DEPARTMENT: **Maths - Yr9 Foundation**

Year 9

Term 1

Topics 1 Number

Knowledge & Skills	Why?	Knowledge & Skills	Why?
This unit explores general calculations, including decimal numbers, place value and factors and multiples. Students will also explore squares, cubes and roots as well as index notatation and prime factors.	This links to everyday life asuch as in money and measurements as well as by scientists when working big or small numbers in standard forms.	This unit focuses on the introduction to algebra, including definitions of key terms. Students will look at expression, substitutions, formulae and expanding and factorising. This learning will support units 5, 6 and 17.	This links to STEM as formulae are often used within this industry. In Science, formulae is regularuly used in calculations. In everyday life, algebra is used to determine the collective cost of products. It is also used in many spreadsheets in order to calculate different variables. Index laws links to Science and Standard Form as large numbers and very small numbers are written in this way.
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-	Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing Function, inverse, square root, cube root, Highest common factor (HCF), lowest common multiple (LCM), Surd, Base, index, power, product, indices, prefix, Prime factor decomposition	Numeracy	Reading & Extended Writing Term, like terms, letters, variable, vary, Formula(e), Common factor, Highest common factor (HCF)	Numeracy
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Term 2

Topics 3 Graphs, Tables and Charts

Knowledge & Skills	Why?	Knowledge & Skills	Why?
During this unit, students will learn about different statistical diagrams and how to read and interpret different graphs. This unit will support the work you do in Unit 7.	This links to everyday life as recipes may contain fractional amounts and when scaling up a recipe, we will need to multiply fractions. Additionally, dividing fractions help us to determine how a quantity can be divided into fractional parts. Percentages link to a range of other academic subjects, including business, as consumer goods often have reductions. Students need to understand inflation and deflation and this is represented in this unit.	Students will learn how to solve one/two/three step linear equations. They will work with inequalities, formulae, and generating sequences. This will support their learning in Units 9, 12, 14, 16, 17 and 20.	This links to Science as it allows us to work out equations when formulae is provided. Engineers use equations to make sure structures are strong enough and will not fall down. Formulae are also used in everyday life to calculate interest on savings accounts. Sequences link to PE and Music as students use sequences to perform a piece of music or to do a kata in martial arts.
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-	Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing Grouped frequency table, inequality, discrete data, continuous data, data collection sheet, Distance chart, two-way table, Comparative bar chart, composite bar chart, histogram, line graph, trend, Time series, Stem and leaf diagram, Pie chart, Scatter graph, correlation, variables, outlier, Line of best fit, interpolation, extrapolation	Numeracy	Reading & Extended Writing Denominator, unit fraction, numerator, Reciprocal, Simple interest, depreciates	Numeracy
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Term 3

Topics 4 Fractions and Percentages

Topics 5 Equations, Inequities and Sequences

Term 4

Topics 6 Angles

Knowledge & Skills	Why?	Knowledge & Skills	Why?
Students will learn how to solve one/two/three step linear equations. They will work with inequalities, formulae, and generating sequences. This will support their learning in Units 9, 12, 14, 16, 17 and 20.	This links to Science as it allows us to work out equations when formulae is provided. Engineers use equations to make sure structures are strong enough and will not fall down. Formulae are also used in everyday life to calculate interest on savings accounts. Sequences link to PE and Music as students use sequences to perform a piece of music or to do a kata in martial arts.	Required to use their knowledge of algebra and link this to what they know about angles. They will also need to use these skills to form and solve equations that involve algebra.	This links to other subjects such as Design Technology as it is often used by engineers and architects to build unusual buildings. This also links to the construction industry where they would look at safe heights and angles for ladders as well as angles for construction. Engineers are required to know about angle properties when completing their plans. There are also links to Art as many artists use shapes to make optical illusions. This is also linked to money as many coins are made in a particular shape to avoid confusion between them. Linking to this the shape of a football was specially designed so that it tesselated.
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-	Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing Equation, solve, balancing method, Brackets, Integer, inequality, Two-sided inequalities, Formula, substitution, equation, subject, Sequence, terms, term-to-term rule, General term	Numeracy	Reading & Extended Writing Congruent, similar, diagonal, bisect, Parallel lines, alternate angles, corresponding angles, co-interior angles, Exterior angle, interior angle, polygon, regular polygon, irregular polygon	Numeracy
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Term 5

