Subject: Mathematics

These are the objectives a student on each Pathway needs to achieve by the end of year 9, to ensure they are making expected progress:

	Outline of Objective	Outline of Objective	Outline of Objective	**Outline of Objective**
Exceptional Performance	**Evidence of Exceptional Performance will be seen from Students attempting to familiarise themselves with the GCSE Maths content and looking to extend each of the objectives outline in Pathway 1 to that standard. Successful students will demonstrate fluency between skills in Maths and will be able to effectively problem solve and use a variety of methods to arrive at a solution. It would also be expected that students are able to provide sound mathematical reasoning at each step of working out.**			
Pathway 1	All objectives included here and all objectives stated in Pathway 2 Half term 1A Reasoning with Algebra • Solve a pair of simultaneous equations using graphical methods • Change the subject of a complex formula • Explore the gradients of perpendicular lines Half Term 3A Reasoning with Proportion • Enlarge shapes by a negative scale factor • Similar triangles – exploring rations in right angled triangles • Inverse proportion graphs • Converting compound measures	Half term 1B Constructing in 2 and 3 dimensions • Explore volumes of cones, spheres and complex shapes • Work out the surface area of any prism • Explore the locus of a path Half term 3B Representations • Tree diagrams	Half term 2A Reasoning with Number • Work with repeated percentage change	Half Term 2B Reasoning with Geometry • Develop more complex geometrical proofs • Find the result of a series of transformations • Explore proofs of Pythagoras' Theorem • Use Pythagoras' Theorem in 3D shapes

KS3 Assessment – Year 9 Progress Grid

Pathway 2

Half term 1A
Reasoning with Algebra

Straight line graphs
- Interpret straight line graphs
- Find and use the equation of a straight line
- Reduce equations to the form y = mx+c
- Compare to linear sequences and finding the rule for the n^{th} term

Forming and solving equations and inequalities
- Revisit and extend to equations and inequalities with unknown on both sides using all previous contexts: angles, probability, area etc
- Change the subject of a formula

Testing conjectures
- Test conjectures in a wide range of context e.g.
  - Sums and products of odd and even numbers
  - Is a given number in a sequence?
  - Is this shape…?
  - Are these lines parallel?
  - What would happen if…?

Half term 1B
Constructing in 2 and 3 dimensions

Three dimensional shapes
- Understand the language of faces, edges and vertices
- Know the names of common prisms and non prisms
- Identify2D shapes within 3D shapes
- Work out the volume and surface area of cuboids and cylinders
- Work out the volume of any prism
- Work out the missing lengths given areas and/or volume

Constructions and congruency
- Construct 3D shapes from nets, and construct the net of a given 3D shape
- Construct and use scale drawings
- Construct perpendiculars and bisectors
- Understand congruency
- Exploring congruency via construction

Half term 2A
Reasoning with Number

Numbers
- Revisit types of number – extend to include rational and real numbers
- Revisit fraction arithmetic
- Extend knowledge of HCF and LCM
- Revisit standard form

Using Percentages
- Revisit percentage increase and decrease
- Use percentages over 100%
- Find percentage changes
- Use multipliers in a variety of contexts
- Solve 'reverse' percentage problems

Mathematics and Money
- Explore financial mathematics including
  - Bills and bank statements
  - Interest
  - Unit pricing (best buys)

Half Term 2B
Reasoning with Geometry

Deduction
- Revisit angles rules, including within special quadrilaterals
- Find angles using algebraic methods
- Use chains of reasoning to evaluate angles

Rotation and Translation
- Identify the order of rotational symmetry of a shape
- Find the result of rotating a shape
- Translate points and shapes by a given vector
- Understand variance and invariance in the context of transformations

Pythagoras' Theorem
- Identify the Hypotenuse of a right angled triangle
- Determine whether a triangle is right angled
- Calculate missing sides in right angled triangles

Half Term 3A
Reasoning with Proportion

Enlargement and Similarity
- Enlarge shapes by a positive scale factor, including from a given point
- Calculate the lengths of missing sides in similar shapes

Half term 3B
Representations

Solve problems using graphs, tables and algebra. Include:
- Revisit data measures, charts, graphs, including bivariate data, criticise mis-leading graphs

	Solve ratio and proportion problems • Direct proportion problems and graphs • Conversion graphs • Solve ratio problems given the whole or a part • Simple inverse proportion • Unit pricing problems (best buys) Rates • Work with speed, distance, time • Solve problems involving density • Work with compound units	• Revisit alternate representations of sequences – including finding algebraic rules • Revisit frequency trees and other representations e.g. tables • Revisit conversion between standard form and ordinary form, and representing numbers as products of primes • Expand a pair of binomials • Create and interpret tables and timetables, solve problems involving speed, distance and time • Solve inequalities on number lines, including error intervals • Represent word problems in a variety of forms (graphs, tables, expressions…) • Interpret graphs of any form (exponential, piece-wise, reading from quadratics, speed/time) • Compare theoretical and experimental probability of two or more events		
Pathway 3	<u>Half term 1A</u> <u>Reasoning with Algebra</u> Straight line graphs • Interpret straight line graphs • Find and use the equation of a straight line • Reduce equations to the form y = mx+c • Compare to linear sequences and finding the rule for the n^{th} term Forming and solving equations and inequalities • Revisit and extend to equations and inequalities with unknown on both sides using all previous	<u>Half term 1B</u> <u>Constructing in 2 and 3 dimensions</u> Three dimensional shapes • Understand the language of faces, edges and vertices • Know the names of common prisms and non prisms • Identify2D shapes within 3D shapes • Work out the volume and surface area of cuboids and cylinders • Work out the volume of any prism • Work out the missing lengths given areas and/or volume	<u>Half term 2A</u> <u>Reasoning with Number</u> Numbers • Revisit types of number – extend to include rational and real numbers • Revisit fraction arithmetic • Extend knowledge of HCF and LCM • Revisit standard form Using Percentages • Revisit percentage increase and decrease • Use percentages over 100% • Find percentage changes	<u>Half Term 2B</u> <u>Reasoning with Geometry</u> Deduction • Revisit angles rules, including within special quadrilaterals • Find angles using algebraic methods Rotation and Translation • Identify the order of rotational symmetry of a shape • Find the result of rotating a shape • Translate points and shapes by a given vector

KS3 Assessment – Year 9 Progress Grid

	contexts: angles, probability, area etc • Change the subject of a formula	Constructions and congruency • Construct 3D shapes from nets, and construct the net of a given 3D shape • Construct and use scale drawings • Construct perpendiculars and bisectors • Understand congruency • Exploring congruency via construction	Mathematics and Money • Explore financial mathematics including ➢ Bills and bank statements ➢ Interest ➢ Unit pricing (best buys)	Pythagoras' Theorem • Identify the Hypotenuse of a right angled triangle • Calculate missing sides in right angled triangles
	<u>Half Term 3A</u> <u>Reasoning with Proportion</u> Enlargement and Similarity • Enlarge shapes by a positive scale factor, including from a given point Solve ratio and proportion problems • Direct proportion problems and graphs • Solve ratio problems given the whole or a part • Unit pricing problems (best buys) Rates • Work with speed, distance, time	<u>Half term 3B</u> <u>Representations</u> Solve problems using graphs, tables and algebra. Include: • Revisit data measures, charts, graphs and criticise mis-leading graphs • Revisit frequency trees and other representations e.g. tables • Create and interpret tables and timetables, solve problems involving speed, distance and time • Compare theoretical and experimental probability of two or more events		