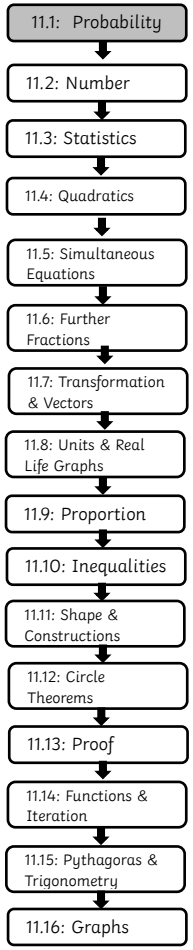
Personalised Learning Checklist (PLC): Year 11 Crossover Higher



Unit 1 – Probability	Sparx Codes
Language of probability, 0-1 probability scale, random, fair, equally likely, bias, unequally likely	U803
Calculate probability and write as fractions, decimals or percentages	U408 U510
Sample space diagrams for combined events	U104
Mutually exclusive events & their probabilities	U683
Experimental probability	U580
Expected results from repeated experiments	U166
Use a frequency tree to record outcomes of an event	U280
Use listing strategies to identify all permutations or combinations & use the product rule for counting	U369
Represent outcomes using a Venn diagram Find the union and intersection of sets	U476 U748
Recognise the symbols { } for sets, ∩ for intersection and ∪ for union	U296
Know the addition law for mutually exclusive events: P(A or B) = P(A) + P(B)	
Know the multiplication law for independent events: P(A & B) = P(A) x P(B)	
Use a tree diagram to solve problems involving combined events that are independent and dependent	U558 U729
Conditional probability using Venn diagrams, tables and tree diagrams	U699 U246 U806

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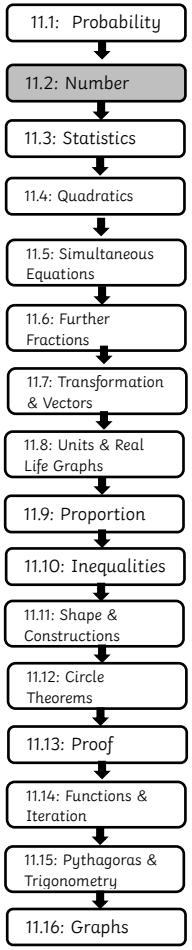

Unit 2 – Number	Sparx Codes
Calculate with fractional indices	U985 U772
Change recurring decimals into their corresponding fractions and vice versa	U550
Convert a recurring decimal to a fraction using algebra	U689
Find error intervals	U657
Truncate decimals	U108
Express truncation errors using inequality notation $a < x \leq b$	U301
Apply and interpret limits of accuracy (eg max/min number of people from a rounded value)	
Calculate with upper or lower bounds	U587

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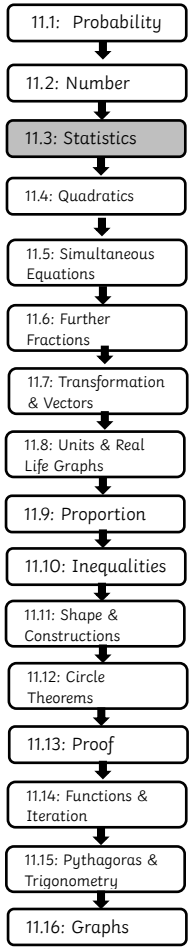

Unit 3 – Statistics	Sparx Codes
Understand sampling and know its limitations	U162
Find upper and lower quartile from a list of data using the positions $\frac{1}{4}$ (n+1) and $\frac{3}{4}$ (n + 1)	
Plot a cumulative frequency curve and use it to estimate the median, quartiles and interquartile range	U182 U642
Draw and interpret boxplots	U879 U837
Compare sets of data using median and interquartile range	U507
Construct histograms	U185 U814
Use and interpret a histogram to solve problems such as estimating the median	U983 U267

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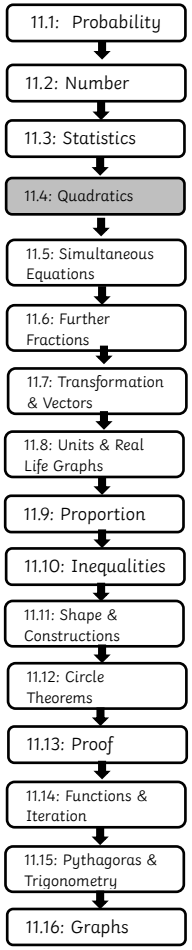

