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| Scheme of Work  Mathematics  Years 7 - 11 |
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| **Scheme of Work** | |
| **Mathematics Years 7 - 11** | |
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| Peregrinate Scheme Manager | Angela Mollan, Chris Mollan |
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| Approving Signature | Angela Mollan |
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**Key Stage 3 (Year 7-8)**

The department will follow the **Numeracy Strategy Framework for Teaching Mathematics** throughout KS3. The content of the framework is divided into units of work based on the following main topic areas:

* Number
* Algebra
* Geometry (previously 'Shape, Space and Measures')
* Statistics (previously 'Handling Data' - includes Probability)

Topics will be revisited and extended throughout years 7 and 8 in order to deepen understanding and build upon previous knowledge.

Pupils will sit internally-marked exams throughout KS3 in order to assess progress and provide opportunities for target setting.

**Key Stage 4 (Year 9-11)**

In Years 9, 10 and 11, pupils follow the Pearson BTEC Edexcel Functional Skills course at the appropriate level. Most pupils will complete from Entry level to Level 2 over three years; those in the accelerated group(s) will complete the courses in less time allowing progression to a higher level of qualification during Year 11. Depending on the success rates Peregrinate Limited plan to offer GCSE courses for learners who are capable of achieving this.

**Year 7 Curriculum**

**Autumn Term**

* **Introduction to Peregrinate Limited**: making friends, organisational skills
* **Learning Skills**: how our brains work, how we learn best
* **Emotional Health and Well Being**: anti - bullying, healthy eating

**Spring Term**

* **Stress:** learning strategies to cope with the pressures of exams etc.
* **Smoking**: Facts about smoking, understanding the reasons why people smoke, resisting peer pressure
* **Sex and Relationships Education**: understanding and coping with puberty, how the body changes, relationships with family and friends

**Summer Term**

* **Being a Citizen**: belonging to a community, why we have rules, being a citizen, personal responsibilities
* **Developing school grounds/Recycling**: knowing why and how we recycle, setting green targets, planning a school wide recycling project
* **Sun Safety:** learning how to stay safe in the sun

The National Curriculum in Mathematics has been an exciting development. It encourages students to apply their mathematical skills to everyday life and uses an investigative approach to learning.

Starting on entry to the school in year 7, students will be taught in tiered groups settled on ability based on thorough assessments. Student setting will continue to be reviewed each term during Key Stage 3. Top set students will have a specially enhanced programme designed to make strong academic demands on them and to further their interest and enthusiasm for the subject. Investigative and exploratory work is encouraged in the learning of Mathematics together with a strong emphasis on the essential algebraic, numeric and geometric skills.

In any year, a mixture of learning activities is used, including teacher led discussions and tasks, small group investigations, use of ICT, practical projects and text book practice. Our aim is to make mathematics as accessible and enjoyable as possible for all our students through the use of a variety of teaching methods to accommodate different learning styles.

**Year 7 Curriculum**

Please note that the specifics of what is covered in each unit will depend on the learning needs of each group. The tables below give a guide to what may be covered in the course of a unit.

**Autumn Term**

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| **Unit Name** | **Topics Covered** |
| **Number 1** Mental, Written and Calculator Methods | Mental, written and calculator methods for addition, subtraction, multiplication and division of integers and decimals; Order of operations. |
| **Geometry 1** Area and Perimeter | Perimeter and area of rectangles, parallelograms, trapezia and circles. Perimeter and area of compound shapes. |
| **Probability** | Probability vocabulary; calculating the probability of an event occurring or not occurring; using frequency trees and Venn diagrams to list show outcomes and find probabilities; calculating probabilities based on experimental data and comparing with theoretical results. |
| **Number 2** Place Value, Rounding, Estimating, Checking | Multiplying and dividing by powers of 10; Rounding to powers of 10; Rounding to decimal places; Rounding to significant figures; Use rounding to make estimates. |
| **Geometry 2** Measures and Conversions | Metric units; Scales; Converting units; Approximate imperial conversions; Converting measures of area and volume; Maps and scale drawings; Compound measures such as speed. |
| **Algebra 1** Simplifying and Substitution | Construct and use expressions and formulae; Simplifying expression by collecting like terms; Expanding single and double brackets; Index notation; Substitution including negatives and decimals; Simple algebraic fractions; |
| **Algebra 2** Co-ordinates | Reading and plotting coordinates; Coordinate geometry; Midpoints of line segments; Dividing a line segment into a given ratio. |

