Maths IGCSE Foundation Scheme of work.

This document should be used alongside the Pearson/Edexcel published Scheme of work that can be found here.

Extension work referred to is from the Pearson/Edexcel published Scheme of work, Higher Tier, that can be found here.

Maths Scheme of Work – IGCSE Foundation Grade 1-5

Unit	Prior Knowledge From ELC 3/Edexcel award L1/FS L1and previous units	Learning Opportunities	Colour band	Edexcel Award	Functional skills	GCSE
1 Integers and place value	Place value, and recognise even and odd numbers. Four operations with whole numbers. Integer complements to 10 and to 100. Multiplying and dividing whole numbers by 2, 4, 5, and 10. Read and write decimals in figures and words.	understand and use integers (positive, negative and zero) understand place value use directed numbers in practical situations order integers use the four rules of addition, subtraction, multiplication and division use brackets and the hierarchy of operations round integers to a given power of 10 Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		;				
Additional Teacher Notes		Much of this unit will have been encountered by students in previous Key Stages, meaning that teaching time may focus on application or consolidation of prior learning. Particular emphasis should be given to the importance of students presenting their work clearly. Negative numbers in Missing digits in calculations involving the four operations				

	Questions such as: Phil states 3.44 × 10 = 34.4 and Chris states 3.44 × 10 = 34.40. Who is correct? Show me another number with 3, 4, 5, 6, 7 digits that includes a 6 with the same value as the "6" in the following number 36, 754 Round numbers to the nearest 10, 100, 1000, the nearest integer, to a given number of decimal places and to a given number of significant figures real life can be modelled by interpreting scales on thermometers using F and C. Encourage the exploration of different calculation methods. Students should be able to write numbers in words and from words as a real-life skill.

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2 Decimals	Place value, and recognise even and odd numbers. Four operations with whole numbers. Integer complements to 10 and to 100. Multiplying and dividing whole numbers by 2, 4, 5, and 10. Read and write decimals in figures and words. .	use decimal notation understand place value order decimals convert a decimal to a fraction or percentage recognise that a terminating decimal is a fraction round to a given number of significant figures or decimal places identify upper and lower bounds where values are given to a degree of accuracy use estimation to evaluate approximations to numerical calculations use a scientific electronic calculator to determine numerical results Teaching ideas and resources here Topic tests here			
Reasoning and problem solving opportunities		Problems involving shopping for multiple items, such as: Rob purchases a magazine costing £2.10, a newspaper costing 82p and two bars of chocolate. He pays with a £10 note and gets £5.40 change. Work out the cost of one bar of chocolate. Explain why the answer to 6.58 × 2.4 cannot be 157.92			
Additional Teacher Notes		Practise estimating answers to calculations and use estimation as a method for checking answers. Amounts of money should always be rounded to two decimal places (when appropriate).			

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3 Special numbers and powers	Place value, and recognise even and odd numbers. Four operations with whole numbers. Integer complements to 10 and to 100. Multiplying and dividing whole numbers by 2, 4, 5, and 10. Read and write decimals in figures and words.	use the terms 'odd', 'even', 'prime numbers', 'factors' and 'multiples' identify prime factors, common factors and common multiples identify square numbers and cube numbers calculate squares, square roots, cubes and cube roots express integers as product of powers of prime factors find highest common factors (HCF) and lowest common multiples (LCM) Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Students should be able to provide convincing counter-arguments to statements concerning properties of stated numbers, i.e. Sharon says 108 is a prime number. Is she correct? Questions that require multiple layers of operations such as: Pam writes down one multiple of 9 and two different factors of 40 She then adds together her three numbers. Her answer is greater than 20 but less than 30 Find three numbers that Pam could have written down. ;				
Additional Teacher Notes		Note that students need to understand, for example, $4\sqrt{2}$ as there will be occasions when their calculator displays an answer in surd form. Use a number square to find primes (Eratosthenes sieve). Using a calculator to check factors of large numbers can be useful. Students need to be encouraged to learn squares from 2×2 to 15×15 and cubes of 2, 3, 4, 5 and 10 and corresponding square and cube roots.				