Unit 4 – Quadratics	Sparx Codes
Expand products of more than two binomials	U606
Factorise quadratics of the form $ax^2 + bx + c$	U858
Solve quadratic equations of the form $x^2 + bx + c = 0$ by factorising	U228
Solve quadratic equations of the form $ax^2 + bx + c = 0$ by factorising	U960
Solve quadratic equations by completing the square	U589
Solve quadratic equations using the quadratic formula	U665
Draw the graph of quadratic functions of the form $y = ax^2 + bx + c$	U989
Use quadratic graphs to estimate values of y for given values of x and vice versa	U667
Identify and interpret roots, intercepts and turning points of quadratic functions graphically	U667
Find approximate solutions to a quadratic equation using a graph	U601
Deduce turning points of quadratic functions by completing the square	U769
Deduce an expression for the nth term of a quadratic sequence	U206

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Notes

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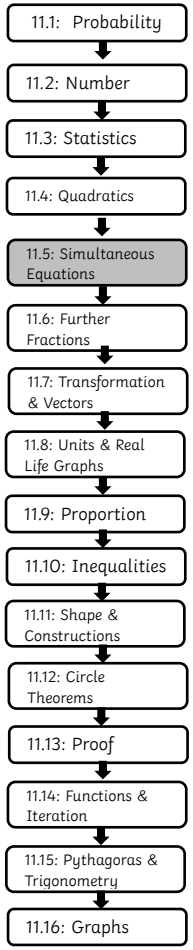

Unit 5 – Simultaneous Equations	Sparx Codes
Translate situations into expressions or formulae	
Derive an equation and interpret the solution	U599
Recognise the point of intersection of two linear graphs represents the solution to these equations	
Approximate solutions to simultaneous equations graphically	U836
Solve simultaneous equations using substitution	U757
Solve two simultaneous equations in two variables, where one is linear, and one is quadratic	U547
Find approximate solutions to simultaneous equations involving quadratics graphically	U875
Derive two simultaneous equations, solve them and interpret the solution	U137

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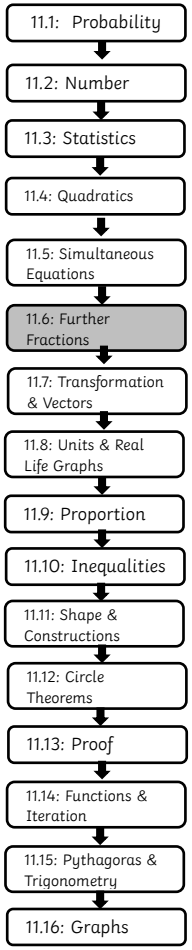

Unit 6 – Further Fractions	Sparx Codes
Work with fractions involving surds and rationalise denominators	U707 U281
Simplify and manipulate algebraic expressions involving algebraic fractions or surds	U103 U437 U294
Add, subtract, multiply and divide fractions with algebraic numerators and/or denominators	U685 U457 U824
Solve equations involving algebraic fractions	

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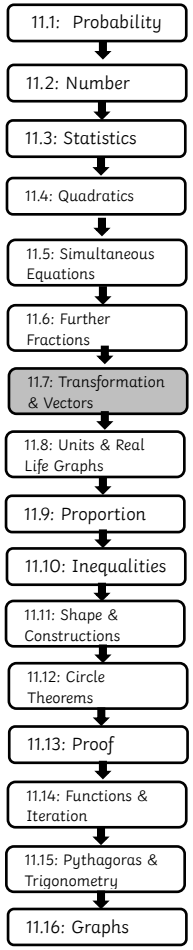

Unit 7 – Transformations and Vectors	Sparx Codes
Line symmetry and rotational symmetry	U849
To draw and describe a translation of a shape	U196
To draw and describe a reflection of a shape	U799
To draw and describe a rotation of a shape	U696
Enlarge a shape using a centre and scale factor	U519 U134
Carry out combinations of transformations Describe the resultant of multiple transformations as a single transformation	U766
Understand invariant points of a transformation	
Add and subtract vectors	U903
Multiply a vector by a scalar	U564
Draw vectors on a diagram and describe them Solve problems using vectors	U781
Identify parallel vectors	U660
Use vectors to construct geometric arguments	U560

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Notes

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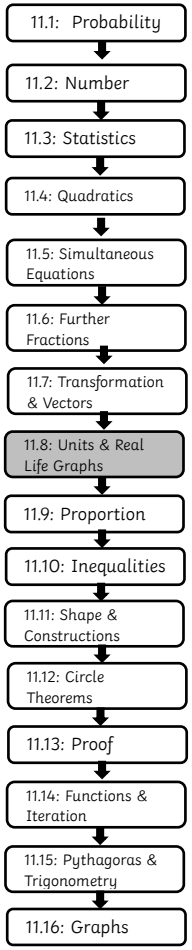

