

Mathematics Faculty Rationale

To make mathematics enjoyable, exciting and interesting for all students, regardless of ability, gender or ethnicity. To create a balanced and supportive culture in which students can confidently apply logic and reasoning to mathematical problems; apply methods that are efficient and reliable without engendering a fear of failure or derision and to ensure that students can work collaboratively.

To engender in students an appreciation that mathematics is more than 'sums' so that they understand that mathematics appears all around us and how it can be used in everyday life.

To equip all students with functional mathematical tools that can be used throughout their lives, particularly to promote an interest in science, engineering and other linked areas.

National Curriculum Aims KS3

The national curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Pearson 11-19 Mathematics for Progression aims to create a new generation of numerate and confident young people who feel well equipped to progress through their Mathematics studies and beyond. The courses that build into Pearson's 11-19 Mathematics for Progression framework embed a deep and broad understanding of mathematics. They promote a can-do philosophy that prepares students in mathematical fluency, reasoning and problem-solving as well as specific key stage or qualification learning and teaching needs. These core principles - created to consistently track, build upon and promote progression - are delivered in the secondary Mathematics services at Pearson through evidence-based and best practice approaches.

YEAR 8 Unit and content	Skills (NC Spec Ref)	Rationale
1 Number Calculations, calculations with negatives, powers and roots, multiples and factors. Substitution. HT 1 Weeks 1-4	N2 N3 N4 N6	To continue to work with numeracy building on the unit in Year 7. Numeracy is the most common prerequisite for topics in mathematics and as such needs to be revisited and developed regularly. Within this area students need to understand powers, roots, negatives and substitution as a base for the following topics of Area and Volume and Algebra.
2 Area and volume Areas of triangles and trapeziums. Volume and surface areas of cubes and cuboids Measures. HT 1 Weeks 5-7	G14 G16 G17	This unit builds on students' learning from Unit 4 in year 7. Students further develop their understanding of areas of triangles and trapeziums following on to the surface areas and volumes. Being able to calculate areas and volumes and work with them will be a useful skill in their real life contexts, for example decorating and furnishing homes, working with food and drink and is an important skill in many areas of industry.
4 Expressions and equations Algebraic powers, expressions and brackets and formulae. HT 2 Weeks 8-12	A1 A2 A3 A4 A5 A6 A7	Students start to use skills developed in Unit 1 in an algebraic context. They will be utilising skills such as substitutions, simplifying and solving to aid them in modelling and solving problems.

5 Real-life graphs Conversion, distance-time, line graphs, functions, real life graphs. HT 2 Weeks 13-15	A9 A10 A14	Building on Unit 7 in year 7 this topic looks at graphs of conversion, distance time and of linear functions. All these areas are linked, they are graphs that present continuous data (mainly time). Students need to draw and interpret these graphs.
6 Decimals and ratio Ordering decimals, rounding, calculations with place value and decimals, ratio and proportion with decimals. HT 3 Weeks 16-18	N1 N2 N15	Building from the Year 7 Units 2 and 4 we now start to link the work they have previously encountered with the unit of ratio interleaving skills and making links. This also mirrors the fact that ratios in real life will more often have values such as decimals to work with rather than integers. STEM using ratios.
7 Lines and angles Properties of quadrilaterals, alternate angles and proof. Interior and exterior angles. Forming and solving equations from geometric problems. HT 3/4 Weeks 19-22	G3 G4	This builds on the work students have covered in Unit 8 in Year 7. Moving from properties of angles, triangles and quadrilaterals to looking at interior angles of any sided shape, regular and irregular, and looking at external angle properties. From here they can combine skills to start to use them in problem solving tasks.
8 Calculating with fractions Four operations with fractions. Reciprocals. Decimal/fraction conversions. Calculations with mixed numbers. HT 4 Weeks 23-26	N8 N10	This unit develops further the understanding they should have developed in the Year 7 Unit 5. They are now extending and making connections between fractions, multiplication and division in looking at reciprocals. They are also extending their fraction calculation skills to use with mixed numbers and working with a combination of decimals and fractions.
9 Straight-line graphs Direct proportions on graphs, equations of straight lines. HT 5 Weeks 27-29	A9 A10 R10 R11 R14	This follows on from the work students have covered in Unit 5 on real life graphs in combination with the skills they should have acquired in Unit 4 and can be linked to the sequences work they have completed in Unit 9 in Year 7. All these areas link together in the development of the functions and their corresponding straight-line graphs. STEM: Direct proportion problems.
10 Percentages, decimals and fractions Converting between fractions and decimals, using fractions, decimals and percentages to compare equivalent proportions. Writing percentages and percentages of amounts. HT 5 Weeks 30-32	N10 N12 R9	Unit 10 should be a development of Units 8 and 6 where students should now be able to convert and understand proportions in different forms as well as using them to compare and manipulate proportions, leading to being able to problem solve with quantities and relationships between different quantities being delivered in different forms. Links should now be made between fractions, decimals, percentages, ratios and proportions. Finance: solving problems.
3 Statistics, graphs and charts Planning a survey, collecting data, pie charts, tables, stem and leaf diagrams, scatter diagrams, comparing data. HT 6 Weeks 33-37	S2 S4 S6	Building on the skills gained in Year 7 Unit 1, students should now be moving to being able to collect, represent and analyse data. In order to do this and interpret representations in other subjects and areas of their life they need to have experience and understanding of the various different types of graphical representations or data, compare them; understand which representations should be used and compare the benefits if more than one is available. This area of maths is one of the most significant in terms of transferable qualities for use and development in other subjects. Finance: misleading graphs.