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4 Fractions	Four operations of number. Common factors. Fractions as 'parts of a whole'.	understand and use equivalent fractions, simplifying a fraction by cancelling common factors understand and use mixed numbers and improper fractions identify common denominators order fractions and calculate a given fraction of a given quantity express a given number as a fraction of another number convert a fraction to a decimal or percentage				
Reasoning and problem solving opportunities		Questions that involve rates of overtime pay, including simple calculations involving fractional (>1, e.g. 1.5) and hourly pay. These can be extended into calculating rates of pay given the final payment and number of hours worked. Working out the number of people/things where the number of people/things in different categories is given as a fraction.				
Additional Teacher Notes		When expressing a given number as a fraction of another, start with very simple numbers < 1, and include some cancelling before fractions using numbers > 1 Regular revision of fractions is essential. Demonstrate how to use the fraction button on the calculator. Use real-life examples where possible.				

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	L1and previous units					
5 Percentages	Define percentage as 'number of parts per hundred'. Complements to 10 and multiplication tables.	understand that 'percentage' means 'number of parts per 100' express a given number as a percentage of another number express a percentage as a fraction and as a decimal understand the multiplicative nature of percentages as operators solve simple percentage problems, including percentage increase and decrease use reverse percentages use compound interest and depreciation Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Sale prices offer an ideal opportunity for solving problems, allowing students the opportunity to investigate the most effective way to work out the "sale" price. Problems that involve consecutive reductions such as: Sale prices are 10% off the previous day's price. If a jacket is £90 on Monday, what is the price on Wednesday?				
Additional Teacher Notes		Amounts of money should always be rounded to two decimal places. Use real-life examples where possible. Emphasise the importance of being able to convert between decimals and percentages and the use of decimal multipliers to make calculations easier.				

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Unit	Prior Knowledge From ELC 3/Edexcel award L1/FS L1and previous units	Learning Opportunities	Colour band	Edexcel Award	Functional skills	GCSE

6 Ratio and proportion	Four operations of number. Understand fractions as being 'parts of a whole'.	use ratio notation, including reduction to its simplest form and its various links to fraction notation divide a quantity in a given ratio or ratios use the process of proportionality to evaluate unknown quantities calculate an unknown quantity from quantities that vary in direct proportion solve word problems about ratio and proportion use and apply number in everyday personal, domestic or community life carry out calculations using standard units of mass, length, area, volume and capacity understand and carry out calculations using time, and carry out calculations using money, including converting between currencies Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Anna, Bob and Clive share some money in the ratio 1 : 2 : 4. Clive gets £36 more than Anna. How much did Bob get? Problems in context, such as scaling a recipe, or diluting lemonade or chemical solutions, will show how proportional reasoning is used in real-life contexts.				
Additional Teacher Notes		Emphasise the importance of reading the question carefully. Include ratios with decimals 0.2 : 1 Find out/prove whether two variables are in direct proportion by plotting the graph and using it as a model to read off other values.				

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Unit	Prior Knowledge From ELC 3/Edexcel award L1/FS L1and previous units	Learning Opportunities	Colour band	Edexcel Award	Functional skills	GCSE
7 Arithmetic of fractions	Four operations of number. Common factors. Fractions as 'parts of a whole'.	use common denominators to add and subtract fractions and mixed numbers understand and use fractions as multiplicative inverses multiply and divide fractions and mixed numbers Teaching ideas and resources here Topic tests here				

Reasoning and problem solving opportunities	Questions that involve rates of overtime pay, including simple calculations involving fractional (>1, e.g. 1.5) and hourly pay. These can be extended into calculating rates of pay given the final payment and number of hours worked. Working out the number of people/things where the number of people/things in different categories is given as a fraction, decimal or percentage.				
Additional Teacher Notes	When adding and subtracting fractions, start with the same denominator, then where one the denominator is a multiple of the other (answers ≤ 1), and finally where both denominators have to be changed (answers ≤ 1). Regular revision of fractions is essential. Demonstrate how to use the fraction button on the calculator. Use real-life examples where possible.				

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8 Set language, notation and Venn diagrams	Types of number, language of probability	understand the definition of a set use the set notation ∪, ∩and ∈and ∉ understand the concept of the universal set and the empty set and the symbols for these sets understand and use the complement of a set use Venn diagrams to represent sets find probabilities from a Venn diagram Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Given the universal set is {1, 2, 3, 4, 5, 6, 7, 8, 9, 10 A = {5, 7, 9} and B = {1, 3, 5, 7} Write down a possible set C so that $A \cap C$ = {7} and C has 4 members. .				