Topics 7 Averages and Range

Knowledge & Skills	Why?	Knowledge & Skills	Why?
This unit focuses on the different types of averages and links them to different graphs and charts. It encourages students to make comparisons between different sets of data by comparing these averages. This topic links to both units 3 and 5 where students are required to use their prior knowledge of data representation to find averages from graphs and charts. They will also need to rely on their knowledge of inequalities as these are used for continuous data. For this topic they will be required to interpret bars and charts in order to find the averages.	This links to a real life context as averages are often used to compare statistical data. They would use this to measure levels of success for example averages would be used to identify median incomes from TV rights and prize money. From having averages, this gives athletes a number to beat or to aim for. For example the average time for the London Marathon is 4 hours and people set out with the goal of beating this time. Grouped data is used within this unit and is often a good visual way of identifying trends and patterns. Sampling is used to create an overview of an entire population without having to ask everyone this ensures that they are able to create patterns and trends. It also allows students to identify fair methods of sampling and understand the concept of bias and how to
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-	Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing Estimate, Sample, population, bias, random sample, mean, mode, median	Numeracy	Reading & Extended Writing Perimeter, area, perpendicular height, Trapezium, isosceles trapezium, Compound shape, Surface area, Volume, capacity	Numeracy
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Term 6

Topics 8 Perimeter, Area and Volume

Knowledge & Skills	Why?
This topic focuses on finding the perimeter, area and volime of shapes and recognising the geometric properties of shapes. There are no pre-requisites for this subject and students are required to use their knowledge of 3D shapes to identify the properties and to form conclusions. Students will need to use their existing knowledge of areas and perimeters to investigate formulas and to fully understand these.	This topic has links to science as students may be required to convert between units and area and volume when comparing a sample or to use units of volume when calculating mass or density. This also has links to a real life context and to Business as many businesses use unusual shapes for their packaging in order to make them stand out. This topic can be linked to more functional maths and often provides problem solving regarding buying products for decorating purposes. There are questions that require students to work out the area of a room to work out how much paint is required to decorate. Or the area of a field to work out how many packs of tiles are required to resurface.
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing Perimeter, area, perpendicular height, Trapezium, isosceles trapezium, Compound shape, Surface area, Volume, capacity	Numeracy
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Year 10

Term 1

Topics 9 Graphs

Knowledge & Skills	Why?	Knowledge & Skills	Why?
Students will look at coordinates, linear graphs and gradients; specifically y=mx+c. Students will study real-life graphs and their applications. This work underpins learning in units 10, and 16.	GPS use coordinates to pinpoint positions. Scientists plot results on graphs to look for relationships between two quantities, and game designers use equations of straight-lines to program character movements.	Students will learn how to complete transformations such as Translations, Reflections, Rotations and Enlargements. Students will go on to describe enlargements as well as combine different transformations. This work will support future learning in units 15 and 19.	Robots and machinery use transformations to move objects from place to place, whilst radar, telescopes and x-ray machines all use reflection to construct maps and pictures. Film animators use rotation to make 3D animations more realistic, and architects use enlargement to produce scale drawings of buildings.
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-	Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing Parallel, midpoint, line segment, Gradient, coefficient, Linear equation, Distance–time graph, average speed, rate of change graph, velocity–time graph, velocity, Constant rate	Numeracy	Reading & Extended Writing Column vector, vertex, vertices, transformation, image, maps, Mirror line, Centre of rotation, Scale factor, centre of enlargement, Origin	Numeracy
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Term 2

