

It is the intention of the mathematics curriculum to promote deep learning of mathematics and develop students into mathematicians. Concepts are covered at a steady pace and in detail, and all students build on prior learning as they progress through the scheme of work. The Big Ideas will be referred to throughout the scheme of work, helping students to make links and connections between topics, and understanding the key concepts that form the foundation of each topic. The scheme of work includes opportunities to explore applications of mathematics in real world contexts, as well as developing student's vocabulary and knowledge of the history of this subject.

CURRICULUM INTENT

THRESHOLD CONCEPTS

The start of the curriculum focusses on number. Mathematics begins with simple rules, which are built upon to create the different operations of arithmetic. These are set in a specific hierarchy, meaning that calculations that involve more than one different operator must be completed following the order of operations. We then start to look at place value and every digit has a specific value according to its place in the number. We can use place value diagrams to compare and order numbers, and to convert easily between fractions, decimals and percentages which we start to explore in spring term.

All fractions can have different forms. We can use fractions to represent a division and vice versa and use the concept of equivalent fractions. We start to explore more ratio and see how it is used to compare two or more quantities, and many mathematical problems can be modelled using ratio notation. Algebraic symbols are used in place of numbers that are either unknown or can be any value, and calculations involving these symbols follow the same rules as with number. This means that algebraic calculations can be checked by substituting numbers for each symbol at any stage.

SUPPORT AT HOME



Parents can support at home by:
Exploring websites such as BBC Bitesize KS3 Maths, Nrich and Numberphile can improve mathematical understanding.
Supporting with homework on Sparx Maths
Talking about real world maths in the adult world such as budgeting, financial maths, and maths in context like special offers.

ENRICHMENT



As a department we run a variety of trips that are linked to mathematical events. We invite guest speakers, provide after school clubs and hold competitions for students. We also have whole school activities to celebrate pi day, national numeracy day and international day of mathematics.

PERSONAL DEVELOPMENT



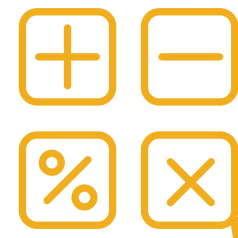
It is the intention that we provide students with opportunities to develop themselves into mathematicians. They will be able to communicate their reasoning and methods clearly, both verbally and through their written work. They will be able to solve problems in an organized and logical manner and be confident in the accuracy of their answers.

CURRICULUM LINKS

There are many parts of the curriculum where Mathematics is linked. Students will often see this is Science through physics where they will be using and applying formulas.
Geography where they will interpret data and through textiles where they draw 2D representations of 3D objects using plans and elevations.

CAREERS

- Engineer
- Accountant
- Research analyst
- Financial Analyst
- Computer programmer
- Games designer
- Information security analyst
- Auditor
- Statistician



WHAT

- Place value
- Perform addition and subtraction with positive integers and know which operations are commutative.
- Use place value to compare, order, add, subtract, multiply and divide by powers of 10

WHY

Students will begin with place value to ensure that they have a deeper conceptual understanding of where to place numbers. This will allow pupils to develop their understanding when adding and subtracting numbers. Students will use prerequisite skills to correctly align numbers when using these operations.

HOW

ASSESSMENT

Pupils will sit formal assessments in September, and a low stakes fluency assessment part way through the term. This data is used to support teacher planning. Students will also have bespoke Sparx Maths homework to support their learning.

THRESHOLD CONCEPTS :
Place Value
Addition and Subtraction

VOCABULARY

- Sum
- Subtract
- Plus
- Take away
- Minus
- Add
- Place value

READING SKILLS

Students will be introduced to keywords and concepts in lessons which will be copied into their class books if appropriate. They will be able to develop their reading skills when answering maths problems. These may be set in real life contexts, requiring students to extract the relevant information from a text.

WHAT

- Multiply and divide integers and decimals using mental and written methods
- Proportional reasoning and the application of multiplication and division to problem solving
- inverse operations and place value.
- Powers, roots and primes.

HALF TERM 2

WHY

Students will use the appropriate methods to multiply and divide numbers. This will be shown through visual representations as well as numerical procedures. Developing fluency with these techniques is key to unlocking problem solving skills. Understanding inverse operations and different types of number, index form and HCF, LCM promote thinking skills, problem solving and mathematical literacy.

HOW

ASSESSMENT

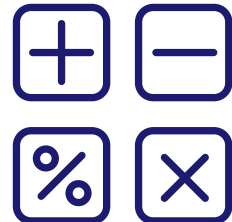
There will be a formal assessment covering the content taught to date at the end of this term. Students will also have bespoke Sparx Maths homework to support their learning.