Additional Teacher Notes	When drawing a Venn diagram it is a good idea to put members in the intersection first.				

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	L1/FS L1and previous units					
9 Indices and standard form	Write powers of 10 in index form and recognise and recall powers of 10, i.e. $10^2 = 100$.	use index notation and index laws for multiplication and division of positive and negative integer powers including zero calculate with and interpret numbers in the form $a \times 10^n$ where n is an integer and $1 \leqslant a < 10$				
Reasoning and problem solving opportunities		Link with other areas of mathematics, such as compound measures, by using speed of light in standard form.				
Additional Teacher Notes		Standard form is used in science and there are lots of cross curricular opportunities. Students need to be given plenty of practice in using standard form with calculators.				

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Unit	Prior Knowledge From ELC 3/Edexcel award L1/FS	Learning Opportunities	Colour band	Edexcel Award	Functional skills	GCSE

	L1and previous units					
10 Algebraic manipulation	Use negative numbers with the four operations. Use hierarchy of operations and understand inverse operations. Common factors Index laws.	understand that symbols may be used to represent numbers in equations or variables in expressions and formulae understand that algebraic expressions follow the generalised rules of arithmetic use index notation for positive and negative integer powers (including zero) use index laws in simple cases collect like terms multiply a single term over a bracket take out common factors Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Forming expressions and equations using area and perimeter of 2D shapes.				
Additional Teacher Notes		Emphasise correct use of symbolic notation, i.e. $3 \times y = 3y$ and not $y3$ and $a \times b = ab$ Use lots of concrete examples when writing expressions, e.g. 'B' boys + 'G' girls. Plenty of practice should be given, and reinforce the message that making mistakes with negatives and times tables is a different skill to the one being developed here.				

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11 Expressions, formulae and rearranging equations	Use negative numbers with the four operations. Use hierarchy of operations and understand inverse operations. Decimals and negatives on a calculator.	evaluate expressions by substituting numerical values for letters understand that a letter may represent an unknown number or a variable use correct notational conventions for algebraic expressions and formulae substitute positive and negative integers, decimals and fractions for words and letters in expressions and formulae use formulae from mathematics and other real-life contexts expressed initially in words or diagrammatic form and convert to letters and symbols derive a formula or expression change the subject of a formula where the subject appears once Teaching ideas and resources here Topic tests here				

Reasoning and problem solving opportunities	Forming and solving equations involving algebra and other areas of mathematics such as area and perimeter.				
Additional Teacher Notes	Provide students with lots of practice. This topic lends itself to regular reinforcement through starters in lessons. Use formulae from mathematics and other subjects, expressed initially in words and then using letters and symbols.				

Unit	Prior Knowledge From ELC 3/Edexcel award L1/FS L1and previous units	Learning Opportunities	Colour band	Edexcel Award	Functional skills	GCSE
12 Equations and inequalities	Negative numbers with the four operations, the hierarchy of operations and inverse operations. Draw a number line.	solve linear equations, with integer or fractional coefficients, in one unknown in which the unknown appears on either side or both sides of the equation set up simple linear equations from given data understand and use the symbols $>$, $<$, $\leqslant$ and $\geqslant$ understand and use the convention for open and closed intervals on a number line solve simple linear inequalities in one variable and represent the solution set on a number line Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Problems that: • could be solved by forming equations such as: Pat and Paul have a combined salary of £800 per week. Pat earns £200 per week more than Paul. How much does Paul earn? • involve the application of a formula with conflicting results such as: Pat and Paul are using the formula $y = 8n + 4$ When $n = 2$, Pat states that $y = 86$ and Paul states $y = 20$. Who is correct?				
Additional Teacher Notes		Emphasise good use of notation. Students need to realise that not all linear equations can be solved by observation or trial and improvement, and hence the use of a formal method is important. Students can leave their answer in fraction form where appropriate. Emphasise the importance of leaving their answer as an inequality (and not change to =).				

