

YEAR 10 | MATHEMATICS

Becoming a Mathematician

The curriculum and assessment of students at this stage of education has been carefully designed to promote deep learning of mathematics and develop students into analytical and logical problem solvers. Students in Year 10 will strengthen and consolidate their knowledge of number, ratio and proportion, algebra, geometry, and data. They will use and apply their understanding of the Big Ideas of mathematics which have been developed to improve the students' ability to retain information, develop their mathematical skills and apply their knowledge using a consistent range of methods and techniques. Students will be taught to link and interconnect the Big Ideas in a fluent way thus becoming familiar with them.

We have carefully designed the curriculum so that students will review the topics taught during Year 9 with interleaving to support the recall and retention of previously learned content. The curriculum will ensure that students are able to solve multi-step problems and will ensure that all students have access to appropriate challenge. In addition to this, we aim to broaden students' perception of mathematics by providing the opportunity to explore how the skills they are developing can be used in real life situations. We believe that this exposure to the application of mathematics, in addition to their learning, will inspire them to be our next generation of mathematicians.

ENRICHMENT OPPORTUNITIES

AMSP will be running support sessions, trips and competitions to widen student understanding of mathematics, particularly with real life scenarios and context. In addition to this, other trips and competitions will be run with a key focus on careers and potential jobs that involve mathematics. Homework support will be available from September. The aims of these are to support students with resources and projects that would normally be unavailable to them.

HALF TERM 1 DEVELOPING FLUENCY IN NUMBER

All students will know:

- Calculations with integers and decimals
- Powers and roots
- Rounding and estimation
- Error intervals
- Index laws
- HCF & LCM
- Product of primes
- Order of operations
- Standard form
- Equivalent fractions
- Calculations with fractions

All students will be assessed:

Students will complete low stake fluency tests regularly to check retention and understanding of topics taught. Gaps identified will be addressed in lesson and through the use of homework set on SparxMaths. Students will also sit a formal GCSE style assessment, which focusses on all the content from half term 1.

Reading skills needed for this unit:

Decoding, fluency, vocabulary, prior knowledge and summarising will all be necessary for this half term.

Key vocabulary:

Grid method, place value table, powers of 10, factor, multiple, equivalent, prime number, integer, estimate, BIDMAS.

HALF TERM 2

RATIO, PROPORTION, PERCENTAGES, ALGEBRA

All students will know:

- How to share an amount in a ratio
- How to solve ratio problems; one part given and difference given
- Combining ratios
- Using ratio and proportion in real life contexts; best value, recipes and exchange rates
- Percentages; percentage change, reverse percentages, interest and depreciation
- Simplifying, expanding and factorising
- Forming and solving equations
- Inequalities

All students will be assessed:

Students will complete low stake fluency tests regularly to check retention and understanding of topics taught. Gaps identified will be addressed in lesson and through the use of homework set on SparxMaths.

Reading skills needed for this unit:

Decoding, fluency, vocabulary, prior knowledge and summarising will all be necessary for this half term.

Key vocabulary:

Increase, decrease, compound interest, depreciation, expand, factorise, balance method, simplify, substitute, solve, rearrange, inverse operations.

HALF TERM 3

SHAPES, MEASURES AND SEQUENCES

All students will know:

- Pythagoras
- Properties of 2D and 3D shapes
- Metric conversion
- Perimeter and Area of 2D shapes
- Calculating with time
- Volume of Cuboids and Prisms
- Surface area of 3D shapes
- Convert metric 2D and 3D units of area and volume
- Recognise sequences
- Continue sequences
- Finding and using the nth term

All students will be assessed:

Students will complete low stake fluency tests regularly to check retention and understanding of topics taught. Gaps identified will be addressed in lesson and through the use of homework set on SparxMaths. Students will also sit a formal GCSE style assessment, that focusses on all the content from half term 1, 2 and 3.

Reading skills needed for this unit:

Decoding, fluency, vocabulary, prior knowledge and summarising will all be necessary for this half term.

Key vocabulary:

Nth term, linear sequence, perimeter, area, volume, metric, prisms, cuboids, Pythagoras.

