MATHS KS3

CURRICULUM INTENT

CURRICULUM INTENT

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.

ORMISTON FORGE ACADEMY

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

MATHS YEAR 7

AUTUMN

ORMISTON FORGE ACADEMY

WHAT

- Place value
- Perform addition and subtraction with positive integers and know which operations are commutative.
- Application of addition and subtraction to problem solving.

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
Commutative

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

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

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 and developing their mathematical fluency.

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
Properties of Numbers

VOCABULARY

Divisible
Product
Factors
Multiples
Prime
Inverse
Proportion

READING SKILLS

MATHS YEAR 7

SPRING

ORMISTON FORGE ACADEMY

HALF TERM 1

WHAT

- 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
Moving along the number line

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.

HALF TERM 2

WHAT

- Directed number
- Fractions – representing, ordering and calculating with fractions

WHY

Fractions underpin many areas of maths, and being competent and confident in working with them is essential to making good progress in this subject.

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

VOCABULARY

Numerator
Denominator
Vinculum
Improper
Mixed number
Divisor
Divider
Quotient

READING SKILLS

MATHS YEAR 7

SUMMER

ORMISTON FORGE ACADEMY

HALF TERM 1

WHAT

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

WHY

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.

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 :
Equivalence, place value

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.

HALF TERM 2

WHAT

- Introduction to algebraic thinking
- Manipulating and simplifying algebraic expressions

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 and in preparation for year 8. Students will also have bespoke Sparx Maths to support their learning.

THRESHOLD CONCEPTS:
Representing numbers and generalising using symbols

VOCABULARY

- Expression
- Variable
- Term
- Equation
- Substitute
- Constant
- Operation
- Factorise
- Simplify
- Collect
- Coefficient

READING SKILLS

MATHS YEAR 8

AUTUMN

ORMISTON FORGE ACADEMY

HALF TERM 1

WHAT

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

WHY

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.

HOW

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.

THRESHOLD CONCEPTS :
Units of measurement
WWWNWWA, equivalence

VOCABULARY

Metric, imperial, scale, length, mass, volume, capacity, construct, locus, loci, path, region, parallel, perpendicular, bisect, equidistant, expand, unknown, factorise, solve, equivalence

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

- Linear equations
- Estimation of calculations and using a calculator

WHY

Students will study the concept of rounding and how this can be used to find approximate solutions, as well as exploring the implications of errors arising from rounding. Time is also given to exploring and becoming confident in using the extended functions of a scientific calculator. The calculator is a very useful tool in mathematics, but only if it is used correctly.

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:
Equivalence, balance method

VOCABULARY

Round, significant, truncate, error interval

READING SKILLS

MATHS YEAR 8

SPRING

ORMISTON FORGE ACADEMY

WHAT

- 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.

WHY

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.

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 :
Proportional reasoning, properties of polygons

VOCABULARY

Direct proportion, inverse proportion, similarity, 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

- Polygons and angles
- Working with discrete data

WHY

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.

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:
Averages, representing data using diagrams

VOCABULARY

Data, discrete, continuous, average, mean, median, mode, range, frequency, outlier

READING SKILLS

MATHS YEAR 8 SUMMER

ORMISTON FORGE ACADEMY

HALF TERM 1

WHAT

- Ratio, understanding and using ratio to solve
- Formulae, writing and using formulae, substitution and generating sequences
- Rearranging formulae

WHY

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 andfinance.

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.
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THRESHOLD CONCEPTS :
Proportional reasoning
Equivalence, WWWNWWA

VOCABULARY

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

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
- The Cartesian grid, reading and plotting coordinates and straight line graphs

WHY

Representing data in diagrams allows for interpretation and analysis. Time series graphs illustrate and allow comment on trends over time. Coordinates provide a way to determine the position of a point in space. The cartesian grid
and graphs offer a connection between algebra and geometry with the use of graphs of lines and curves. Coordinates are used in lots of fields such
as engineering, architecture, physics and animation.

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.
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THRESHOLD CONCEPTS:
Representing data using diagrams, Coordinate points

VOCABULARY

Correlation, scatter graph, positive, negative, time series, x-axis, y-axis, gradient, y-intercept

READING SKILLS

MATHS YEAR 9

AUTUMN

ORMISTON FORGE ACADEMY

WHAT

- Linear inequalities
- Standard form

WHY

Students will build on their understanding of equivalence in algebra, representing and solving inequations. They will then look at how very large and small numbers can be expressed using standard form, a format used extensively in fields such as science and engineering.

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, equivalence, balance method

VOCABULARY

Inequality, inequation, less than, greater than, exponent

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

- Contextual graphs
- Area
- Sequences

WHY

Maths is a power tool that can be used to model the real world. Contextual graphs looks at how we represent real situations that we can then use to predict outcomes. We then revisit area and sequences, building on previous knowledge.

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:
Representing maths using diagrams, Substitution

VOCABULARY

Perimeter, area, parallel, perpendicular, parallelogram, trapezium, rhombus, kite, quadrilateral, radius, diameter, circumference, term, arithmetic, geometric

READING SKILLS

MATHS YEAR 9

SPRING

ORMISTON FORGE ACADEMY

HALF TERM 1

WHAT

- Introduction to probability

WHY

Maths can be used to model the real world, including predicting the outcome of events. Probability looks at calculating the likelihood of certain outcomes occurring. Students will learn the different methods and diagrams used with probability.

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 : Probability

VOCABULARY

Combinations, probability, relative frequency, fair, bias, event, outcome, trial, mutually exclusive, sample space, Venn diagram

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

- Congruency and similarity

WHY

Students will learn how 2D objects can be transformed through translations, reflections, rotations and enlargements. These concepts form the basis of how everything from 3D animations and graphic design works, to modelling the trajectories of satellites and spacecraft through our solar system.

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: Transformations

VOCABULARY

Transform, translate, reflect, rotate, enlarge, object, image, vector, scale, similar, congruent

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.

MATHS YEAR 9

SUMMER

ORMISTON FORGE ACADEMY

HALF TERM 1

WHAT

- Right angled triangles - Pythagoras' Theorem and trigonometry
- Circles

WHY

Pythagoras' Theorem and 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. Students will then revisit and build on their knowledge of geometry and circles, exploring arcs and sectors, and the many angle properties that arise within a circle.

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.

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THRESHOLD CONCEPTS :

Apply Pythagoras' Theorem and trigonometry in RA triangles; angle properties

VOCABULARY

Hypotenuse, adjacent, opposite, sine, cosine, tangent, asymptote, arc, sector, segment, subtension

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

- Advanced proportion and rates of change
- Revision ready for KS4 in Year 10

WHY

Multiplicative reasoning and proportion is a concept that underpins many areas of maths, and students will revisit and build upon their previous knowledge in this unit, covering topics such as compound interest which is a concept used widely in the world of banking and finance.

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.

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THRESHOLD CONCEPTS:

VOCABULARY

Compound interest, simple interest, direct proportion, inverse proportion

READING SKILLS