THRESHOLD CONCEPTS:
Multiplication and Division
Inverse Operations

VOCABULARY

- Divisible
- Product
- Factors
- Multiples
- Prime
- Inverse
- Proportion
- Highest Common Factor
- Lowest Common Multiple

READING SKILLS



WHAT

- Powers, roots and primes
- Order of operations
- Ordering and calculating with directed numbers and their application in context

WHY

Students will develop their understanding of the order of operations in which we calculate as mathematicians. The wrong order of operations will often lead to the wrong answer. Students will also begin to learn about directed numbers including their relationship to many everyday concepts including money and temperature.

HOW

ASSESSMENT
Students will be given a fluency task in this half term to assess their understanding of the curriculum thus far. Students will also have bespoke Sparx Maths homework to support their learning.

THRESHOLD CONCEPTS:
Order of operations

VOCABULARY

- Power
- Roots
- Square
- Cube
- Exponent
- Negative number
- Prime
- Factors

READING SKILLS

Students will be introduced to keywords and concepts in lessons, which will be copied into their class books if appropriate. They will be able to develop their reading skills when answering maths problems set in real life contexts, that require students to extract the relevant information from a text.

WHAT

- Directed number
- Introduction to algebraic thinking
- Fractions – representing, ordering and calculating with fractions

WHY

Algebra allows you to take any formula, substitute numbers and solve problems to find an unknown value. Algebra is used in many other subjects. It allows students to move away from thinking and working with particular numbers and measures to understanding and reasoning with generalized relationships.

HOW

ASSESSMENT
Pupils will sit a formal assessment on the content taught to date. Data is used to support teacher planning. Students will also have bespoke Sparx Maths homework to support their learning.

THRESHOLD CONCEPTS:
A fraction is a division
Equivalence

VOCABULARY

- Variable
- Term
- Inverse
- Expression
- Numerator
- Denominator
- Equivalent

READING SKILLS

SUMMER

WHAT

WHY


HOW

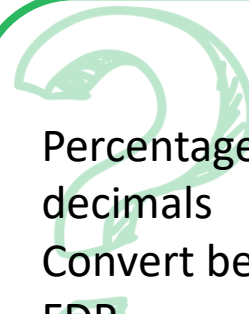
THRESHOLD CONCEPTS:
 Equivalence, place value
 estimation and rounding

VOCABULARY

Percent
 Fraction
 Percentage
 Terminating
 Recurring
 Equivalence
 Place value
 Decimal point
 Significant figure
 Round
 Estimate

READING SKILLS


 Students will be introduced to keywords and concepts in lessons, which will be copied into their class books if appropriate. They will develop their reading skills when answering maths problems set in real life contexts that require students to extract the relevant information from a text.



- Percentages, fractions & decimals
- Convert between and order FDP
- Percentages of amounts, percentage increase and decrease

Students will understand the equivalence of fractions, decimals and percentages and be able to convert between and order them. Calculations with percentages allow students to compare quantities and prices, are needed for financial literacy, and for analysing and interpreting statistics.

ASSESSMENT
 Students will be given a low stakes fluency task in this half term to assess their understanding of the curriculum thus far. Students will also have bespoke Sparx Maths homework to support their learning.

HALF TERM 2

WHAT

WHY

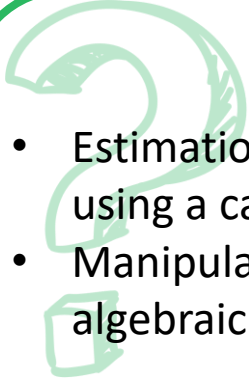
HOW

THRESHOLD CONCEPTS:
 Variables, substitution

VOCABULARY

Expression
 Variable
 Term
 Equation
 Substitute
 Constant
 Operation
 Factorise
 Simplify
 Collect
 Coefficient

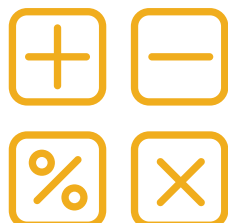
READING SKILLS



- Estimation, rounding and using a calculator
- Manipulating & simplifying algebraic expressions

Students will focus the accurate use of calculators which is an important skill for more complex calculations and future topics such as trigonometry. Studying algebra helps the mind to think logically, break down and solve problems. It allows you to take a situation and make it more general and solve problems that may not include numbers. Good algebraic skills are needed to access many areas of mathematics and science.