**Spring Term**

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| **Unit Name** | **Topics Covered** |
| **Algebra 3** Sequences | Number and picture patterns; Generating sequences using term-to-term rules; Generating sequences using position-to-term rules; Find the nth term of a linear sequence; Find the nth term of a quadratic sequence; Recognise and use triangular numbers; square numbers; cube numbers and the Fibonacci sequence. |
| **Geometry 4** 2D and 3D Visualising | Properties of 2D and 3D shapes; Nets; Plans and elevations; Isometric drawing. |
| **Number 3** Integers, Powers and Roots | Prime numbers; Arithmetic with negative numbers; Factors; Multiples; Highest common factor; Lowest common multiple; Prime factor decomposition; Roots of numbers; Standard form; Calculations with standard form. |
| **Algebra 4** Solving Equations | Solving one-step and two-step equations; Solving equations with brackets; Solving equations with unknowns on both sides; Construct simple linear equations; Solving equations with fractional and negative coefficients. |
| **Geometry 5**  Lines, Angles and Shapes | Types of angles; Angles on straight lines and in triangles; Angles properties of parallel lines; Interior and exterior angles of polygons; Bearings from and between points; Parts of circles; |
| **Number 4** Fractions, Decimals and Percentages | Shading and stating fractions; Simplifying fractions; Converting between improper and mixed number fractions; Adding, subtracting, multiplying and dividing with fractions; Simple algebraic fractions; Percentages of amounts; Percentage increase and decrease; Percentage change; Finding original amounts; Converting between fractions, decimals and percentages; Ordering fractions, decimals and percentages. |
| **Geometry 6** Volume and Surface Area | Volume and surface area of cuboids, right prisms and cylinders. |

**Summer Term**

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| **Unit Name** | **Topics Covered** |
| **Ratio, Proportion**  **and Rates of Change** | Creating, simplifying and using ratios; Simple proportion including recipes;  Dividing amounts into a given ratio; Comparing quantities using proportion; Variation (direct and inverse proportion). |
| **Geometry 7** Transformations and Vectors | Lines and planes of symmetry; Reflection in lines, axes or lines given by equations; Rotational symmetry; Rotating shapes about a given point; Translations given by instructions and by vectors; Enlargements; Enlargement from a point; Describing transformations; Combinations of transformations. |
| **Statistics 1** Processing, Representing and Interpreting | Pictograms; Frequency tables; Bar charts including dual and composite bar charts; Pie charts; Scatter graphs and correlation; Measures of average (mean, median and mode) and dispersion (range, quartiles and inter quartile range); Mean from frequency tables; Mean from grouped frequency tables. |
| **Geometry 8** Pythagoras and Trigonometry | Pythagoras’ theorem in 2D contexts. |
| **Algebra 5** Formulae | Substitution into formulae; Changing the subject of a formula. |
| **Algebra 6** Functions and Graphs |  |
| **Geometry 9** Loci and Constructions | Drawing 2D and 3D shapes; Construct parallel and perpendicular lines; Constructing triangles; Construct perpendicular bisectors of a line, bisect an angle; Simple loci |

**Year 8 Curriculum**

Please note that the specifics of what is covered in each unit will depend on the learning needs of each group. The tables below give a guide to what may be covered in the course of a unit.

**Autumn Term**

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| **Unit Name** | **Topics Covered** |
| **Number 1** Mental, Written and Calculator Methods | Mental, written and calculator methods for addition, subtraction, multiplication and division of integers and decimals; Order of operations. |
| **Geometry 1** Area and Perimeter | Perimeter and area of rectangles, parallelograms, trapezia and circles. Perimeter and area of compound shapes. |
| **Probability** | Probability vocabulary; calculating the probability of an event occurring or not occurring; using frequency trees and Venn diagrams to list show outcomes and find probabilities; calculating probabilities based on experimental data and comparing with theoretical results. |
| **Number 2** Place Value, Rounding, Estimating and Checking | Multiplying and dividing by powers of 10; Rounding to powers of 10; Rounding to decimal places; Rounding to significant figures; Use rounding to make estimates. |
| **Geometry 2** Measures and Conversions | Metric units; Scales; Converting units; Approximate imperial conversions; Converting measures of area and volume; Maps and scale drawings; Compound measures such as speed. |
| **Algebra 1** Simplifying and Substitution | Construct and use expressions and formulae; Simplifying expression by collecting like terms; Expanding single and double brackets; Index notation; Substitution including negatives and decimals; Simple algebraic fractions; |
| **Algebra 2** Co-ordinates | Reading and plotting coordinates; Coordinate geometry; Midpoints of line segments; Dividing a line segment into a given ratio. |

