability

Why this?	Students can understand the probabilities of things happening and how to display those in a number of ways.
Why now?	This is a key component in understanding the later component of Data, as well as supporting GCSE Statistics.

Year 9

12 3D Shapes

Why this?	Many Scientific problems require an understanding of volume. It is also essential for construction.
Why now?	Back to shape for a change following our forays into algebra.

11 Algebra

Why this?	Accessing quadratic equations allows you to solve more complex Mathematical problems.
Why now?	Time to re-visit algebra in year 10 and look at working with more complex equations.

10 Angles

Why this?	Angles and plan drawings are important for a plethora of jobs. They are also useful for home DIY!
Why now?	This topic is key to geometry problems.

7 Percentages

Why this?	Another essential Maths skill. Potentially the most visible for all of our daily lives.
Why now?	You will use percentages in a wide range of other GCSE subjects. It can be applied to problems many business and finance related problems in real life too.

8 Ratio

Why this?	The most assessed question in GCSE Maths. Ratio is very common in real life problem solving.
Why now?	Ratio is another very versatile topic that links to many others.

9 Pythagoras & Trigonometry

Why this?	Finding sides and angles in right angles triangles is used in many areas, including architecture and design.
Why now?	After a lot of number topics is it nice to delve into some geometry!

Year 9

6 Area & Perimeter

Why this?	Learning how to work with 2D shapes accurately allows you to solve problems in many contexts including finding volumes.
Why now?	Another essential skill that later topics build upon.

5 Fractions & Decimals

Why this?	Real life problems don't usually give you nice integer answers.
Why now?	You need to be confident to work with all types of numbers when solving problems.

4 Equations

Why this?	Solving equations allows you to find unknown values and solve problems.
Why now?	Equations are found in so many different contexts. Learning this skill early is essential.

1 Types of Number

Why this?	Knowing how to work with different types of numbers accurately is key to Maths.
Why now?	This is important for all other topics as we launch our GCSE Maths course.

2 Rounding & Accuracy

Why this?	Accuracy is important in Maths. You need to understand the implications of rounding.
Why now?	You will use these skills when working with answers through out your GCSE.

3 The Language of Algebra

Why this?	Learning to write in algebra is a real gateway skill. Algebra is the language of Maths.
Why now?	You will use algebra in most of the topic that you study in one form or another.

Year 8

12 Fundamentals of Maths – Revision

Why this?	It is important to refresh all the skills learnt so far across KS3.
Why now?	This is revision ahead of the end of course assessment to enable us to reassess classes moving into Year 9.

11 Transformations, Shape & Constructions

Why this?	Transformations and constructions are useful for design projects and shape stretches previous skills.
Why now?	This concludes the Foundations of GCSE course with a variety of geometry skills.

10 Probability

Why this?	Probabilities underpin things like election polls, it's important to understand how this works.
Why now?	A pleasant change in pace from previous topics, some good opportunities to problem solve.

7 Fractions, Decimals, Percentages & Ratio

Why this?	Real life problems often give non integer answers and ratio can be used to understand many concepts.
Why now?	Refreshes number skills at the start of Year 8.

8 Length, Area & Volume

Why this?	Geometry problems are useful both in GCSE and in real life, in many careers and DIY projects.
Why now?	This extends geometry knowledge in Year 8 and encourages practice of algebra from Year 7.

9 Sequences, Functions & Graphs

Why this?	These topics are intrinsically linked, this topic explores their connections and how they can be used together.
Why now?	This builds on the algebra and fractions & decimals topic and stretches knowledge further.

Year 7

6 Statistics

Why this?	Statistics are all around us – we are bombarded by them. Learning statistics helps pupils appreciate the modern world.
Why now?	This helps pupils answer new questions in maths and helps them understand data in other subjects.

5 Angles

Why this?	Angles are all around us – developing an appreciation of the rules will help in many potential careers and home projects.
Why now?	This topic continues to encourage curiosity and allows pupils to use some of their algebra knowledge.

4 Integers, Powers & Roots

Why this?	This number topic covers a lot of key skills and teaches links between many different aspects of mathematics.
Why now?	This topic is placed here to encourage pupils to become intellectually curious about mathematics.

1 Number Operations

Why this?	These are the key skills which underpin all other mathematics.
Why now?	This ensures everyone has a strong start to their maths career at Fitzharrys.

2 Place Value, Ordering & Rounding

Why this?	It is crucial to round and give answers to degrees of accuracy. Also ordering is key for many question types.
Why now?	This continues to ensure we have successful and positive starts to Year 7.

3 Algebra

Why this?	Many KS3 and GCSE skills rely on strong algebra knowledge and being able to manipulate equations and formulas.
Why now?	This opens many other areas of mathematics questions, also means we can practice these skills repetitively.