HALF TERM 4

GRAPHS

All students will know:

- Plot linear graphs
- Plot quadratic graphs
- Use graphs to approximate solutions
- Recognise different graphs
- Solve problems involving coordinates

All students will be assessed:

Students will complete low stake fluency tests regularly to check retention and understanding of topics taught. Gaps identified will be addressed in lesson and through the use of homework set on SparxMaths.

Reading skills needed for this unit:

Decoding, fluency, vocabulary, prior knowledge and summarising will all be necessary for this half term.

Key vocabulary:

Linear, cubic, quadratic, axis, coordinates, horizontal, vertical, simultaneous, roots, cubic, reciprocal, gradient, y intercept.

HALF TERM 5

ANGLES, PROBABILITY AND DATA

All students will know:

- Bearings
- Trigonometry
- Angles around a point
- Angles that meet at a point on a straight line
- Angles in triangles and quadrilaterals
- Internal and external angles of polygons
- Problem solving with angles
- Calculating averages from a list and a table
- Representing data
- Calculating probability
- Tree diagrams
- Venn diagrams

All students will be assessed:

Students will complete low stake fluency tests regularly to check retention and understanding of topics taught. Gaps identified will be addressed in lesson and through the use of homework set on SparxMaths.

Reading skills needed for this unit:

Decoding, fluency, vocabulary, prior knowledge and summarising will all be necessary for this half term.

Key vocabulary:

Isosceles, acute, obtuse, reflex, bearings, regular, irregular, mean, median, mode, range, pie chart, stem and leaf diagram, frequency polygon, cumulative frequency, hypotenuse, adjacent, opposite, sine, cosine, tangent, sample space, independent, dependent, probability conditional, tree diagrams, sample space outcome, theoretical, experimental, relative frequency, fair, biased.

HALF TERM 6

ALGEBRA, CONGRUENCE, SIMILARITY AND TRANSFORMATIONS

All students will know:

- Simplify and manipulate algebraic expressions
- Congruency
- Similar shapes
- Transformations

All students will be assessed:

Students will complete low stake fluency tests regularly to check retention and understanding of topics taught. Gaps identified will be addressed in lesson and through the use of homework set on SparxMaths.

Students will sit a mock GCSE at the end of the half term which will consist of 3 GCSE papers. This will be used to support gap closure and intervention moving into Year 11.

Reading skills needed for this unit:

Decoding, fluency, vocabulary, prior knowledge and summarising will all be necessary for this half term.

Key vocabulary:

Reflection, rotation, translation, congruency, enlargement, Similarity, scale factor.

HOW STUDENTS CAN BE SUPPORTED AT HOME

As a department, we have invested in SparxMaths which is an online learning platform containing over 10000 mathematical videos and quizzes. This can be accessed on any device and is an excellent revision tool. Students can use revision guides and bespoke "Passports" to support their studies. Modelled answers are provided after each assessment, via YouTube videos so that students can review any topics they found challenging.

HOW THIS LEARNING WILL BE EMBEDDED ELSEWHERE IN THE CURRICULUM

There are opportunities for links with science, technology, geography and PE. Consistent methods will be used across all departments to support students' understanding of mathematics.

YEAR 11 | MATHEMATICS

“Becoming a Mathematician

The curriculum and assessment of students at this stage of education has been carefully designed to promote deep learning of mathematics and develop students into analytical and logical problem solvers:

Year 11 students will strengthen their knowledge and understanding of the Big Ideas and will start to prepare for their GCSE exams. We have chosen Pearson Edexcel as our exam board; a key element of student learning in Year 11 is how to interpret GCSE questions and how to apply their understanding of the Big Ideas to these questions. Big Ideas have been developed to improve the student’s ability to retain information and knowledge.

Year 11 will build on the knowledge, skills and understanding of mathematical concepts learned during Years 9 and 10. Foundation tier students in Year 11 will become more confident when applying this understanding to a range of challenges including multistep questions. Higher tier students will continue to develop a wider and deeper knowledge of topics, and a greater number of mathematical skills and procedures. We also aim for fluency in the language of mathematics and for students to enhance their literacy skills when explaining their understanding of mathematics.