Unit 8 – Units & Real Life Graphs	Sparx Codes
Read, convert and calculate with time Convert units of length, mass and capacity	U902 U388
Understand and calculate compound units involving speed, distance and time	U151 U256
Understand and calculate compound units involving density, mass and volume	U910
Understand and calculate pressure	U527
Understand and calculate population density	
Solve problems involving compound units	U842
Solve problems involving time, timetables, speed and distance tables	
Plot and interpret graphs in real contexts	U652 U638 U862 U896
Plot and interpret distance-time graphs	U403 U914
Interpret the gradient of a straight line graph as a rate of change	U462 U966
Review plotting linear graphs, y = mx + x, gradient and intercept	U741 U315 U669
Recognise, sketch and interpret graphs of quadratic, cubic and reciprocal functions	U980 U593
Estimate gradients at a point on a curve using a tangent	U800
Estimate the area under a non-linear graph	U882
Plot a velocity-time graph Calculate acceleration from a velocity-time graph Calculate a distance from a velocity-time graph	U937 U562 U611

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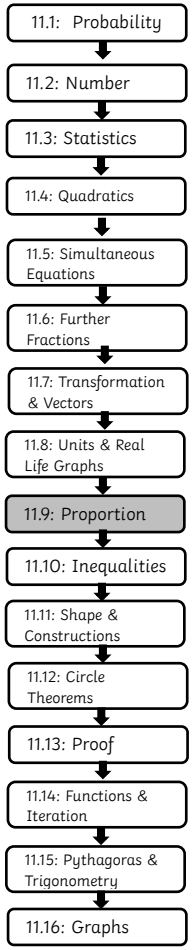

Unit 9 – Proportion	Sparx Codes
Understand direct proportion and solve problems involving direct proportion	U721
Understand inverse proportion and solve inverse proportion problems Understand that X is inversely proportional to Y is equivalent to X is proportional to $\frac{1}{Y}$	U357
Graphs of direct and inverse proportion	U238
Interpret direct proportion equations	U640
Interpret inverse proportion equations	U364
Construct equations for directly proportional relationships	U407
Construct equations for inversely proportional relationships	U138
Use equations of proportionality to find missing values	

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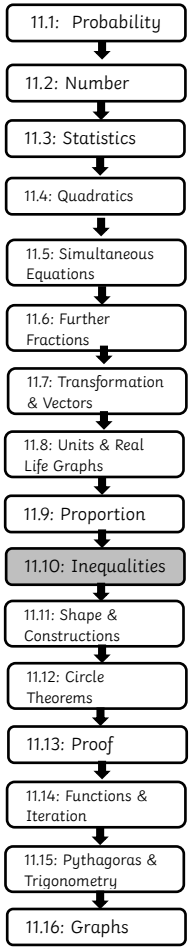

Unit 10 – Inequalities	Sparx Codes
Solve linear inequalities in one or two variables	U759
Solve linear inequalities with the variable on both sides	U738
Represent a solution set on a number line	U509
Solve quadratic inequalities in one variable	U133
Represent the solution using set notation	
Represent the solution on a graph	
Solve double inequalities	U145
Graphs of linear inequalities	U747
In graphical solutions, know and use the convention of a dashed line for strict inequalities and a solid line for an included inequality	
Construct and solve inequalities	U337

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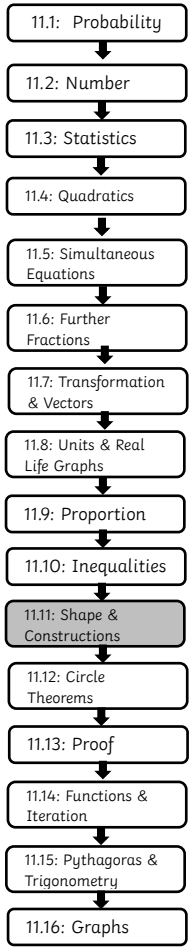

Unit 11 – Shape & Constructions	Sparx Codes
Solve geometrical problems involving coordinates	U889
Calculate midpoint of a line	U933
Properties of 3D shapes (including faces, edges and vertices)	U719
Construct and interpret plans and elevations of 3D shapes	U743
Understand and use isometric drawings	
Recognise, draw and interpret nets of 3D shapes	U761
Congruence and congruence criteria for triangles (SSS, SAS, ASA, RHS)	U790 U866
Understand similarity and find missing values in similar shapes	U551 U578
Find areas and volumes in similar shapes	U630 U110
Mixed problems using congruence and similarity	U112
Use compasses	U678
Use ruler and protractor or compasses to construct triangles	U187
Construct an angle bisector	U787
Construct perpendicular bisectors and lines	U245 U979
Construct loci	U820
Use scale diagrar	U257