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13 Sequences	Types of number. Count on in steps. Four operations.	generate terms of a sequence using term-to-term and position-to-term definitions of the sequence (nth term) find subsequent terms of an integer sequence and the rule for generating it use linear expressions to describe the nth term of arithmetic sequences Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Evaluating statements about whether or not specific numbers or patterns are in a sequence and justifying the reasons.				
Additional Teacher Notes		Emphasise use of $3n$ meaning $3 \times n$ Students need to be clear on the description of the pattern in words, the difference between the terms and the algebraic description of the nth term. Students are not expected to find the nth term of a quadratic sequence.				

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	From ELC 3/Edexcel award L1/FS L1and previous units					
14 Real life graphs	Plot coordinates and read scales Substitute into a formula.	interpret information presented in a range of linear and non-linear graphs Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Students should be able to decide what the scales on any axis should be and be able to draw a correct graph. Conversion graphs can be used to provide opportunities for students to justify which distance is further, or whether or not certain items can be purchased in different currencies.				
Additional Teacher Notes		Clear presentation of axes is important. Ensure that you include questions that include axes with negative values to represent, for example, time before present time, temperature or depth below sea level. Careful annotation should be encouraged: it is good practice to get students to check that they understand the increments on the axes. Use standard units of measurement to draw conversion graphs. Use various measures in distance–time and velocity–time graphs, including miles, kilometres, seconds, and hours. .				

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15 Straight line graphs	An understanding of why data needs to be collected and some idea about different types of charts	understand and use conventions for rectangular Cartesian coordinates plot points (x, y) in any of the four quadrants or locate points with given coordinates determine the coordinates of points identified by geometrical information determine the coordinates of the midpoint of a line segment, given the coordinates of the two end points draw and interpret straight line conversion graphs find the gradient of a straight line recognise that equations of the form $y = mx + c$ are straight line graphs with gradient m and intercept on the y-axis at the point $(0, c)$ recognise, generate points and plot graphs of linear functions				

		represent simple linear inequalities on rectangular Cartesian graphs identify regions on rectangular Cartesian graphs defined by simple linear inequalities Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Given three vertices of a parallelogram, find coordinates of the fourth vertex. Students should be able to decide what the scales on any axis should be in order to draw a correct graph. Use a conversion graph to convert quantities that cannot be found on the axes. E.g. scale goes from 1 kg to 10 kg; convert 150 kg into pounds.				
Additional Teacher Notes		Emphasise the importance of drawing a table of values when not given one. Values for a table should be taken from the x-axis.				

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16 Quadratic equations and graphs	Square negative numbers. Substitute into formulae. Plot points on a coordinate grid.	expand the product of two simple linear expressions understand the concept of a quadratic expression and be able to factorise such expressions (limited to $x^2 + bx + c$) solve quadratic equations by factorization (limited to $x^2 + bx + c = 0$) recognise, generate points and plot graphs quadratic functions Teaching ideas and resources here				

	Expand single brackets and collect 'like' terms.	Topic tests here				
Reasoning and problem solving opportunities		Visual proof of the difference of two squares. Given the length and width of a rectangle as expressions in x and the area of the rectangle, form a quadratic equation.				
Additional Teacher Notes		Emphasise the fact that x^2 and x are different 'types' of term – illustrate this with numbers. The graphs should be drawn freehand and in pencil, joining points using a smooth curve. Encourage efficient use of the calculator.				

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17 Simultaneous equations	Substitute into and solve equations. Use formulae.	calculate the exact solution of two simultaneous equations in two unknowns Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Simple simultaneous equations can be formed and solved from real-life scenarios such as: 2 adult and 2 child tickets cost £18, and 1 adult and 3 child tickets costs £17. What is the cost of 1 adult ticket?				
Additional Teacher Notes		Emphasise the need for good algebraic notation. Clear algebraic working must be shown. .				