ASSESSMENT
 Pupils will sit a formal assessment on the content taught to date. Data is used to support teacher planning and in preparation for year 8. Students will also have bespoke Sparx Maths to support their learning.



WHAT

WHY

HOW

THRESHOLD CONCEPTS:
Units of measurement
Variables, equivalence

- Drawing, measuring & constructing accurate diagrams using rulers, compasses and angle measures.
- Manipulating & simplify expressions by expanding and factorising.
- Linear equations

Measurement and construction help with spatial understanding and geometric problem-solving. It enables us to navigate our surroundings, plan and design spaces, and make accurate calculations for various practical applications.

Algebraic skills allow students to move away from thinking and working with specific numbers and measures to understanding and reasoning with general relationships.

Algebraic reasoning is needed in many areas of mathematics and science.

ASSESSMENT
Pupils will sit a formal assessment in September, and a low stakes fluency assessment part way through the term. This data is used to support teacher planning. Students will also have bespoke Sparx Maths homework to support their learning.

VOCABULARY

Metric, imperial, scale, milli-, centi-, deci-, kilo-, mega-, giga-, metre, litre, gram, length, mass, volume, capacity, construct, locus, loci, path, region, parallel, perpendicular, bisect, equidistant, expand, factorise

READING SKILLS

Students will be introduced to keywords and concepts in lessons which will be copied into their class books if appropriate. They will be able to develop their reading skills when answering maths problems. These may be set in real life contexts, requiring students to extract the relevant information from a text.

WHAT

WHY

HOW

THRESHOLD CONCEPTS:
Multiplication and division
360° in a full turn

- Proportional reasoning. Direct and indirect proportion, application to problem solving and links with fractions, decimals and percentages.
- Polygons and angles. Classify, recall and apply angle and shape properties of lines and polygons.

Ratio and proportional reasoning are used in many real life applications including recipes and exchange rates. They are needed to understand mathematical topics such as percentages, gradient, algebra and trigonometry.

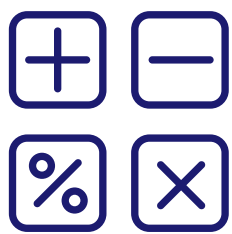
Shape and angle properties develop spatial awareness, understanding of patterns and the ability to problem solve.

ASSESSMENT
There will be a formal assessment covering the content taught to date at the end of this term. Students will also have bespoke Sparx Maths homework to support their learning.

VOCABULARY

Acute, obtuse, reflex, full turn, right-angle, parallel, transversal, perpendicular, corresponding, vertically opposite, polygon, triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, decagon, diagonal

READING SKILLS



MATHS YEAR 8

SPRING

WHAT

WHY

HOW

THRESHOLD CONCEPTS :
Area and perimeter

- Discrete data
Collection, analysis and displaying discrete data
- Area and perimeter of shapes including compound shapes and circles.

The ability to read, understand, analyse, and communicate with data enables individuals and organizations to make informed decisions, drive innovation, and achieve success. In today's data-driven world, the ability to effectively analyse and interpret data is more important than ever. Understanding and being able to calculate area and perimeter enhances knowledge of measurement, thinking and reasoning skills and demonstrates the application of algebra.

ASSESSMENT
Students will be given a fluency task in this half term to assess their understanding of the curriculum thus far. Students will also have bespoke Sparx Maths homework to support their learning.

VOCABULARY

Data, discrete, continuous, average, mean, median, mode, range, frequency, outlier, area, perimeter, pi, circumference, diameter, radius,

READING SKILLS

Students will be introduced to keywords and concepts in lessons which will be copied into their class books if appropriate. They will be able to develop their reading skills when answering maths problems. These may be set in real life contexts, requiring students to extract the relevant information from a text.

WHAT

WHY

HOW

HALF TERM 2 **THRESHOLD CONCEPTS:**
Equivalence
Substitution, balance method

- Ratio, understanding and using ratio to solve a variety of problems
- Formulae, writing and using formulae, substitution and generating sequences.
- Rearranging formulae

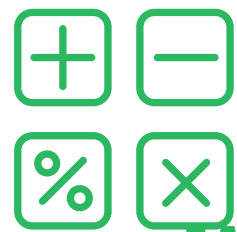
Ratio and proportional reasoning are used in many real life applications. They are needed to understand mathematical topics such as percentages, gradient, algebra and trigonometry. Mathematical formulae and equations are in many areas of maths and science as well as having real life applications such as budgeting and finance.

