

## Our intent – Maths

At Northampton School, we see it as our responsibility to ensure that all students are engaged with the subject and continue to make excellent progress each year. We seek to develop confidence and accuracy in their use of mathematical language and techniques to produce solutions to problems. By requiring rigour in such work, we build resilience and resourcefulness. We provide opportunities for them to become more creative and encourage them to find alternative solutions.

**We believe that students deserve a creative and ambitious mathematics curriculum, rich in skills and knowledge, which ignites curiosity and prepares them well for everyday life, further studies and future employment. Our mathematics curriculum will give students the opportunity to:**

- become fluent in the fundamentals of mathematics, 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.
- 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.
- communicate, justify, argue and prove using mathematical vocabulary.
- develop their character, including resilience, confidence and independence, so that they contribute positively to the life of the school, their local community and the wider environment.

## Curriculum Implementation and Impact - Maths

Our non-negotiable common factor is 'High Expectations'. We all hold high expectations from every student. All teachers work extremely hard to get the best out of every student they teach. We require and expect each student to master the curriculum at every stage and be ready for what follows. Our intent at KS3 is to prepare students for the demands of GCSE. Our intent at KS4 is to deliver the curriculum fully, stretch the most able and prepare them for A level studies. Our aim is to make the subject accessible and enjoyable and relevant as much as possible to real life applications of Mathematics. Our teachers deliver the intent with strong level of subject knowledge, high level of enthusiasm and total commitment to improving the understanding and consequently confidence levels of their students.

Our students are taught Maths in ability groups. Maths is a tiered subject at GCSE by teaching in ability groups teachers and students are able to work to develop the fundamental mathematical skills appropriate for their ability level. An example of a week in Maths is below-

Week 3	1	Introduction to Algebraic Notation Collecting Like Terms (Addition and Subtraction)	<ul style="list-style-type: none"> <li>• I know that letters are used to represent unknown quantities or variables.</li> <li>• I know how to simplify expressions with addition and subtraction by collecting like terms.</li> </ul>	Ensure you give key explanations surrounding definitions; term, expression, variable, operation, coefficient. Clear concept of replacing an unknown with a letter. Have a clear progression start with separate letters, then with coefficients, then multiple letters, add numbers and negatives.	Common misconceptions to look out for and address: Students missing negative signs in front of terms, or thinking that $3x-5y+2x = +15y$ because they read it left to right $3x + 4x + 2 + 1 \rightarrow$ adding numbers to the $x$ also $x^2 + x$ added together Students often forget that $x$ has a coefficient of 1 when adding to something like $3x$	Challenge can be added through combining letters so students recognise $xy + xy$ can be done and that $yx$ is the same. Introduce squared terms and discuss difference.
	2	Simplifying Expressions with 4 operations	<ul style="list-style-type: none"> <li>• If I know how to interpret algebraic notation I can simplify expressions involving the four basic operations.</li> <li>• I know how to use and interpret algebraic notation, including: <math>a \times b</math> as <math>ab</math>, <math>y + y + y</math> as <math>3y</math>, <math>a \times a</math> as <math>a^2</math>, <math>a \div b</math> as <math>a/b</math>.</li> </ul>	Reintroduce key terms from lesson 1, this time dealing with all four operations as listed in success criteria. Again, gradually build up to more difficult problems with more letters.	Common misconceptions to look out for and address: $a \times a = 2a$ $2y \times 3y = 5y^2$	Students can be challenged with mixed operations and using BIDMAS, negative terms also make for a challenge.
	3	Substitution in to various formulae	<ul style="list-style-type: none"> <li>• I know how to substitute numbers into expressions to work out their value by following the rules of BIDMAS.</li> </ul>	By the end of the lesson students will know how to replace all letters with numbers and calculate corresponding values. Again, definitions will be crucial to understanding; substitution, variable. Mix up questions with different operations and negatives.	Common misconceptions to look out for and address: if $a = 6$ and $b = 2$ , $ab = 62$ If $x = 4$ , $3x^2$ becomes $12^2$ Any other misuse of order of operations	Students can be stretched with more complex operations involving fractions and multiple operations.
	4	Expanding Single Brackets and simplifying where possible.	<ul style="list-style-type: none"> <li>• I can multiply terms in order to remove brackets from an expression.</li> </ul>	Start with a quick recap of multiplying terms before proceeding with multiplying brackets. Start easy with single brackets and build up to a point where they are expanding two single brackets and collecting like terms.	Common misconceptions to look out for and address: Missing the multiplication of the second term issues with negative numbers Issues with multiplying like letters or different letters	An excellent challenge is to give two single brackets where the second has a negative in front with a negative in the bracket: eg, $3(2x+1)-3(x-4)$

Each topic area is developed using a success criterion that ensure teachers are aware of the end points for each area.