Topics 10 Transformations

Topics 11 Ratio and Proportion

Knowledge & Skills	Why?	Knowledge & Skills	Why?
Students will look at ratio and measure, as well as proportion and graphs. This will support their learning in Units, 15, 19 and 20.	This is used by engineers in the design of cars to compare the power to weight ratio. In schools, ratio is used regularly to ensure the correct supervision ratios. Ratios can link to art as you need to mix paint in the same ratio to get the same colour each time. In everyday life, ratios are used for exchange rates, to work out the price of jewellery and in recipes. Ratios can also support best-buy situations in every day life.	In the construction industry, builders use Pythagoras' Theorem to check the layout of a building where the corners have to be right-angles. Computer game developers use trigonometry to control the movement of characters. Civil engineers and astronomers use trigonometry for their calculations. In everyday life, Sat Navs use Trigonometry to calculate the position of a vehicle.	Car insurance companies use probabilities to assess how likely a driver is to have an accident. This topic links to Science as it allows us to predict outcomes for experiements. First choices can change the options for second choices, this is relevent at this point as students will be chosing from certain blocks for A Level subjects or Further Education.
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-	Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing Ratio, simplify, equivalent, highest common factor, Simplest form, Ratio, unit, Proportion, unit ratio, unitary method, direct proportion, inverse proportion	Numeracy	Reading & Extended Writing Hypotenuse, Surd, Hypotenuse, opposite, adjacent, sin θ, sin−1, Cosine, cos θ, Tangent, tan θ, elevation, depression	Numeracy
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Term 3

Topics 12 Right-angled Triangle

Topics 13 Probability

Term 4

Topics 14 Multiplicative Reasoning

Knowledge & Skills	Why?	Knowledge & Skills	Why?
Students will learnt to illustrate probability problems with probability tree diagrams and venn diagrams. Students will also study experimental probabilities as well as calculating probabilities.	Car insurance companies use probabilities to assess how likely a driver is to have an accident. This topic links to Science as it allows us to predict outcomes for experiements. First choices can change the options for second choices, this is relevent at this point as students will be chosing from certain blocks for A Level subjects or Further Education.	This topic focuses on using percentages to work out amounts of interest and to calculate percentage increases and decrease. They also look at a number of different formulae (Unit 5) that they are required to substitute values in to in order to complete their calculations. There is a requirement that students are able to substitute and also convert between decimals and percentages in order to find a multiplier.	This unit has links to many other subjects as in Business they also look at Bank accounts and interest. Students in this year group may also be taking at this as part of their finance qualification or during Personal Development time with their Form tutors. This unit also has many links to a real life context as companies describe their success and failures based on an increase or decrease in profit levels. This allows students to understand the concept of depreciation as values decrease over time for example they may look at the depreciating car values. This also has links to science who also look at Speed, Distance and Time, Force, Pressure and Area and Density, Mass and Volume.
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-	Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing mutually exclusive, exhaustive, Sample space diagram, Relative frequency, experimental probability, Union, intersection, universal set, Venn diagram, Independent, Dependent events	Numeracy	Reading & Extended Writing Percentage change, Compound interest, per annum, annual, salary, half-life, Density, pressure, Kinematics formulae, acceleration, initial velocity	Numeracy
SMSC: Maths DepartmentDocumentsGeneralSMSC Statement.docx		SMSC: Maths DepartmentDocumentsGeneralSMSC Statement.docx	

Term 5

Topics 15 Construction, Loci and Bearings

Knowledge & Skills	Why?	Knowledge & Skills	Why?
This unit looks at loci, construction and bearings and allows students to understand this key terminology. It is necessary that they have an understanding of different angles so that they can begin to understand compass directions. They will be required to draw on their knowledge of transformations and to identify the direction in which something has moved. Lastly they will need to have an understanding of ratios in order to be able to convert scales of measure.	This unit has links to other subjects such as Geography where they may be required to read a map and to interpret different scales from maps. This also has real life links as many architects use symmetrical shapes in order to make them more appealing. Plan and elevation drawings are used in this unit and they are also used by engineers and architects. If a person is applying for planning permission they would need to provide the plan and elevation drawings prior to this being approved. On boats and aircrafts they use bearings in order to identify their direction and sailors use compasses when plotting a course. Nets of shapes are used in this unit and will also link to technology and geography when it comes to a packaging and building a more sustainable future. When they look to cut packaging they would look at the net of the product and also look at vacuum packing.	Topics 16 Quadratic Equations and Graphs	
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-	Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing Faces, edges, vertices (vertex), dimension, pyramid, right prism, Plane, plane of symmetry, plan, side elevation, front elevation, ASA, SAS, SSS, RHS, hypotenuse, Construct, cyclic quadrilateral, Bisect a line, perpendicular bisector, construction lines, construct, angle bisector, constructions, Equidistant, locus, loci, region , Bearing	Numeracy	Reading & Extended Writing line of symmetry, parabola, Coordinates, roots, Difference of two squares	Numeracy
SMSC: Maths DepartmentDocumentsGeneralSMSC Statement.docx		SMSC: Maths DepartmentDocumentsGeneralSMSC Statement.docx	