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Unit	Prior Knowledge From ELC 3/Edexcel award L1/FS L1and previous units	Learning Opportunities	Colour band	Edexcel Award	Functional skills	GCSE
18 Measures, bearings and scale drawings	Measure and draw lines. Use a protractor. Use a protractor.	interpret scales on a range of measuring instruments calculate time intervals in terms of the 24-hour and the 12-hour clock make sensible estimates of a range of measures understand angle measure including three-figure bearings distinguish between acute, obtuse, reflex and right angles measure an angle to the nearest degree measure and draw lines to the nearest millimetre solve problems using scale drawings use and interpret maps and scale drawings convert measurements within the metric system to include linear and area units convert between units of volume within the metric system Teaching ideas and resources here Topic tests here				

Reasoning and problem solving opportunities	Work out a speed, having first had to work out a time. Work out cost of 400 g of cheese given the price of 1 kg of cheese.				
Additional Teacher Notes	Emphasise that diagrams in examinations are seldom drawn accurately. Make sure drawings are neat, labelled and accurate. Give students lots of practice. Angles should be accurate to within 2° Use tracing paper to assist with symmetry questions. Ask students to find their own examples of symmetry in real life.				

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19 Symmetry, shapes, parallel lines and angle facts	Understand angles as a measure of turning. Name angles and identify acute, obtuse, reflex and right angles. Recognise reflection symmetry, be able to	identify any lines of symmetry and the order of rotational symmetry of a given two-dimensional figure use angle properties of intersecting lines, parallel lines and angles on a straight line understand the exterior angle of a triangle property and the angle sum of a triangle property understand the terms 'isosceles', 'equilateral' and 'right-angled triangles' and the angle properties of these triangles understand and use the term 'quadrilateral' and the angle sum property of quadrilaterals understand and use the properties of the parallelogram, rectangle, square, rhombus, trapezium and kite give informal reasons, where required, when arriving at numerical solutions to geometrical problems recognise and give the names of solids				

	identify and draw lines of symmetry, and complete diagrams with given number of lines of symmetry. Recognise rotation symmetry and be able to identify orders of rotational symmetry, and complete diagrams with given order of rotational symmetry.	understand the terms 'face', 'edge' and 'vertex' in the context of 3-D solids Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Multi-step "angle chasing" style problems that involve justifying how students have found a specific angle. Geometrical problems involving algebra whereby equations can be formed and solved allow students the opportunity to make and use connections with different parts of mathematics. What is the same, and what is different, between families of polygons?				
Additional Teacher Notes		Emphasise that diagrams in examinations are seldom drawn accurately. Write any found angles on the diagram in a question and/or identify clearly in working. Emphasise the need to give geometric reasons when required.				

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Unit	Prior Knowledge From ELC 3/Edexcel award L1/FS L1and previous units	Learning Opportunities	Colour band	Edexcel Award	Functional skills	GCSE
20 Polygons	Understand angles as a measure of turning. Name angles and identify acute, obtuse, reflex and right angles.	recognise and give the names of polygons understand the term 'regular polygon' and calculate interior and exterior angles of regular polygons understand and use the angle sum of polygons Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Problems whereby students have to justify the number of sides that a regular polygon has given an interior or exterior angle.				
Additional Teacher Notes		Study Escher drawings. Use examples of tiling patterns with simple shapes to help students investigate if shapes 'fit together'.				

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Unit	Prior Knowledge From ELC 3/Edexcel award L1/FS L1and previous units	Learning Opportunities	Colour band	Edexcel Award	Functional skills	GCSE
21 Compound measure	Rearrange equations and use these to solve problems. Speed=distance/time, density=mass/volume.	understand and use the relationship between average speed, distance and time use compound measure such as speed, density and pressure Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Find the mass of an object, having first to find its volume. Work out the average speed of a journey.				

Additional Teacher Notes	Practise converting time into decimals. Ensure that conversions between metric units are known.				

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Unit	Prior Knowledge From ELC 3/Edexcel award L1/FS L1and previous units	Learning Opportunities	Colour band	Edexcel Award	Functional skills	GCSE
22 Perimeter, area and volume	Measure lines and recall the names of 2D shapes. Use strategies for multiplying and dividing by powers of 10. Find areas by counting squares and volumes by counting cubes. Interpret scales on a range of measuring instruments.	find the perimeter of shapes made from triangles and rectangles find the area of simple shapes using the formulae for the areas of triangles and rectangles find the area of parallelograms and trapezia find the surface area of simple shapes using the area formulae for triangles and rectangles find the volume of prisms, including cuboids and cylinders, using an appropriate formula Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Given two 2D shapes that have equal areas, work out all the dimensions of the sides of the shapes. Problems involving straightforward and compound shapes in a real-life context should be explored to reinforce the concept of area. For example, the plan of a garden linked to the purchase of grass seed.				

