Statement of Intent – Maths

"Mathematics knows no races or geographic boundaries; for mathematics, the cultural world is one country." David Hilbert

At All Saints Academy we align our maths curriculum to our vision of '*Living Well Together with Dignity, Faith and Hope*.' Within maths, we promote collaborative learning in the classroom in order for students to have the opportunities to build relationships with peers therefore demonstrating that we encourage them to show each other, and staff, that they are '*Living Well Together*.' We strive to ensure that our students are mathematically literate in order have dignity in later life by applying the skills they have learnt to the wider world, but also to have the confidence to make mistakes and learn from them. We endeavour to develop their financial literacy across the 5 years to ensure students have the dignity to live life confidently handling money matters once they leave school. As staff, we encourage students to have faith in their ability and their mastery of the key skills and content. It is our hope that all students leave us with the minimum of a GCSE grade 4 in order to give them the best opportunities in later life.

We make sure that any boundaries to learning are removed by using our pupil premium funding to fully equip students with the tools they require to complete all aspects of the maths curriculum. We do this by having scientific calculators, rulers, protractors and compasses in all maths classrooms. 5-a-day retrieval task books are purchased for all students. These are used as a 'Do Now' task at the start of every lesson and enable staff to identify gaps in knowledge. These retrieval task books are differentiated and ensure that every student has tasks that are aimed at enabling them to make progress towards the next grade. We recognise that all students learn at different rates and to make sure all students learn effectively we use differentiated online textbooks, which utilise the iPads that we have provided for all students. These textbooks are designed in conjunction with exam board so that we are confident that all content is covered in a way that builds self-mastery of the skills. Topic based learning mats support and extend students with additional needs. The learning mats used throughout Year 10 and 11 include basic mathematical skills scaffolding and a copy of the formula sheet that will be available to students in the external examinations.

Additionally, we use our student support workers to support small group work for students to allow them the time and space to develop their skills, without feeling rushed by the pace of the lesson for others in the class or to support in the classroom setting. Staff are also proficient at supporting SEND students. The teaching PowerPoints have s 'New Learning in Small Steps' section which limits the amount of new knowledge students are exposed to. There are pink scaffolding hints on PowerPoints and staff also provide pink guidance in exercise books as they circulate.

In order to engage our Year 10 cohort immediately we start students off by developing skills that were covered in KS3 so that students are aware that the KS4 curriculum is continually developing throughout their time at All Saints Academy.

Year 10

Substantive knowledge (Declarative Knowledge)

Students are expected to have a working knowledge of all skills, techniques and formulae from both the KS2 and KS3 syllabus. Students will then need to know when to apply these skills within a GCSE exam paper. This is the first year where students will be split into higher and foundation tiers. Foundation students will start with number in Year 10, with the aim to ensure there is an opportunity to use retrieval to ensure fluency, but also to plug any gaps in learning. Students will

then revisit fractions and percentages with a view to extend their previous KS3 learning to further reasoning and problem-solving skills, especially as Paper 3, the problem-solving paper, has been a weaker area for our cohort.

Algebra in Year 10 also works on mastery of the skills learned through Year 7 to Year 9, but challenges students to further interweave these skills with other mathematical skills as they started to do in Year 9. The data lessons will focus on extending the knowledge they already have in Stem and Leaf Diagrams and Scatter Graphs and add further knowledge in Pie Charts and Time Series graphs before moving onto extension tasks in averages such as estimating the mean and looking at sampling in research. In shape, students will look at retrieving their angle skills and applying these to more complicated geometrical problems that interweave with various other mathematical skills. Students will also learn to convert metric measurements in area and volume as an extension to their previous learning as well as how to describe and combine the transformations they learned in KS3.

Higher students will also start with number in Year 10, but will focus on reinforcing the higher skills that were visited in Year 9 such as negative indices and calculating with standard form. They will then develop their fraction and percentage skills to interweave these with their ratio skills.

Algebra at the higher tier assumes mastery at a higher level in terms of covering more content in a shorter space of time, allowing students to extend to solving simultaneous equations and solving quadratics through to completing the square by the end of Year 10. The data lessons will focus on introducing some new content such as Time Series as well as developing disciplinary knowledge in interpreting data.