Term 6

Topics 17 Perimeter, Area and Volume 2

Knowledge & Skills	Why?
This topic focus on area, perimeter and volume of more complex 3D shapes. They will be required to calculate the area and perimeter of a circle and area and perimeter of sectors. They will need to look at the surface area and volume of pyramids, cones and spheres as well as cylinders and hemispheres. This topic links to the previous unit on perimeter area and volume as they will also need to remember the units used for area and volume (B1 mark on the exam). They will need to have an understanding of addition in order to work out perimeters and multiplication to calculate areas. They will need to substitute into formulae so will need an understanding of algebra and equations. Some of these formulas (sphere) use fractions and they would need to be able to multiply fractions and they would need to use their understanding of pythagoras' theorem to calculate the slant of a cone.	This topic has links to real life as it is necessary to know the circumference of a wheel to work out the distance travelled per revolution. It is essential to know the diameter and area of particular shapes in order to plan building materials accordingly. Designers would need to know the area of a circle in order to work out the amount of material required for a trampoline. Additionally this is used by car designers as the volume of a cylinder determines the power of a car. This has links to science as the Planet Jupier has a polar diameter of 133709 and this is necessary to work out the comparison between this and the other planets. In Design Technology often circles and cones and prosms are used to make items appear more appealing.
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing circumference, perimeter, Area, radius, diameter, formula, substitution, rounding, Chord, arc, segment, sector, tangent, semicircle, Surface area, Slant height, Sphere, spherical	Numeracy
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Year 11

Term 1

Topics 18 Fractions, Indices and Standard Form

Knowledge & Skills	Why?
Students will learn to multiply and divide fractions as well as understanding the laws of indices. Students will explore standard form and be able to calculate in standard form.	Biologists work with microscopic bacteria that are millionths of a metre long, and standard form allows them to write their size down in an easily understood form.
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing Standard form, Reciprocal, Index laws, Ordinary numbers	Numeracy
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Term 2

Topics 19 Congruence, Similarity and Vectors

Knowledge & Skills	Why?
Students will learn to plot and explore vectors, study congruence and it's links to similarity.	Links to A Level Maths (Mechs) and Physics. Vectors allows us to understand the motion of objects acted on by different forces, linking back to Pythagoras' Theorem. Similarity links to everyday life as Architects often use the blueprint for existing buildings to replicate the same image. Congruency is used in roofing as the congruent triangles are used to support roofs. Pilots use vectors to predict the position of their aircraft.
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing Similar, corresponding sides, corresponding angles, Orientation, congruent, Resultant, Parallel vector	Numeracy
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Term 3, 4 & 5

Topics 20 More Algebra

Knowledge & Skills	Why?
Students will learn to rearrange formulae, be able to solve simultaneous equations graphically and algebraically as well as plot non-linear graphs.	Links to Science with non-linear graphs to model radioactive decay as well as rearranging formulae for 'Speed Distance Time'. Simultaneous Equations links to Business as its allows us to consider the relationship between the price of a commodity and quantity. They can be used to solve everyday problems such as job choices, considering all variables such as travel, parking, time, hours and benefits.
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing Cubic function, asymptotes, Simultaneous equations, intersection, Equation, identity, consecutive integers	Numeracy
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Topics Highlighted Specific Revision & Exam Practice

Knowledge & Skills	Why?
Highlighted and specific revision based on mock exams and GAP analysis.	
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing Calculate, sum, construct, sketch, expression, equation, solve, estimate/approximate, suitable degree of accuracy, expand, explain, product, express, consecutive, factorise	Numeracy
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Topics

Knowledge & Skills	Why?
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing	Numeracy
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Topics

Knowledge & Skills	Why?
Group Differentiation - See Differentiation document	Links to careers: https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-
Reading & Extended Writing	Numeracy
SMSC: Maths DepartmentDocumentsGeneralSMSC Statement.docx	