**Spring Term**

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| **Unit Name** | **Topics Covered** |
| **Algebra 3** Sequences | Number and picture patterns; Generating sequences using term-to-term rules; Generating sequences using position-to-term rules; Find the nth term of a linear sequence; Find the nth term of a quadratic sequence; Recognise and use triangular numbers; square numbers; cube numbers and the Fibonacci sequence. |
| **Geometry 4** | Properties of 2D and 3D shapes; Nets; Plans and elevations; Isometric drawing, 2D and 3D visualising. |
| **Number 3** Integers, Powers and Roots | Prime numbers; Arithmetic with negative numbers; Factors; Multiples; Highest common factor; Lowest common multiple; Prime factor decomposition; Roots of numbers; Standard form; Calculations with standard form. |
| **Algebra 4** Solving Equations | Solving one-step and two-step equations; Solving equations with brackets; Solving equations with unknowns on both sides; Construct simple linear equations; Solving equations with fractional and negative coefficients. |
| **Geometry 5** Lines, Angles and Shapes | Types of angles; Angles on straight lines and in triangles; Angles properties of parallel lines; Interior and exterior angles of polygons; Bearings from and between points; Parts of circles; |
| **Number 4** Fractions, Decimals and Percentages | Shading and stating fractions; Simplifying fractions; Converting between improper and mixed number fractions; Adding, subtracting, multiplying and dividing with fractions; Simple algebraic fractions; Percentages of amounts; Percentage increase and decrease; Percentage change; Finding original amounts; Converting between fractions, decimals and percentages; Ordering fractions, decimals and percentages. |
| **Geometry 6** Volume and Surface Area | Volume and surface area of cuboids, right prisms and cylinders. |

**Summer Term**

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| --- | --- |
| **Unit Name** | **Topics Covered** |
| **Ratio, Proportion and Rates of Change** | Creating, simplifying and using ratios; Simple proportion including recipes; Dividing amounts into a given ratio; Comparing quantities using proportion; Variation (direct and inverse proportion). |
| **Geometry 7** Transformations and Vectors | Lines and planes of symmetry; Reflection in lines, axes or lines given by equations; Rotational symmetry; Rotating shapes about a given point; Translations given by instructions and by vectors; Enlargements; Enlargement from a point; Describing transformations; Combinations of transformations. |
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| **Geometry 8** Pythagoras and Trigonometry | Pythagoras’ theorem in 2D contexts. |
| **Algebra 5** Formulae | Substitution into formulae; Changing the subject of a formula. |
| **Algebra 6** Functions and Graphs |  |
| **Geometry 9** Loci and Constructions | Drawing 2D and 3D shapes; Construct parallel and perpendicular lines; Constructing triangles; Construct perpendicular bisectors of a line, bisect an angle; Simple loci; |

**GCSE/Functional Skills Course Content**

Most students will begin to follow the Pearson BTEC Edexcel specification from September in Year 9. Some students may complete the **Edexcel Entry Level and/or Level 1 Functional Skills Mathematics** first.

The Functional Skills are assessed by a paper based or online examination at the end of the course (Calculator and Non-Calculator) with some controlled assessments.

We will take a staged approach to teaching the course, as suggested by BTEC. Each tier of entry is comprised of four stages (Initial, Bronze, Silver and Gold); each stage contains mathematical content from all topic areas (Number, Algebra, Geometry and Statistics) but each is more challenging than the previous.

It is expected that all students will complete three of these stages over the course, starting with the most appropriate for their ability. At the end of each stage, they will take a short examination to assess their understanding. Depending on the outcome of this examination, they will either receive a certificate to mark this progress and move on to the next stage, or revise the content contained within it in order to increase their confidence before moving on further. Consequently, final decisions about tiers of entry for final examinations will not be made until later in the course.

**Key Stage 3 (Year 7-8)**

The department aims to follow the **Numeracy Strategy Framework for Teaching Mathematics** throughout KS3. The content of the framework is divided into units of work based on the following main topic areas:

* Number
* Algebra
* Geometry (previously 'Shape, Space and Measures')
* Statistics (previously 'Handling Data' - includes Probability)

Topics are revisited and extended throughout years 7 and 8 in order to deepen understanding and build upon previous knowledge.

Pupils sit internally-marked exams throughout KS3 in order to assess progress and provide opportunities for target setting.

**Key Stage 4 (Year 9-11)**

In Years 9, 10 and 11, pupils will follow the Pearson BTEC Edexcel Functional Skills M**athematics cou**rses from Entry Level, through Level 1 and progress to Level 2. Most pupils will complete the courses over three years. Peregrinate also plans to seek accreditation for GCSE’s for those pupils who are likely to achieve.

