Numeracy and Problem Solving 2020-2021

At the Academy St Francis of Assisi we place an early emphasis on developing strong numeracy skills. These underpin the entire Mathematics curriculum and support students' learning in other areas such as Science, Design Technology, Computing and Geography. The Mathematics curriculum encourages students to make connections across mathematical concepts in order to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.

ASFA 10 Key Concepts for all:

Our aim is that **all** students will leave our Academy with solid understanding and application of the following topics and skills. We consider these to be key to whichever path our students decide to follow post-16.

1. Ratio and proportion
2. Geometric and spatial awareness
3. Measurement and the metric system
4. The equivalence of fractions, decimals and percentages
5. Using and reasoning with data
6. Place value
7. Written and mental methods for the four rules.
8. Calculating with fractions
9. Calculating with percentages
10. Algebraic manipulation

ASFA numeracy and problem-solving strategy:

- Strategies to utilise students' time in school, both in lessons and in additional intervention, in the most effective way, will be based upon evidence-based approaches. These include **Education Endowment Foundation, Nuffield Foundation** and students' identified barriers to learning upon entry and as they progress through school.
- A consistent approach to numeracy and problem solving will be developed in mathematics lessons and across the wider curriculum.
- Existing school assessment data and baseline GL data play a central role in this.

Barriers

Typically, students arrive well below national average in terms of their standardised aged scores. We have identified key barriers to mathematical and numerate application via GL analysis, internal assessment and have utilised our work with the SSIF Deeper Learning Project and MathsHub to identify specific areas of focus.

On entry	B1	Average maths scaled scores, upon entry to the school, are significantly below the national average. Year 7 entry 2020 are below and previous years' cohorts.
	B2	Students with low scores on entry need additional support to improve their concrete operational methods in order to establish and consolidate an understanding of number. Mental maths skills need to be further developed for these students.
	B3	Students need to develop their language of mathematics, in particular their abilities to reason, explain and justify, which, in turn, will help them to develop into confident problem solvers.
	B4	Students need to be encouraged to develop the more formal written language of mathematics and have an understanding of the key terms in the appendix of this policy.
	B5	Problem solving – application of knowledge and understanding.

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On going KS3/4	B6	Problem solving – resilience when approaching tasks or questions.
	B7	Consistency of approach across the school.

Identified Barriers	Action	Intended outcomes
B1, B2, B3, B4	**Small Learning Community** Identified students to be taught by KS2/3 specialist in parallel with the rest of the cohort. **Every Child Counts Intervention** KS3 Lead to coordinate additional sessions for identified cohort. **Curriculum Planning** KS3 leads to coordinate the improvement of lessons in the shared area and monitor the delivery and impact.	There is a significant reduction in students identified as NSR measured using GL assessments at identified points across the year. Students demonstrate that they learn more, remember more, deepen their knowledge. They make progress at least in line with their peers nationally. P8 and SPI show a rapid closing of gap towards 0.
B3, B4, B5, B6, B7	**Numeracy Across the Curriculum** Numeracy coordinator to with numeracy rich subjects to establish a consistent approach to the language and methods of mathematics. Numeracy coordinator to work with the whole staff on methods for problem solving to adopt a consistent approach.	There is consistency of language across the curriculum. Consistent approached to numeracy is evident across the school. Students are able to solve problems with more confidence and demonstrate resilience.
B2, B5, B6	**Curriculum Planning** Fluency is developed in all year groups and interleaving planned into the curriculum.	There is a coherent sequence of lesson planning from years 7-11 that enables students, as a minimum, to access their target grade.
B5, B6	**SSIF Deeper Learning Project** CPD programme for the whole maths team 2018-2020. **MathsHub Project** Developing a strategy based on examples and non-examples, a particular emphasis on geometry in the first instance.	Teachers confidently select genuine, nonroutine problem-solving tasks. Teachers know a range of strategies, which they can model effectively for pupils. They teach pupils to carefully and consciously choose the most appropriate strategy for the problem at hand.
B5, B6	**Curriculum Design** Problem solving task, anchor tasks, diagnostic questioning numerical fluency	Lessons are more consistently of a high standard and students improve their fluency and are more resilient when problem solving.

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	have all been embedded in the lessons in our shared drive. **Coaching Cycle** Identified strengths and areas for development form the focus for our coaching problem.	

Baseline testing to inform planned recovery curriculum provision and targeted support

- GL assessments used to generate SAS scores for students.
- 'Small Learning Community' to target and support students identified as SEND via primary trained teacher.
- Pearson KS3 baseline tests in Maths cross referenced with GL assessments.

Catch Up Numeracy Strategy

In addition to targeted planned support via National Tutor programme, and TeachFirst graduate mentor, the maths department have a transition programme to close the gap for those students who are not at the expected standard.

Maths strategies include:

- Recovery curriculum amended planning. Key focus on deliberate active practice of **number,** identified as main skill lacking post-lockdown this involves retrieval interleaving with planned curriculum.
- All class sets, based on GL and Pearson internal baseline testing. In class interventions identified with KS3 lead. Information used through a QLA identify individual and whole class strengths and areas of improvement. KS3 lead uses this to target students in class.
- November 2020-'Every Child Counts'. Teaching Assistant led programme to commence. NSR students.
- Diagnostic questioning used to evaluate critical skills and knowledge, and to target support.
- Interleaved starters evaluate students understanding and application of key prior knowledge
- "Numeracy Ninjas" to be re-introduced in form time when appropriate and as lesson starters until that point.
- Curriculum differentiated into **'Core Support'** and **'Greater Depth'**
- All students rigorously monitored using testing to check progress throughout the year.
- 1-1 CPD for every teacher by KS3 lead, targeted at identifying and providing bespoke support for students working below 100, age related expectation, below target. This is monitored after each unit.

Numeracy Across the Curriculum

- Maths and Geography teachers to jointly plan a unit of work that addresses common numerical misconceptions.
- Maths and Science teachers to plan GCSE sessions based on numeracy/maths skills.
- Common language adopted by Science, Technology, Geography, PE and Computer Science.
- Posters created for subject areas with key subject specific terminology.

In addition to the above students with SEND receive:

- Immersion and targeted support though our 'Small Learning Community' and specialist teaching via our primary trained teacher. Small Learning Community curriculum is aimed at bridging the gaps in knowledge from Primary School. Students follow the same curriculum as other students but with a greater focus on imbedding key literacy and numeracy skills that may be lacking.

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Appendix

Key Terms

1. Add
2. Sum
3. Subtract
4. Difference
5. Multiply
6. Product
7. Divide
8. Fraction
9. Decimal
10. Numerator
11. Denominator
12. Ratio
13. Proportion
14. Percentage
15. Increase
16. Decrease
17. Ascending
18. Descending
19. Interest rate
20. Depreciation
21. Annual Percentage Rate (APR)