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| **Maths (3)** | **Topic/Content**Unit 1: Number**How does this link to prior learning?*** It is essential that students have a firm grasp of place value and be able to order integers and decimals and use the four operations.
* Students should have knowledge of integer complements to 10 and to 100, multiplication facts to 10 × 10, strategies for multiplying and dividing by 10, 100 and 1000.
* Students will have encountered squares, square roots, cubes and cube roots and have knowledge of classifying integers.

**Non-negotiable experiences in the learning scheme*** Guided reading task: ‘The Maths Behind the Moon Landing!’
* Learners move at an appropriate pace through the SOL, largely in-line with other groups studying the same tier, accessing all content. Some students will access additional challenge content.
* Previous learning links are made, along with real-life uses and careers content from the maths bulletin.
* Students will be taught and emphasis given to key words and their definitions.

**Skills being developed**N2 apply the four operations, including formal written methods, to integers, decimals … both positive and negative; understand and use place value (e.g. working with very large or very small numbers, and when calculating with decimals)N3 recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions); use conventional notation for priority of operations, including brackets, powers, roots and reciprocalsN4 use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theoremN5 apply systematic listing strategies **including use of the product rule for counting** **(i.e. if there are *m* ways of doing one task and for each of these, there are *n* ways of doing another task, then the total number of ways the two tasks can be done is *m* × *n* ways)**N6 use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5; **estimate powers and roots of any given positive number**N7 calculate with roots and with integer **and fractional** indicesN8 calculate exactly with … **surds**; … **simplify surd expressions involving squares (e.g. √12 = √(4 × 3) = √4 × √3 = 2√3)**N9 calculate with and interpret standard form *A* x 10*n*, where 1 ≤ *A* < 10 and *n* is an integer.N14 estimate answers; check calculations using approximation and estimation, including answers obtained using technologyN15 round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures); …**How will it be assessed?**End of unit assessments with next steps being linked to assessment misconceptions and errors. Teachers to model assessment solutions before students attempt their next steps. | **Topic/Content**Unit 2: Algebra**How does this link to prior learning?*** the ability to use negative numbers with the four operations and recall and use hierarchy of operations and understand inverse operations;
* dealing with decimals and negatives on a calculator;
* using index laws numerically.
* prior algebra content.

**Non-negotiable experiences in the learning scheme*** Diversity among Mathematicians: Al-Khwarizmi algebra task.
* Learners move at an appropriate pace through the SOL, largely in-line with other groups studying the same tier, accessing all content. Some students will access additional challenge content.
* Previous learning links are made, along with real-life uses and careers content from the maths bulletin.
* Students will be taught and emphasis given to key words and their definitions.

**Skills being developed**N1 … use the symbols =, ≠, <, >, ≤, ≥N3 recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions); use conventional notation for priority of operations, including brackets, powers, roots and reciprocalsN8 calculate exactly with fractions, **surds** …; **simplify surd expressions involving squares** …N9 calculate with and interpret standard form *A* × 10*n*, where 1 ≤ *A* < 10 and *n* is an integer.A1 use and interpret algebraic notation. A2 substitute numerical values into formulae and expressions, including scientific formulaeA3 understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factorsA4 simplify and manipulate algebraic expressions.A5 understand and use standard mathematical formulae; rearrange formulae to change the subjectA6 know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments **and proofs**A7 where appropriate, interpret simple expressions as functions with inputs and outputs; …A17 solve linear equations in one unknown algebraically …;A20 **find approximate solutions to equations numerically using iteration**A21 translate simple situations or procedures into algebraic expressions or formulae; derive an equation …, solve the equation and interpret the solutionA23 generate terms of a sequence from either a term-to-term or a position-to-term ruleA24 recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions, Fibonacci type sequences and simple geometric progressions (*rn* where *n* is an integer, and *r* is a rational number > 0), recognise and use other sequences **or a surd)**A25 deduce expressions to calculate the *n*th term of linear sequences.**How will it be assessed?**End of unit assessments with next steps being linked to assessment misconceptions and errors. Teachers to model assessment solutions before students attempt their next steps. | **Topic/Content**Unit 3: Averages, collecting data, representing data.**How does this link to prior learning?*** Students should be able to read scales on graphs, draw circles, measure angles and plot coordinates in the first quadrant.
* Students should have experience of tally charts.
* Students will have used inequality notation.
* Students must be able to find midpoint of two numbers.

**Non-negotiable experiences in the learning scheme**- Year group ‘Spot the Mistakes’ competition.* Learners move at an appropriate pace through the SOL, largely in-line with other groups studying the same tier, accessing all content. Some students will access additional challenge content.
* Previous learning links are made, along with real-life uses and careers content from the maths bulletin.
* Students will be taught and emphasis given to key words and their definitions.