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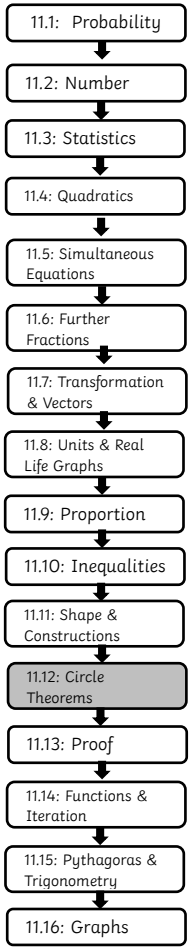

Unit 12 – Circle Theorems	Sparx Codes
Angle subtended by an arc at the centre is equal to twice the angle subtended at any point on the circumference	U459
Angle subtended at the circumference by a semicircle is 90°	
Angles in the same segment are equal	U251
Opposite angles in a cyclic quadrilateral sum to 180°	
Tangent at any point on a circle is perpendicular to the radius at that point	U489
Tangents from an external point are equal in length	
The perpendicular from the centre to a chord bisects the chord	
Alternate segment theorem	U130
Mixed Problems: Circle Theorems	U808

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- 11.6: Further Fractions
- 11.7: Transformation & Vectors
- 11.8: Units & Real Life Graphs
- 11.9: Proportion
- 11.10: Inequalities
- 11.11: Shape & Constructions
- 11.12: Circle Theorems
- **11.13: Proof**
- 11.14: Functions & Iteration
- 11.15: Pythagoras & Trigonometry
- 11.16: Graphs

Unit 13 – Proof	Sparx Codes
Know the difference between an equation (true for a specific value) and an identity (true for all values)	
Show algebraic expressions are equivalent, and construct algebraic proofs	U582
Construct geometric proofs using angle facts	U471
Understand the proof of the angle sum of a triangle using alternate angles	
Construct geometric proofs using congruence & similarity	U887

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Unit 14 – Functions & Iteration	Sparx Codes
Understand and use notation such as $f(x)$, $fg(x)$ and $f^{-1}(x)$	
Interpret simple expressions as functions with inputs and outputs	U637
Interpret the reverse process as the 'inverse function'	U996
Interpret the succession of two functions as a 'composite function'	U895 U448
Work with general iterative processes	U434
Find approximate solutions to equations numerically using iteration	U168
Use suffix notation in recursive formulae (Recurrence relations such as $u_{n+1} = 2u_n + 3$)	U171

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- **11.15: Pythagoras & Trigonometry**
- 11.16: Graphs

Unit 15 – Pythagoras & Trigonometry	Sparx Codes
Know the exact values of sin θ and cos θ for $\theta = 30, 45, 60 \; and \; 90$	U627 U319
Know the exact values of tan θ for $\theta = 30, 45, 60$	U627 U319
Know and use the formula for Pythagoras' Theorem $c^2 = a^2 + b^2$	U385
Know and use the trigonometric ratios sin, cos and tan	U605 U283 U545
Use angles of elevation and depression and bearings with trigonometry	U967 U164
Use Pythagoras' Theorem and trigonometry to find angles and lengths in 3D shapes	U541 U170
Know and apply the sine rule to find unknown lengths and angles $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$	U952
Know and apply the cosine rule to find unknown lengths and angles $a^2 = b^2 + c^2 - 2bc \cos A$	U591
Know and apply Area = $\frac{1}{2} ab \sin C$ to calculate the area, sides or angles in any triangle	U592

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- 11.15: Pythagoras & Trigonometry
- **11.16: Graphs**

Unit 16 – Graphs	Sparx Codes
Use the form y = mx + x to recognise perpendicular lines	U898
Recognise, sketch and interpret graphs of linear functions and quadratic functions	U669 U667
Recognise, sketch and interpret graphs of simple cubic functions and the reciprocal function, $y = \frac{1}{x}$ with $x \neq 0$	U980 U593
Recognise, sketch and interpret graphs of exponential functions $y = k^x$ for positive values of k	U229
Recognise, sketch and interpret graphs of trigonometric functions (in degrees) $y = \sin x, y = \cos x \; and \; y = \tan x$ for angles of any size	U450
Sketch translations and reflections of a given function	U598 U487 U455
Recognise and use the equation of a circle with centre at the origin	U567
Find the equation of a tangent to a circle at a given point	U567

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