

## **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. 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. 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.

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. We have also designed the maths curriculum in such a way that retrieval tasks are used to refresh prior knowledge before developing further.

### **Specific support planned for SEND students:**

In Maths, colour coded tasks are provided for specific tasks at parts of the lesson. These offer progressively less scaffolding so that as students develop more confidence and fluency they can attempt more challenging tasks. The least able benefit from heavily scaffolded questions to ensure that they can access all parts of the lesson. The teacher explains new learning in small steps and allows time for students to practice this, providing support where needed. As with other subjects where support is given the teacher uses a pink pen in exercise books. Learning mats are used to support students, they provide key concepts and vocabulary and act as a useful reminder in class to those that need it.

## **Year 10**

### **Substantive 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. Students will be split into higher and foundation tiers but will access the same scheme of work at a differentiated level. This has been designed to allow teaching for mastery, whereby all students acquire a solid understanding of the maths that has been taught to enable them to move

onto more advanced material. Students will start with shape in Year 10, specifically transformations and similarity. They will extend and formalise their knowledge on enlargements and scale factors, with higher tiered students focusing on negative scale factors. The aim of this, particularly with transformations is to ensure there is an opportunity to use retrieval to ensure fluency, but also to plug any gaps in learning. Students also revisit ratio and proportion to extend their previous KS3 learning but also so they can apply existing and new knowledge to exam specimen questions.

Algebra in Year 10 also works on mastery of the skills learned from Year 7 through to Year 9. Students will learn algebra throughout Year 10, both algebraically and graphically in order to consolidate, interweave and strengthen their existing skills. This will be done by ensuring they are comfortable and familiar enough with quadratics to be able to solve them graphically, via factorisation or by quadratic formula. They will do this in November and then further consolidate their fluency in algebra in December through the learning of simultaneous equations especially when modelling equations from worded problems. This will enhance their reasoning and problem-solving skills, especially as Paper 3, the problem-solving paper, has been a weaker area for our cohort. The data lessons will focus on extending the knowledge they already have in stem and leaf diagrams, scatter graphs and pie charts. This will be the pre-requisite knowledge they will use when learning about histograms, cumulative frequency graphs, real life graphs and box plots especially in exam context. This will also allow students to develop a disciplinary knowledge in interpreting and comparing different types of data. Students will also look at sampling and how the different contexts examiners can question on this. 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 be focusing on worded and disguised questions of the same topics. For instance, skills that were visited in Year 9 such as indices and basic algebra will be further developed through the learning of surds later in the year. They will also develop their fraction and percentage skills to interweave these with their ratio skills.

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 onto new shapes such as sectors, spheres and pyramids. Higher students will also revisit and extend probability skills through learning tree diagrams.

### **Disciplinary 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.

### **Year 11**

#### **Substantive 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 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 quadratics, 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**

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 on 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 the national tutoring programme and our usual interventions to address any gaps in learning. Additionally, students will continue their financial literacy development by investigating and understanding mortgages