HALF TERM 1

DEVELOPING FLUENCY IN NUMBER

All students will know:

- Calculations with integers and decimals
- Rounding and estimation
- Index laws
- HCF & LCM
- Product of primes
- Order of operations
- Standard form
- Fraction calculations
- Percentages
- Ratio and proportion

All students will be assessed:

Students will complete low stake fluency tests regularly to check retention and understanding of topics taught. Gaps identified will be addressed in lesson and through the use of homework set on SparxMaths.

Students will sit a GCSE assessment at the end of the half term. This will be used to support gap closure and intervention during Half Term 2.

Reading skills needed for this unit:

Decoding, fluency, vocabulary, prior knowledge and summarising will all be necessary for this half term.

Key vocabulary:

Grid method, place value table, powers of 10, factor, multiple, equivalent, prime number, HCF, LCM, equivalent, recurring

HALF TERM 2 ALGEBRA AND SHAPE

All students will know:

- Simplifying, expanding and factorising
- The balance method
- Properties of 2D and 3D shapes
- Perimeter, area and volume
- Surface area
- Pythagoras Theorem

All students will be assessed:

Students will complete low stake fluency tests regularly to check retention and understanding of topics taught. Gaps identified will be addressed in lesson and through the use of homework set on SparxMaths.

Reading skills needed for this unit:

Decoding, fluency, vocabulary, prior knowledge and summarising will all be necessary for this half term.

Key vocabulary:

Expand, factorise, balance method, simplify, substitute, solve, Pythagoras, perimeter, area, volume.

HALF TERM 3 SEQUENCES AND GRAPHS

All students will know:

- Sequences
- Linear and non-linear graphs
- Real life graphs

All students will be assessed:

Students will complete low stake fluency tests regularly to check retention and understanding of topics taught. Gaps identified will be addressed in lesson and through the use of homework set on SparxMaths.

Students will sit a GCSE assessment during the half term.

Reading skills needed for this unit:

» Decoding, fluency, vocabulary, prior knowledge and summarising will all be necessary for this half term.

Key vocabulary:

Linear sequence, quadratic sequence, nth term, gradient, axes, linear, quadratic, cubic, speed, distance, gradient, intercept, origin

HALF TERM 4 GEOMETRIC REASONING AND AVERAGES

All students will know:

- Angle properties
- Trigonometry
- Bearings
- Vectors
- Similarity
- Transformations
- Construction
- Averages and range from lists, diagrams and tables

All students will be assessed:

Students will complete low stake fluency tests regularly to check retention and understanding of topics taught. Gaps identified will be addressed in lesson and through the use of homework set on SparxMaths.

Reading skills needed for this unit:

» Decoding, fluency, vocabulary, prior knowledge and summarising will all be necessary for this half term.

Key vocabulary:

Hypotenuse, adjacent, opposite, sine, cosine, tangent, reflection, rotation, translation, congruency, enlargement, similarity, scale factor, mean, median, mode and range

HALF TERM 5 AVERAGES AND PROBABILITY

All students will know:

- Charts and diagrams
- Probability including expected results and relative frequency, Frequency trees
- Probability trees
- Venn diagrams
- Students will follow a bespoke revision plan of content based on the needs of each individual class

All students will be assessed:

Students will complete low stake fluency tests regularly to check retention and understanding of topics taught. Gaps identified will be addressed in lesson and through the use of homework set on SparxMaths.

In preparation for the exams, students will also participate in a walking talking mock.

Reading skills needed for this unit:

Decoding, fluency, vocabulary, prior knowledge and summarising will all be necessary for this half term.

Key vocabulary:

Sample space, independent, dependent, probability, conditional, experimental, relative frequency, fair, biased tree diagrams, sample, space outcome, theoretical,

HALF TERM 6 EXAMS

All students will know:

- » Exam experience.
- » Organisation.
- » Application.

All students will be assessed:

- » External assessment

ENRICHMENT OPPORTUNITIES

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