Additional Teacher Notes	Use questions that involve different metric measures that need converting. Measurement is essentially a practical activity: use a range of everyday shapes to bring reality to lessons. Ensure that students are clear about the difference between perimeter and area. Practical examples help to clarify the concepts, i.e. floor tiles, skirting board. Discuss the correct use of units. Drawings should be done in pencil. Consider 'how many small boxes fit in a larger box'-type questions. Practical examples should be used to enable students to understand the difference between perimeter, area and volume.

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Unit	Prior Knowledge From ELC 3/Edexcel award L1/FS L1and previous units	Learning Opportunities	Colour band	Edexcel Award	Functional skills	GCSE
23 Circles and cylinders	Formula for calculating the area of a rectangle. Four operations on a calculator.	recognise the terms 'centre', 'radius', 'chord', 'diameter', 'circumference', 'tangent', 'arc', 'sector' and 'segment' of a circle understand chord and tangent properties of circles find circumferences and areas of circles using relevant formulae; find perimeters and areas of semicircles find the surface area of a cylinder find the volume of prisms, including cuboids and cylinders, using an appropriate formula Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Calculate the radius/diameter given the area/circumference type questions could be explored, including questions that require evaluation of statements, such as Andy states "Diameter = 2 × Radius" and Bob states "'Radius = 2 × Diameter". Who is correct? Problems involving straightforward and compound shapes in a real-life context should be explored to reinforce the concept of area. For example, the floor plan of a room linked to the amount of flooring needed. Problems using number of revolutions of a wheel.				
Additional Teacher Notes		Emphasise the need to learn the circle formula: 'Cherry Pie's Delicious' and 'Apple Pies are too' are good ways to remember them. Ensure that students know it is more accurate to leave answers in terms of π but only when asked to do so.				

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Unit	Prior Knowledge From ELC 3/Edexcel award L1/FS L1and previous units	Learning Opportunities	Colour band	Edexcel Award	Functional skills	GC
24 Transformations	Recall basic shapes. Plot points in all four quadrants. Understand rotation. Draw and recognise lines parallel to axes and $y = x, y = -x$. Recognise clockwise and anticlockwise.	understand that rotations are specified by a centre and an angle rotate a shape about a point through a given angle recognise that an anticlockwise rotation is a *positive* angle of rotation and a clockwise rotation is a *negative* angle of rotation understand that reflections are specified by a mirror line construct a mirror line given an object and reflect a shape given a mirror line understand that translations are specified by a distance and direction translate a shape understand and use column vectors in translations understand that rotations, reflections and translations preserve length and angle so that a transformed shape under any of these transformations remains congruent to the original shape understand that enlargements are specified by a centre and a scale factor understand that enlargements preserve angles and not lengths enlarge a shape given the scale factor identify and give complete descriptions of transformations Teaching ideas and resources here Topic tests here				

Reasoning and problem solving opportunities		Students should be given the opportunity to explore the effect of reflecting in two parallel mirror lines and combining transformations.				
Additional Teacher Notes		Emphasise the need to describe the transformations fully, and if asked to describe a 'single' transformation they sho not include two types. It is essential to check the increments on the coordinate grid when translating shapes. Students may need reminding about how to find the equations of straight lines, including those parallel to the axes. When reflecting shapes, students must include mirror lines on or through original shapes.				

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Unit	Prior Knowledge From ELC 3/Edexcel	Learning Opportunities	Colour band	Edexcel Award	Functional skills	GCSE

	award L1/FS L1and previous units					
25 Pythagoras' theorem and trigonometry	Recall basic angle facts. Answer in surd form. Rearrange simple formulae and equations, as preparation for rearranging trigonometric formulae.	know, understand and use Pythagoras' theorem in two dimensions know, understand and use sine, cosine and tangent of acute angles to determine lengths and angles of a right-angled triangle apply trigonometrical methods to solve problems in two dimensions Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Combined triangle problems that involve consecutive application of Pythagoras' theorem or a combination of Pythagoras' theorem and the trigonometric ratios. In addition to abstract problems, students should be encouraged to apply Pythagoras' theorem and/or the trigonometric ratios to real-life scenarios that require them to evaluate whether their answer fulfils certain criteria, e.g. the angle of elevation of a 6.5 m ladder cannot exceed 65°. What is the greatest height it can reach?				
Additional Teacher Notes		Students may need reminding about surds. Drawing the squares on the three sides will help to illustrate the theorem. Include examples with triangles drawn in all four quadrants. Scale drawings are not acceptable. Calculators need to be in degree mode. Use a suitable mnemonic to remember SOHCAHTOA. Use Pythagoras' theorem and trigonometry together.				