**Skills being developed**G14 use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)S2 interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, tables and line graphs for time series data and know their appropriate useS3 **construct and interpret diagrams for grouped discrete data and continuous data i.e. histograms with equal and unequal class intervals …**S4 interpret, analyse and compare the distributions of data sets from univariate empirical distributions through:* appropriate graphical representation involving discrete, continuous and grouped data …
* appropriate measures of central tendency (median, mode and modal class) and spread (range, including consideration of outliers) …

S5 apply statistics to describe a populationS6 use and interpret scatter graphs of bivariate data; recognise correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing**How will it be assessed?**End of unit assessments with next steps being linked to assessment misconceptions and errors. Teachers to model assessment solutions before students attempt their next steps. | **Topic/Content**Unit 4: Fractions, Percentages, Ratio and Proportion.**How does this link to prior learning?*** Students should know the four operations of number.
* Students should be able to find common factors.
* Students should have a basic understanding of fractions as being ‘parts of a whole’.
* Students can define percentage as ‘number of parts per hundred’.
* Students are aware that percentages are used in everyday life.

**Non-negotiable experiences in the learning scheme*** Guided reading task: ‘The Golden Ratio’.
* Learners move at an appropriate pace through the SOL, largely in-line with other groups, accessing all core content. Some students will access additional challenge content.
* Previous learning links are made, along with real-life uses (one homework per unit is real-world based) and careers content.
* Students will be taught and emphasis given to key words and their definitions.

**Skills being developed**N1 order positive and negative integers, decimals and fractions; …N2 apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative; …N3 recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions); use conventional notation for priority of operations, including brackets, powers, roots and reciprocalsN8 calculate exactly with fractions …N10 work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and  or 0.375 and ); **change recurring decimals into their corresponding fractions and vice versa**N11 identify and work with fractions in ratio problemsN12 interpret fractions and percentages as operatorsN13 use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriateR2 use scale factors, scale diagrams and mapsR3 express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1R4 use ratio notation, including reduction to simplest formR5 divide a given quantity into two parts in a given part : part or whole : part ratio; express the division of a quantity into two parts as a ratio; apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations) R6 express a multiplicative relationship between two quantities as a ratio or a fractionR7 understand and use proportion as equality of ratiosR8 relate ratios to fractions and to linear functionsR9 define percentage as ‘number of parts per hundred’; interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; express one quantity as a percentage of another; compare two quantities using percentages; work with percentages greater than 100%; solve problems involving percentage change, including percentage increase/decrease, and original value problems and simple interest including in financial mathematicsR10 solve problems involving direct proportion; …**How will it be assessed?**End of unit assessments with next steps being linked to assessment misconceptions and errors. Teachers to model assessment solutions before students attempt their next steps. | **Topic/Content**Unit 5: Angles and Trigonometry**How does this link to prior learning?*** Students should be able to rearrange simple formulae and equations, as preparation for rearranging trig formulae.
* Students should recall basic angle facts.
* Students should understand that fractions are more accurate in calculations than rounded percentage or decimal equivalents.

**Non-negotiable Experiences in the learning scheme****-** Outdoor learning  Trigonometry lesson.* Learners move at an appropriate pace through the SOL, largely in-line with other groups, accessing all core content. Some students will access additional challenge content.
* Previous learning links are made, along with real-life uses (one homework per unit is real-world based) and careers content.
* Students will be taught and emphasis given to key words and their definitions.

**Skills being developed**N7 Calculate with roots and with integer **and fractional** indicesN8 calculate exactly with fractions and **surds** …N15 round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures); …A4 simplify and manipulate algebraic expressions (including those involving surds) by collecting like terms …A5 understand and use standard mathematical formulae; …R12 compare lengths, areas and volumes using ratio notation; make links to similarity (including trigonometric ratios) and scale factorsG1 use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries; …G3 … understand and use alternate and corresponding angles on parallel lines; derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)G4 derive and apply the properties and definitions of: special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; … G6 apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras’ theorem and the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofsG11 solve geometrical problems on coordinate axesG20 know the formulae for: Pythagoras’ theorem *a*2 + *b*2 = *c*2, and the trigonometric ratios sine, cosine and tan; apply them to find angles and lengths in right-angled triangles … and in two dimensional figuresG21 know the exact values of sin *θ* and cos *θ* for *θ* = 0°, 30°, 45°, 60° and 90°; know the exact value of tan *θ* for *θ* = 0°, 30°, 45° and 60°**How will it be assessed?**End of unit assessments with next steps being linked to assessment misconceptions and errors. Teachers to model assessment solutions before students attempt their next steps. | **Topic/Content**Units 1 to 5 do not run for exactly 1 half term each, content will run in to half term 6.End of year assessment of cumulative knowledge and skills.Suggested summer ‘pre-reading’ by way of Hegarty tasks. |