**Year 9 Curriculum:**

**Number and Algebra**

* Describe number patterns
* Find multiples
* Find factors
* Work out the square numbers
* Use word formulae
* Use co-ordinates in the first quadrant
* Multiply and divide whole numbers by 10 and 100
* Say my tables up to 10x10
* Add and subtract numbers like 13.64 and 48.95
* Write decimal numbers in the correct order
* Check my own answers

**Shape, Space and Measures**

* Make 3D models
* Draw 2D shapes
* Find perimeters of shapes
* Find the area by counting squares

**Handling Data**

* Draw line graphs
* Present data clearly
* Read simple pie charts
* Draw frequency tables
* Find the mode
* Find the range

**Year 10 Curriculum:**

**Number and Algebra**

* Multiply and divide whole numbers by 10, 100 and 1000
* Add and subtract negative numbers
* Put numbers in order including negative numbers
* Add, subtract, multiply and divide numbers like 19.75 and 34.21
* Simplify a fraction
* Work out a fraction or percentage of a number
* Multiply or divide a three digit number by a two digit number
* Use inverse operations of approximation to check my answers
* Use simple formulae like C = 2n + 4
* Use co-ordinates in all four quadrants

**Shape, Space and Measures**

* Measure and draw angles to the nearest degree
* Remember the metric to imperial conversions
* Use and understand the formula for the area of a rectangle

**Handling Data**

* Find the mean of discrete data
* Use the range and one of the averages to compare two sets of data
* Say what diagrams and graphs show
* Use the probability scale from 0 to 1
* Understand that experiments don’t always have the same outcome

**Year 11 Curriculum:**

**Number and Algebra**

* Use trial and improvement to solve things like x3 + 5x = 38
* Work out one number as a fraction or percentage of another
* Understand that fractions, decimals and percentages can be equivalent to each other (eg 0.5=50%)
* Calculate using ratio
* Add and subtract fractions with common denominators
* Find and describe in words the rule for the next term in a sequence (linear)
* Find and describe in words the rule for the nth term in a sequence
* Solve linear equations with integer coefficients
* Plot the graph of y = mx + c

**Shape, Space and Measures**

* Recognise 2D representations of 3D objects
* Classify quadrilaterals by knowing their properties
* Find the missing angles when two parallel lines are intersected
* Solve angle problems in polygons
* Write instructions to make a computer draw a shape
* Find the area and circumference of a circle
* Find the volume of cuboids
* Enlarge a shape by a positive handling data
* Work with continuous data
* Construct pie charts
* Say what a scatter diagram tells us
* Understand correlation
* Find all the possible outcomes of two experiments
* Use the fact that the probability of mutually exclusive events add up to 1

**Extension Tasks:**

**Number and Algebra**

* Round to one significant figure
* Understand what happens when we multiply or divide by numbers between 0 and 1
* Multiply and divide numbers of any size
* Understand proportional change
* Describe in symbols the rule for the next term or nth term in a sequence (quadratic)
* Multiply things like (a + b)(c + d)
* Simplify quadratic expressions
* Solve simultaneous, linear equations with two variables (using graphs or algebra)
* Solve inequalities like 6(2n + 1)=18

**Shape, Space and Measures**

* Understand and use Pythagoras’ Theorem in 2D
* Calculate lengths, areas and volumes in right prisms
* Enlarge a shape by a fractional scale factor
* Understand similarity
* Draw the locus of a moving object
* Find and understand upper and lower bounds
* Use compound measures like speed, distance, time

**Handling Data**

* Give and test a hypothesis to a situation
* Understand bias
* Find the modal class and an estimate to the mean, median and range when using grouped data
* Compare distributions using frequency polygons
* Draw a line of best fit on a scatter diagram
* Understand relative frequency

**Extension Tasks:**

**Number and Algebra**

* Solve problems involving powers and roots
* Solve problems involving standard form
* Solve problems involving repeated proportional change
* Substitute fractions and decimals into equations and expressions and find the answers
* Calculate one variable in a formula when I know the others
* Understand that a2 - b2 = (a + b)(a - b)
* Solve inequalities in two variables
* Sketch and interpret graphs of quadratic, cubic and reciprocal functions
* Interpret graphs that model real life situations

**Shape, Space and Measures**

* Use congruence and mathematical similarity
* Use sine, cosine and tangent in right angled triangles in 2D
* Distinguish between formulae for perimeter, area and volume by considering dimensions

**Handling Data**

* Interpret and construct cumulative frequency diagrams
* Estimate the median and interquartile range
* Calculate the probability of a compound event