# Y7 Half Term 2 Student Success Criteria

## Number– Fractional Operations and Percentages

- I know how to write fractions in their simplest form by finding common factors between numerator and denominator.
- I know how to add and subtract fractions by finding the common denominator.
- I know to multiply fractions by multiplying the corresponding numerators and denominators.
- I know that to divide one fraction by another I must find the reciprocal of the second fraction and then multiply as normal.
- I know how to convert between mixed numbers and improper fractions.
- I can find a fraction of a given quantity.
- I know that a percentage is the number of parts per hundred.
- I know how to find common percentages of amounts such as 10%, 1%, 50%, 25% and 5% without a calculator.
- If I know how to find common percentages I can find more complex percentages such as 38% or 17.5%.
- If I know how to find common percentages I can find the value of quantities after a percentage increase or decrease, including worded problems.
- I know how to express an increase or decrease as a % change.
- I know the procedure for calculating multiple repeated % change.
- I know how to calculate original values after a % change.
- If I know the operations with fractions and how to convert mixed numbers in to improper fractions, I can solve fraction problems with mixed numbers.

## Algebra – Solving Linear Equations and Formulae

- I know how to apply inverse operations to find missing values.
- I understand what an equation and can solve equations with one operation by applying the inverse operation.
- If I know how to apply inverse operations, I can solve equations with two operations.
- If I can solve two-step equations I can solve equations with an unknown on both sides.
- If I know how to expand brackets, I can solve an equation with brackets.
- I know how to solve more complicated linear equations involving fractions.
- I know how to express simple expressions in their factorised form.
- I know how to express real life situations as formulae and use them by substituting in values.

## Geometry – Loci and Constructions

- I know how to draw and measure lines and angles using geometrical equipment.
- I know how to interpret and use simple scales in accurate drawings, eg, 1cm = 2 miles.
- I know how to use a ruler and compass to draw accurate geometric constructions.
- If I can use a ruler and compass correctly I can show accurately show a locus of points that satisfy a condition.

**Key Vocabulary:** Numerator, Denominator, Reciprocal, Factorise, Solve, Equation, Unknown, Construction, Formulae, Locus, Scale

		Year 7 KS3 Scheme of Work (Items in RED are new additions from previous years)					
HT1	Week 1	Week 2 to 5			Week 6	Week 7	
	Half-Term 1 Topic List is the same for Sets 1, 2 and 3					Term 1 Assessment and Feedback	Personal Development Week
	<u>Number</u>	<u>Number</u>	<u>Algebra</u>	<u>Geometry</u>			
	<ul style="list-style-type: none"> <li>• Written Methods</li> <li>• Negative Numbers</li> </ul>	<ul style="list-style-type: none"> <li>• Order of Operations</li> <li>• Types of Number</li> <li>• Powers and Roots</li> </ul>	<ul style="list-style-type: none"> <li>• Simplifying Expressions</li> <li>• Expanding Brackets</li> <li>• Substitution</li> </ul>	<ul style="list-style-type: none"> <li>• Angle Facts:</li> <li>(Triangle, Straight Line, Quadrilaterals and Vertically Opposite Angles)</li> </ul>			
COMMON TEST (End of Week)	Key Vocabulary: Variable, Expression, Index, Power, Root, Substitution, Expand, Vertically Opposite, Prime, Square, Cube						



		Year 8 KS3 Scheme of Work (Items in RED are new additions from previous years)					
HT1	Week 1 to 5				Week 6	Week 7	
	Higher (Sets 1 and 2)		Foundation (Set 3)		Term 1 Non-Calc Assessment and Feedback	Personal Development Week	
	<u>Number</u>	<u>Algebra</u>	<u>Number</u>	<u>Algebra</u>			
	<ul style="list-style-type: none"> <li>• Types of Number</li> <li>• HCF/LCM</li> <li>• Product of Primes</li> <li>• Standard Form</li> <li>• Indices/Powers/Roots</li> </ul>	<ul style="list-style-type: none"> <li>• Linear Equations</li> <li>• Expanding and Factorising</li> <li>• Quadratic Equations</li> <li>• Index Laws</li> </ul>	<ul style="list-style-type: none"> <li>• Types of Number</li> <li>• Ordering Numbers</li> <li>• Numbers ↔ Words</li> <li>• Indices/Powers/Roots</li> <li>• Product of Primes</li> <li>• Standard Form</li> </ul>	<ul style="list-style-type: none"> <li>• Simplifying Expressions</li> <li>• Linear Equations</li> <li>• Expanding and Factorising</li> <li>• Index Laws</li> <li>• Substitution</li> </ul>			
Key Vocabulary: Highest Common Factor, Lowest Common Multiple, Prime Factor, Standard Form, Reciprocal, Root, Expand, Factorise, Index Laws, Quadratic, Expression							