ASSESSMENT
Pupils will sit a formal assessment on the content taught to date. Data is used to support teacher planning. Students will also have bespoke Sparx Maths homework to support their learning.

VOCABULARY

Ratio, proportion, equivalent, part, subject, variable, equal, inverse, constant, equation, formula

READING SKILLS



MATHS YEAR 8

SUMMER

WHAT

- The Cartesian grid
Reading and plotting coordinates
- Equations and characteristics of straight line graphs
- Plotting non linear graphs

WHY

Coordinates provide a way to determine the position of a point in space. The cartesian grid and straight line graphs offer a connection between algebra and geometry with the use of graphs of lines and curves. We can use coordinates to draw 3D shapes, or see the position of an object in the real world - or even in space! Coordinates are used in engineering, architecture, physics and animation.

HOW

ASSESSMENT

Students will be given a low stakes fluency task in this half term to assess their understanding of the curriculum thus far. Students will also have bespoke Sparx Maths homework to support their learning.

THRESHOLD CONCEPTS:
Coordinate points

VOCABULARY

x axis, y axis, grid, quadrant, relationship, coordinate, plot, negative, linear, reciprocal, quadratic, cubic, gradient, sequence, origin.

READING SKILLS

Students will be introduced to keywords and concepts in lessons which will be copied into their class books if appropriate. They will be able to develop their reading skills when answering maths problems. These may be set in real life contexts, requiring students to extract the relevant information from a text.

HALF TERM 2

WHAT

- Bivariate data analysis including scatter graphs and correlation
- Time series graphs
- Introduction to sequences
- Common sequences
- Term to term and position to term rules
- Arithmetic sequences

WHY

To observe and show a possible relationship and correlation between two variables. Time series graphs illustrate and allow comment on trends over time. A solid grasp of number patterns equips children with the skills needed to excel in computational thinking and problem-solving. Sequences are fundamental concepts mathematics and form the basis for more advanced topics like calculus, analysis and number theory.

HOW

ASSESSMENT

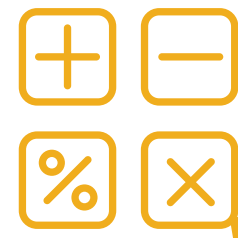
Pupils will sit a formal assessment on the content taught to date. Data is used to support teacher planning and in preparation for year 9. Students will also have bespoke Sparx Maths to support their learning.

THRESHOLD CONCEPTS:
Coordinate points

VOCABULARY

Correlation, scatter graph, positive, negative, time series, number pattern, sequence, term, rule, nth term, substitution, Fibonacci, squares, cubes, triangular, Pascal, x-axis, y-axis, gradient, y-intercept

READING SKILLS



WHAT

WHY


HOW

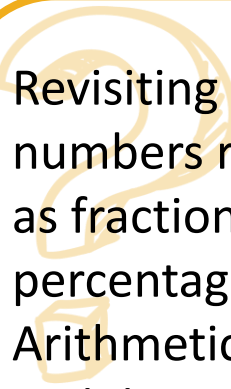
THRESHOLD CONCEPTS :
Place value, equivalent fractions, a fraction is a division

VOCABULARY

Numerator, denominator, vinculum, proper and improper, mixed number, terminating, recurring, repetend

READING SKILLS


Students will be introduced to keywords and concepts in lessons which will be copied into their class books if appropriate. They will be able to develop their reading skills when answering maths problems. These may be set in real life contexts, requiring students to extract the relevant information from a text.



- Revisiting working with numbers represented as fractions, decimals and percentages.
- Arithmetic with fractions and decimals

Students will revisit the foundation of maths, number, beginning with fluently converting between fractions, decimals and percentages before moving onto performing calculations in each representation. Fluency and confidence with these representations will allow students to access every other part of the maths curriculum.

ASSESSMENT
Pupils will sit formal assessments in September, and a low stakes fluency assessment part way through the term. This data is used to support teacher planning. Students will also have bespoke Sparx Maths homework to support their learning.

HALF TERM 2

WHAT

WHY

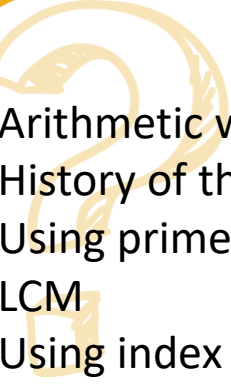
HOW

THRESHOLD CONCEPTS:
Equivalent fractions, inverse operations, place value, factor pairs

VOCABULARY

Factors
Multiples
Prime
Highest Common Factor (HCF)
Lowest Common Multiple (LCM)
Base number
Exponent

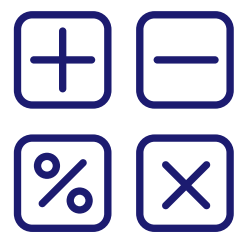
READING SKILLS



- Arithmetic with percentages
- History of the number systems
- Using prime factors with HCF and LCM
- Using index notation
- Working with numbers expressed in standard form

Percentages appear in many places in maths and the real world, so a secure understanding of them is important. Students will then learn about why the different number systems came to be, before learning about how work with numbers expressed in index notation and standard form in preparation for KS4.