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26 Similarity and congruence in 2D	Enlarge shapes and calculate scale factors. Area and volume in various metric measures. Measure lines and angles and using compasses, ruler and protractor, and construct standard constructions.	understand congruence as meaning the same shape and size understand that two or more polygons with the same shape and size are said to be congruent to each other understand and use the geometrical properties that similar figures have corresponding lengths in the same ratio but corresponding angles remain unchanged Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Using scale diagrams, including bearings and maps, provides a rich source of real-life examples and links to other areas of mathematics.				
Additional Teacher Notes		Use simple scale factors that are easily calculated mentally to introduce similar shapes. Reinforce the fact that the sizes of angles are maintained when a shape is enlarged.				

Maths Scheme of Work – GCSE Foundation Grade 1-5

Unit	Prior Knowledge From ELC 3/Edexcel award L1/FS L1and previous units	Learning Opportunities	Colour band	Edexcel Award	Functional skills	GCSE
27 Constructions and bearings	Measure and draw lines. Use a protractor. Use a pair of compasses.	construct triangles and other two-dimensional shapes using a combination of a ruler, a protractor and compasses use straight edge and compasses to: (i)construct the perpendicular bisector of a line segment (ii) construct the bisector of an angle Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Link problems with other areas of mathematics, such as the trigonometric ratios and Pythagoras' theorem.				
Additional Teacher Notes		Drawings should be done in pencil. Construction arcs should be left in.				

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28 Graphical representation of data	An understanding of why data needs to be collected and some idea about different types of charts and graphs.	use different methods of presenting data use appropriate methods of tabulation to enable the construction of statistical diagrams interpret statistical diagrams Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Students should be able to decide what the scales on any axis should be and be able to present information. From inspection of a pie chart, students should be able to identify the fraction of the total represented and know when that total can be calculated and compared with another pie chart				
Additional Teacher Notes		Ensure that you include a variety of scales, including decimal numbers of millions and thousands, timescales in hours, minutes, seconds. Relate $\frac{1}{4}$, $\frac{1}{2}$, etc. to percentages. Practise dividing by 20, 30, 40, 60, etc. Compare pie charts to identify similarities and differences. Angles when drawing pie charts should be accurate to 2°				

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29 Statistical measures	Calculate the midpoint of two numbers. Draw the statistical diagrams. Use inequality notation.	understand the concept of average calculate the mean, median, mode and range for a discrete data set calculate an estimate for the mean for grouped data identify the modal class for grouped data Teaching ideas and resources here Topic tests here				
Reasoning and problem solving opportunities		Students should be able to provide a correct solution as a counter-argument to statements involving the "averages", e.g. Susan states that the median is 15, she is wrong. Explain why. Given the mean, median and mode of five positive whole numbers, can you find the numbers?				
Additional Teacher Notes		Encourage students to cross out the midpoints (m) of each group once they have used these numbers to work out $m \times f$. This helps students to avoid summing m instead of f. Remind students how to find the midpoint of two numbers.				

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30 Probability	Add and multiply fractions and decimals. Express one number as a fraction of another number.	understand the language of probability understand and use the probability scale understand and use estimates or measures of probability from theoretical models find probabilities from a Venn diagram understand the concepts of a sample space and an event, and how the probability of an event happening can be determined from the sample space list all the outcomes for single events and for two successive events in a systematic way estimate probabilities from previously collected data calculate the probability of the complement of an event happening use the addition rule of probability for mutually exclusive events understand and use the term 'expected frequency' Teaching ideas and resources here				

		Topic tests here				
Reasoning and problem solving opportunities		Lotteries provides a real-life link to probability. Work out the probabilities of winning on different lotteries. Students should be given the opportunity to justify the probability of events happening or not happening.				
Additional Teacher Notes		Use this as an opportunity for practical work.				