In shape, students will master and deepen their understanding of Pythagoras' Theorem and trigonometry visited in Year 9 as well as moving their area and volume knowledge on to new shapes such as sectors, spheres and pyramids. Higher students will also revisit and extend probability skills through learning tree diagrams.

Disciplinary knowledge (Procedural Knowledge)

Both foundation and higher students will prepare for their GCSE exams by developing their reasoning and problem-solving skills throughout Year 10 and Year 11. Foundation students in particular will use Year 10 to develop their problem-solving and reasoning in number, algebra and shape by ensuring that they master the skills through fluency and retrieval, leading to them being able to work with a variety of problems that uses the cross-over of this skill set. Higher students will focus their problem-solving in data by being able to identify appropriate statistical graphs and diagrams to represent and interpret data. This will also allow students to revisit their work on misleading data.

In addition to the above, students will continue to develop their financial literacy through work on understanding salary in terms of taxes and national insurance.

Year 11

Substantive knowledge (Declarative Knowledge)

In Year 11, our focus is on mastery of the skills taught at KS3 which, once mastered, will further extend, aiming for the top grades in their particular tier of entry. We also ensure students are not capped at any point and allow fluid movement between foundation and higher tiers when assessments indicate this is appropriate.

Foundation students in Year 11 develop their ratio skills and revisit these from Year 8, then building on them they look at proportion linking this to graphs, showing again the interweaving of skills across maths. They will also look at an entire topic based on multiplicative reasoning, demonstrating the variety of skills that are founded in basics of number and multiplication, before moving on to secure their knowledge in indices and standard form.

Their algebra lessons will now extend to where higher students were in Year 10 in order to allow students to solve quadratic equations, simultaneous equations as well as drawing quadratic graphs. Shape is a big focus for Year 11 foundation students who will develop their area and volume skills by looking at circles, pyramids and cones, but also will secure their learning in Year 9 in terms of Pythagoras' Theorem and trigonometry. Students will also develop their understanding of enlargement in order to understand similarity, linking this through to congruency.

Higher students will start with interwoven skills in multiplicative reasoning before extending their number skills in proportion and direct proportion, leading to exponential functions and function graphs. Data lessons will ensure students develop the higher skill set through learning cumulative frequency, box plots and histograms. Their algebra lessons will develop the previously mastered skills to now look at algebraic fractions and surds, especially linking surds to early algebra skills such as expanding brackets. Similarly to foundation students, shape is a big focus as they further develop their skills in similar shapes and congruency as well as advancing trigonometry beyond right-angled triangles and learning circle theorems.

Disciplinary knowledge (Procedural Knowledge)

Throughout Year 11, teachers and students will focus on ensuring all gaps in learning are addressed and also that with each development of a skill, there is an opportunity for retrieval and mastery to ensure students are confident when they walk into their exam in the summer. Students studying for the foundation tier will ensure their reasoning skills are secure in Year 11 as this is often a weakness for our cohort at this level. Students will have multiple opportunities to investigate the kinds of questions that require reasoning in terms of both drawing conclusions and reasoning links between different areas of maths. At a higher level, students will need to develop their problem-solving skills from being able to identify the elements of a problem to being able to problem-solve which mathematical skill and/or formula is appropriate - such as when to use the sine or cosine rule.

Due to the disruption to learning caused by the pandemic we will ensure students have opportunities to become engaged with our usual interventions to address any gaps in learning. This includes setting up small intervention groups in maths and English following the November mock exams.

After the AP1 mock exams in November 2023, the whole year group will spend December filling the gaps in their knowledge. These gaps are identified from the Question by Question Analysis documents which are used by all staff for every class in both year groups. The gaps identified in December 2023 were:

Foundation	Higher
Transformations	Simultaneous Equations
Solving Inequalities and representing on a number line	Solving Inequalities
Scale Drawings	Triple Brackets
Ratios	Rearranging Formula
Interior Angles of Polygons	Parallel and Perpendicular Lines
Compound Interest	Congruency
Graph Drawing given an equation	

In the final two weeks of term, all students are given personalised learning opportunities where their own unique learning gaps will be addressed by giving them personalised learning booklets containing numerous practice questions.