ASSESSMENT
There will be a formal assessment covering the content taught to date at the end of this term. Students will also have bespoke Sparx Maths homework to support their learning.



MATHS YEAR 9

SPRING

WHAT

WHY

HOW

THRESHOLD CONCEPTS :
Coordinate points, substitution, inverse operations, equivalence

VOCABULARY

Factorise, expand, bracket, equation, unknown, variable, term, linear, quadratic, gradient, y-intercept, coordinate, plot, sketch, axis, origin.

READING SKILLS

Students will be introduced to keywords and concepts in lessons which will be copied into their class books if appropriate. They will be able to develop their reading skills when answering maths problems. These may be set in real life contexts, requiring students to extract the relevant information from a text.

- Manipulation of algebraic expressions
- Linear and quadratic functions

Algebra forms a big part of maths, and being confident in working and manipulating expressions, such as expanding and factorising to single and double brackets, will set students up ready for KS4. Students will also continue to explore how graphs are able to visually show an algebraic relationship.

ASSESSMENT
Students will be given a fluency task in this half term to assess their understanding of the curriculum thus far. Students will also have bespoke Sparx Maths homework to support their learning.

HALF TERM 2

WHAT

WHY

HOW

THRESHOLD CONCEPTS:
Coordinate points, substitution, inverse operations

VOCABULARY

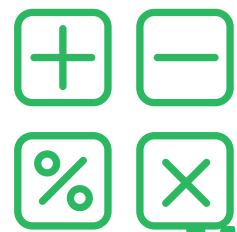
Cubic, reciprocal, exponential, asymptote, coordinate, plot, sketch, axis, intercept, origin, hypotenuse.

READING SKILLS

- Cubic, reciprocal and exponential functions
- Pythagoras' Theorem

Following on from the previous unit on graphs of functions, we now move onto other non-linear functions. The famous Pythagoras' Theorem is a powerful tool that has many applications in solving numerical, algebraic and numerical problems, linking topics such as irrational numbers, perimeter and distance, and algebraic proof, and is used in KS4 and A-level.

ASSESSMENT
Pupils will sit a formal assessment on the content taught to date. Data is used to support teacher planning. Students will also have bespoke Sparx Maths homework to support their learning.



MATHS YEAR 9

SUMMER

WHAT

- Trigonometry
- Transformations

WHY

Trigonometry is an important area of maths at KS3, KS4, A-level and beyond, and has many real world applications such as in engineering, navigation and astronomy.

Transformations, such as reflection and rotation, allows us to understand how we can change a shape and gives us insight into how this is used in areas such as computer generated imagery.

HOW

ASSESSMENT

Students will be given a low stakes fluency task in this half term to assess their understanding of the curriculum thus far. Students will also have bespoke Sparx Maths homework to support their learning.

THRESHOLD CONCEPTS :
Apply trigonometry in RA triangles; transform a 2D shape

VOCABULARY

Hypotenuse, adjacent, opposite, sine, cosine, tangent, asymptote, transform, translation, rotation, reflection, enlargement, scale factor.

READING SKILLS

Students will be introduced to keywords and concepts in lessons which will be copied into their class books if appropriate. They will be able to develop their reading skills when answering maths problems. These may be set in real life contexts, requiring students to extract the relevant information from a text.

HALF TERM 2

WHAT

- Similar and congruent shapes
- Revision ready for KS4 in Year 10

WHY

Understanding congruence allows students to quickly identify if two shapes are identical, or in the case of similarity whether two shapes are connected by a proportion and scale factor. Both provide a foundation for more complex geometric problems in maths.

HOW

ASSESSMENT

Pupils will sit a formal assessment on the content taught to date. Data is used to support teacher planning and in preparation for year 9. Students will also have bespoke Sparx Maths to support their learning.

THRESHOLD CONCEPTS:
Identify congruent and similar shapes

VOCABULARY

Congruent, similar, scale factor, SAS, ASA, RHS, SSS

READING SKILLS